



**LibreOffice**  
The Document Foundation

**LibreOffice Technology**  
the unique FOSS platform  
for personal productivity

**Italo Vignoli**



# From Product to Platform

- Background
- Road to LibreOffice
- LibreOffice
- Development Resources
- Code Cleaning
- Code Refactoring
- User Interface
- Performance
- Code Quality & Security
- Open Document Format
- Interoperability
- Easy APIs and Libraries
- Recognitions
- LibreOffice Technology



# Background



# Personal Productivity Market (1)

- **Before 1995**
  - Documents had to be printed to be shared
- **Between 1995 and 2005**
  - Evolution from sharing printouts (analog heritage) to sharing static digital documents (interoperability)
  - HTML was the turning point as it decoupled SW and contents, making interoperability a reality
  - Birth of cloud solutions for personal productivity, from Google (based on business model) and Microsoft (to find an alternative source of revenues from desktop)



# Personal Productivity Market (2)

- **Between 2005 and 2010**
  - Availability of XML based document formats
  - Development of the ODF standard document format and of the OOXML pseudo-standard document format
  - OpenOffice.org is the de facto alternative to MS Office
- **After 2010**
  - Announcement of LibreOffice, based on ODF
  - OOXML as cornerstone of Microsoft lock-in strategy
  - Several freeware office suites enter the market, while cloud based office suites grow and evolve



# Road to LibreOffice



# Timeline

1985: Marco Borries releases StarWriter

1990: StarOffice, with StarCalc & StarBase

2000: announcement of OpenOffice.org

2006: ODF (Open Document Format) 1.0

2010: announcement of LibreOffice

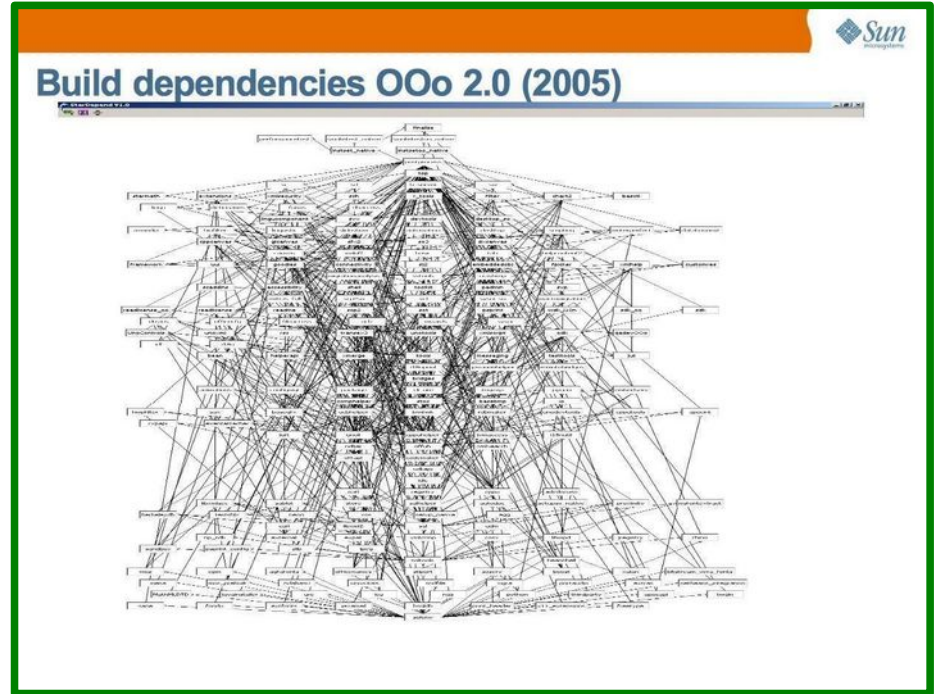
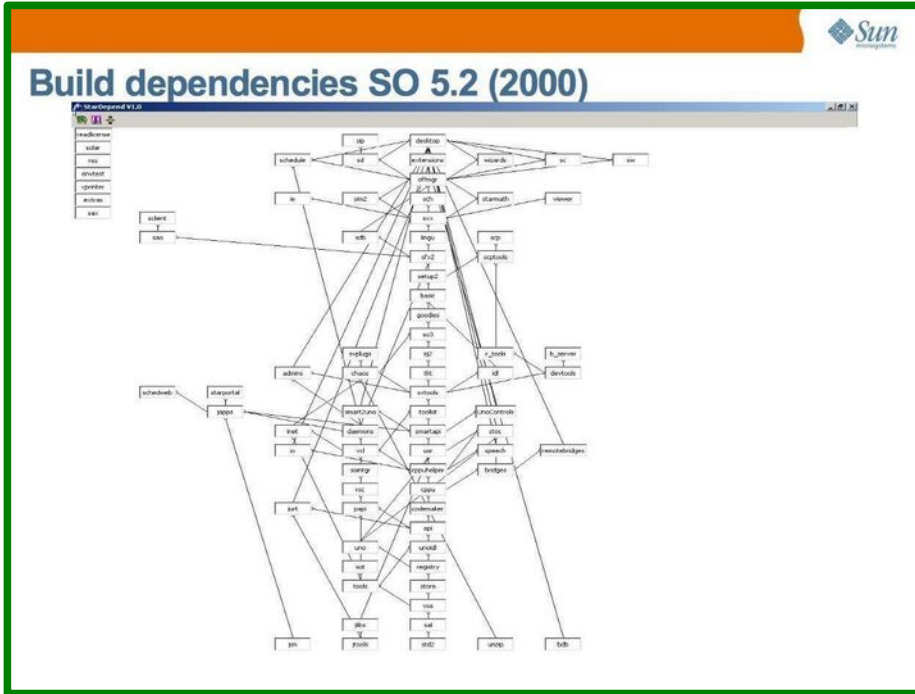
2014: ODF (Open Document Format) 1.2

2020: LibreOffice 7.0 with ODF 1.3 Draft

2021: LibreOffice 7.1 Community



# Measure of OOO Technical Debt





# Main Issues

- Code too complex for the average developer
- Build environment too difficult to create and manage
- Slow (and sometime obfuscated) handling of patches from volunteer contributors
- Mentoring of new volunteer developers to reduce the learning curve and speed up the process
- Lack of transparency for project sites, wiki and blog

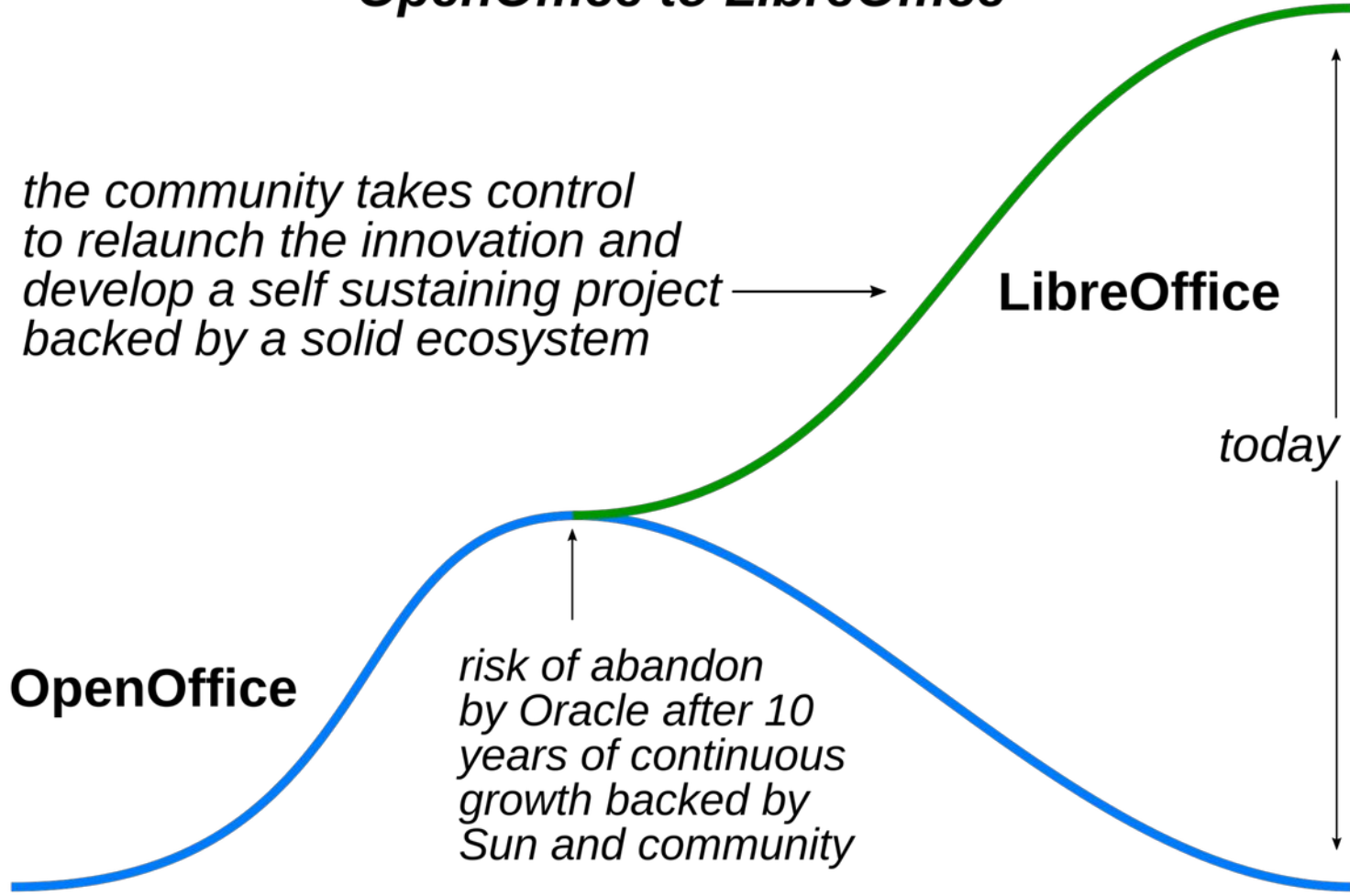


# LibreOffice



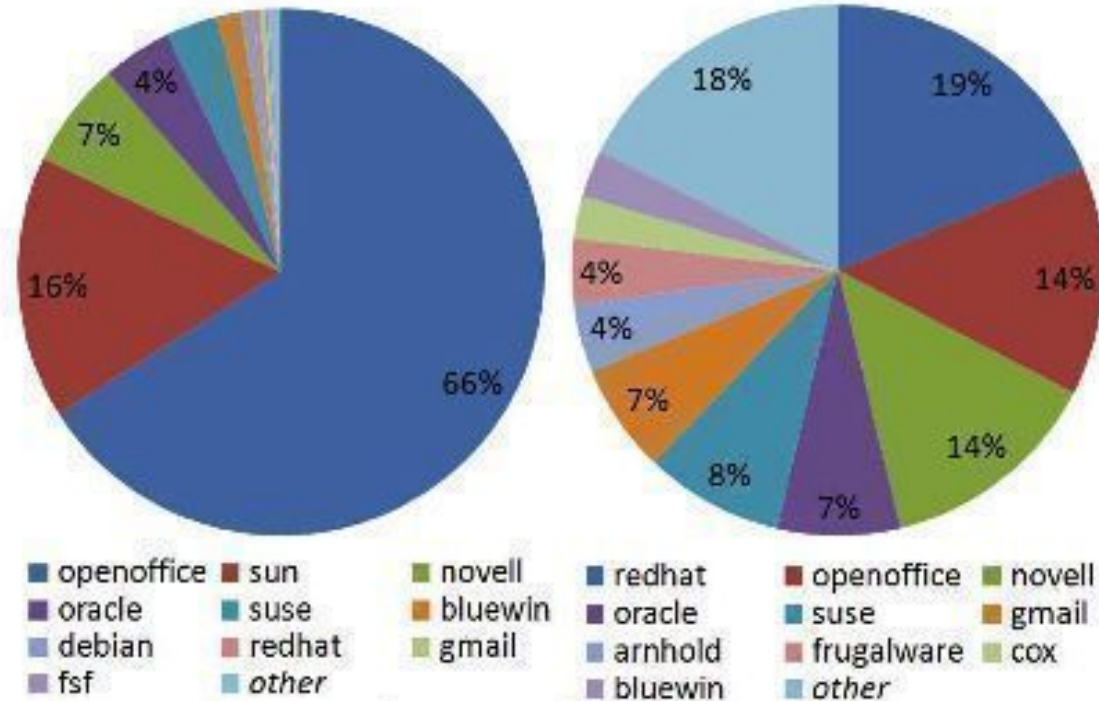
# Relaunch the Innovation

## *OpenOffice to LibreOffice*





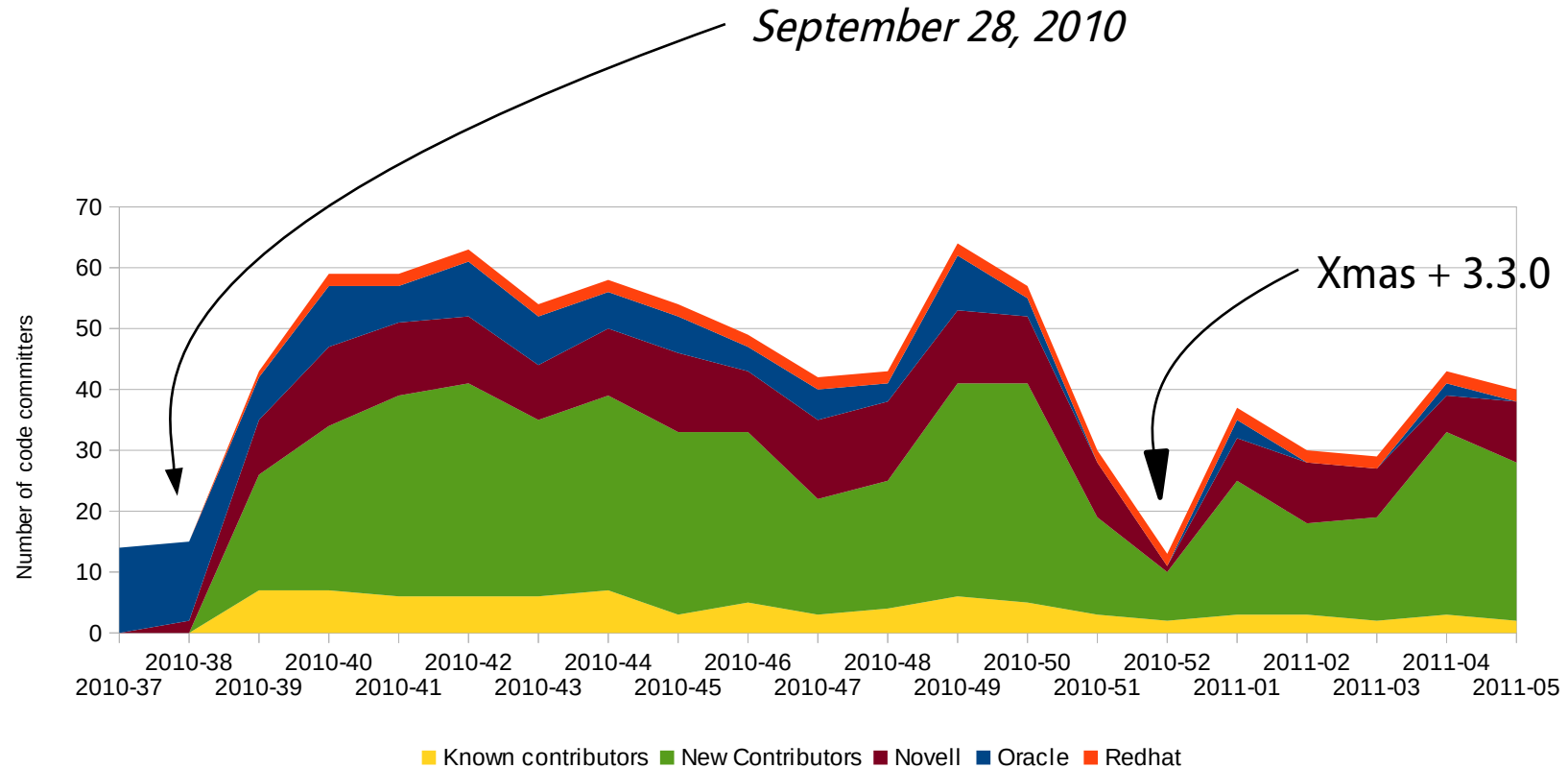
The total affiliation commit influence for LibreOffice  
10 months before (left) & after the fork on 28 Sept. 2010



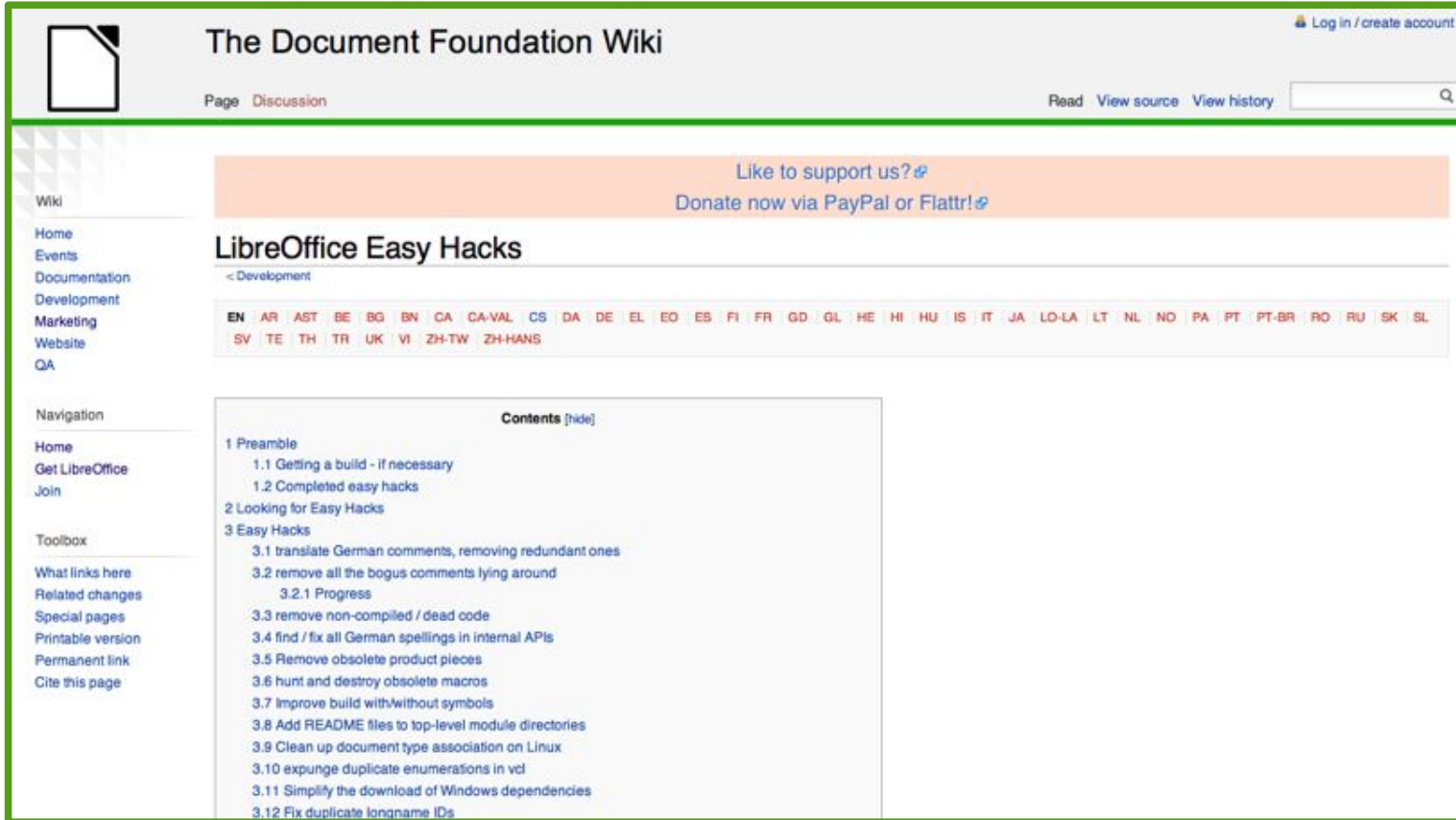
Gamalielsson, J. and Lundell, B. (2011) **Open Source communities for long-term maintenance of digital assets: what is offered for ODF & OOXML?**, in Hammouda, I. and Lundell, B. (Eds.) Proceedings of SOS 2011: **Towards Sustainable Open Source**, Tampere University of Technology, Tampere, ISBN 978-952-15-2718-0, ISSN 1797-836X.



# Announcement to Release



# Incredible Easy Hacks



The screenshot shows the top of a wiki page. At the top left is a document icon. The page title is "The Document Foundation Wiki". On the right, there is a "Log in / create account" link. Below the title, there are tabs for "Page" and "Discussion". On the far right, there are links for "Read", "View source", and "View history", followed by a search box. A light orange banner contains the text "Like to support us?\*" and "Donate now via PayPal or Flattr!\*". The main heading is "LibreOffice Easy Hacks" with a "< Development" link. Below the heading is a language selection bar with codes: EN, AR, AST, BE, BG, BN, CA, CA-VAL, CS, DA, DE, EL, EO, ES, FI, FR, GD, GL, HE, HI, HU, IS, IT, JA, LO-LA, LT, NL, NO, PA, PT, PT-BR, RO, RU, SK, SL, SV, TE, TH, TR, UK, VI, ZH-TW, ZH-HANS. A "Contents [hide]" section lists the following items:

- 1 Preamble
  - 1.1 Getting a build - if necessary
  - 1.2 Completed easy hacks
- 2 Looking for Easy Hacks
- 3 Easy Hacks
  - 3.1 translate German comments, removing redundant ones
  - 3.2 remove all the bogus comments lying around
    - 3.2.1 Progress
  - 3.3 remove non-compiled / dead code
  - 3.4 find / fix all German spellings in internal APIs
  - 3.5 Remove obsolete product pieces
  - 3.6 hunt and destroy obsolete macros
  - 3.7 Improve build with/without symbols
  - 3.8 Add README files to top-level module directories
  - 3.9 Clean up document type association on Linux
  - 3.10 expunge duplicate enumerations in vcl
  - 3.11 Simplify the download of Windows dependencies
  - 3.12 Fix duplicate longname IDs

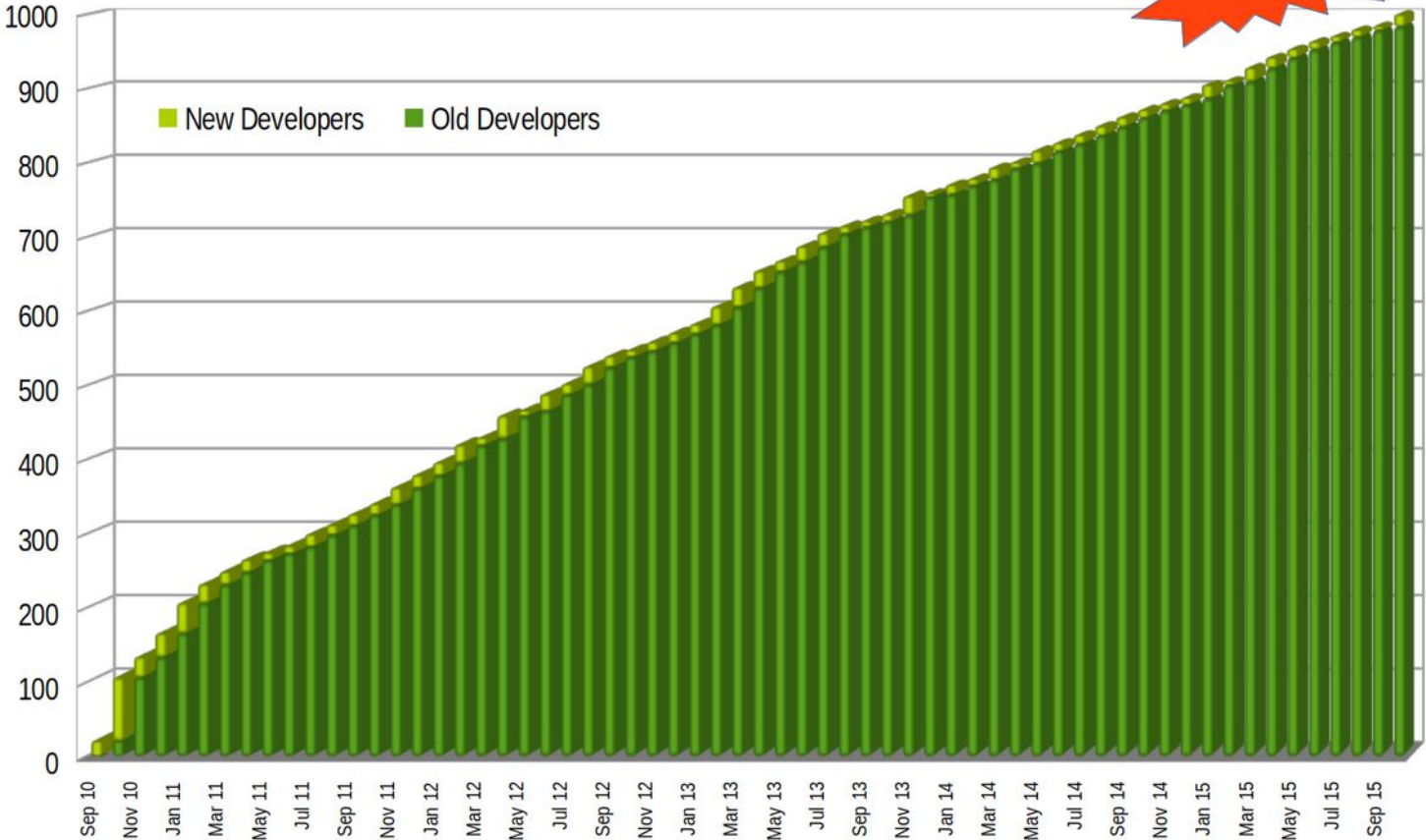
# Easy Hacks Advantages

- Easy hacks are simple and accessible tasks for developers new to the project with little or no knowledge of the code
- Easy hacks have a twofold objective: easing the learning curve and solving a number of problems which would distract core developers
- Core developers are committed in mentoring new contributors and checking their work



# Serial Growth of LibreOffice Developers from September 2010 to October 2015

1,000





# Summary

- Balanced the mix of contributions
- Attracted many new code contributors
- Increased the number of core developers
- Created a strong base of new developers thanks to a huge mentoring effort
- Attracted several new "star" contributors performing challenging cleaning tasks



# Objectives

- Reduce software footprint
- Undertake long awaited code renovation
- Remove tens of thousands lines of dead code
- Remove deprecated libraries
- Translate majority of German comments to English
- Many other code renovation actions left and right
- Use state of the art C++ constructs



# Development Resources



# Engineering Steering Committee ...

- **Talking & ensure everyone is heard**
- **Many large FLOSS projects fight tooth & nail**
  - Module "maintainers" rampant waste & re-writing
  - Bickering, and passive aggression
- **Whole team are peers ... no-one "owns" modules**
  - Respect input from local experts: of course !
- **Calls live transcribed to reduce English listening needs**
  - Avoids the "confused IRC wait-fest" problem

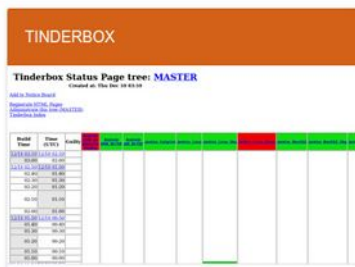


# Websites related to LibreOffice Development



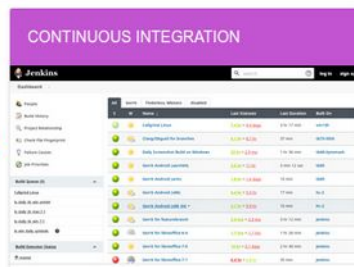
**GERRIT**

Gerrit is the tool LibreOffice developers use for code review. This is where developers submit and review patches.



**TINDERBOX**

TinderBox present the result of the many, many tinderboxes that build Libreoffice all day and all night.



**CONTINUOUS INTEGRATION**

LibreOffice has a Continuous Integration system, running gerrit verification jobs, tinderboxes and all sort of other task.



**BUGZILLA**

Bugzilla is the tool for LibreOffice developers, QA and users to submit, triage, handles bug reports.



**WIKI**

LibreOffice has a Wiki where you can find a trove of information. It is a wiki, so help organize and keep the content up-to-date.



**OPENGROK**

OpenGrok is a source browser, that allows you to do search on the very large LibreOffice code base.



**ONLINE HELP**

The Online help for LibreOffice contains the end user documentation for Writer, Calc, Draw, Base, Math, and Basic.




**API FOR UNO**

You will find the documentation and examples of use of the API for Universal Network Objects (UNO).



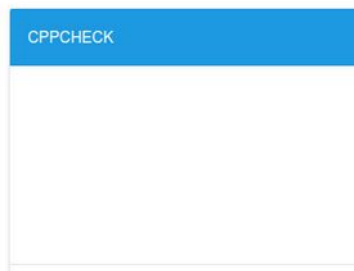
**WEBLATE**

LibreOffice operate a Weblate server with which we manage the translation of the product in many languages.



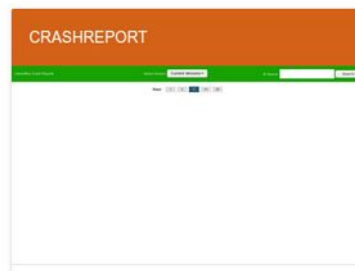
**PERFORMANCE**

We run a set of Callgrind Performance tests, the result of which are presented graphically on there.



**CPPCHECK**

We run a cppcheck regularly.



**CRASHREPORT**

We collect crash reports.

# Gerrit for Code Review

LibreOffice The Document Foundation		CHANGES	DOCUMENTATION	BROWSE	status:open -is:wip					Sign in
Subject	Status	Owner	Assignee	Repo	Branch	Updated	Size	CR	V	
make Skia image cache size configurable	-	Luboš Luňák	-	core	master	16:31	S			
One more OUString::fromUtf(u8...) simplification	-	Stephan Bergmann	-	core	master	16:29	S		✓	
tdf#107229 remove two more obsolete template guide files	-	Seth Chaiklin	-	help	master	16:29	-	+1	✓	
FastParser.cxx changes	-	Dante DM	-	core	master	16:26	S	+1		
tdf#118711 writerfilter: don't hardcode default page description	-	Justin Luth	-	core	master	16:22	S		✓	
Don't leave an empty area at the bottom if we can move the text down	-	Caolán McNamara	-	core	master	16:14	S			
Do not call getaddrinfo if we just want the hostname	-	Samuel Mehrbrodt	-	core	master	16:08	S		✓	
jsdialog: export dialog id	-	Szymon Kłos	-	core	distro/collabora/cp-6.4	15:59	XS		✓	
tdf#99613 clarify empty parameters in IF function in Calc	-	Seth Chaiklin	-	help	master	15:52	XS		✓	
fix printing of 'margins in comment'	-	Caolán McNamara	-	core	libreoffice-7-1	15:51	S			
negative return passed to parameter that cannot be negative	-	Caolán McNamara	-	core	libreoffice-7-0	15:48	XS		✓	
fix printing of 'margins in comment'	-	Caolán McNamara	-	core	libreoffice-7-0	15:43	S		✓	
tdf#123613 XLSX shape: fix save	-	Szabolcs Toth	-	core	master	15:30	S			
Catch inadvertent uses of OString(char) ctor	-	Stephan Bergmann	-	core	master	15:19	S			
tdf#138621 Hide the .uno:TemplateManager from customization	-	Seth Chaiklin	-	core	master	15:02	XS	+1	✓	
notebookbar: add named ranges management	-	Szymon Kłos	-	core	distro/collabora/cp-6.4	15:02	M		✓	
tdf#124983 In calc make printable page borders initially visible	-	Ilhan Yesil	-	core	master	14:43	M		✓	
tdf#124176: use #pragma once instead of include guards	-	homeboy445	-	core	master	14:33	S		✓	
Resolves: tdf#138789 disable widgets on 'none' when status changes	-	Caolán McNamara	-	core	libreoffice-7-0	13:55	S		✓	
tdf#136929 docx export: keep frame with paragraph	-	Justin Luth	-	core	master	12:36	S	+1	✓	
update ToD statusbar preview	-	Andreas Kainz	-	core	master	12:24	-		✓	
tdf#137819 SW: Fix As-Char Anchor of TextBoxes	-	Attila Bakos	-	core	master	12:22	M		✓	
tdf#137803 SW: Fix AutoSize of TextBoxes	-	Attila Bakos	-	core	master	11:52	S	-1	✗	
WIP improve lifecycle of ScPostIt	Merge Conflict	Noel Grandin	-	core	master	10:23	XL		✗	
Added translation using Weblate (Esperanto)	-	Weblate	-	impress_remote	master	10:13	XS	-1		



# Commit Peer Review

**Change 12213 by sushil\_shinde** Review in Progress

Reviewers  
CC [test\\_jenkins\\_mac](#)  
Project [Q core](#)  
Branch [master](#)  
Strategy [Cherry Pick](#)

Updated 23 hours ago  
Change-Id [I5d664867c982e48d2ff01363659282354822e541](#)  
Topic

Code-Review  
Verified

Commit [781575e97a42e7873e5de11f7e987151e0591292](#) ([gitweb](#))  
Author [sushil\\_shinde <sushilshinde@libreoffice.org>](#) Nov 3, 2014 8:23 AM  
Committer [sushil\\_shinde <sushilshinde@libreoffice.org>](#) Nov 3, 2014 10:53 AM  
[fdo#85491](#) : break parameter incorrectly set in .XLSX import.

1) TextBreak Parameter was bydefault 'false'.  
2) At xichart.cxx::convert() [line:2973] 'TextBreak' property was changed as per 'labelFreq' value.  
4) I have done same thing here and by doing this no existing unit test was failed.  
5) Added unit test to check 'TextBreak' value for chart.

Change-Id: [I5d664867c982e48d2ff01363659282354822e541](#)

**Files** Diff against:

File Path	Comments	Size
Commit Message		
chart2/qa/extras/chart2import.cxx		21
A chart2/qa/extras/data/xlsx/chart-label-text-break.xlsx		
oox/source/drawingml/chart/axisconverter.cxx		2
	+22, -1	

**History**

**sushil\_shinde**  
Uploaded patch set 1.

**test\_jenkins\_mac**  
Patch Set 1:  
Build Started [http://ci.libreoffice.org/job/gerrit\\_master/431/](http://ci.libreoffice.org/job/gerrit_master/431/)

**test\_jenkins\_mac**  
Patch Set 1:  
Build Successful  
[http://ci.libreoffice.org/job/gerrit\\_master/431/](http://ci.libreoffice.org/job/gerrit_master/431/) : SUCCESS



# Commit Peer Review

- Master Branch
  - Committers without review
  - One review for other developers
- Major Release Branch
  - Only bugfixing + one review in any case
- Minor Release Branches
  - Patches from major branch + two reviews





# Tinderbox

## Tinderbox Status Page tree: [MASTER](#)

Created at: Thu Dec 10 16:30

[Add to Notice Board](#)

[Regenerate HTML Pages](#)

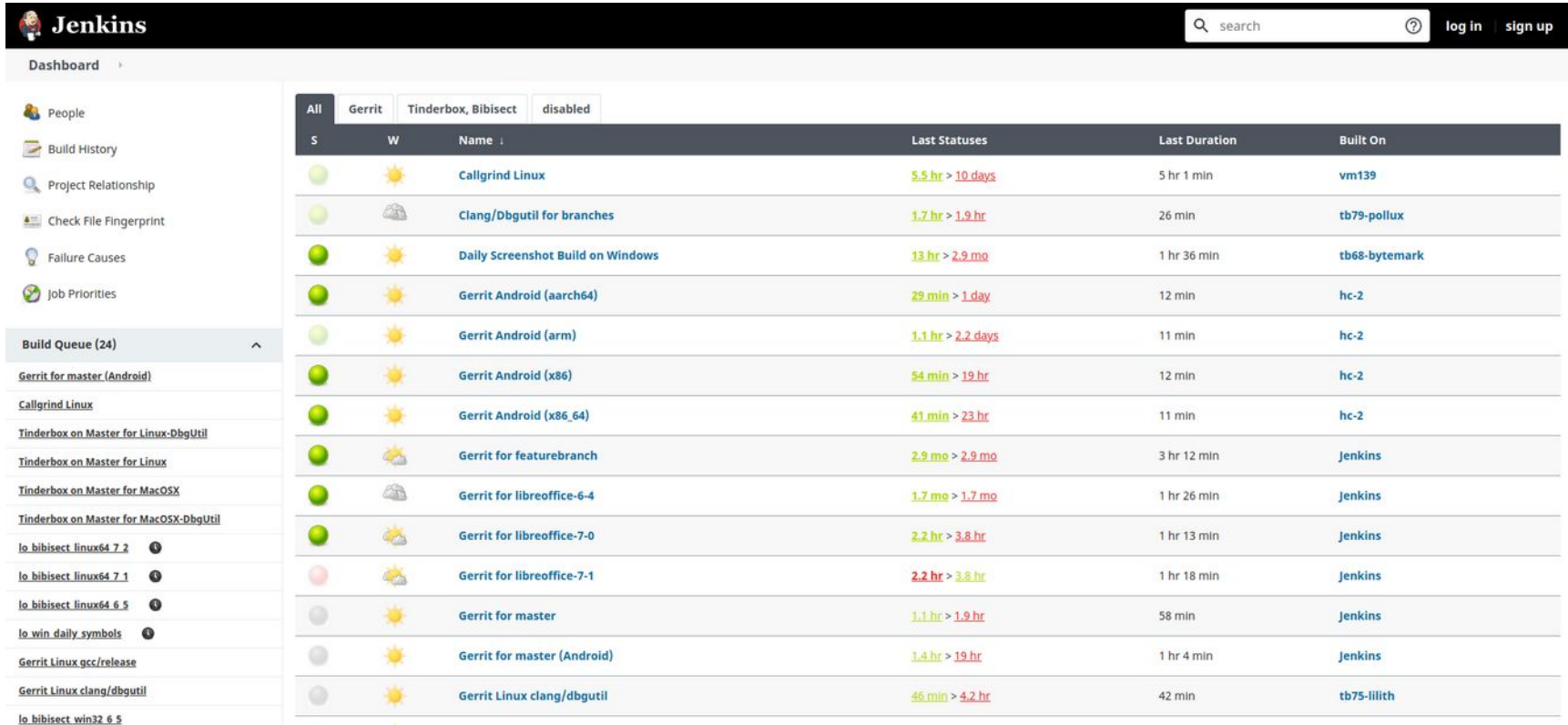
[Administrate this tree \(MASTER\)](#)

[Tinderbox Index](#)

Build Time	Time (UTC)	Guilty	Android-ARM_244-Systemare-Positiva	Android-ARM_86-TDF	Android-x86_86-TDF	Jenkins_Callgrind	Jenkins_Linux	Jenkins_Linux_Dbg	Jenkins_Linux_Ubuntu	Jenkins_MacOSX	Jenkins_MacOSX_Dbg	Jenkins_Win64_Dbg	Jenkins_Windows	Jenkins_Windows_Dbg	Jenkins_tb77_Arm64	Jenkins_tb77_x64	Jenkins_tb81	Jenkins_x86
<a href="#">12/10 16:30</a>	<a href="#">12/10 15:30</a>																	
16:20	15:20																	
16:10	15:10													details errs: 1 jenkins on tb72 core				
16:00	15:00												details errs: 1 jenkins on tb72 core					
<a href="#">12/10 15:50</a>	<a href="#">12/10 14:50</a>									details errs: 1 jenkins on tb69 core	details errs: 1 jenkins on tb69 core							
15:40	14:40																	
15:30	14:30									details errs: 1 jenkins on tb69 core								
15:20	14:20										details errs: 1 jenkins on tb69 core							
15:10	14:10																	
15:00	14:00																	
<a href="#">12/10 14:50</a>	<a href="#">12/10 13:50</a>																	
14:40	13:40													details errs: 1 jenkins on tb72 core				
14:30	13:30																	
14:20	13:20																	
14:10	13:10											details errs: 1 jenkins on tb72 core	details errs: 1 jenkins on tb73 core	details errs: 1 jenkins on tb72 core				



# Continuous Integration



The screenshot displays the Jenkins dashboard interface. At the top, there is a navigation bar with the Jenkins logo, a search bar, and links for 'log in' and 'sign up'. Below the navigation bar, the 'Dashboard' section is visible, featuring a sidebar with navigation options like 'People', 'Build History', and 'Project Relationship'. The main content area shows a table of build jobs, categorized by tabs: 'All', 'Gerrit', 'Tinderbox, Bibisect', and 'disabled'. The table columns include 'S' (status), 'W' (weather icon), 'Name', 'Last Statuses', 'Last Duration', and 'Built On'. The jobs listed include 'Callgrind Linux', 'Clang/Dbgutil for branches', 'Daily Screenshot Build on Windows', and various 'Gerrit Android' and 'Gerrit for master' jobs.

S	W	Name	Last Statuses	Last Duration	Built On
		Callgrind Linux	5.5 hr > 10 days	5 hr 1 min	vm139
		Clang/Dbgutil for branches	1.7 hr > 1.9 hr	26 min	tb79-pollux
		Daily Screenshot Build on Windows	13 hr > 2.9 mo	1 hr 36 min	tb68-bytemark
		Gerrit Android (aarch64)	29 min > 1 day	12 min	hc-2
		Gerrit Android (arm)	1.1 hr > 2.2 days	11 min	hc-2
		Gerrit Android (x86)	54 min > 19 hr	12 min	hc-2
		Gerrit Android (x86_64)	41 min > 23 hr	11 min	hc-2
		Gerrit for featurebranch	2.9 mo > 2.9 mo	3 hr 12 min	Jenkins
		Gerrit for libreoffice-6-4	1.7 mo > 1.7 mo	1 hr 26 min	Jenkins
		Gerrit for libreoffice-7-0	2.2 hr > 3.8 hr	1 hr 13 min	Jenkins
		Gerrit for libreoffice-7-1	2.2 hr > 3.8 hr	1 hr 18 min	Jenkins
		Gerrit for master	1.1 hr > 1.9 hr	58 min	Jenkins
		Gerrit for master (Android)	1.4 hr > 19 hr	1 hr 4 min	Jenkins
		Gerrit Linux clang/dbgutil	46 min > 4.2 hr	42 min	tb75-lilith



# Continuous Integration

- Several machines compile LibreOffice
  - Daily or several times per day
  - They also run unit tests
- All supported platforms: Windows, macOS, Linux
- Different compilation options



# Bugzilla (Main Page)

Bugzilla – Main Page version 5.0.6

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**7.1 Beta1 is available!**  
Help us to test it  
[Click here to download](#)





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[Documentation](#)

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**Common Queries:**

- [Bugs reported in the last 24 hours](#) [5] | [last 7 days](#) [5]
- [Bugs changed in the last 24 hours](#) [5] | [last 7 days](#) [5]

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# Bugzilla (Bug List)

Bugzilla - Bug List


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**LibreOffice**  
The Document Foundation

**7.1 Beta1 is available!**

Help us to test it  
Click here to download



Thu Dec 10 2020 15:34:38 UTC  
*\*.lml\_ is a strong supporter of crash-only software*

[Hide Search Description](#)

**Changed:** (is greater than or equal to 24h)

197 bugs found.

ID	Product	Comp	Assignee	Status	Resolution	Summary	Changed
<a href="#">107984</a>	LibreOff	Draw	libreoffice-bugs	UNCO	---	Missing pixels on right and bottom when export/copy drawing	14:27:40
<a href="#">131238</a>	LibreOff	Base	libreoffice-bugs	UNCO	---	SQLite/ODBC: LibreOffice fails Unicode compliance with multi-byte characters, such as emoji, for example 🍌	08:50:43
<a href="#">134421</a>	LibreOff	LibreOff	libreoffice-bugs	UNCO	---	Replace xcu settings storage with sqlite database	08:39:35
<a href="#">135096</a>	LibreOff	Writer	libreoffice-bugs	UNCO	---	LibreOffice is showing empty image frames after save to ODT (tracking changes enabled). File reload solves it	Wed 19:09
<a href="#">136762</a>	LibreOff	Calc	libreoffice-bugs	UNCO	---	LibreOffice does not paste after v7	14:26:50
<a href="#">138226</a>	LibreOff	Writer	libreoffice-bugs	UNCO	---	Poor and slow HTML importation - vertically stretched elements	04:15:07
<a href="#">138259</a>	LibreOff	Linguist	libreoffice-bugs	UNCO	---	Tools>Language>For All Text change default languages for all documents	Wed 16:31
<a href="#">138266</a>	LibreOff	Writer	libreoffice-bugs	UNCO	---	Increase default space for line numbering	Wed 17:49
<a href="#">138376</a>	LibreOff	Calc	libreoffice-bugs	UNCO	---	The attached spread sheet frequently crashes after saving during closing.	Wed 17:23
<a href="#">138476</a>	LibreOff	Calc	libreoffice-bugs	UNCO	---	LibreOffice Calc file loading time, saving time and response time. FILEOPEN, FILESAVE	03:49:26
<a href="#">138478</a>	LibreOff	Calc	libreoffice-bugs	UNCO	---	CALC: Dynamic conditional colour formatting in autofiltered arrays	03:49:30
<a href="#">138484</a>	LibreOff	Writer	libreoffice-bugs	UNCO	---	Libreoffice/Preferences/LibreOffice Writer/Print Comments settings choices are not reflected in File/printer settings/Options choices configuration, printing	03:49:35
<a href="#">138485</a>	LibreOff	Document	libreoffice-bugs	UNCO	---	help.LO search result links to other page than where the search string was found	03:49:39
<a href="#">138495</a>	LibreOff	Linguist	libreoffice-bugs	UNCO	---	Removed duplicate lines from spelling dictionaries	03:49:45
<a href="#">138497</a>	LibreOff	Writer	libreoffice-bugs	UNCO	---	Changing anchor to page changes position of image became of different position area (which isn't adapted)	03:49:50
<a href="#">138625</a>	LibreOff	LibreOff	libreoffice-bugs	UNCO	---	The footnote number in an imported word text is not in a superscript, like in the original.	13:17:17
<a href="#">138710</a>	LibreOff	Calc	libreoffice-bugs	UNCO	---	Crash when deleting cell rows (multi_type_vector::position#1707: block position not found!)	00:33:52
<a href="#">138748</a>	LibreOff	UI	libreoffice-bugs	UNCO	---	Replace number format "L language" with "L locale"	14:47:08
<a href="#">138750</a>	LibreOff	Writer	libreoffice-bugs	UNCO	---	Add option to make paragraph border color same as paragraph default font color	14:45:46
<a href="#">138752</a>	LibreOff	Writer	libreoffice-bugs	UNCO	---	regular expressions find with newline fails search	Wed 17:08
<a href="#">138757</a>	LibreOff	BASIC	libreoffice-bugs	UNCO	---	Crash after	Wed 17:54



# Bug Triaging

- Periodically check bugzilla reports
  - Confirm bugs
  - Detect duplicates
  - Prioritize
  - Verify patches



Project(s)

[select all](#)

[all code](#)

[clear](#)

Full Search

Definition

Symbol

File Path

History

Type

[Search](#)

[Clear](#)


[Help](#)

Repository	SCM Type: Parent (branch)	Current version
<a href="#">core</a>	git: <a href="https://git.libreoffice.org/core">https://git.libreoffice.org/core</a> (master)	2020-12-08 22:55 +0000 e4dc <a href="#">show more ...</a>
<a href="#">cppunit</a>	git: <a href="https://git.libreoffice.org/cppunit">https://git.libreoffice.org/cppunit</a> (master)	2020-08-31 17:51 +0000 9429 <a href="#">show more ...</a>
<a href="#">dev-tools</a>	git: <a href="https://git.libreoffice.org/dev-tools">https://git.libreoffice.org/dev-tools</a> (master)	2020-11-03 13:15 +0000 2918 <a href="#">show more ...</a>
<a href="#">dictionaries</a>	git: <a href="https://git.libreoffice.org/dictionaries">https://git.libreoffice.org/dictionaries</a> (master)	2020-11-24 17:19 +0000 2bfb <a href="#">show more ...</a>
<a href="#">help</a>	git: <a href="https://git.libreoffice.org/help">https://git.libreoffice.org/help</a> (master)	2020-12-08 11:49 +0000 452d <a href="#">show more ...</a>
<a href="#">impress_remote</a>	git: <a href="https://git.libreoffice.org/impress_remote">https://git.libreoffice.org/impress_remote</a> (master)	2020-12-08 21:06 +0000 cbaf <a href="#">show more ...</a>
<a href="#">libabw</a>	git: <a href="https://git.libreoffice.org/libabw">https://git.libreoffice.org/libabw</a> (master)	2019-08-17 13:59 +0000 6ad7 <a href="#">show more ...</a>
<a href="#">libcdr</a>	git: <a href="https://git.libreoffice.org/libcdr">https://git.libreoffice.org/libcdr</a> (master)	2020-11-04 15:23 +0000 bf3e <a href="#">show more ...</a>
<a href="#">libetonyek</a>	git: <a href="https://git.libreoffice.org/libetonyek">https://git.libreoffice.org/libetonyek</a> (master)	2020-05-20 07:14 +0000 4b4d <a href="#">show more ...</a>
<a href="#">libfreehand</a>	git: <a href="https://git.libreoffice.org/libfreehand">https://git.libreoffice.org/libfreehand</a> (master)	2019-11-03 12:03 +0000 961c <a href="#">show more ...</a>

# OpenGrok



# Online Help

 LibreOffice 7.0 Help  
Module ▾ Language ▾

[Please support us!](#)

## Index ▾

← → 1 2 3 4 5 6 → ←


### WRITER


- abbreviations
- accessibility – LibreOffice Writer
- address books – exchanging
- adjusting page margins and cell widths
- alphabetical indexes
- anchors – objects
- animations – text
- arithmetic operators in Formulae
- arranging – headings
- Asian languages – search options
- Asian languages – sorting paragraphs/table rows
- aspect ratio – resizing objects
- AutoCorrect function – adding exceptions
- AutoCorrect function – headings
- AutoCorrect function – smart tags
- AutoCorrect function – text documents
- AutoCorrect function – turning off
- AutoCorrect function – word completion
- AutoFormat function for tables
- automatic bullets/numbers – AutoCorrect function
- automatic changes on/off

## The LibreOffice Help

LibreOffice Help pages are displayed in your system default web browser.

The Help references the default settings of the program on a system that is set to defaults. Descriptions of colours, mouse actions, or other configurable items can be different for your program and system.

 The Help system for all versions of the software is based on the same source files. Some of the functions described in Help may not be included in this particular distribution. Some features specific to a distribution may not be mentioned in this Help.

 Help pages of LibreOffice Extensions still use the old Help system. The old Help system help pages [are available from here](#).

### The LibreOffice Help pages features

#### The Module List

Located on the top of the page, click to open the drop-down list and select the LibreOffice module to display the module Help main entry page.

#### The Language List (Help online only).

Available only in the online version, select the language to display the current help page.

#### The Help Index

The Help Index displays a list of keywords for all LibreOffice modules. Click on any keyword in the list to open the linked Help page.

#### Searching the Help Index

## Contents

- Text Documents (Writer)
- HTML Documents (Writer Web)
- Spreadsheets (Calc)
- Presentations (Impress)
- Drawings (Draw)
- Database Functionality (Base)
- Formulae (Math)
- Charts and Diagrams
- Macros and Scripting
- LibreOffice Installation
- Common Help Topics





## LibreOffice 6.4 API Documentation

- [→ Installation Guide](#)      An overview of all necessary installation steps (e.g. environment variables) to use LibreOffice SDK.

---

- [→ IDL Reference](#)            Complete LibreOffice 6.4 API reference.
- [→ Java UNO Runtime Reference](#)      Reference documentation of the Java UNO runtime API.
- [→ C++ Reference](#)            Reference documentation of the C++ UNO runtime and a set of C/C++ base and helper functions and classes to abstract from the system layer.

---

- [→ Development Tools](#)        Overview and a short description of the UNO development tools.
- [→ Examples](#)                A collection of examples in different programming languages (Java, Python, C++, Basic, OLE, CLI).
- [→ Additional Examples](#)      A git repository with additional examples from various contributors: `git clone https://git.libreoffice.org/sdk-examples`

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The Document Foundation acknowledges all community members, please find more info at our [website](#).

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# API for UNO



# Weblate for Localization

TDF Weblate - LibreOffice Dashboard Projects Languages Checks Register Sign in

Dashboard

This site runs Weblate for translating the software projects listed below. You need to be signed in to translate, otherwise you can only make suggestions.

Project	Translated	Untranslated	Untranslated words	Checks	Suggestions	Comments	
LibreOffice UI - master	53%	2,528,891	13,214,783	86,600	5,195	173	<a href="#">Browse</a>
LibreOffice Help - master	53%	1,737,952	21,435,649	76,210	5,590	43	<a href="#">Browse</a>
LibreOffice Help - 6.4	59%	1,425,905	17,991,837	86,033	848	26	<a href="#">Browse</a>
LibreOffice UI - 6.4	59%	1,947,673	6,590,989	87,311	1,058	20	<a href="#">Browse</a>
LibreOffice UI - 6.3	62%	1,663,142	5,697,528	91,774	696	2	<a href="#">Browse</a>
LibreOffice Help - 6.3	67%	973,158	12,694,802	90,724	175	3	<a href="#">Browse</a>
LibreOffice Online	30%	83,992	754,093	256	903	3	<a href="#">Browse</a>
Impress Remote	90%	596	2,801	222	55		<a href="#">Browse</a>
website	78%	1,341	9,800	61	132	2	<a href="#">Browse</a>
LibreOffice UI - 7.0	58%	2,022,996	6,843,391	86,701	567	8	<a href="#">Browse</a>
LibreOffice Help - 7.0	55%	1,602,781	19,875,430	82,143	2,751	19	<a href="#">Browse</a>



# Huge Localization Effort

- **Localization Teams**
  - ~**120** shipping languages
  - **145** active language projects
  - **4605** registered translators
  - Over **400K** translations made
- **LibreOffice is available in more native language versions than any other application**



# Performance (Suite)

LibreOffice  
The Document Foundation

OUT-OF-TREE

calc

**empty**

writer

PERFCHECK

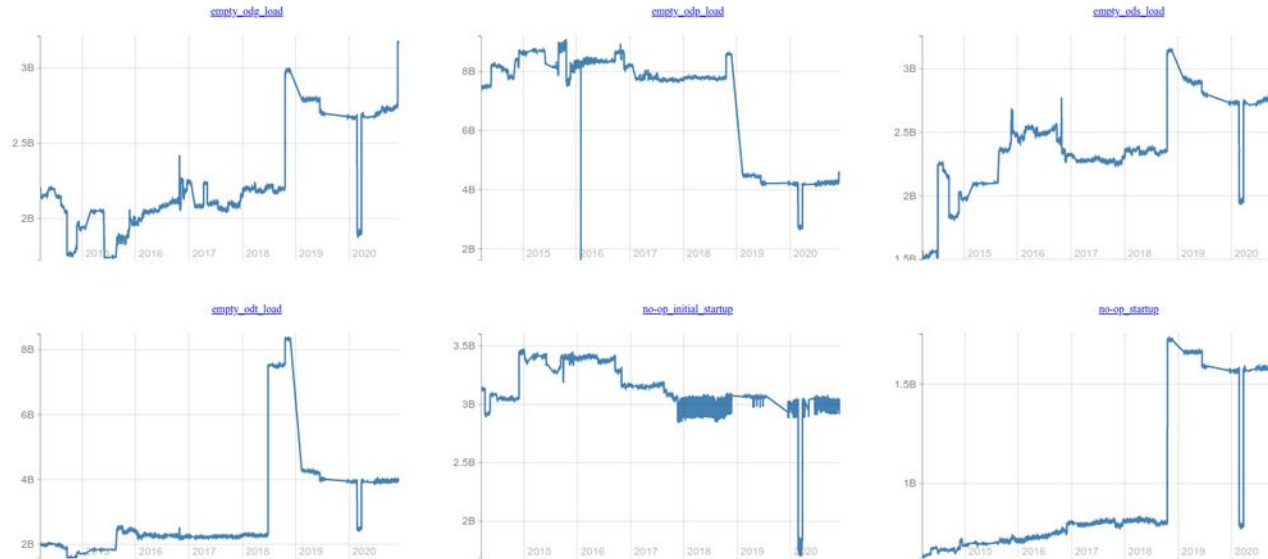
cppu\_sc

cppu\_test

[Privacy Policy](#)  
[Impressum \(Legal Info\)](#)

## Suite empty

As of Thu 10 Dec 2020 03:02:45 PM UTC



# Performance (Writer)

**LibreOffice**  
The Document Foundation

**OUT-OF-TREE**

- calc
- empty
- writer**

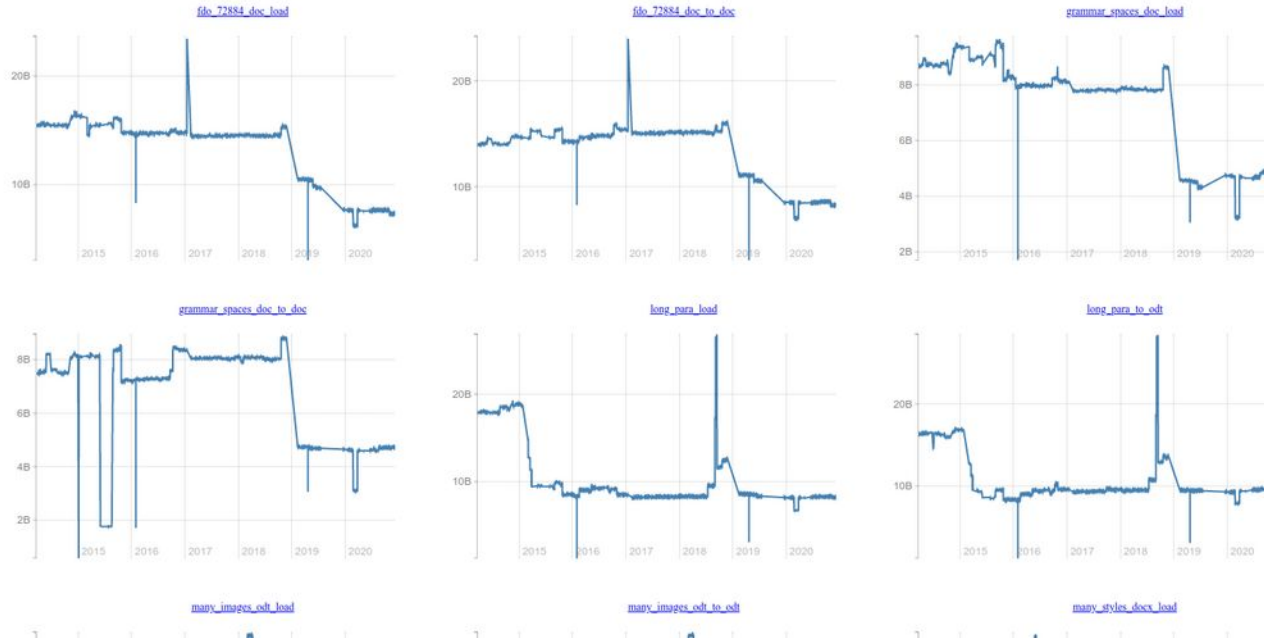
**PERF CHECK**

- cppu\_sc
- cppu\_test

[Privacy Policy](#)  
[Impressum \(Legal Info\)](#)

## Suite writer

As of Thu 10 Dec 2020 03:02:22 PM UTC



# Performance (Calc)

**LibreOffice**  
The Document Foundation

OUT-OF-TREE

calc

empty

writer

PERFCHECK

cppu\_sc

cppu\_test

Privacy Policy  
Impressum (Legal Info)

## Suite calc

As of Thu 10 Dec 2020 10:00:03 AM UTC



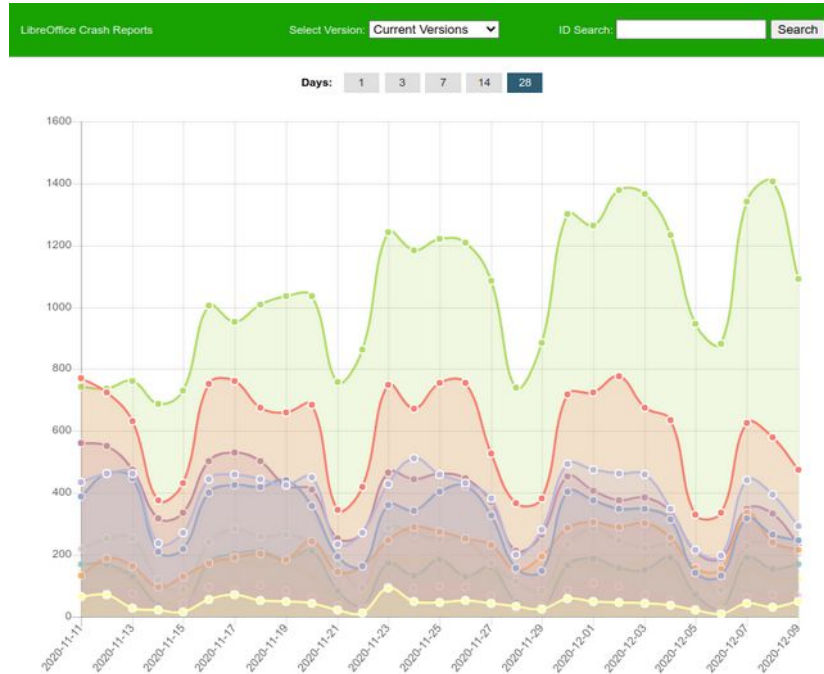
# CppCheck Report

Cppcheck report - LibreOffice 2020-06-13 19:58:00 41c465b5ee443ec04441077b5eb80f263336ea8a, CppCheck 2020-06-13 18:19:47  
6d5d12f283cf568d2dfe09aa77cb41f34b322d62:

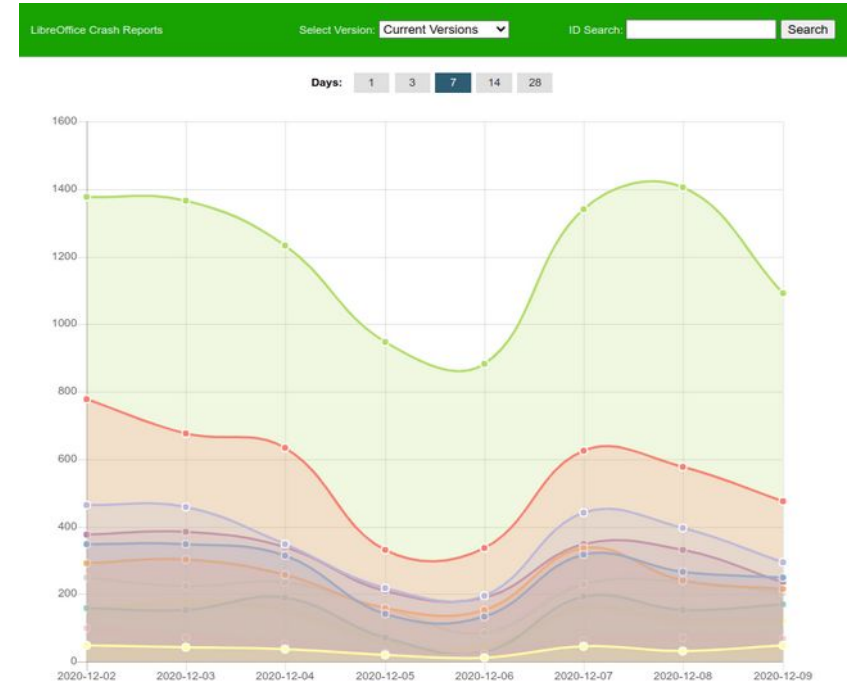
Defect summary:		Line	Id	CWE	Severity	Message
<a href="#">Defect summary:</a>						
<input checked="" type="checkbox"/> Toggle all						
<b>Show #</b>	<b>Defect ID</b>					
<input checked="" type="checkbox"/>	3526		unusedFunction			
<input checked="" type="checkbox"/>	1733		unreadVariable			
<input checked="" type="checkbox"/>	1392		noExplicitConstructor			
<input checked="" type="checkbox"/>	947		knownConditionTrueFalse			
<input checked="" type="checkbox"/>	866		useStlAlgorithm			
<input checked="" type="checkbox"/>	451		unknownMacro			
<input checked="" type="checkbox"/>	432		syntaxError			
<input checked="" type="checkbox"/>	324		uninitVar			
<input checked="" type="checkbox"/>	306		nullPointerRedundantCheck			
<input checked="" type="checkbox"/>	288		identicalConditionAfterEarlyExit			
<input checked="" type="checkbox"/>	279		variableScope			
<input checked="" type="checkbox"/>	251		allocaCalled			
<input checked="" type="checkbox"/>	240		redundantAssignment			
<input checked="" type="checkbox"/>	202		constParameter			
<input checked="" type="checkbox"/>	124		duplicateExpression			
<input checked="" type="checkbox"/>	108		missingOverride			
<input checked="" type="checkbox"/>	94		uninitMemberVar			
<input checked="" type="checkbox"/>	90		duplicateCondition			
<input checked="" type="checkbox"/>	87		constVariable			
<input checked="" type="checkbox"/>	80		ConfigurationNotChecked			
<input checked="" type="checkbox"/>	77		redundantInitialization			
<input checked="" type="checkbox"/>	73		assertWithSideEffect			
<input checked="" type="checkbox"/>	66		knownArgument			
<input checked="" type="checkbox"/>	51		duplicateConditionalAssign			
<input checked="" type="checkbox"/>	47		shadowVariable			
<input checked="" type="checkbox"/>	44		dupInheritedMember			
<input checked="" type="checkbox"/>	36		operatorEqVarError			
<input checked="" type="checkbox"/>	33		deallocuse			
			missingInclude		information	Cppcheck cannot find all the include files (use --check-config for details)
			<a href="#">UnoControls/source/base/registercontrols.cxx</a>			
			79	unusedFunction	561 style	The function 'ctl_component_getFactory' is never used.
			<a href="#">accessibility/source/extended/AccessibleBrowseBoxBase.cxx</a>			
			522	unknownMacro	error	There is an unknown macro here somewhere. Configuration is required. If IMPLEMENT_FORWARD_XINTERFACE2 is a macro then please configure it.
			<a href="#">accessibility/source/extended/AccessibleBrowseBoxCheckBoxCell.cxx</a>			
			44	unknownMacro	error	There is an unknown macro here somewhere. Configuration is required. If IMPLEMENT_FORWARD_XINTERFACE2 is a macro then please configure it.
			<a href="#">accessibility/source/extended/AccessibleGridControlBase.cxx</a>			
			443	unknownMacro	error	There is an unknown macro here somewhere. Configuration is required. If IMPLEMENT_FORWARD_XINTERFACE2 is a macro then please configure it.
			<a href="#">accessibility/source/extended/accessibleeditbrowseboxcell.cxx</a>			
			62	unknownMacro	error	There is an unknown macro here somewhere. Configuration is required. If IMPLEMENT_FORWARD_XINTERFACE2 is a macro then please configure it.
			<a href="#">accessibility/source/extended/accessiblechoicectrl.cxx</a>			
			51	unknownMacro	error	There is an unknown macro here somewhere. Configuration is required. If IMPLEMENT_FORWARD_XINTERFACE2 is a macro then please configure it.
			<a href="#">accessibility/source/extended/accessiblelistbox.cxx</a>			
			62	unknownMacro	error	There is an unknown macro here somewhere. Configuration is required. If IMPLEMENT_FORWARD_XINTERFACE2 is a macro then please configure it.
			<a href="#">accessibility/source/extended/accessiblelistboxentry.cxx</a>			
			94	syntaxError	error	syntax error
			<a href="#">accessibility/source/extended/accessibletabbar.cxx</a>			
			157	unknownMacro	error	There is an unknown macro here somewhere. Configuration is required. If IMPLEMENT_FORWARD_XINTERFACE2 is a macro then please configure it.
			<a href="#">accessibility/source/extended/accessibletabbarbase.cxx</a>			
			43	syntaxError	error	syntax error
			<a href="#">accessibility/source/extended/accessibletabbarpage.cxx</a>			
			192	unknownMacro	error	There is an unknown macro here somewhere. Configuration is required. If IMPLEMENT_FORWARD_XINTERFACE2 is a macro then please configure it.
			<a href="#">accessibility/source/extended/accessibletabbarpagelist.cxx</a>			
			331	unknownMacro	error	There is an unknown macro here somewhere. Configuration is required. If IMPLEMENT_FORWARD_XINTERFACE2 is a macro then please configure it.
			<a href="#">accessibility/source/extended/accessibletablestb.cxx</a>			
			67	unknownMacro	error	There is an unknown macro here somewhere. Configuration is required. If IMPLEMENT_FORWARD_XINTERFACE2 is a macro then please configure it.
			<a href="#">accessibility/source/extended/accessibletablestbtable.cxx</a>			
			252	unknownMacro	error	There is an unknown macro here somewhere. Configuration is required. If IMPLEMENT_FORWARD_XINTERFACE2 is a macro then please configure it.
			<a href="#">accessibility/source/extended/textwindowaccessibility.cxx</a>			
			1503	syntaxError	error	syntax error
			<a href="#">accessibility/source/helper/accresmgr.cxx</a>			
			23	unusedFunction	561 style	The function 'AccResId' is never used.



# Crash Test (28 Days vs 7 Days)



LibreOffice Crash Reports - Powered by [Crash](#) - Inspired by [Scornio](#) - All dates are UTC - Impressum (some German legal stuff)



LibreOffice Crash Reports - Powered by [Crash](#) - Inspired by [Scornio](#) - All dates are UTC - Impressum (some German legal stuff)





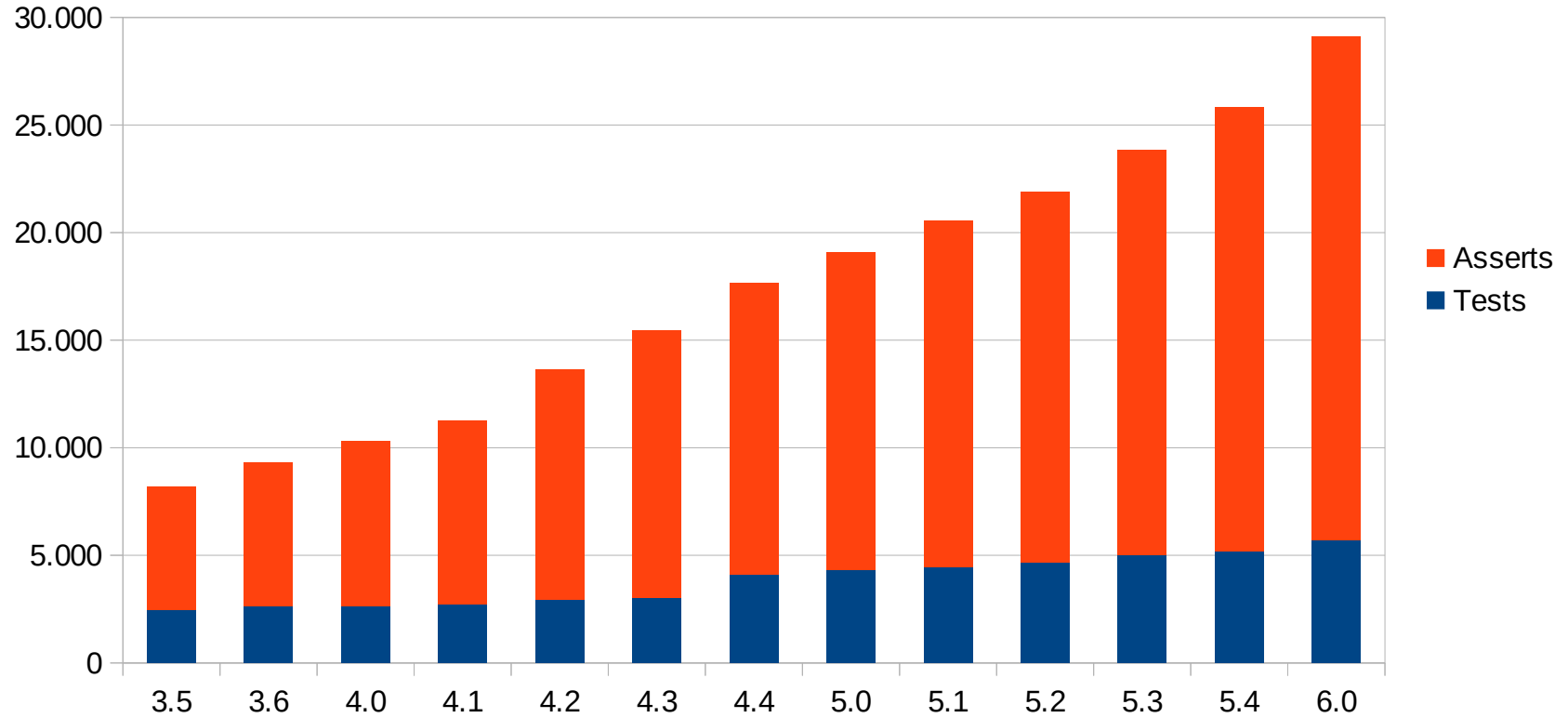
# Crash Tests

- Check crashes when opening and saving documents
- Sample size: 55,000 documents
  - Most come from bug reports (as attachments)
- Periodicity: weekly



# Growth in unit tests over time

count of various CPPUNIT macros



# Unit Tests

- Check key elements in documents
  - Import AND Import + Export + Import
- Variable coverage
  - Good coverage for new document formats



# Regression Detection Tools

- Regression
  - A problem that was not present in previous versions
- LibreOffice tool: *bi-bisect* (*binary bisect*)
  - Binary repository from different development stages
  - Recompilation not necessary

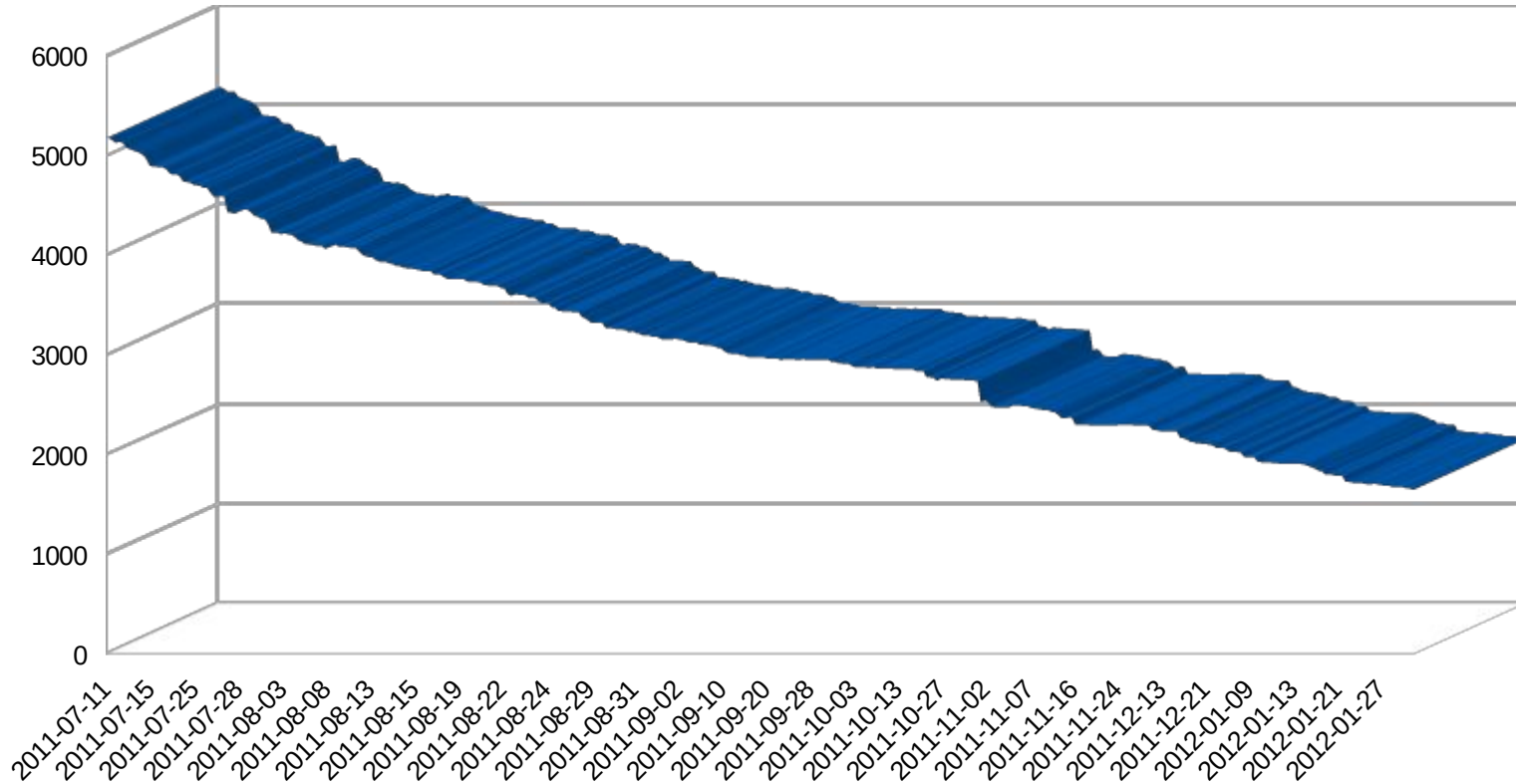


# Code Cleaning



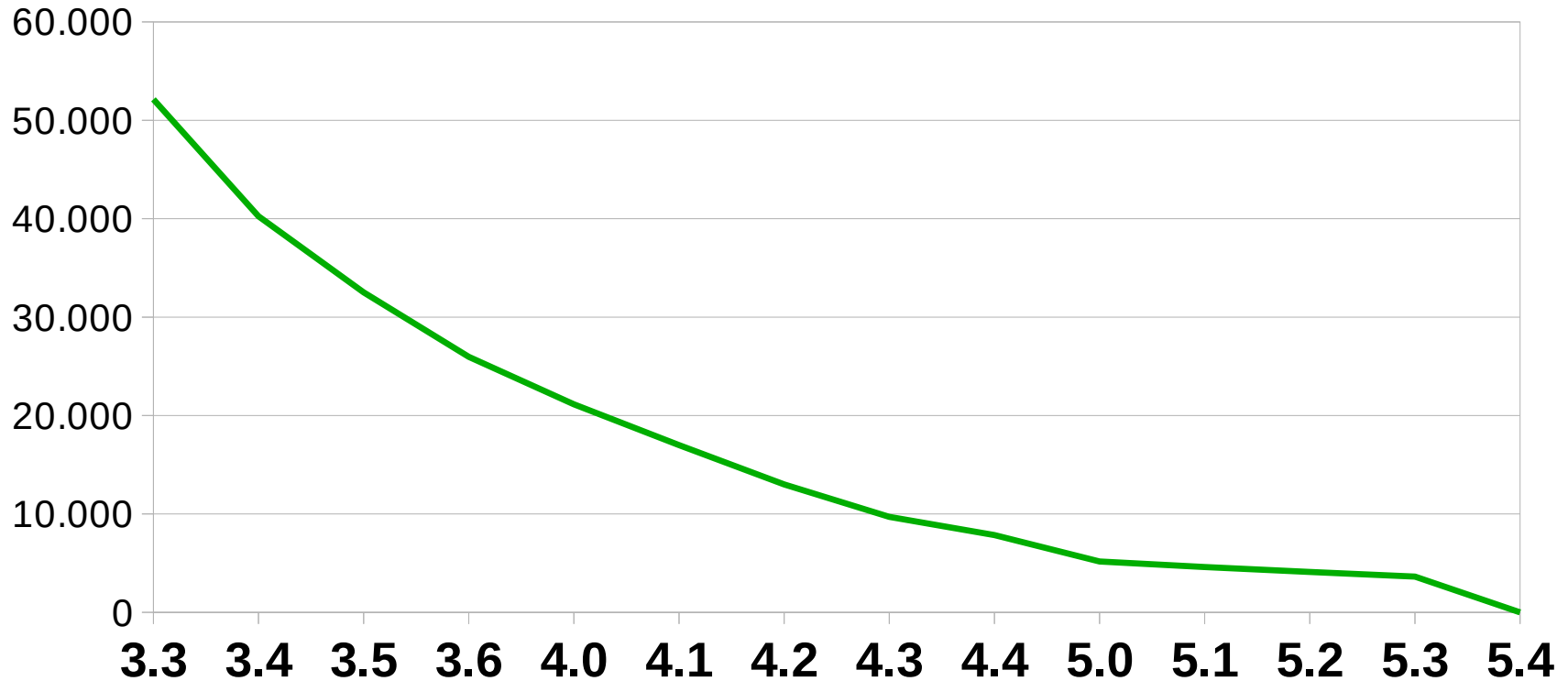
# Removing Unused Code

Remaining unused method count



# German Comment Translation

Detected lines of German comment

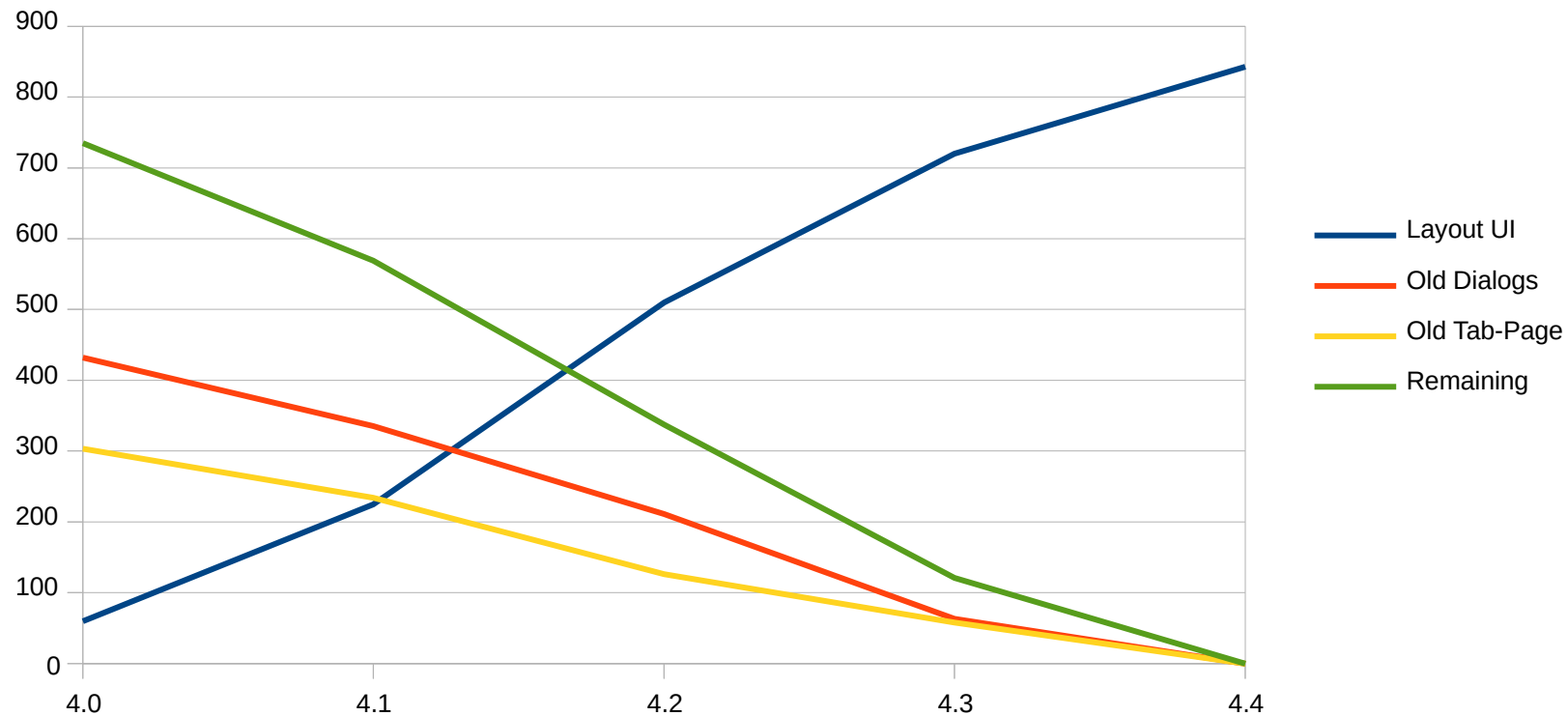


# Code Refactoring





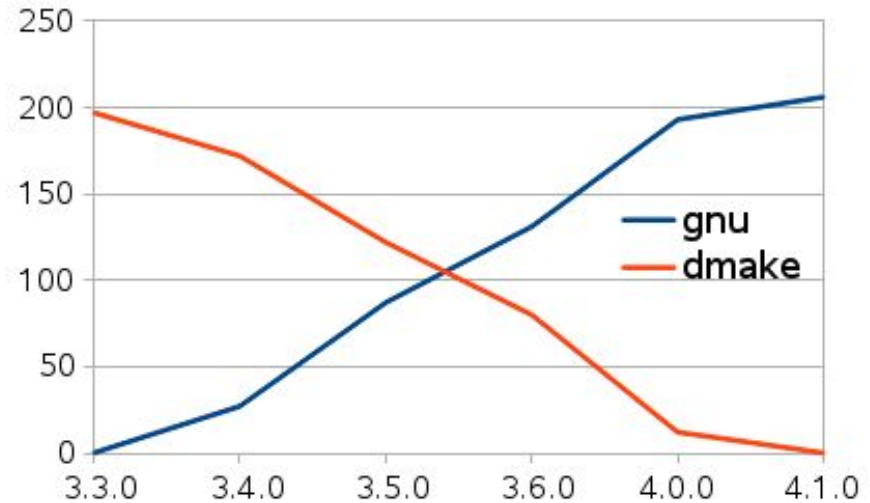
# UI Layout Conversion



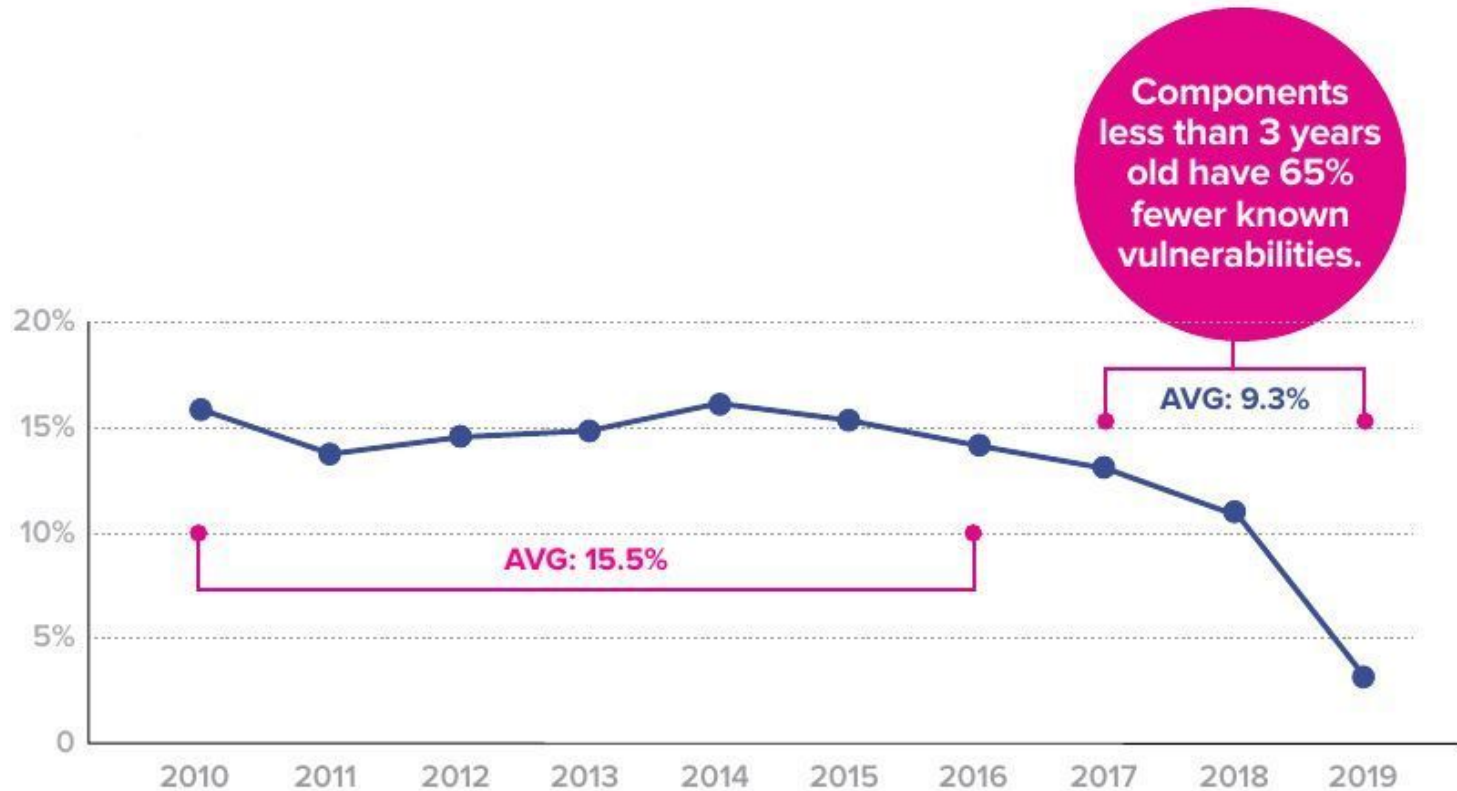
# GNUmake: 1 make to build ~10k wide

- Completed re-write of legacy perl + dmake build system ...
- Carl Fogel: "LibreOffice is now ridiculously easy to build"

gnumake vs. dmake by module count



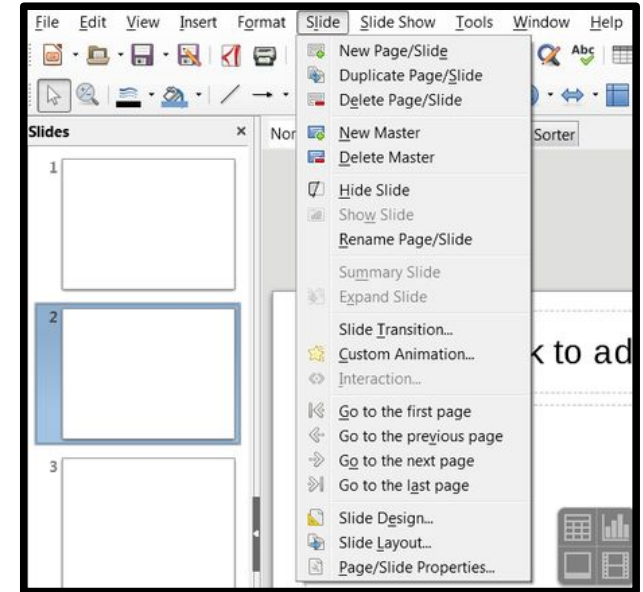
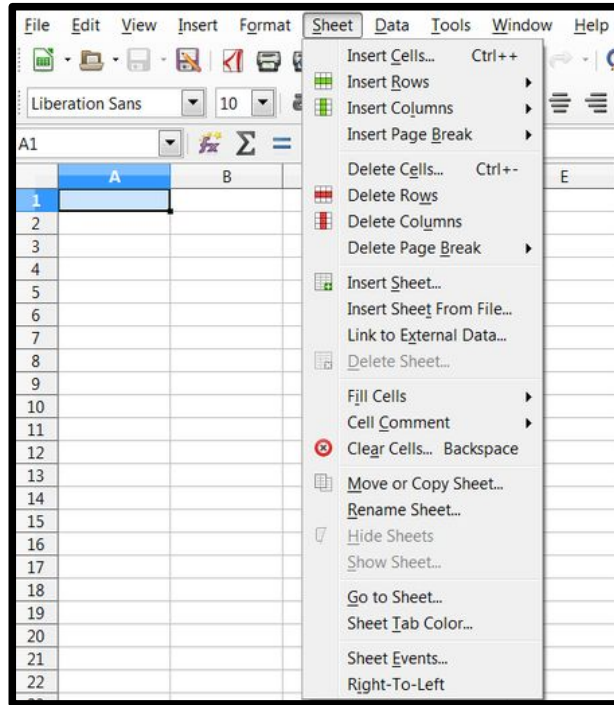
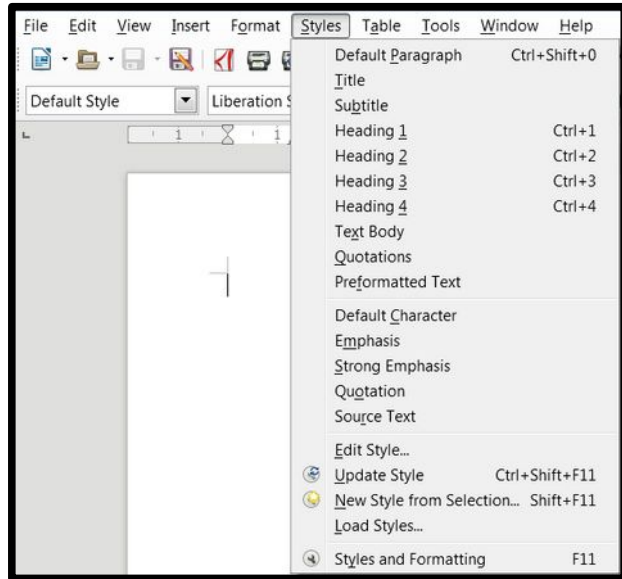
# Advantage of Refactoring



# User Interface



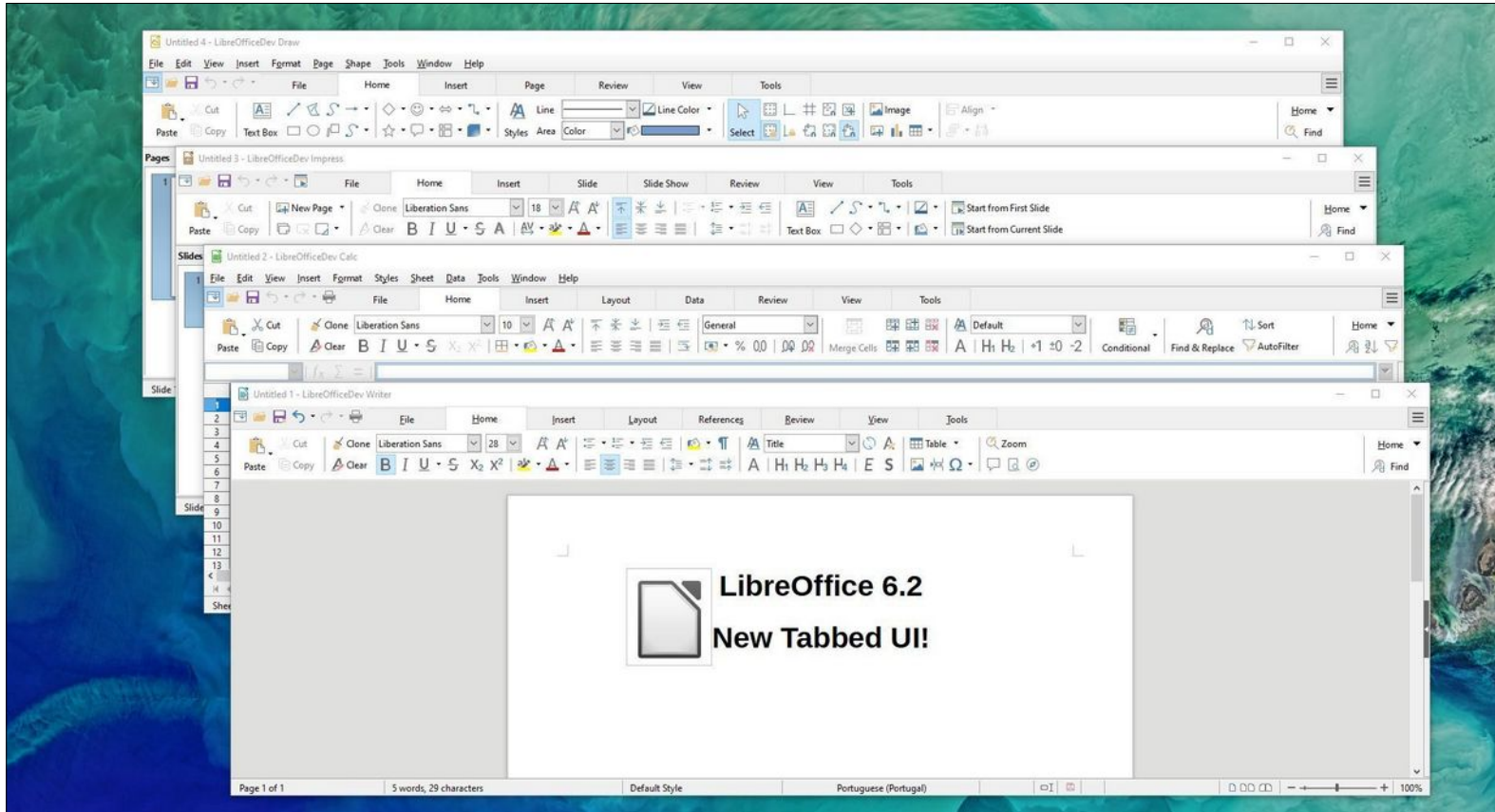
# Reorganization of Menus



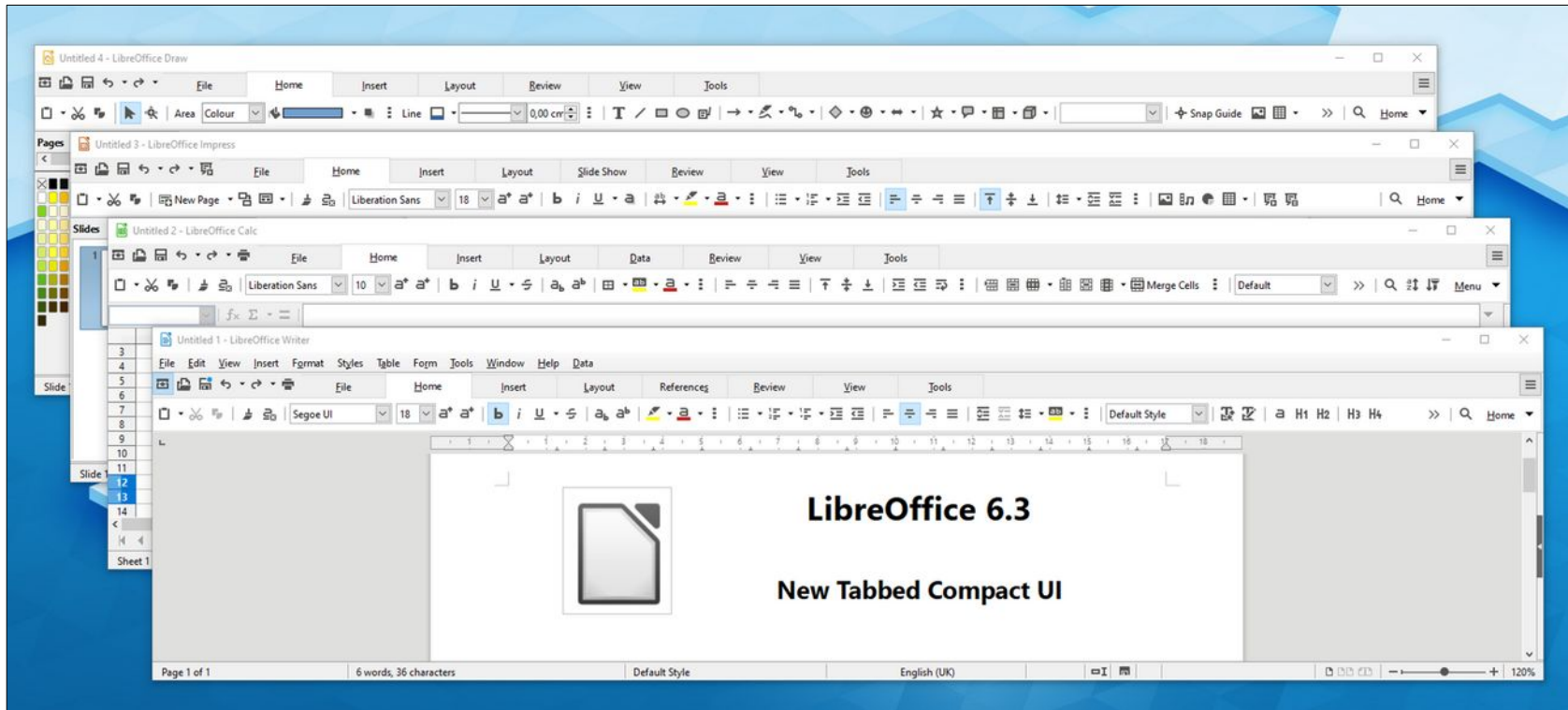
Reorganization of Writer, Calc and Impress menus, including the addition of a Styles menu (Writer), a Sheet menu (Calc) and a Slide menu (Impress)



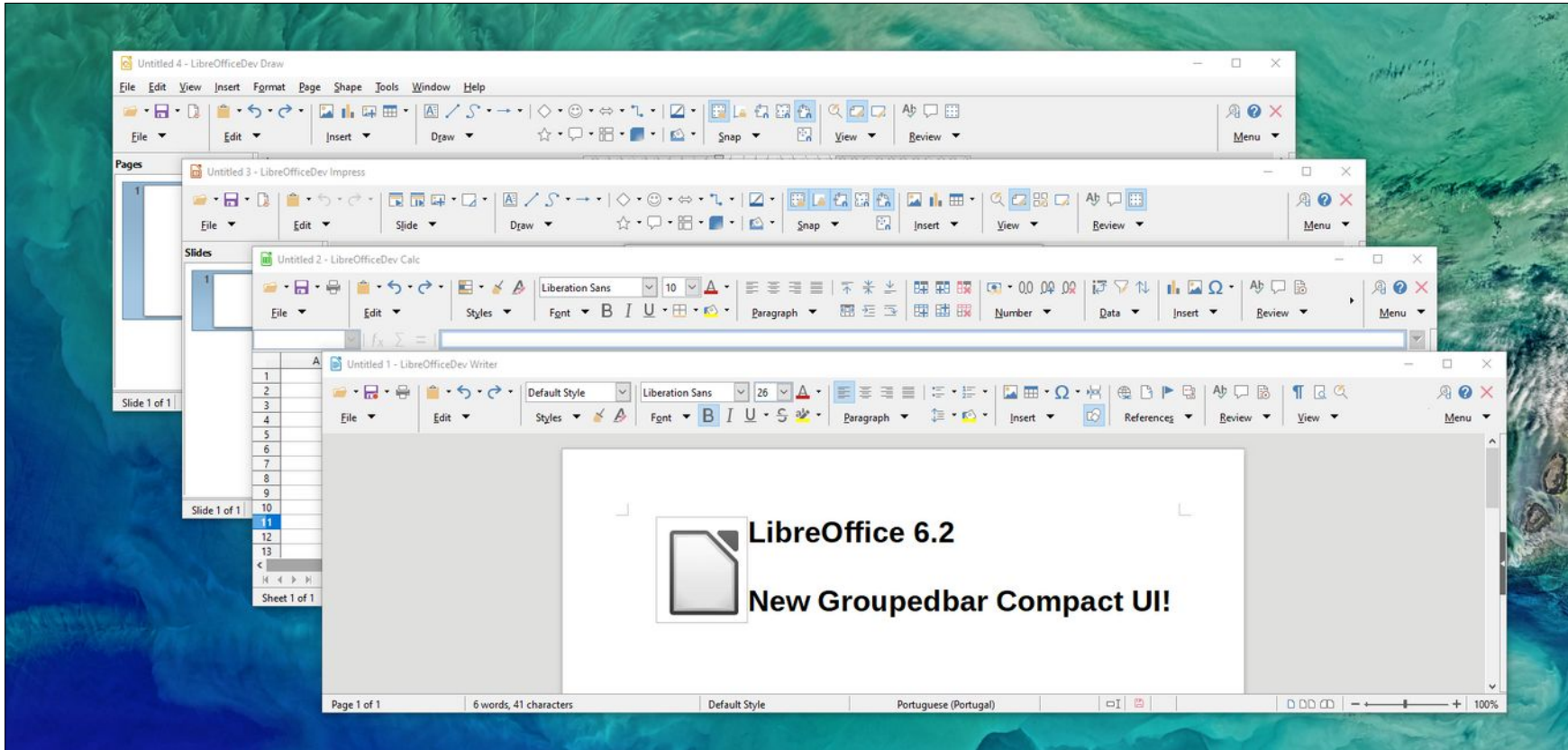
# NotebookBar



# NotebookBar Compact



# GroupedBar Compact



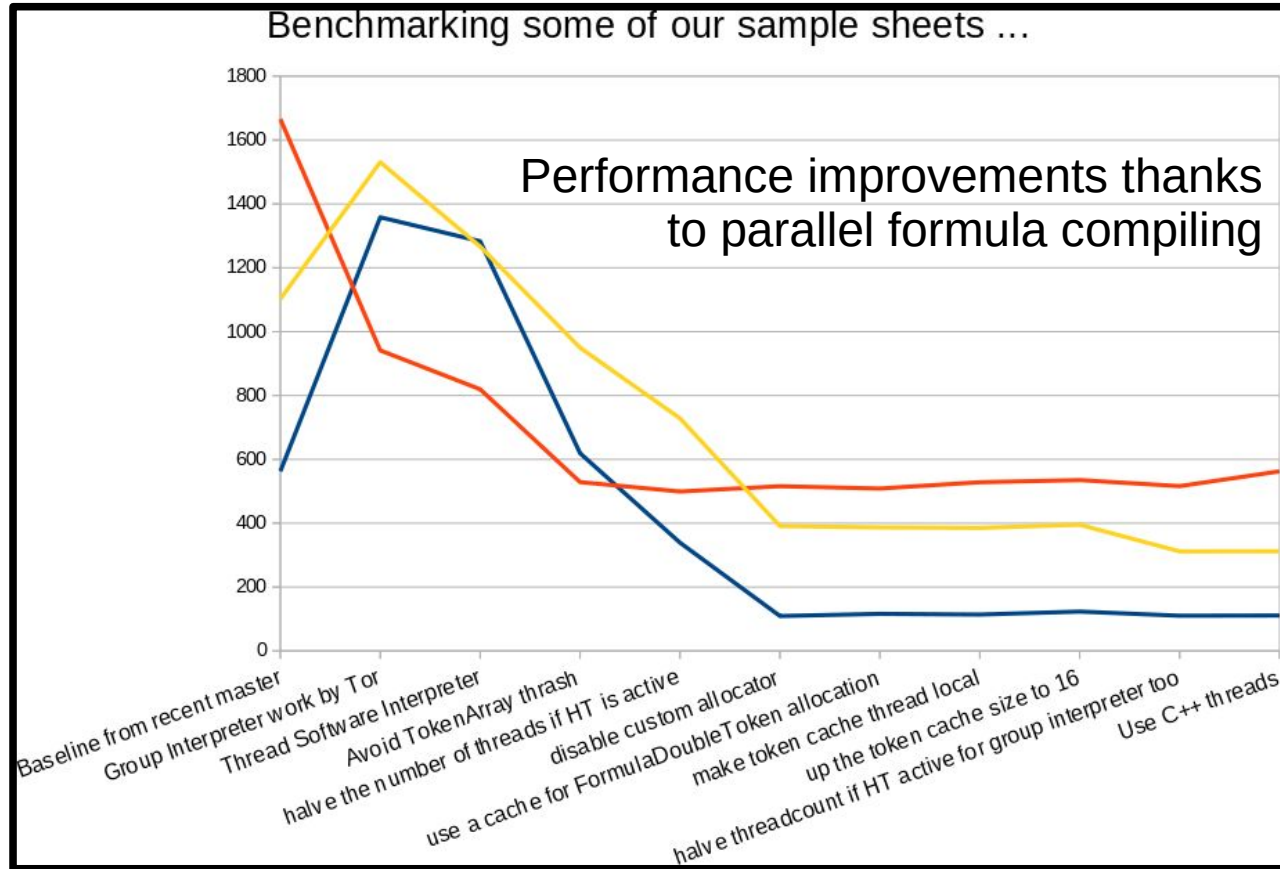


# Performance

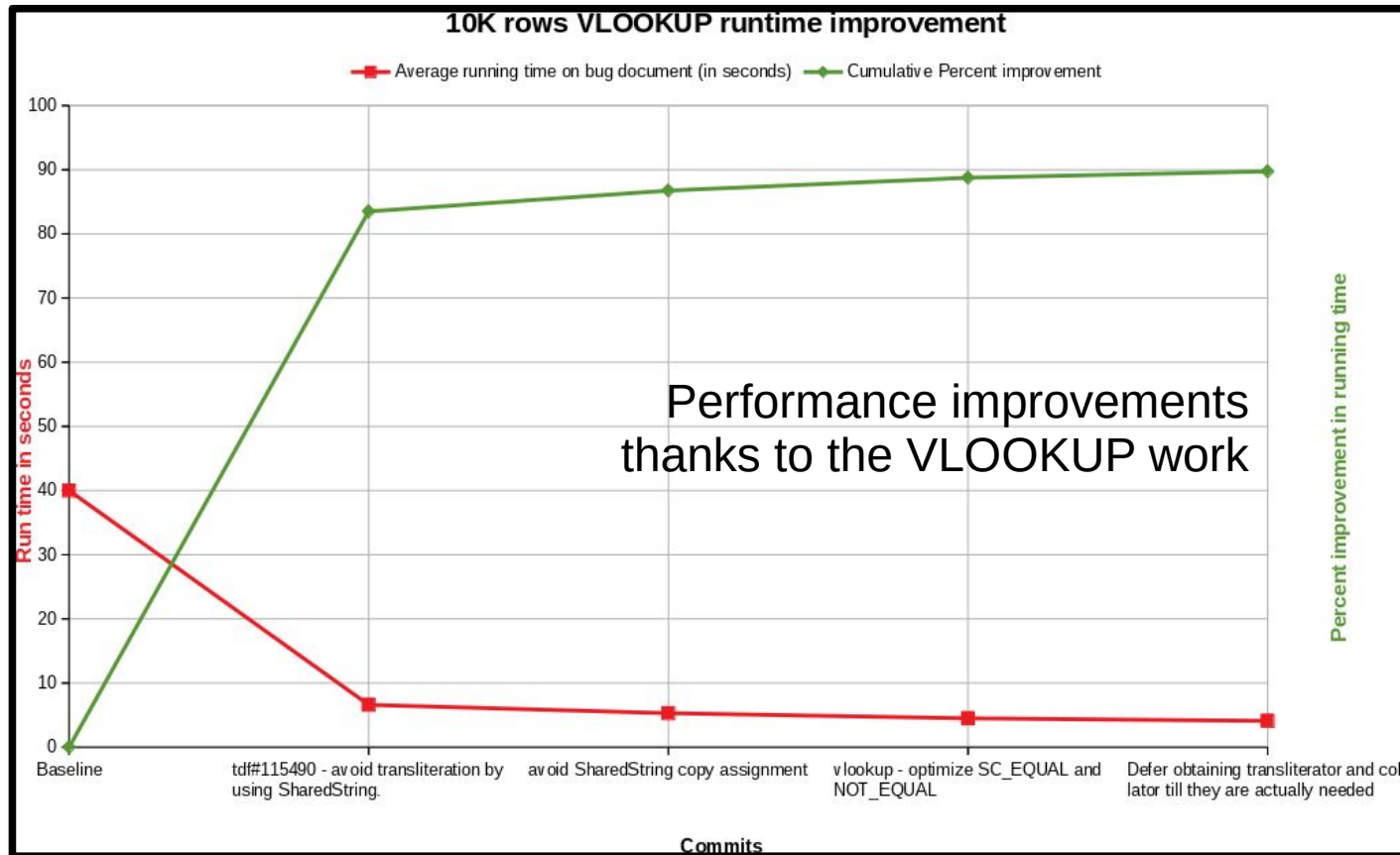


# Calc 6.1

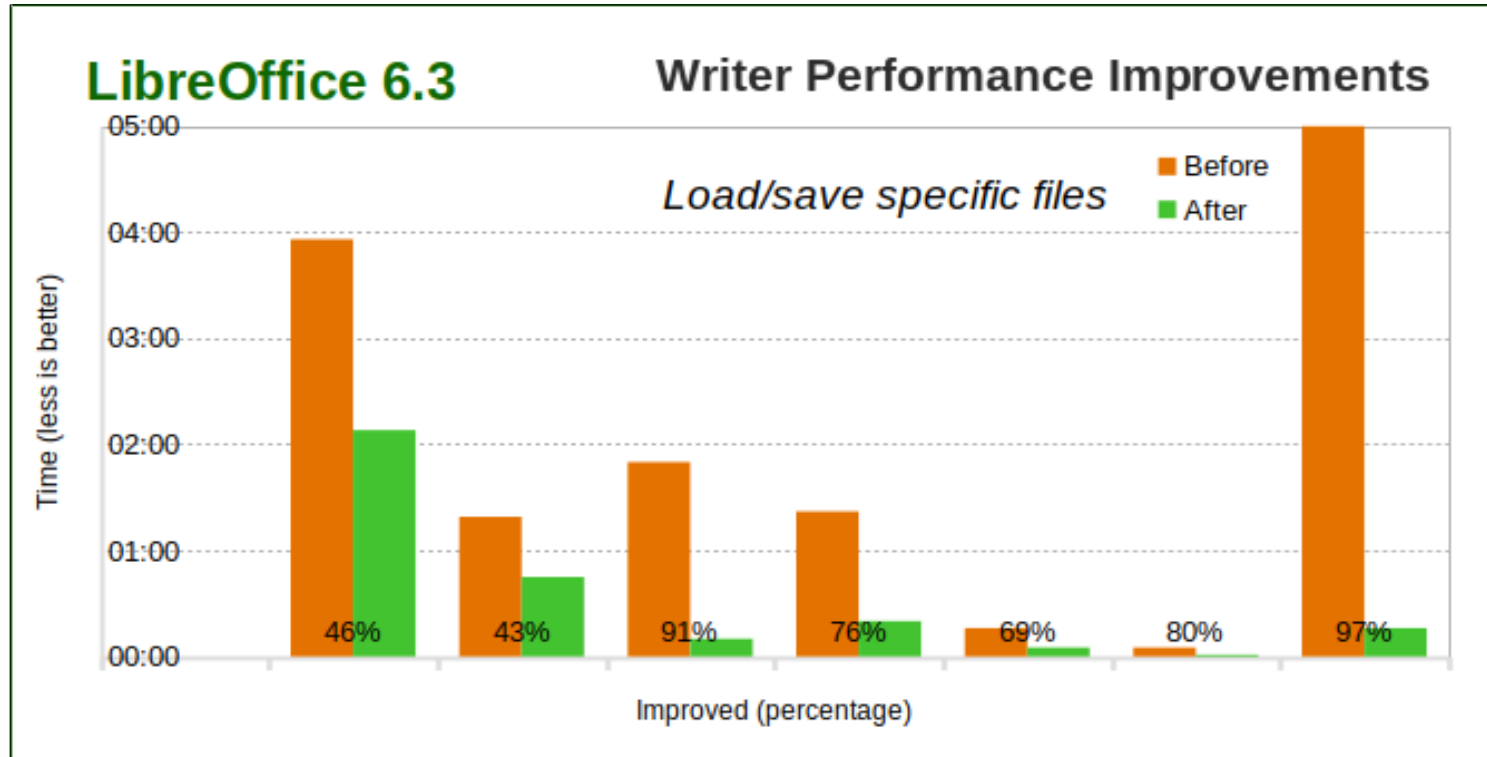
Benchmarking some of our sample sheets ...



# Calc 6.1



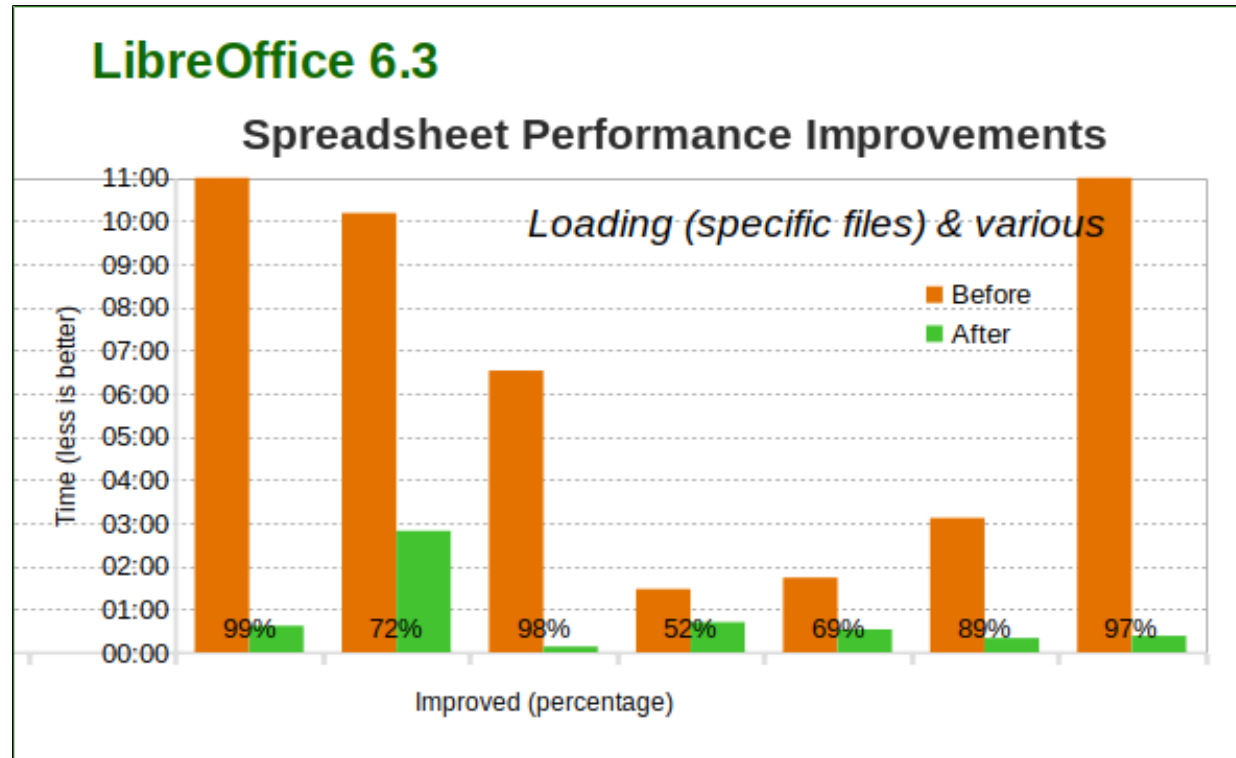
# Writer 6.3



Significant Open/Save performance improvements



# Calc 6.3



Significant Open/Save performance improvements



# Code Quality and Security



# Static Code Analysis

- Tool: *Coverity Scan*
  - Free for open source projects
- Detects dead code, uninitialized variables, uncaught exceptions...
- Defect density reduced from 1.1 to ~0,00x
  - Density measured in defects every 1.000 lines
  - Average density for similar sized projects: 0.71



# Coverity Scan

## DEFECTS WE FIND INCLUDE



Crashes



Security  
Vulnerabilities



Concurrency



Memory  
Corruption



Uninitialized  
memory



Error handling



Resource leaks





# Coverity Scan Score

Dec 06, 2020

Last Analyzed

6,143,004

Lines of Code Analyzed

0.00

Defect Density

## Defect changes since previous build dated Dec 05, 2020

0

Newly detected

1

Eliminated

## Defects by status for current build

26,283

Total defects

0

Outstanding

356

Dismissed

25,927

Fixed

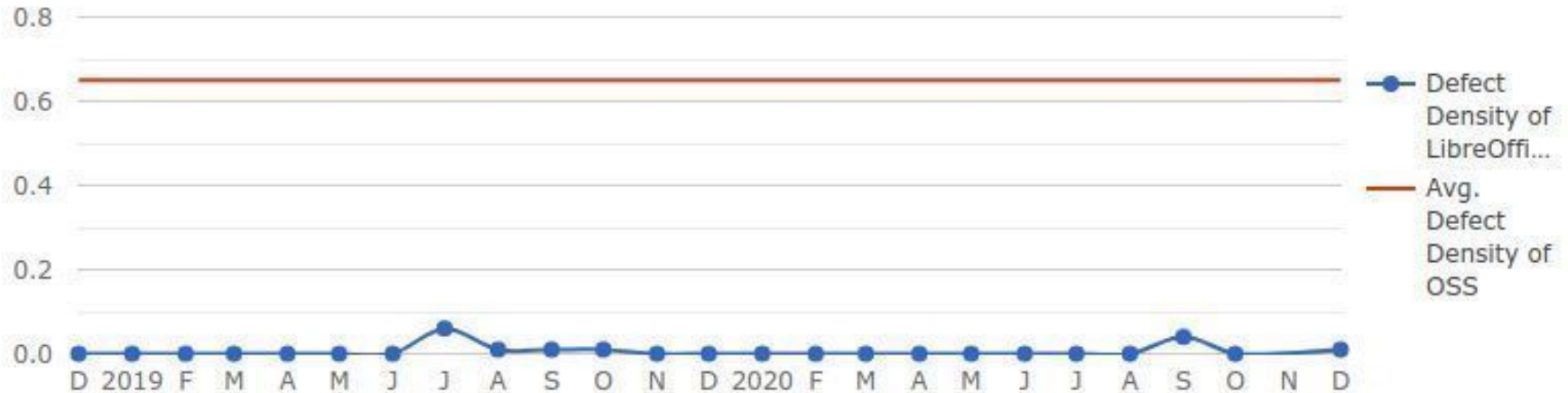


# Coverity Scan @ LibreOffice



# Coverity Scan @ LibreOffice

Defect Density over period of time

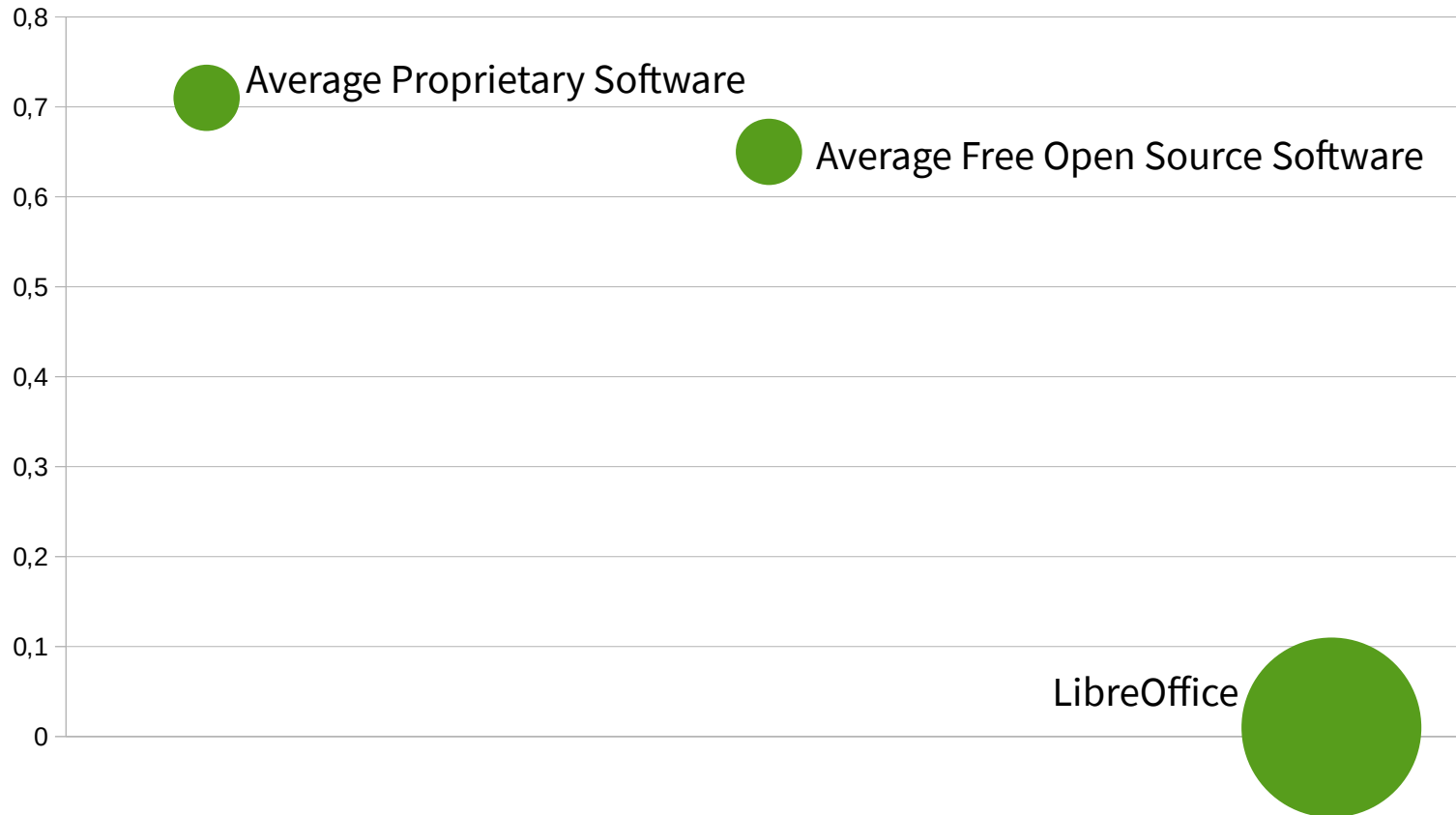


*The graph compares the defect density of the project with the average defect density of open source projects that are similar in size (i.e. more than 1 million lines of code)*



# Issues x 1000 Lines of Source Code

Source Code Scan by Coverity Scan (since 2015)

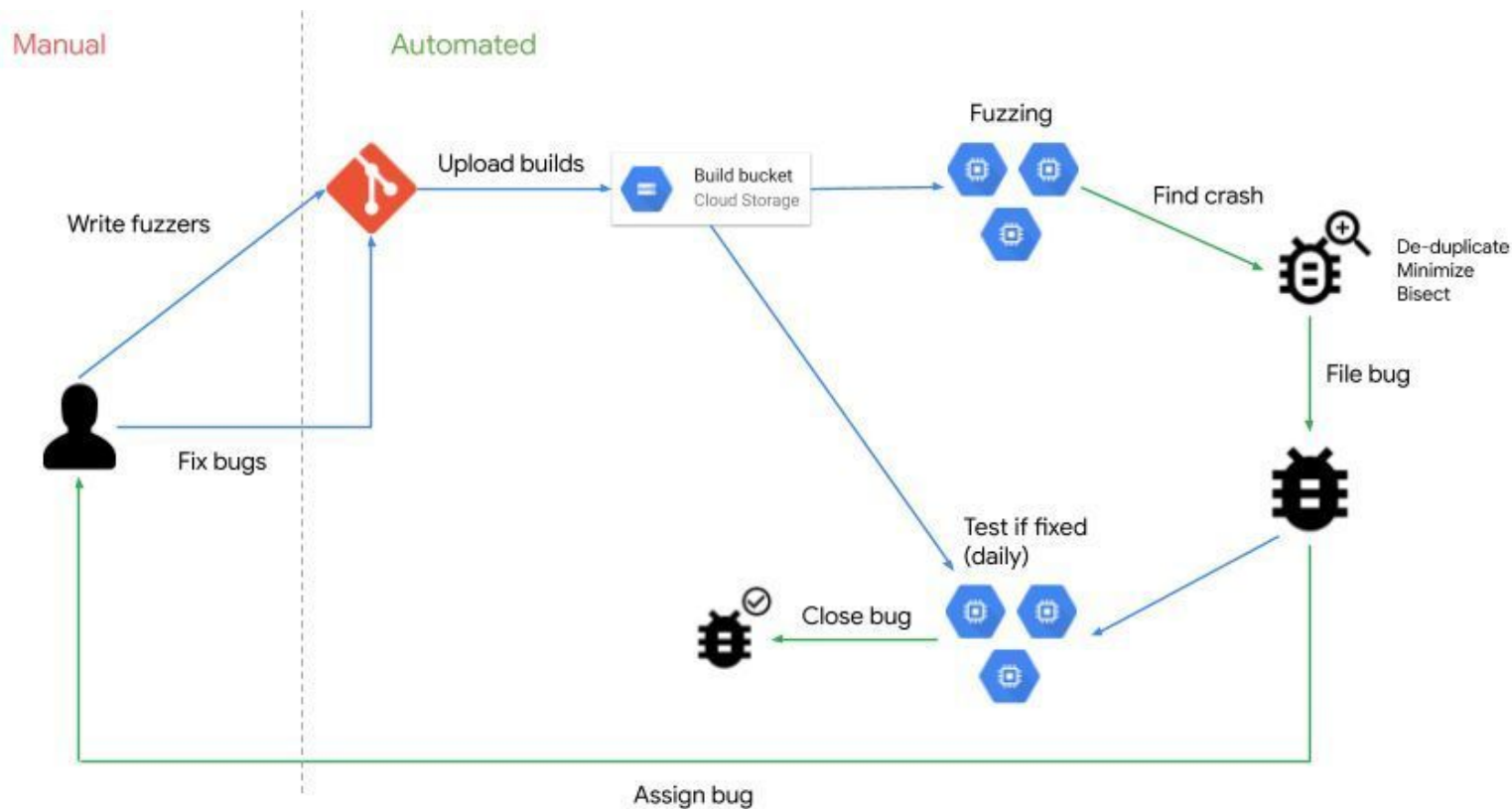


# Fuzzing

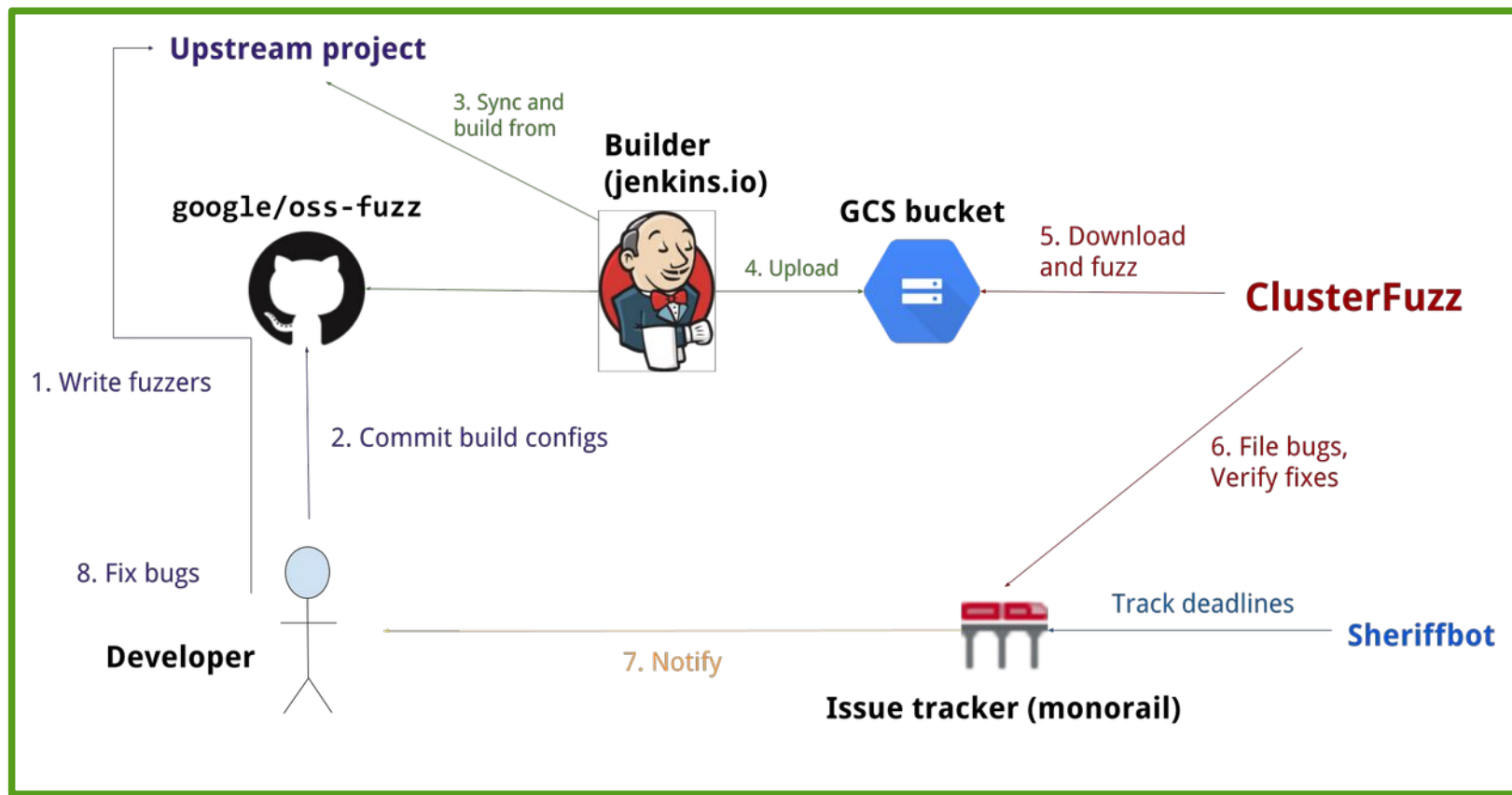
- Feeding a program random data in order to induce faults
- Black box fuzzing assumes nothing about the expectations of the program
- White box fuzzing knows about the underlying formats and protocols



# Fuzzing

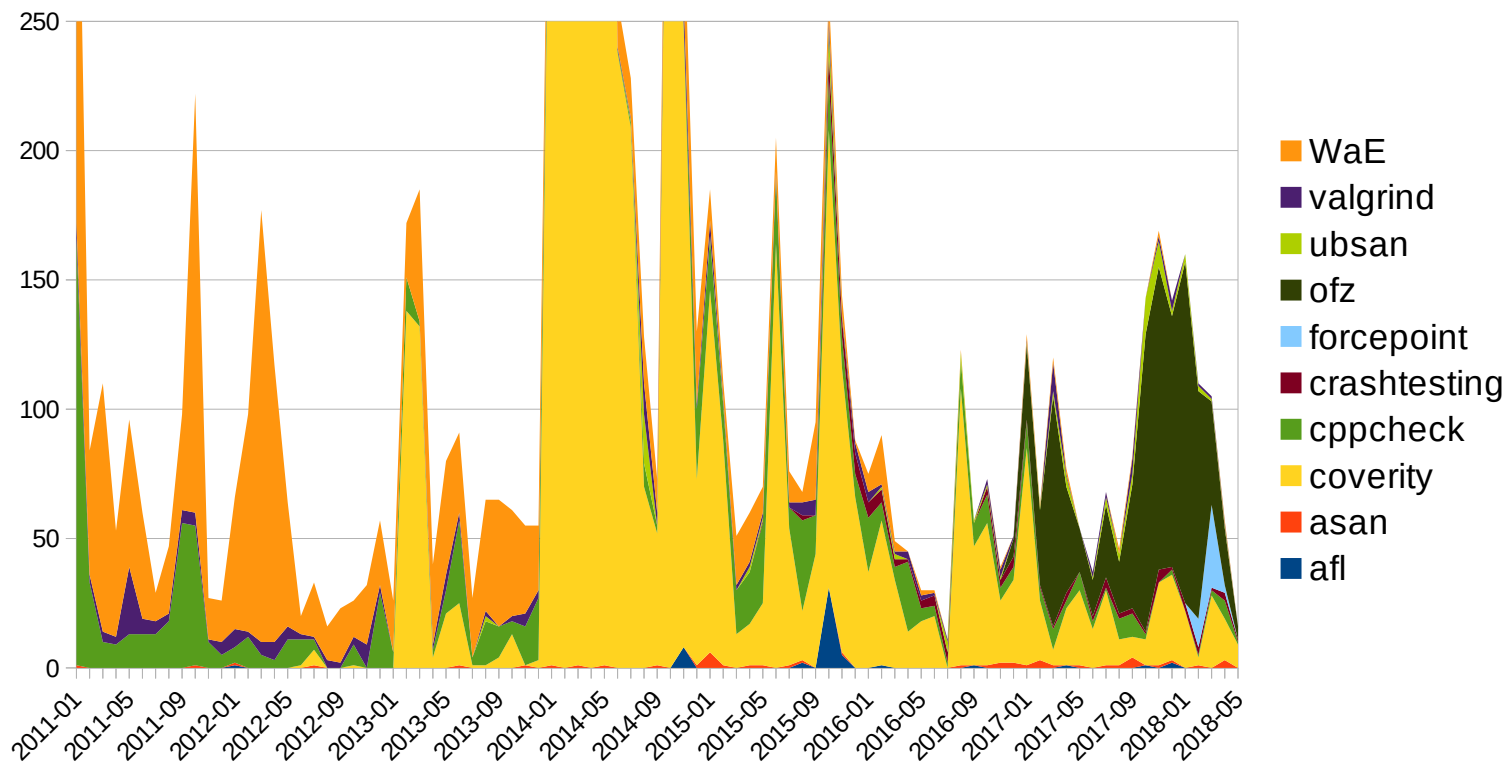


# Google's OSS-Fuzz



# Commits Based on Fuzzing

Commits per month easily attributable to various tools





# Fuzzing: the Take Home ...

- New tools find new bugs, and the number reduces over time
- Hard to see: not everyone uses consistent git commit tooling references, for instance Crashtesting is badly under-represented



# Open Document Format





# Open Document Format

the true document standard  
which offers freedom of choice



# ODF Philosophy

- The philosophy behind the ODF standard document format was to design a mechanism in a "vendor neutral" manner from the ground up using existing standards wherever possible
- Although this means that software vendors would need to tweak their individual packages more than if they continued down their original routes the benefits for interoperability were important enough to justify the move



# Open Document Format

- **Independent** from a single product: anyone can write a software that handles an open format
- **Interoperable**: allows the transparent sharing of data between heterogeneous systems
- **Neutral**: it does not force the user to adopt, and often buy, a specific product, but leaves a wide choice based on features and quality versus price ratio
- **Perennial**: protects user developed contents from the “evolution” based obsolescence of technology



# ODF Advantages

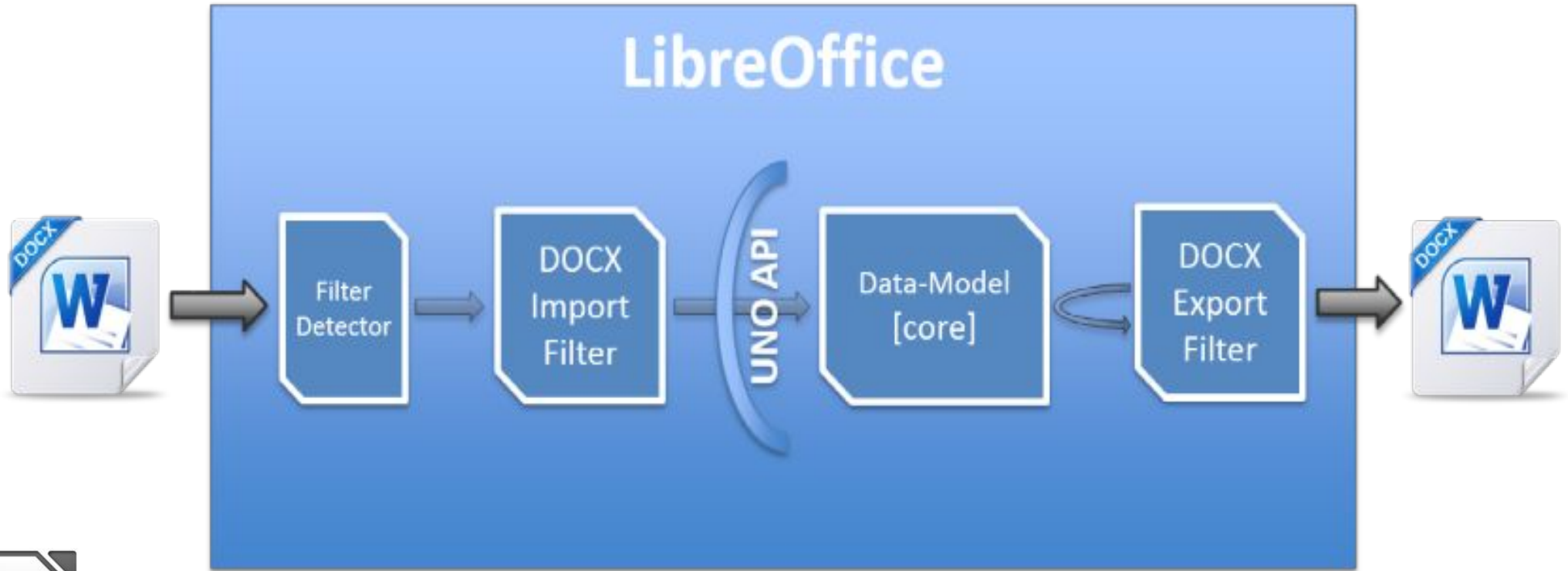
- ODF is solid and robust
- ODF is consistent across OS
- ODF is truly interoperable
- ODF is predictable
- **ODF is the best standard file format for users of personal productivity SW**



# Interoperability



# Roundtrip Test





Original File



Roundtripped File

- Use Interop libraries provided by Microsoft
- Capture the following details from document:
  - # of Page
  - # of Words
  - # of Characters (no spaces)
  - # of Characters (with spaces)
  - Paragraphs
  - Lines
- Compare the results for Original and Roundtripped files
- Generate the result files

**.NET TOOL**



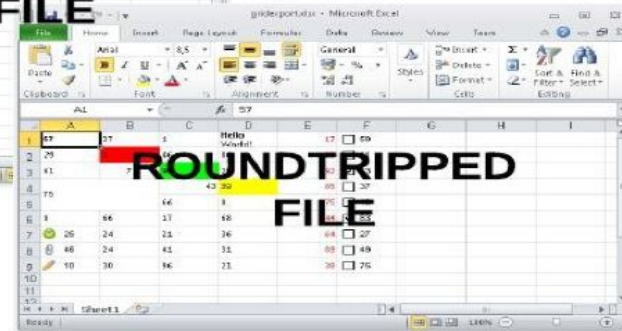
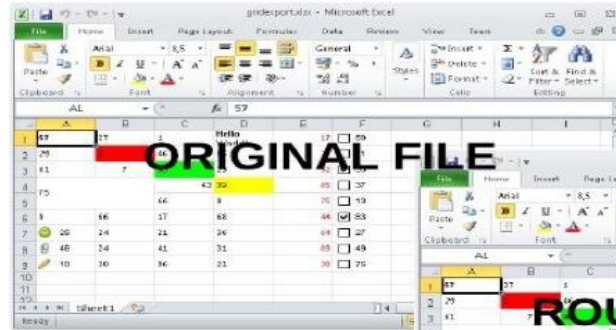
Result CSV



Original File



Roundtripped File



Result CSV

- Scan active grid for following:
  - Cell Values
  - Cell Formulas & Functions
  - Pivot Table & Sorting Metadata
  - Objects / Charts
  - Images / Shapes
- Repeat the same for remaining worksheets (Sheet 2 ... Sheet n)
- Compare values for Original and Roundtripped Files
- Generate the result file

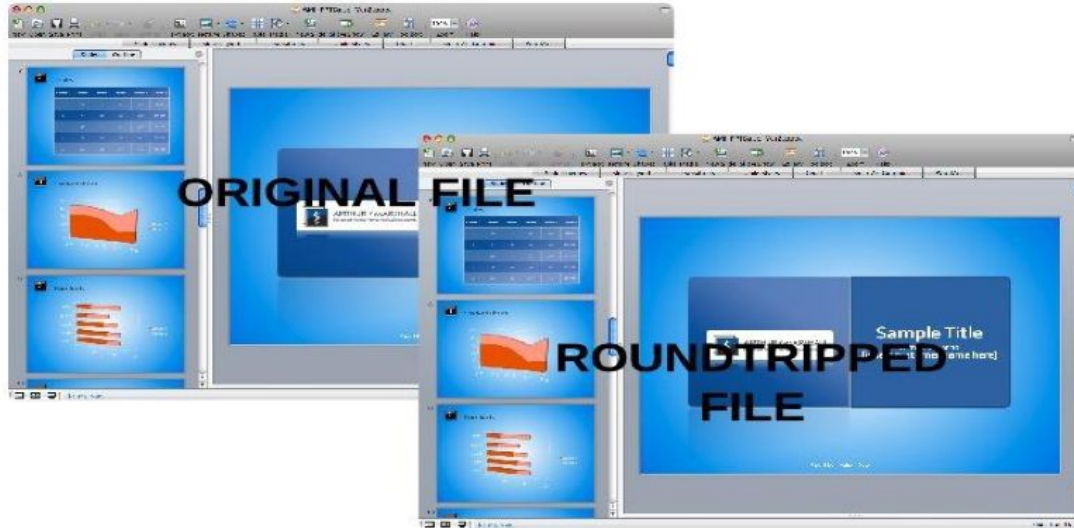




Original File



Roundtripped File



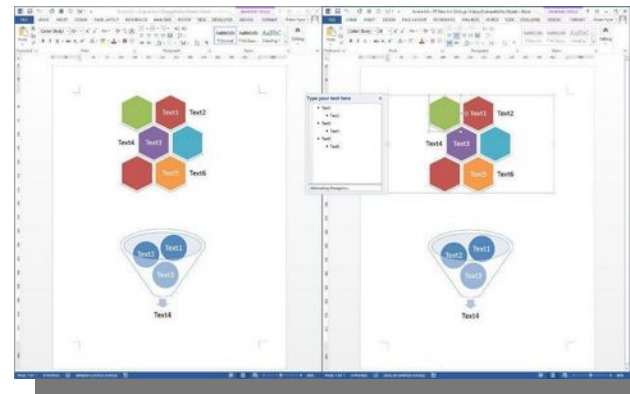
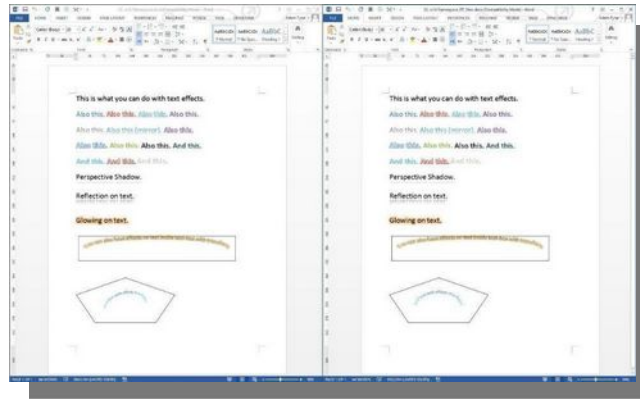
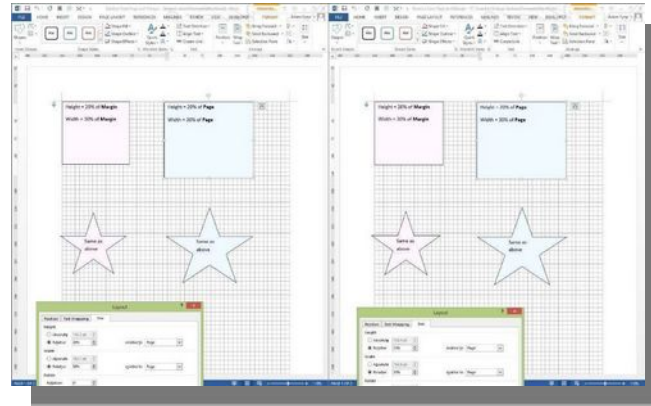
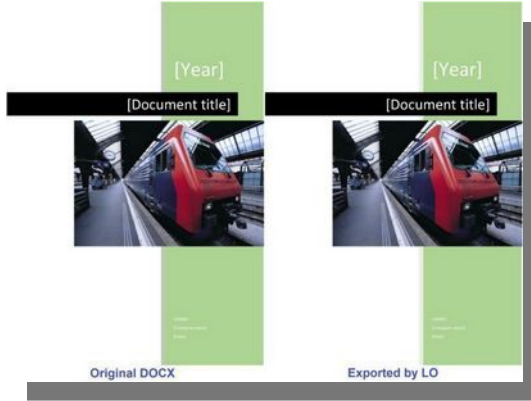
- Scan slides for following:
  - Plain Text
  - Shapes / Images
  - Objects / Charts
  - Master Layouts
- Compare values for Original and Roundtripped Files
- Generate the result file

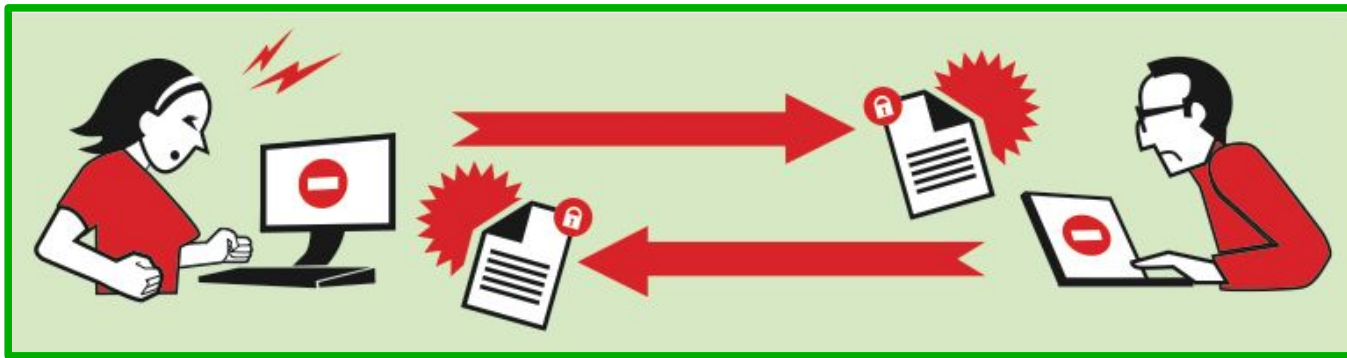


Result CSV

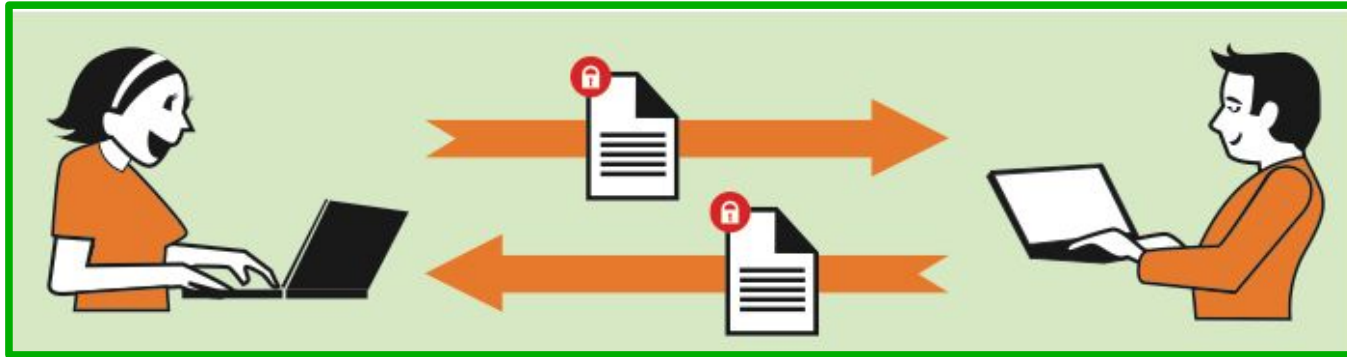


# Document Interoperability

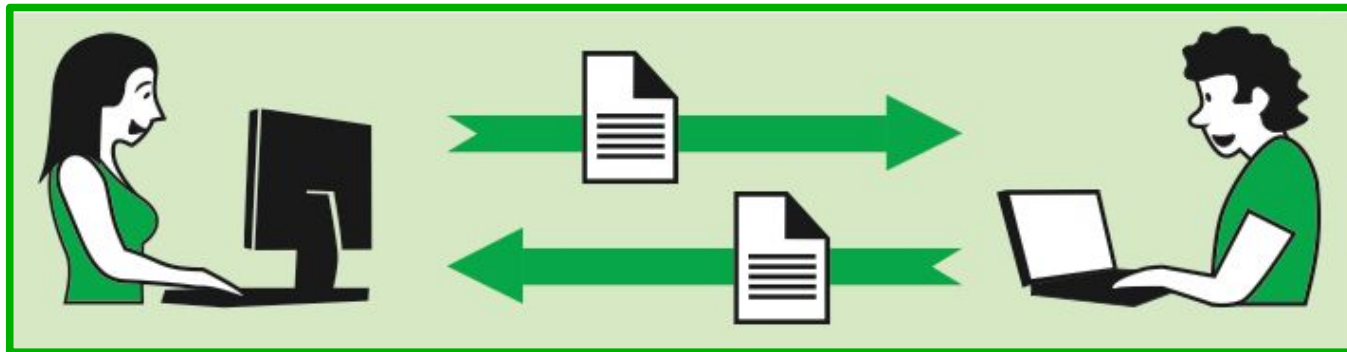




**Proprietary  
Document Format  
DOC/XLS/PPT**



**Pseudo-Standard  
Document Format  
DOCX/XLSX/PPTX**



**True Standard  
Document Format  
ODT/ODS/ODP**



# **LibreOffice Kit**

## **ScriptForge Libraries**



# LibreOfficeKit

- LibreOfficeKit can be used for accessing LibreOffice functionality through C/C++, without any need to use UNO
- The essence of the idea is to provide a thin API for LibreOffice, that allows people to write small, external apps without having to compile or link to LibreOffice, and learn UNO or other complex topics
- Allows fast rendering of documents for any application



# LibreOfficeKit Elements

## CORE REPOSITORY

- **tilebench**: benchmarks document tile rendering
- **android**: used by native (legacy) Java / Fennec app
- **lokdocview**: gtk+ widget to easily re-use LibO in custom gtk+ apps
- **gtkiledviewer**: a demo app for testing / development

## ALSO EXTERNAL REPOSITORIES

- **lloconv**: format converter (<https://gitlab.com/ojwb/lloconv>)
- **gnome-documents**: (<https://wiki.gnome.org/Apps/Documents>)
- **COOL**: Collabora Online (<https://github.com/CollaboraOnline/online>)





# ScriptForge Libraries

- ScriptForge libraries are an extensible and robust collection of macro scripting resources for LibreOffice to be invoked from user Basic or Python scripts
- ScriptForge libraries help overcome LibreOffice Application Programming Interface (API) steep learning curve, as they offer easy access to and management of actual windows and documents, automation on Calc sheets, cells and ranges of cells, management of dialogs and their controls as well as access to data contained in databases



# Recognitions



# Future of OSS 2016

SECTION 4  
TECHNOLOGY

MOST VALUABLE  
OPEN SOURCE PROJECT?

@FUTUREFOSS  
#FUTUREFOSS

openstack  
OPEN SOURCE SOFTWARE

docker

Drupal

LibreOffice  
The Document Foundation

Linux

ubuntu

PostgreSQL



# Ubuntu 18.04 LTS Default Desktops Applications Survey

## Office Suites Category



# LibreOffice Technology



# LibreOffice: Product to Platform

- 2010: LibreOffice only for the Desktop
- 2020: LibreOffice for the Desktop, LibreOffice LTS optimized for Enterprises, LibreOffice Online for the Cloud, LibreOffice Mobile for Android & iOS, and LibreOffice for Chrome OS
- All these products, from different organizations, share the same engine, which is common to all modules



# LibreOffice Versions & Users

## Beta / RC

Early Adopters  
Quality Assurance  
Feature Testing  
(power users)

## Community

Community  
Individual Users  
SMB Deployments  
(desktop users)

## Enterprise

Enterprises  
Large Migrations  
Large Deployments  
(professional users)

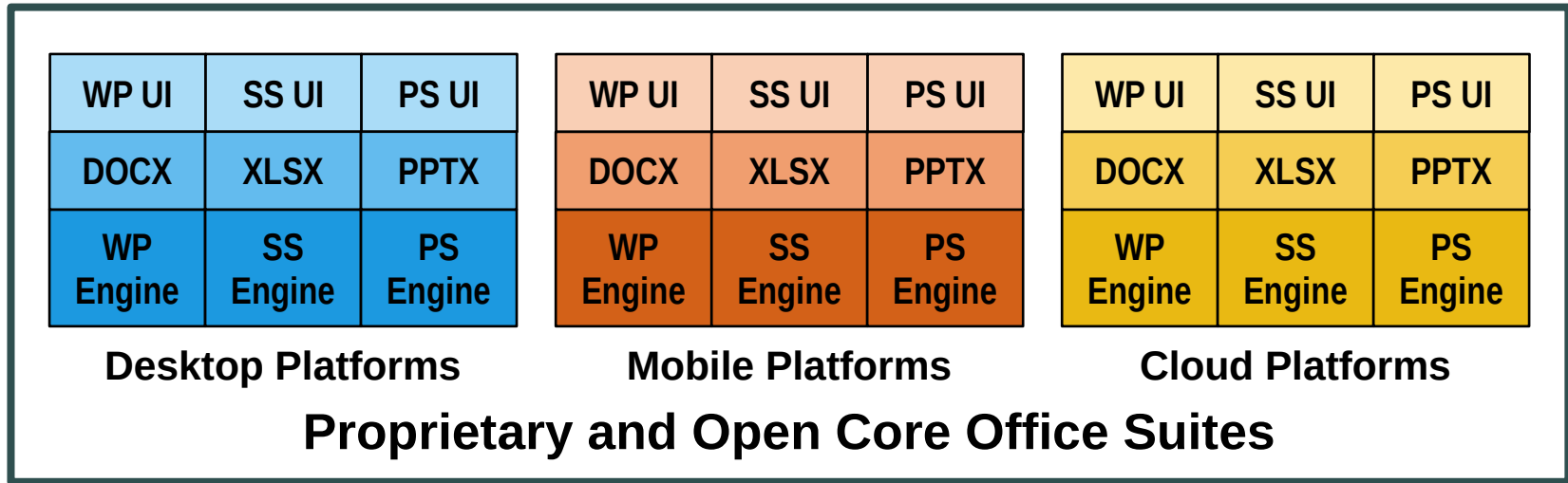
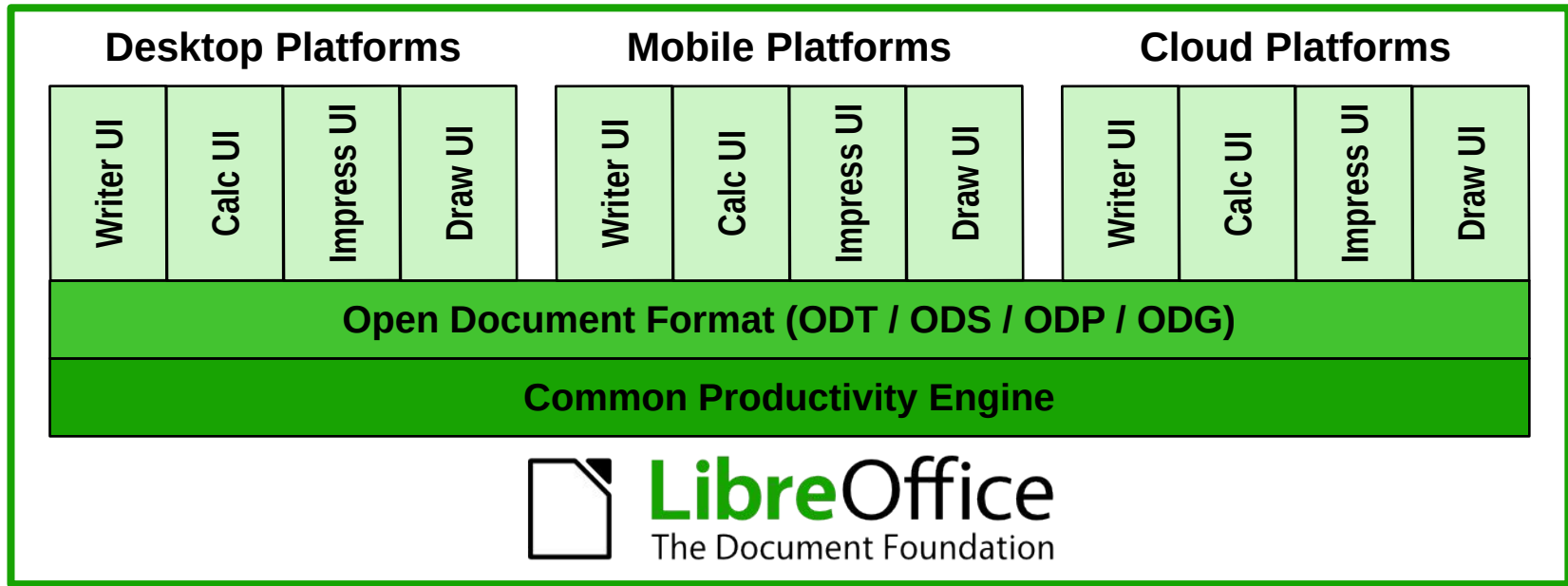


# LibreOffice Technology

- LibreOffice Technology is the result of 10 years of development in the right direction
  - Same processing engine common to all modules
  - Based on a cleaned and refactored source code
  - With a focus on code quality and consistency
  - Supported by easy and extensive APIs
- The best open source platform for personal productivity tightly integrated on desktop, mobile and cloud







# LibreOffice Technology Based SW

- Desktop (TDF, Red Hat & SUSE)
- Enterprise LTS (Collabora & CIB)
- Online / Cloud (Collabora & CIB)
- Android (Collabora)
- iOS & Apple Store (Collabora)
- Windows Store (CIB)



# LibreOffice USP

- The best open source office suite ever, backed by a strong community and a strong ecosystem
- Based on the ODF ISO standard document format for interoperability and digital sovereignty, and providing a superior compatibility with proprietary document format
- The best of FOSS, with professional support available for organizations using office productivity for production and management of strategic business contents



# Thanks

Italo Vignoli  
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[italo@vignoli.org](mailto:italo@vignoli.org)

