

LibreOffice

Architecture, accessibility and QA

Jacobo Aragunde Pérez

blogs.igalia.com/jaragunde

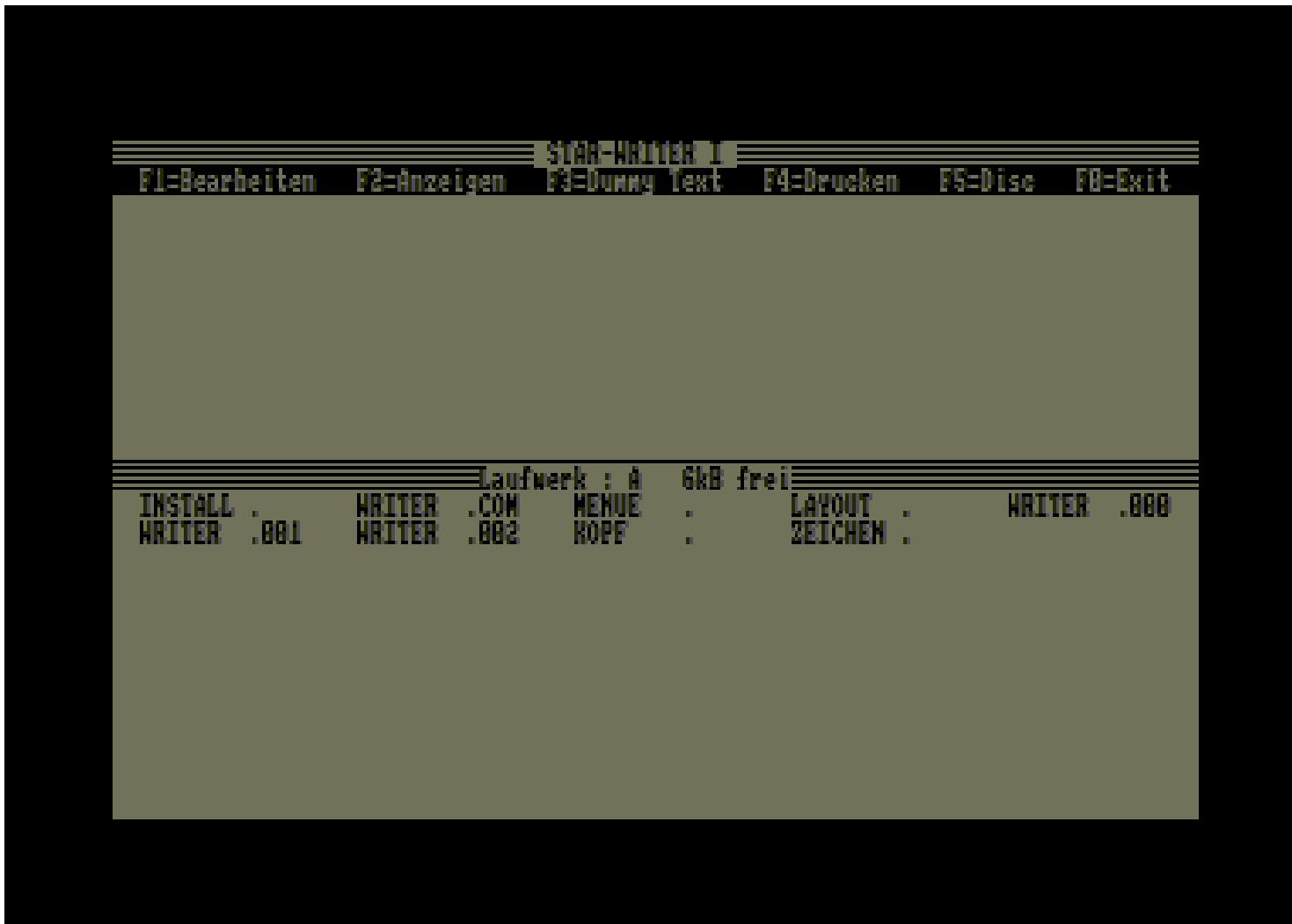


Project history

Some history

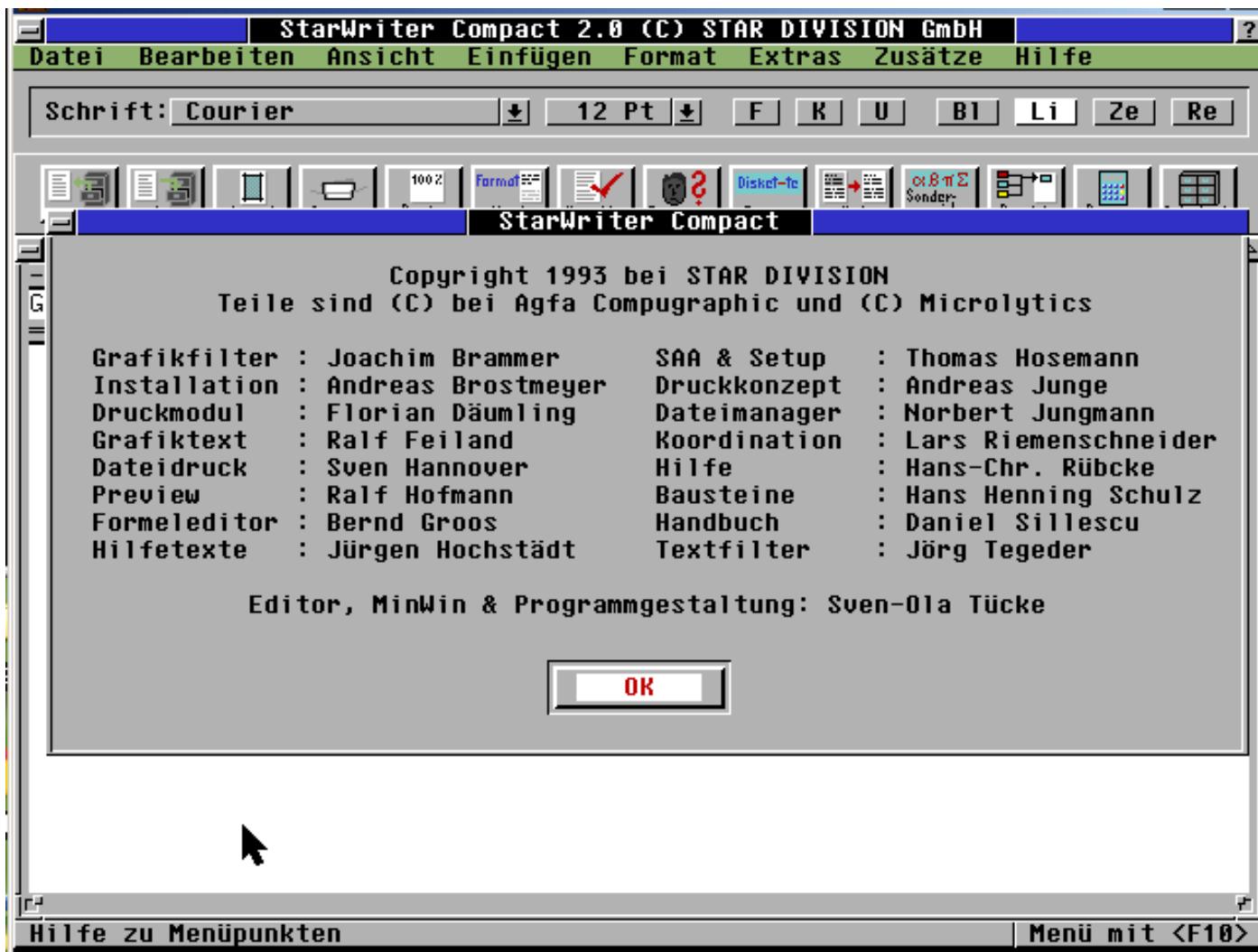
- 1985: StarWriter for Z80 micros
- 1986: StarDivision founded, StarOffice
- 1999: Sun Microsystems acquires StarDivision

StarWriter 1.0, 1986



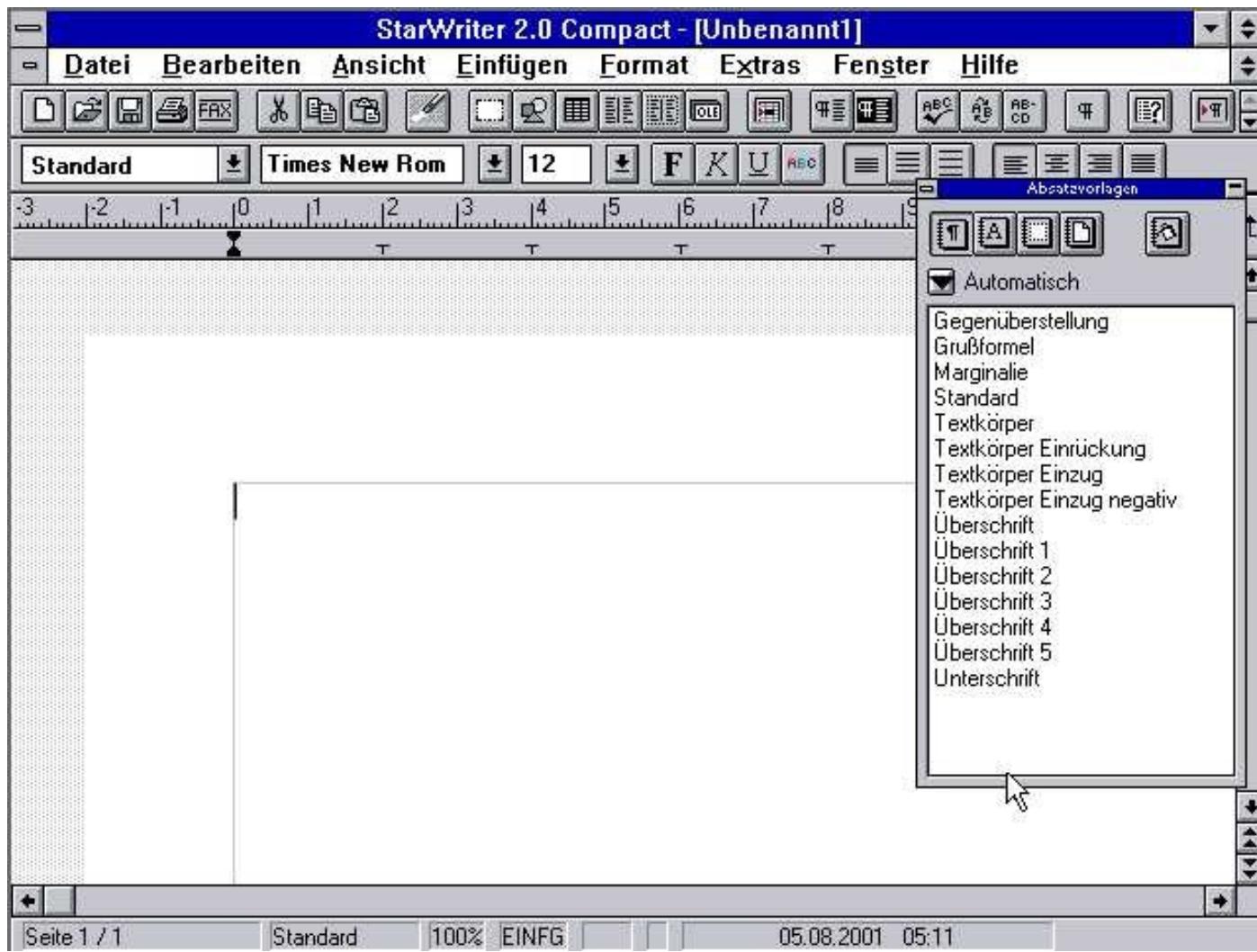
(source)

StarOffice 2.0, 1994



(source)

StarOffice 2.0, 1994



(source)

StarOffice 5.2, 2000

The screenshot shows a StarOffice 5.2 document window titled "StarOffice 5.2 - [kupfer.sdw]". The menu bar includes File, Edit, View, Insert, Format, Tools, Window, and Help. The toolbar has icons for file operations, text styling, and tables. The main content area displays a table of copper minerals (Erzminerale) with their chemical formulas and properties:

Erzminerale			
Chalkopyrit	CuFeS ₂	34,5% Cu	D=4,2–4,3
Chalkosin	Cu ₂ S	80	5,7–5,8
Enargit	Cu ₃ AsS ₄	48	4,4
Digenit	Cu ₂ S ₅	78	5,7–5,8
Covellin	CuS	66	4,7
Cuprit	Cu ₂ O	89	6,2
Malachit	Cu ₂ (OH) ₂ CO ₃	72	4

Below the table, there is a bulleted list:

- Bauwurdig sind kleinere Kupferlagerstätten bei Gehalten von 3–5% im Erz, während sehr große. Im Tagbau gewinnbare Erzkörper ab 0,5%, bei Vorliegen weitere Metalle (Mo, Au, etc.) sogar ab 0,3 abgebaut werden. Sulfidische Kupfererze werden in der Regel durch Flotation zu Konzentraten mit 30 bis 60% Cu angereichert; diese werden durch metallurgische und elektrochemische Methoden zum *Kathodenkupfer* verarbeitet.
- Die Verwendung von Kupfer ist durch die hohe Leitfähigkeit des Metall für Wärme und Elektrizität geprägt, so dass über 50% des Verbrauches diverse Produkte der Elektroindustrie betreffen. Weiter findet das Metall und seine Legierungen (Bronzen: Cu+Sn; Messing: Cu+Zn) durch günstige mechanische Eigenschaften sowie Verwitterungsbeständigkeit eine breite Anwendung in der Bauindustrie, im Maschinenbau und im Fahrzeugbau.
-

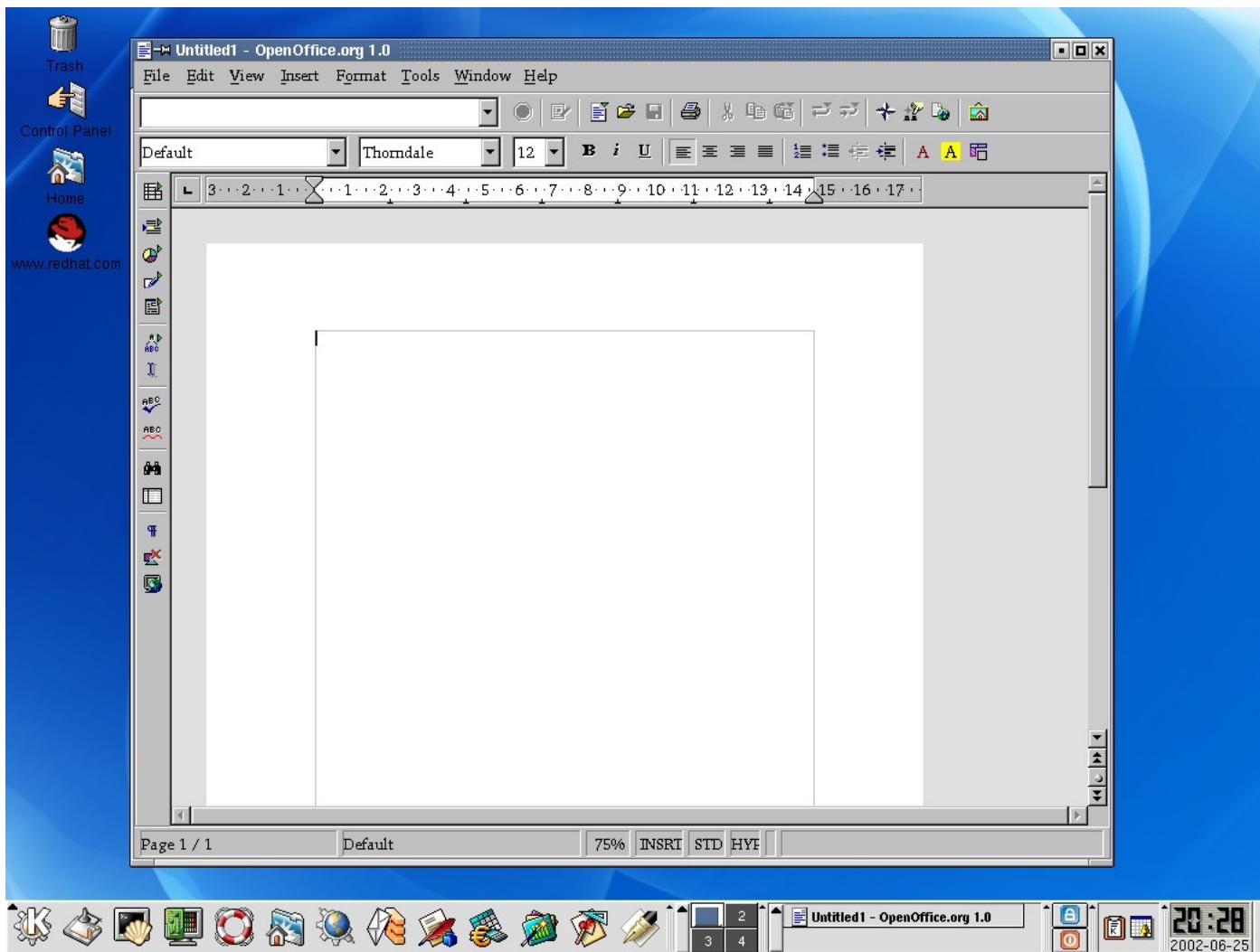
At the bottom, the status bar shows "Page 1 / 1", "Standard", "111%", "INSRT", "STD", "HYP", "22:37", and a file icon for "kupfer.sdw".

(source)

Some history

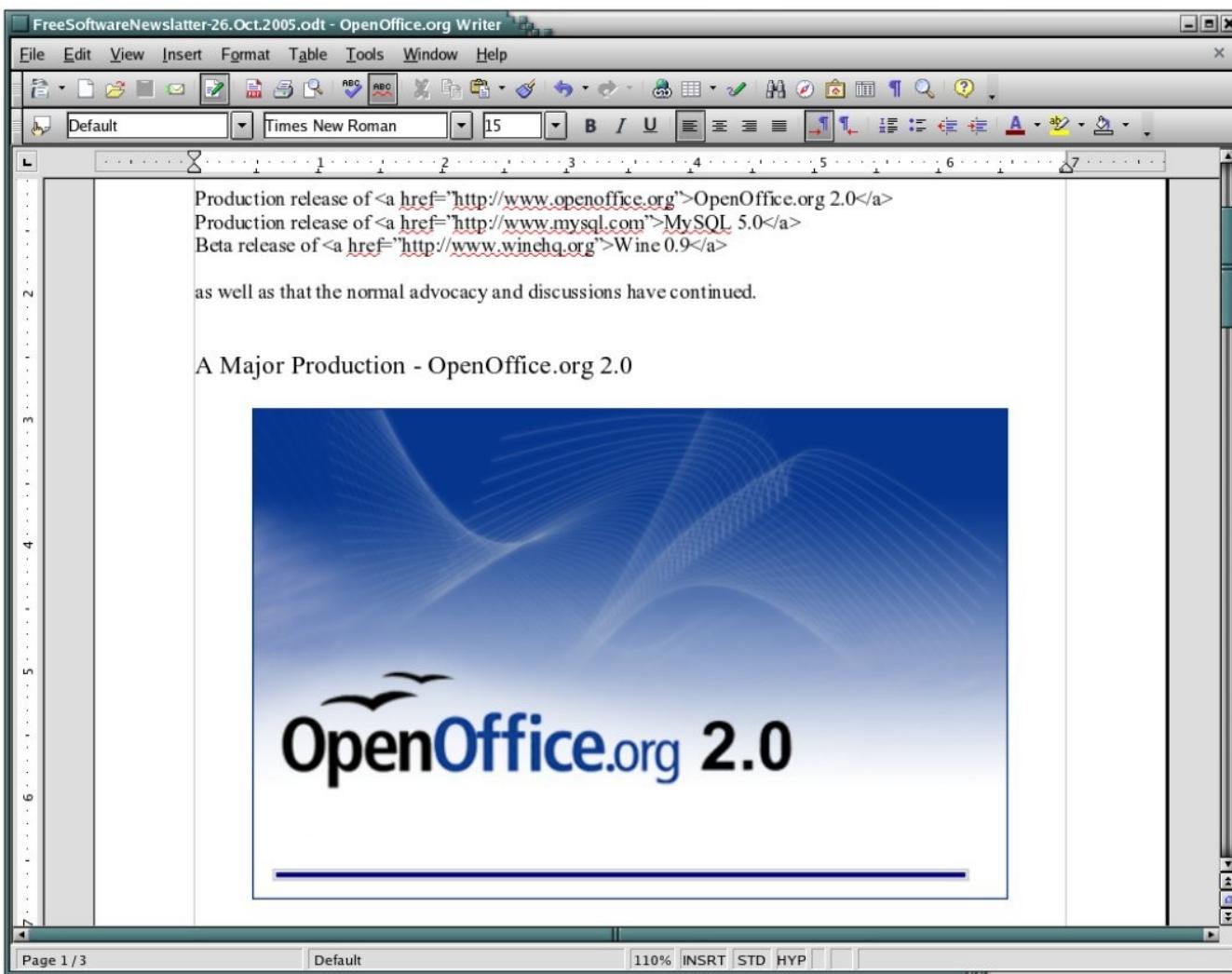
- 2000: OpenOffice becomes Free Software
- 2002: OpenOffice 1.0
- 2005: OASIS standard, OpenOffice 2.0

OpenOffice.org 1.0, 2002



(source)

OpenOffice.org 2.0, 2005

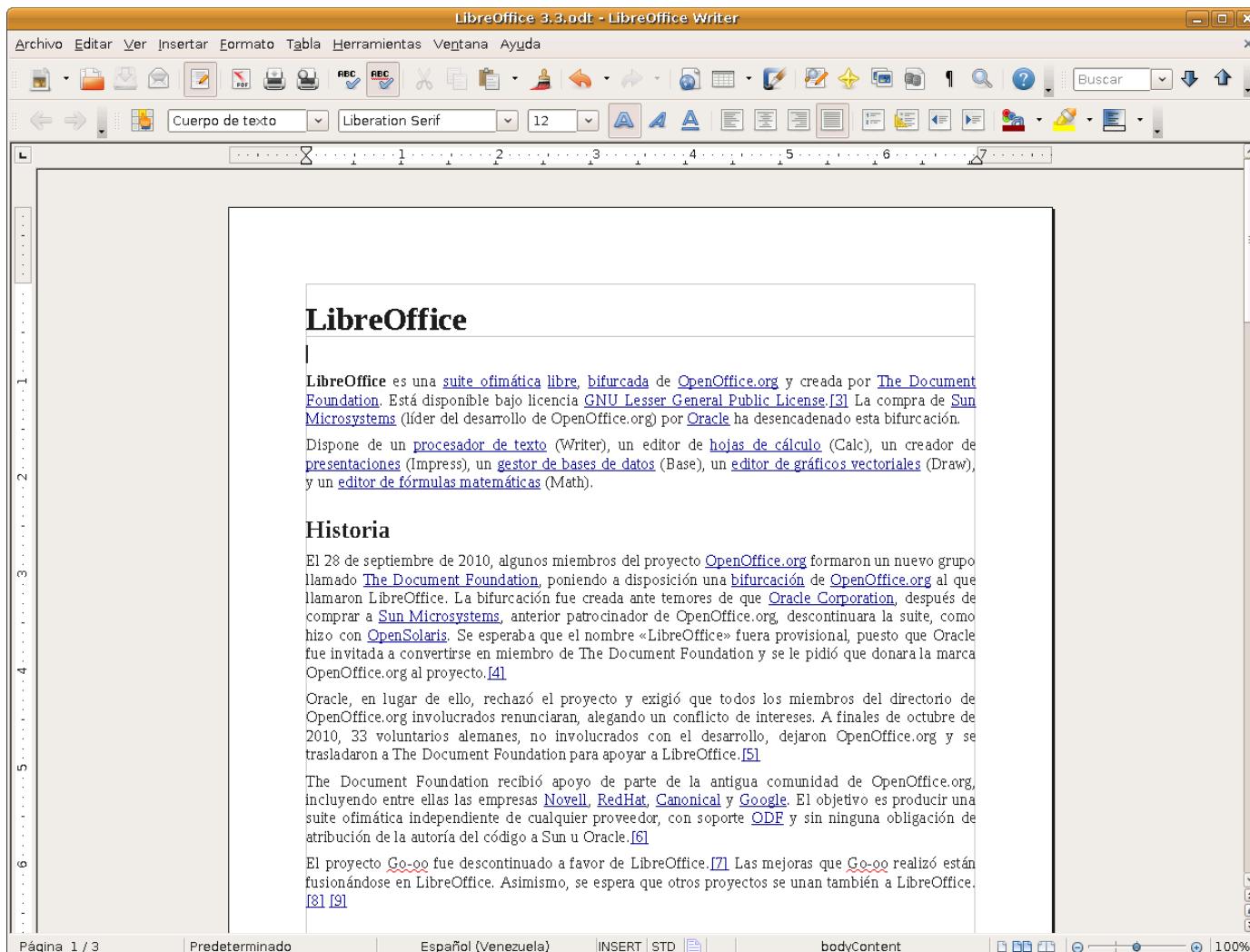


(source)

Some history

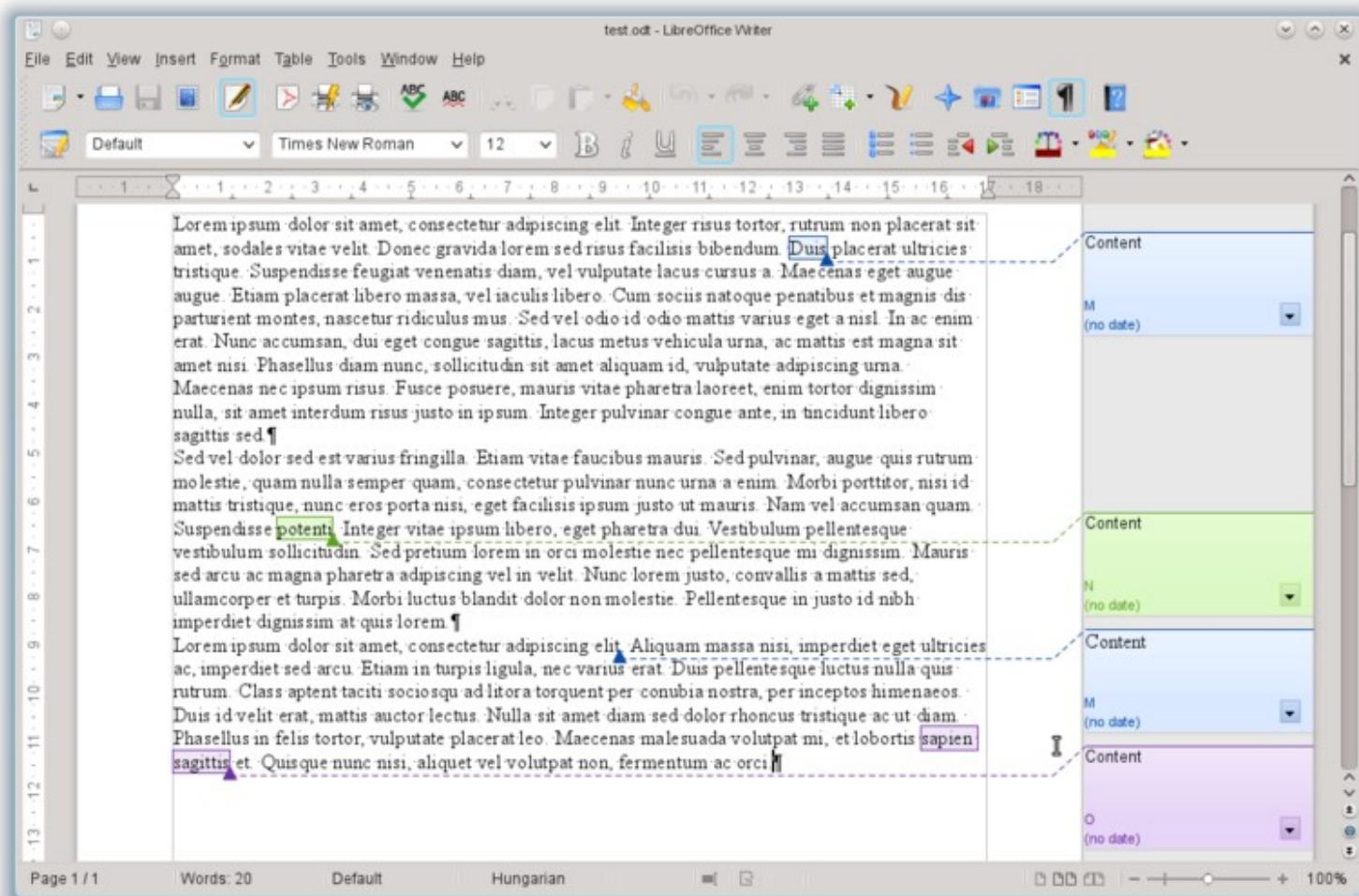
- 2010: Oracle acquires Sun
- 2010: LibreOffice and The Document Foundation
- 2011: Apache OpenOffice

LibreOffice 3.3, 2010



(source)

LibreOffice 4.x, 2013-15



(source)

LibreOffice 5.x, 2015-17

The screenshot shows a LibreOffice Writer document titled "tdf-migrationwhitepaper1.pdf". The interface includes a top menu bar with File, Edit, View, Insert, Format, Styles, Table, Tools, Window, and Help. Below the menu is a toolbar with various icons for file operations, text styling (bold, italic, underline), and document layout. The main content area features the LibreOffice logo and the title "White Paper". A section titled "Migrating to LibreOffice to promote Software and Document Freedom" is present, followed by two paragraphs about LibreOffice's features and its adoption. The right side of the screen displays the "Properties" panel, which contains tabs for Styles, Character, and Paragraph, along with settings for font, size, and spacing.

LibreOffice 6.x, 2018-

The screenshot shows the LibreOffice Writer application window titled "tdf-migrationwhitepaper1.pdf - LibreOffice Writer". The interface includes a top menu bar with File, Home, Insert, Layout, References, Review, View, and Tools. Below the menu is a toolbar with various editing icons like Cut, Paste, Clone, and Liberation Ser. The main content area displays a white paper document with the LibreOffice logo and the title "White Paper". The text discusses migrating to LibreOffice for productivity and its adoption by governments and organizations worldwide. It also mentions the Hybrid PDF feature and document interoperability.

White Paper

Migrating to LibreOffice to promote Software and Document Freedom

LibreOffice is the leading Free Software personal productivity suite for MS Windows, MacOS X and GNU/Linux, offering six feature-rich applications for all document production and data processing needs: Writer for text, Calc for spreadsheets, Impress for presentations, Draw for drawings, Base for databases, and Math for mathematical annotations.

LibreOffice is designed to address any personal productivity need, whether the user is an individual or an organization. The software is deployed on millions of PCs, including those of the French government, many regions, provinces and cities all over Europe - including the city of Munich in Germany - and many other organizations like the hospital system of Copenhagen in Denmark.

LibreOffice adopts the ISO standard Open Document Format (ODF), recognized by governments and organizations worldwide - including NATO - and based on true open standards, as the default format for all office documents. ODF files can easily be recognized by the filename extension: .odt for texts, .ods for spreadsheets, .odp for presentations, .odg for drawings, .odb for databases and .odf for mathematical formulas.

LibreOffice allows to save documents in the so called "Hybrid PDF" format, which is a standard PDF file which embeds a fully editable ODF document. These documents can be opened by LibreOffice users as normal ODF documents, and by other users as plain PDF files (the recipients will get perfect formatting when reading-only, but still can edit the document in LibreOffice if necessary). This represents a significant improvement in document interoperability, which is impossible to obtain with proprietary solutions.

LibreOffice provides shortcuts to send documents as e-mail attachments in all available formats: ODF, PDF (including Hybrid) and MS Office formats, including legacy ones.

Page 1 of 8 | 3,462 words, 21,803 characters | Default Style | English (USA) | 100%

LibreOffice Online, 2019

The screenshot shows a LibreOffice Online interface with a document titled "example.odt". The document content is as follows:

ownCloud Example Document

Welcome to ownCloud, your self-hosted file sync and share solution.

OwnCloud is open source file sync and share software for everyone from individuals operating the free Community Edition, to large enterprises and service providers operating ownCloud Enterprise Edition. ownCloud provides a safe, secure and compliant file sync and share solution on servers you control.

With ownCloud you can share one or more folders on your PC, and sync them with your ownCloud server. Place files in your local shared directories, and those files are immediately synced to the server, and then to other PCs via the desktop client. Not near a desktop client? No problem, simply log in with the web client and manage your files there. The Android and iOS mobile apps allow you to browse, download and upload photos and videos. On Android, you may also create, download, edit and upload any other files, with the correct software installed.

Whether using a mobile device, a workstation, or a web client, ownCloud provides the ability to put the right files in the right hands at the right time on any device in one simple-to-use, secure and controlled solution.

After all, with ownCloud, it's Your Cloud, Your Data, Your Way.

At the bottom, there are search and navigation controls: Buscar: [] ⌂ ⌂ Página 1 de 1 | 204 palabras, 1.239 caracteres | Insertar | Selección estándar | Alemán (Alemania) | 2 usuarios | ⌂ ⌂ | 100% +

Apache OpenOffice 4.1.7, 2019

The screenshot shows the Apache OpenOffice Writer application window with the file 'My Resume.odt' open. The document contains a resume with sections for employment history, education, and skills. The resume is formatted with a header, contact information, and two employment entries. The right side of the screen displays the Properties panel, which shows font settings (Port Lligat Slab, size 10), paragraph settings (list style, alignment, spacing), and page settings (margin, indent). The bottom of the window shows the status bar with page numbers, language, and other document details.

My Resume.odt - OpenOffice Writer

File Edit View Insert Format Table Tools Window Help

Port Lligat Slab 10 B I U

Properties

Text: Port Lligat Slab, 10

Paragraph: Indent: 1.25"

Page: Margin: 0.00", 0.00", -0.25"

John Doe

E-mail: john@example.com Mobile: (555) 555-7840

12 Main St.
Toronto, Ontario
A1A 1A1

◆ EMPLOYMENT

IT Information Management Developer, XYZ Co.

- Projects were executed in a Rational Unified Process iterative life cycle. Gained a spectrum of valuable project skills like collecting & negotiating requirements and deliverables, modeling, planning, development drops and deadlines, unit and functional testing, user acceptability, production deployment and support.
- Designed and implemented a J2EE application for aggregating event driven e-mails and notifications based on analytical data. The application integrated Dojo, JAXB, Websphere feature pack for XML and Java Mail API to create rich browser UIs and e-mails.
- Developed a framework web application for reporting on all aspects of the IT environment for IBM SWG Labs worldwide. The application served as a tool for assessing the state of the IT environment for function managers and lab directors worldwide. J2EE application written in Rational Software Architect and integrated with the Eclipse BIRT project as the reporting engine.
- Developed Business Intelligence reports for the integrated BIRT engine against the CMDB warehouse heavily using SQL.
- Developed, delivered and supported a Windows Mobile 6 barcode app for auditing, managing and locating hardware assets. Scanned assets and their configurations are sent from the device to the configuration management database (CMDB) on DB2. Smartphone .NET C# application written in Visual Studio and integrated with IBM DB2 Everyplace for synchronizing data with the CMDB.
- Designed and implemented a J2EE application for scoring computing resource utilization in our data center. The application integrated JBoss Charts Enterprise using JSF for chart graphics.
- Designed and implemented a project for reporting and improving a data centre's efficiency by executing analytics on CMDB data. The output report details areas for improvement. The score is weighted to value energy savings compared to the amount of effort to accomplish the savings. Java application using JDBC/SQL and XML/XSLT/XPath.

Web Developer Internship, ABC Inc.

- Created, tested and debugged changes to JSP pages throughout the development cycle of three finance web applications using the NetBeans IDE.
- Financial data such as purchase orders were entered in the web applications and stored in an Oracle database. One job responsibility was to develop reports using Oracle PL/SQL and Microsoft

January 2008 – May 2013

May 2007 – August 2007

Page 1 / 2 Default English (USA) INSRT STD Level 1 90% (source)

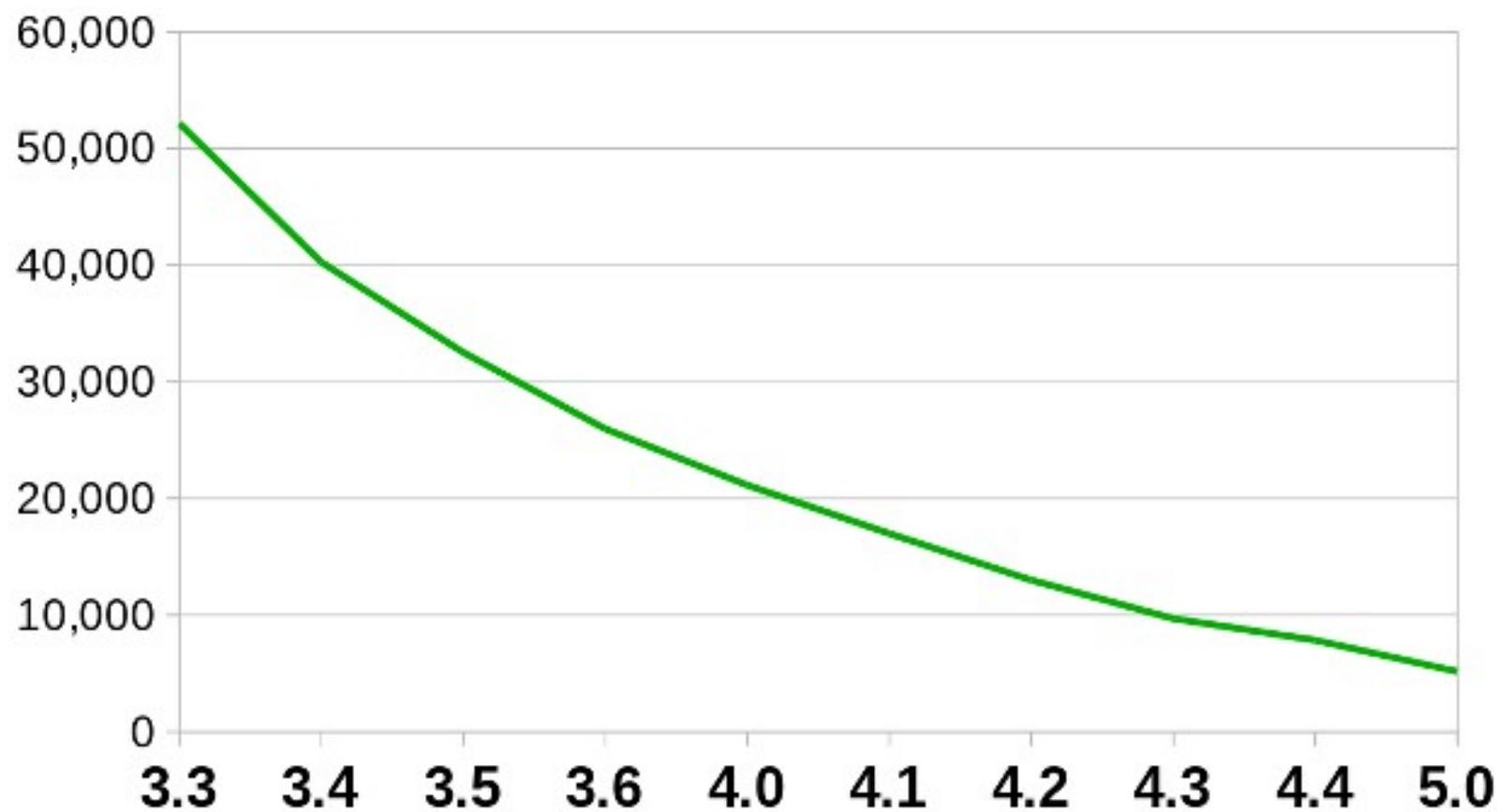
The project today

Development figures

- Around 400 weekly commits by 50 different authors
- 9M lines of code
- ~28 years of history
 - “Exact history was lost before Sept. 18th, 2000, but old source code comments show that Writer core dates back until at least November 1990.”
- Still 50000 lines of German code comments when LibreOffice was forked!
 - Bug closed in 2018

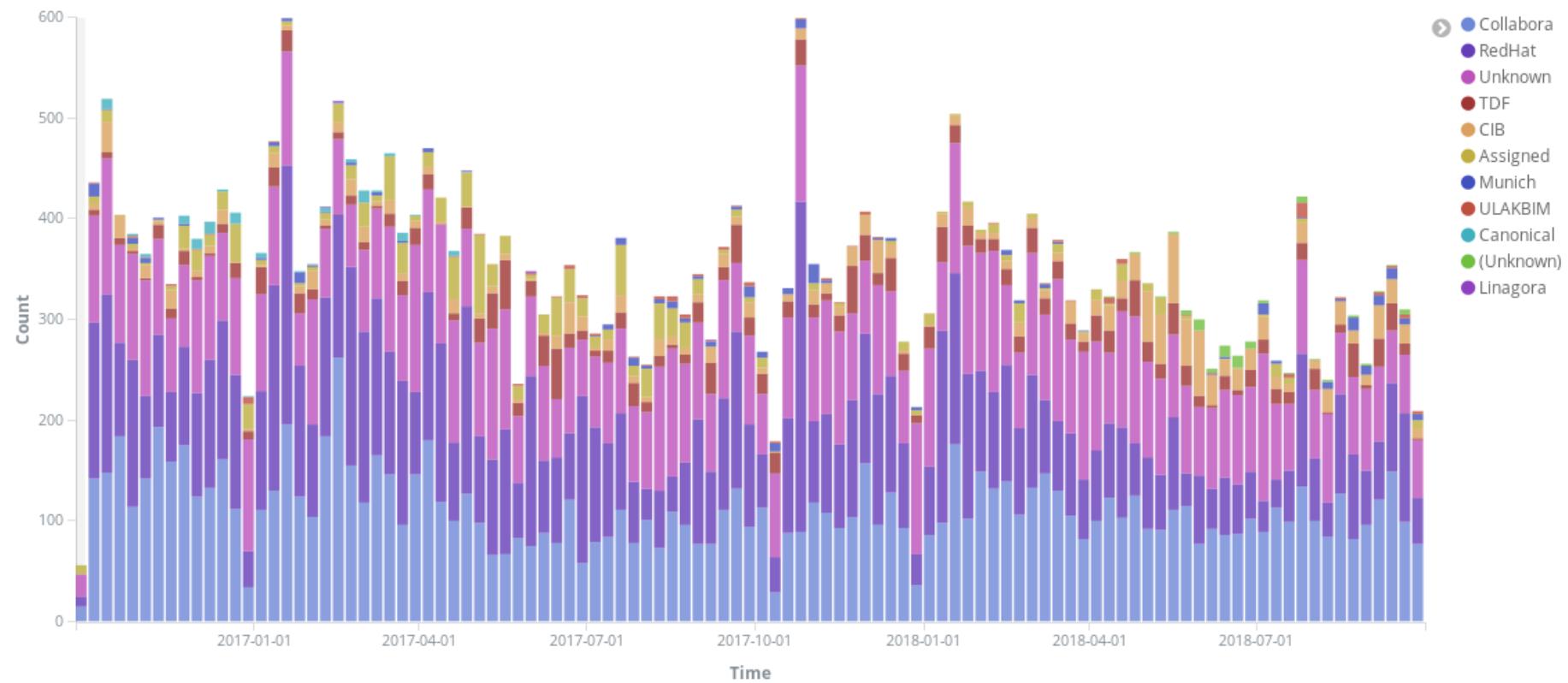
Stats: German comments

Detected lines of German comment



Stats: commits (Oct 16-Sep 18)

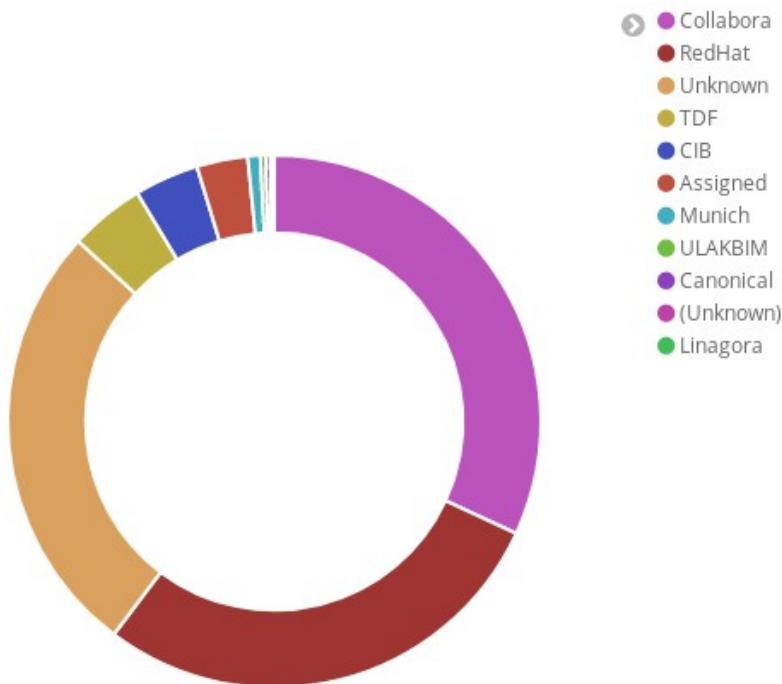
Organizations



(source)

Stats: commits (Oct 16-Sep 18)

Organizations



(source)

Release calendar

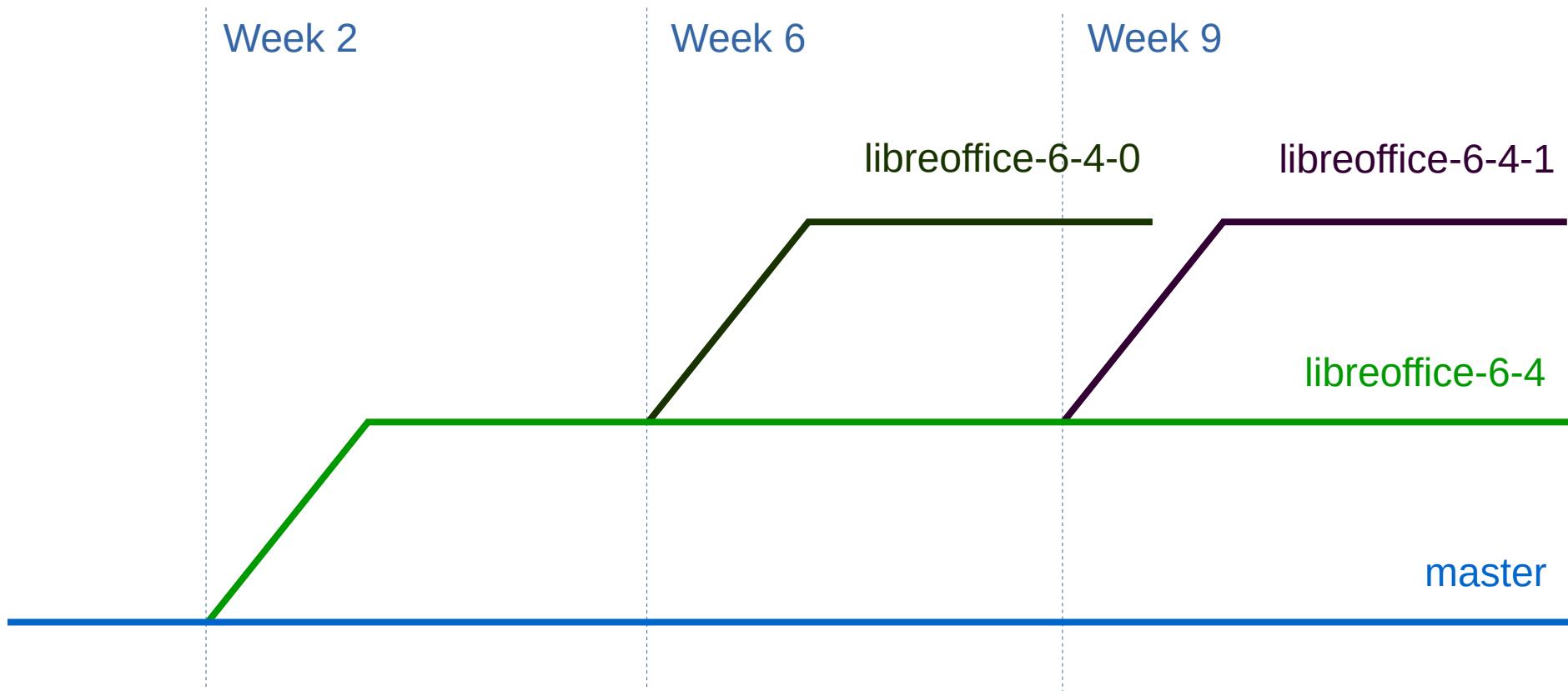
- *Release early, release often*
- Major release every six months (6.3.0)
 - Brings new features
- Minor release ~ every month (6.3.1, etc.)
 - Bugfixing only
- End of life: 9 months
- Always two versions coexisting
 - Right now: 6.2.8 and 6.3.3

Release calendar

- Plan for 6.4
 - <https://wiki.documentfoundation.org/ReleasePlan>

Release	Freeze	Publishing
6.4.0 (freeze: week 02)	Week 42 , Oct 14, 2019 - Oct 20, 2019	Week 05 , Jan 27, 2020 - Feb 2, 2020
6.4.1	Week 06 , Feb 3, 2020 - Feb 9, 2020	Week 09 , Feb 24, 2020 - Mar 1, 2020
6.4.2	Week 09 , Feb 24, 2020 - Mar 1, 2020	Week 12 , Mar 16, 2020 - Mar 22, 2020
6.4.3	Week 13 , Mar 23, 2020 - Mar 29, 2020	Week 16 , Apr 13, 2020 - Apr 19, 2020
6.4.4	Week 18 , Apr 27, 2020 - May 3, 2020	Week 21 , May 18, 2020 - May 24, 2020
6.4.5	Week 24 , Jun 8, 2020 - Jun 14, 2020	Week 27 , Jun 29, 2020 - Jul 5, 2020
6.4.6	Week 30 , Jul 20, 2020 - Jul 26, 2020	Week 33 , Aug 10, 2020 - Aug 16, 2020
6.4.7	Week 39 , Sep 21, 2020 - Sep 27, 2020	Week 42 , Oct 12, 2020 - Oct 18, 2020
End of Life	November 30, 2020	

Branch model



Organizing a community

- The Document Foundation umbrella
 - Owns trademarks
 - Collects donations
 - Provides services to community
 - Organizes events
 - Occasionally funds development

Organizing a community

- Communication channels
 - Mailing lists
 - IRC
 - Bug tracker and code review
- Committees and teams
 - Engineering Steering Committee
 - Design team
 - QA team

Organizing a community

- Ultimately, individuals and companies define the project priorities by providing effort

Current lines of work

- Mobile and cloud versions
 - LibreOfficeKit API
- Support more document types
 - OOXML
 - Document Liberation Project
- GTK+ 3, Wayland, KDE Plasma
- UX improvements (design team)
- Polish

Architecture

General considerations

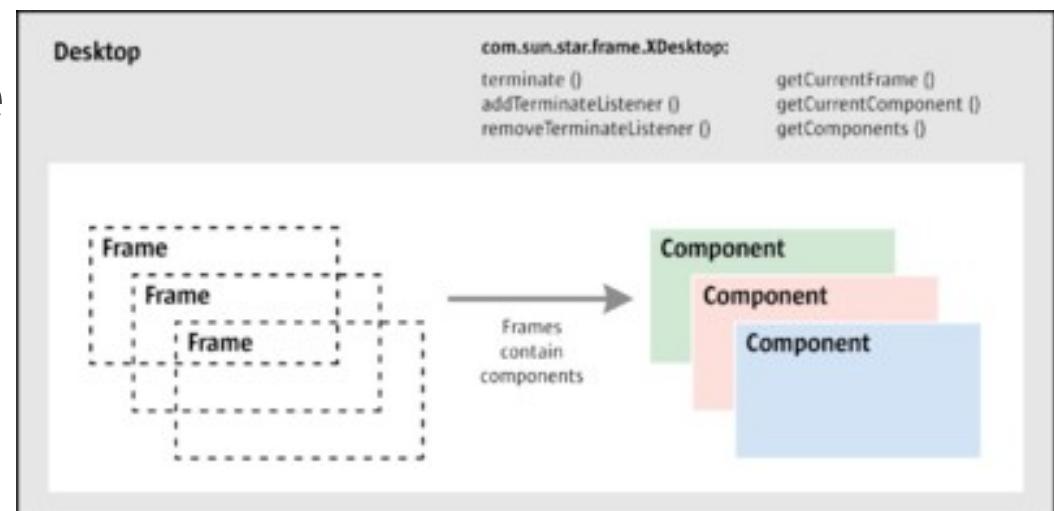
- There is not a global, application-wide design
 - Document filters: finite-state machine
 - VCL (visual components library): modeled after existing UI frameworks
 - Document model: Frame-Controller-Model

Frame-Controller-Model

- Model
 - Represents an object from the document
 - Text, shapes, spreadsheet cells
- Controller
 - Interaction between the screen and the model
 - Observes the model
 - Manipulates the presentation but not the model
- Frame
 - Bidirectional communication between controller and UI
 - Hierarchical organization

Other elements

- Component
 - Common interface between controller and frame
 - A frame can contain several components, which are either controllers of other frames
- Desktop
 - Hierarchy root frame
 - Specific interface



Dispatch framework

- Communication interfaces between components and UI
- Commands expressed by a URL
- Implemented in frames and controllers
- Responsibility chain
 - Traverse the hierarchy until reaching the one implementing the command

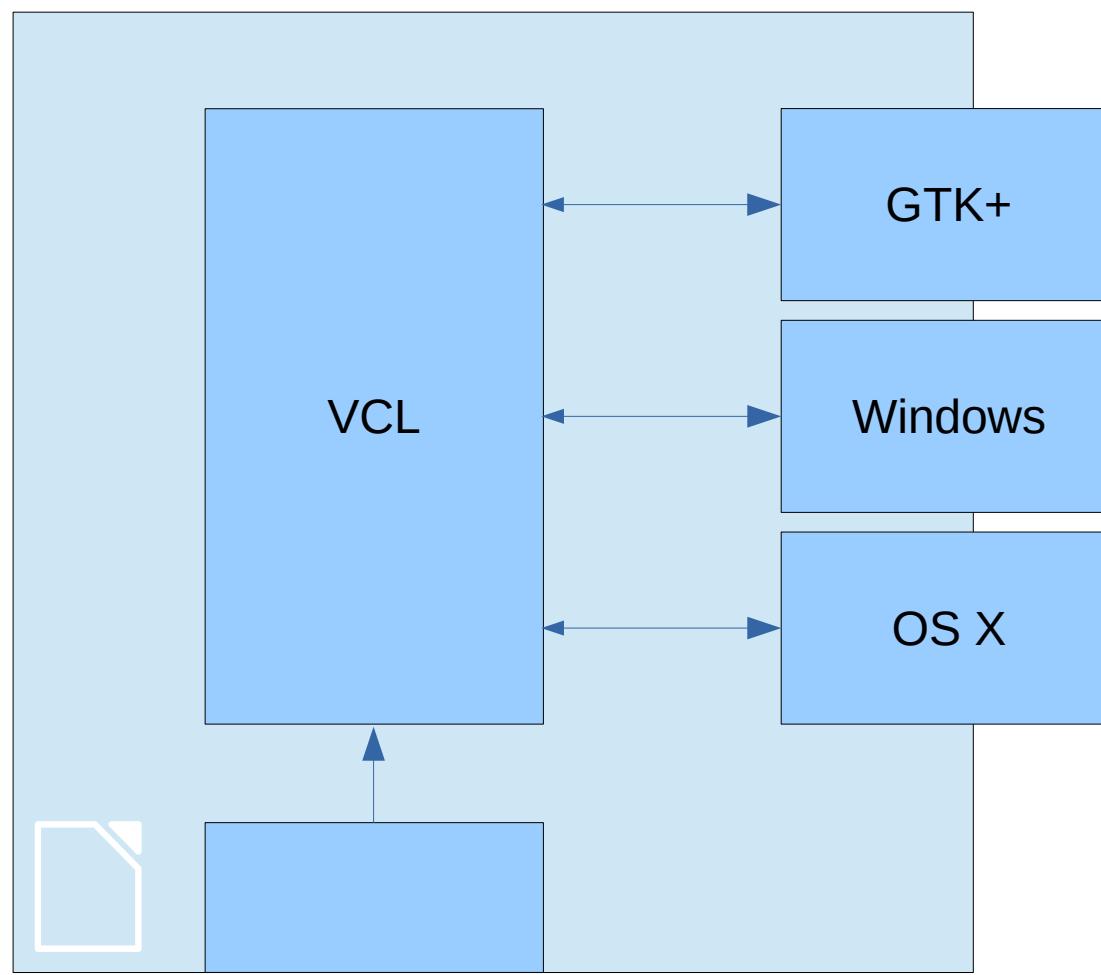
Other considerations

- Sometimes, interfaces expose the Frame-Controller-Model architecture but the implementation does not match
 - Historical reasons: architecture was engineered over an existing code base
 - Need to provide uniform API

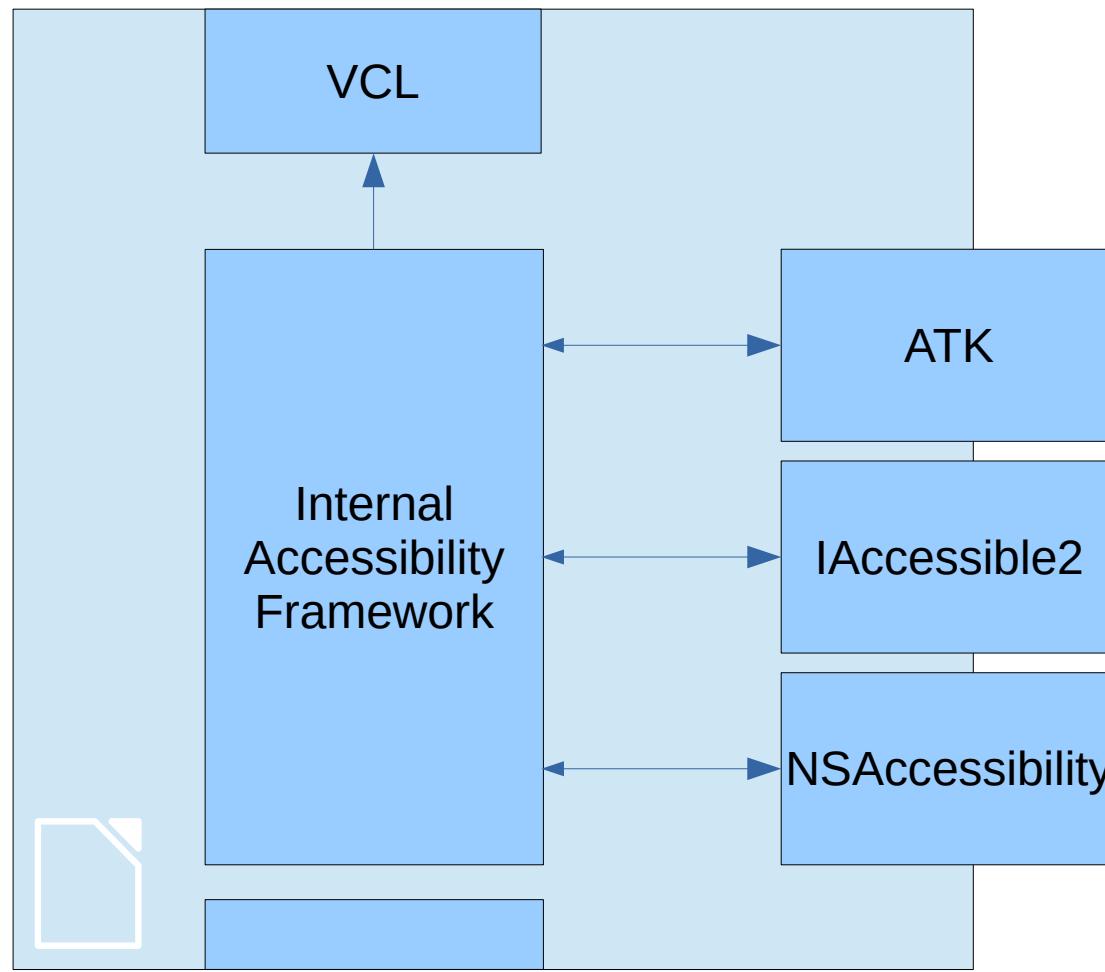
Visual components library

- Abstract UI elements: buttons, menus, etc.
- Each abstract element wraps an actual element of a supported UI framework
- Several UI frameworks available, enabled in compile time
 - GTK+, Windows, OSX

Visual components library



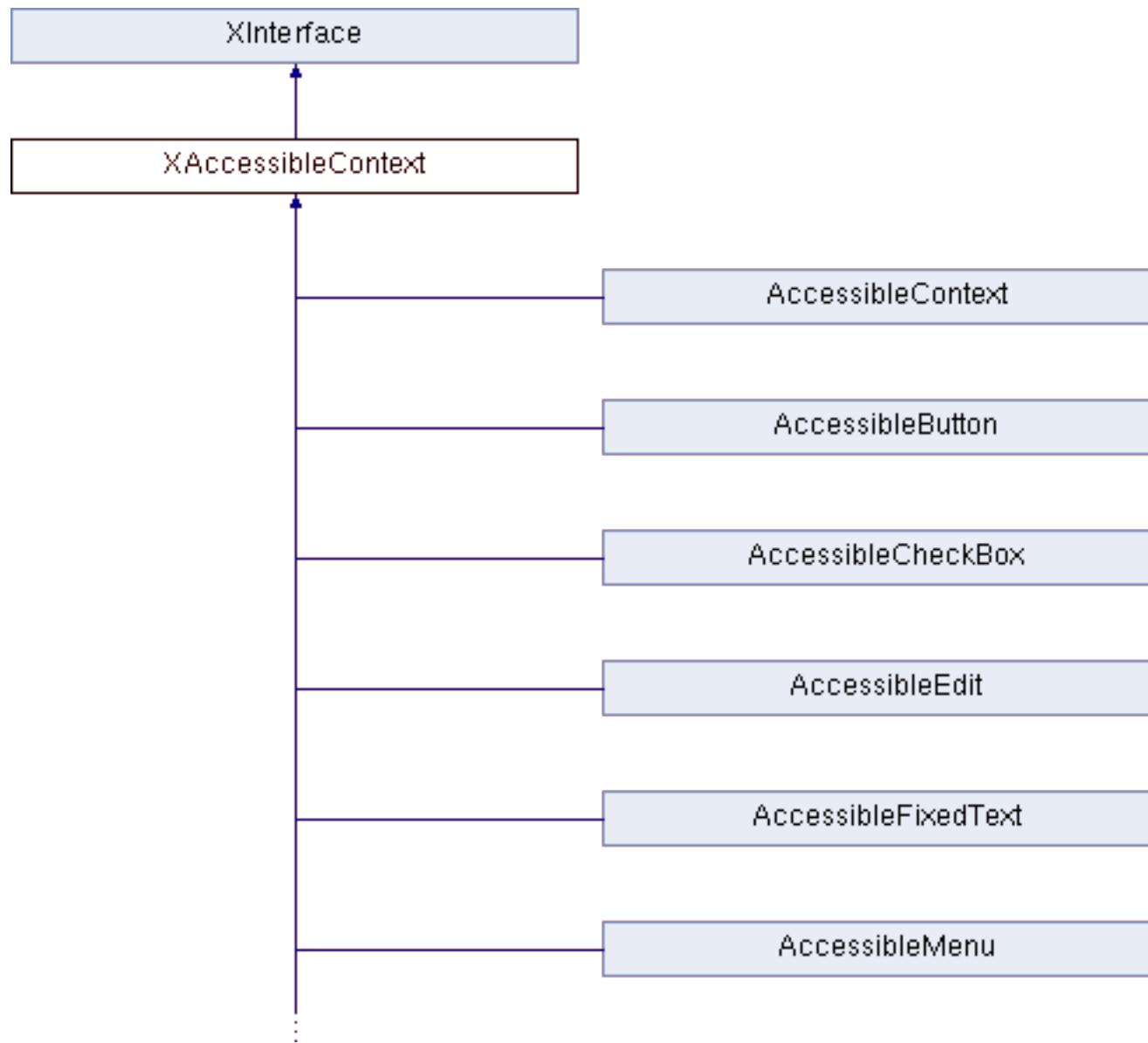
Accessibility framework



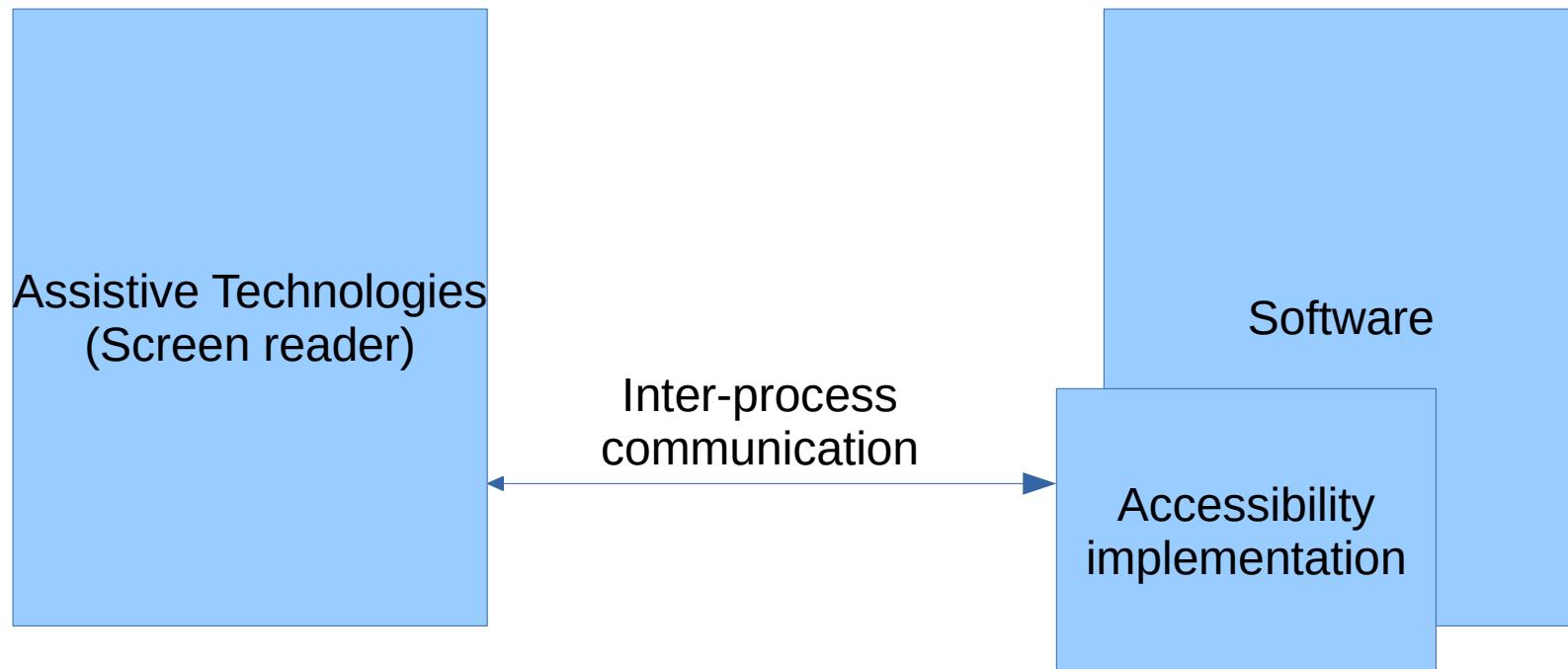
Accessibility framework

- Abstract accessible elements: buttons, menus, etc.
- Accessible elements match members of the VCL and wrap native classes of the a11y framework
- Several frameworks available, enabled in compile time
 - ATK (Linux), IAccessible2 (Windows), NSAccessibility (OSX)

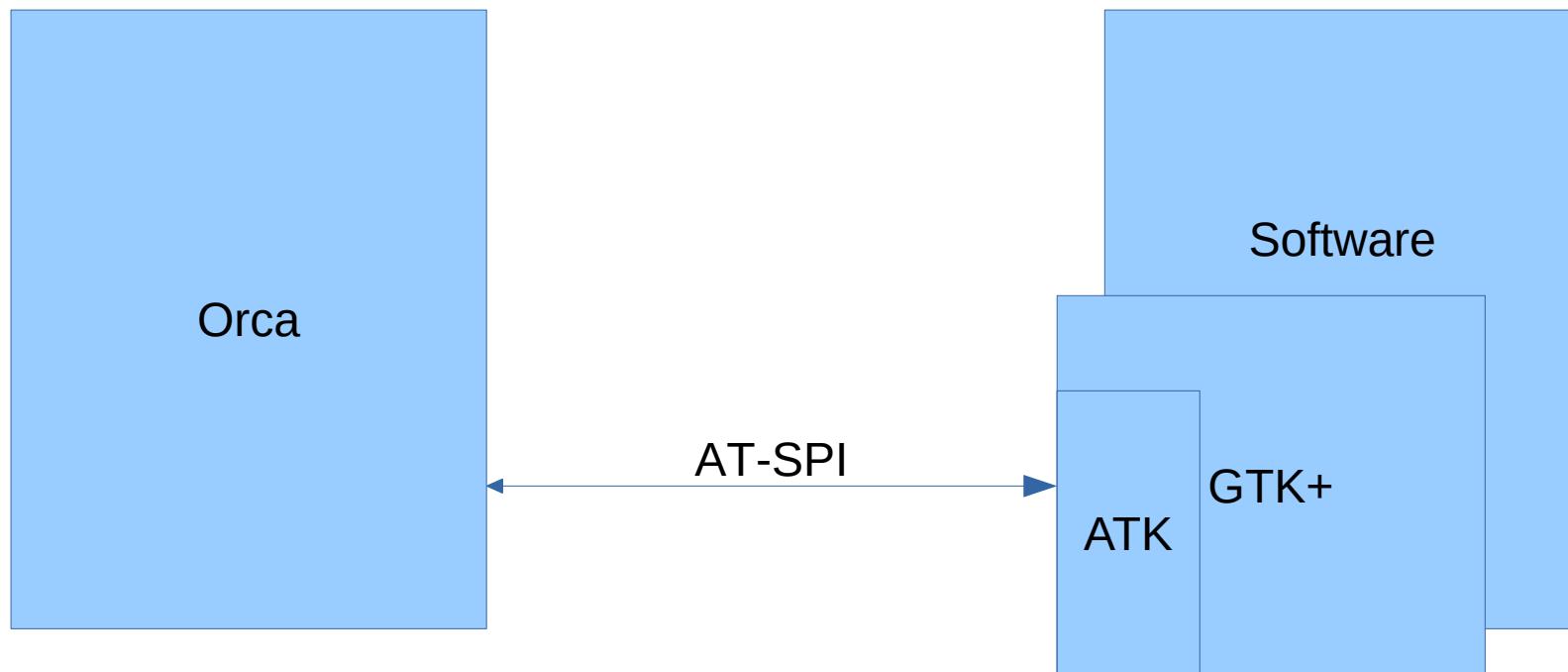
Interfaces involved in a11y



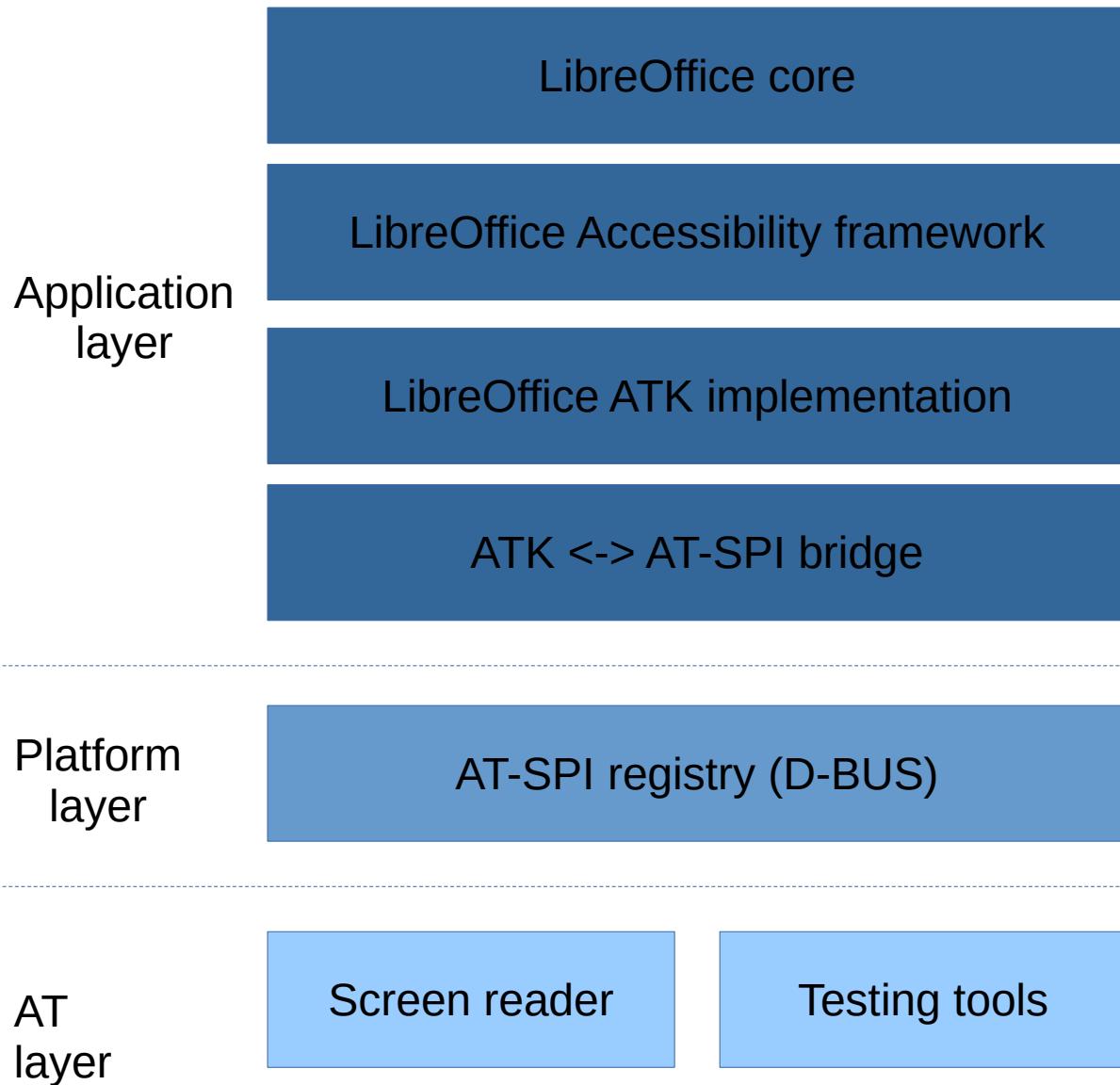
An abstract screen reader



Screen reader (GNOME)



Layers



Quality assurance

Techniques and tools

- Peer review
- Unit tests
- Continuous integration
- *Crashtests*
- Static code analysis
- *Bug triaging*

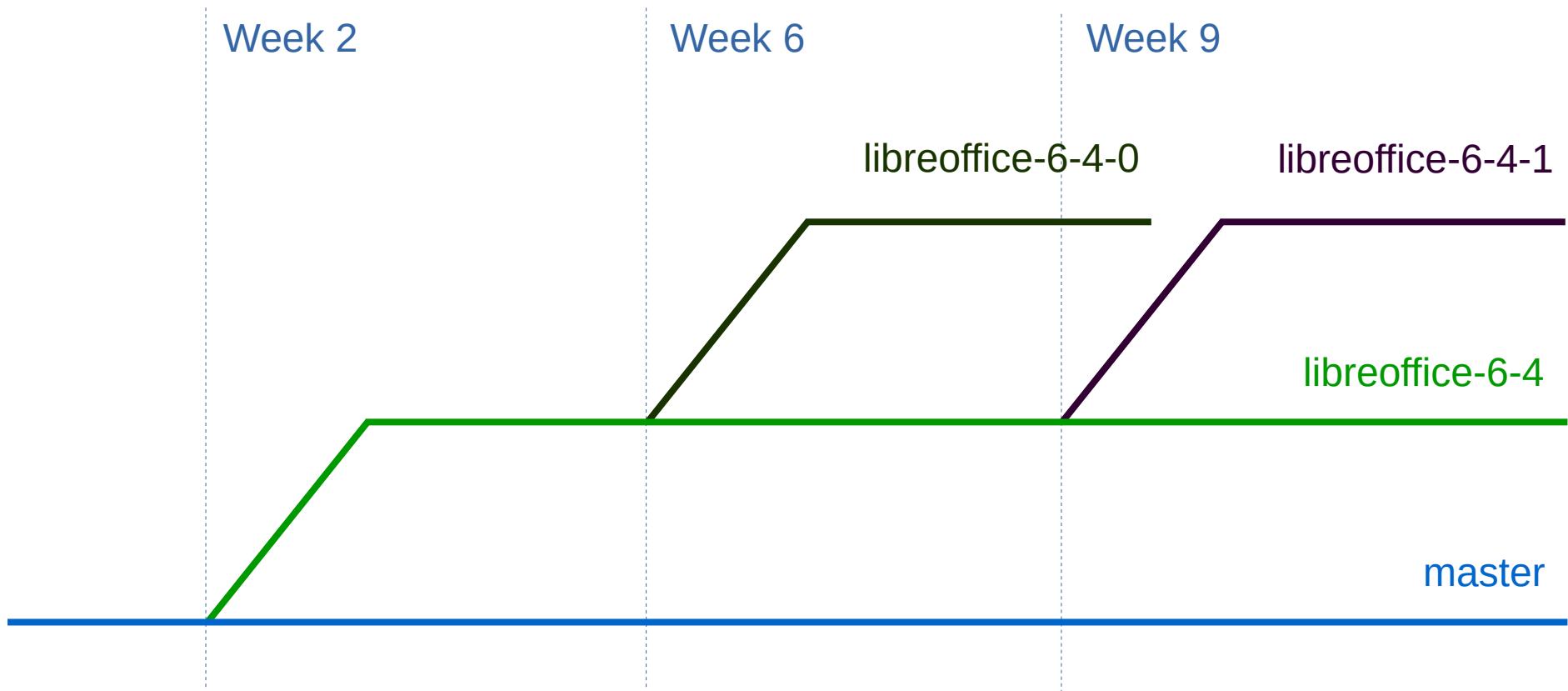
Regression detection tools

- Manual testing

Peer review

- master branch
 - Committers without review, 1 review for others
- libreoffice-6-4 branch:
 - Only bugfixing
 - +1 review in any case
- libreoffice-6-4-x branches:
 - Only patches from 6-4 branch
 - +2 reviews

Peer review



Peer review

Change 12213 by sushil_shinde Review in Progress C [Reply...](#)

Reviewers
CC test_jenkins_mac
Project core
Branch master
Strategy Cherry Pick

Updated 23 hours ago
Change-Id: I5d664867c982e48d2ff01363659282354822e541
Topic

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

Code-Review
Verified

Files Diff against: [Base](#)

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

History [Expand All](#)

sushil_shinde
Uploaded patch set 1.

test_jenkins_mac
Patch Set 1:
Build Started http://ci.libreoffice.org/job/gerrit_master/431/

test_jenkins_mac
Patch Set 1:
Build Successful
http://ci.libreoffice.org/job/gerrit_master/431/ : SUCCESS

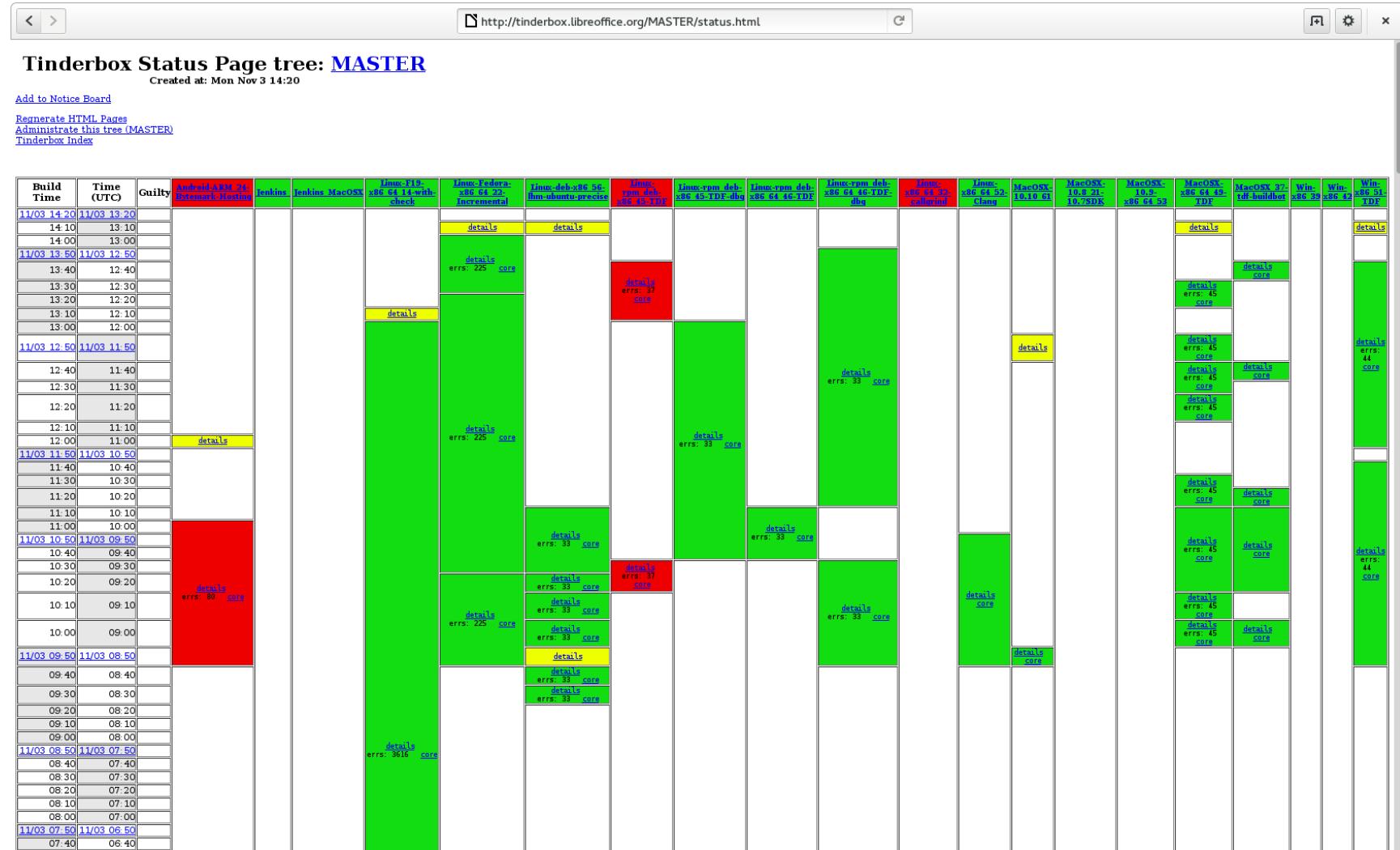
Unit tests

- Check key elements in documents
 - Import
 - Import + export + import
- Variable coverage
 - Good coverage for new document formats
- No automated UI testing as for now

Continuous integration

- Several machines are periodically compiling LibreOffice
 - Daily or several times per day
 - Also run unit tests
- Compile patches in code review
- Different platforms
 - All supported platforms and some more (Android, iOS)
- Different compilation options

Continuous integration



Crash tests

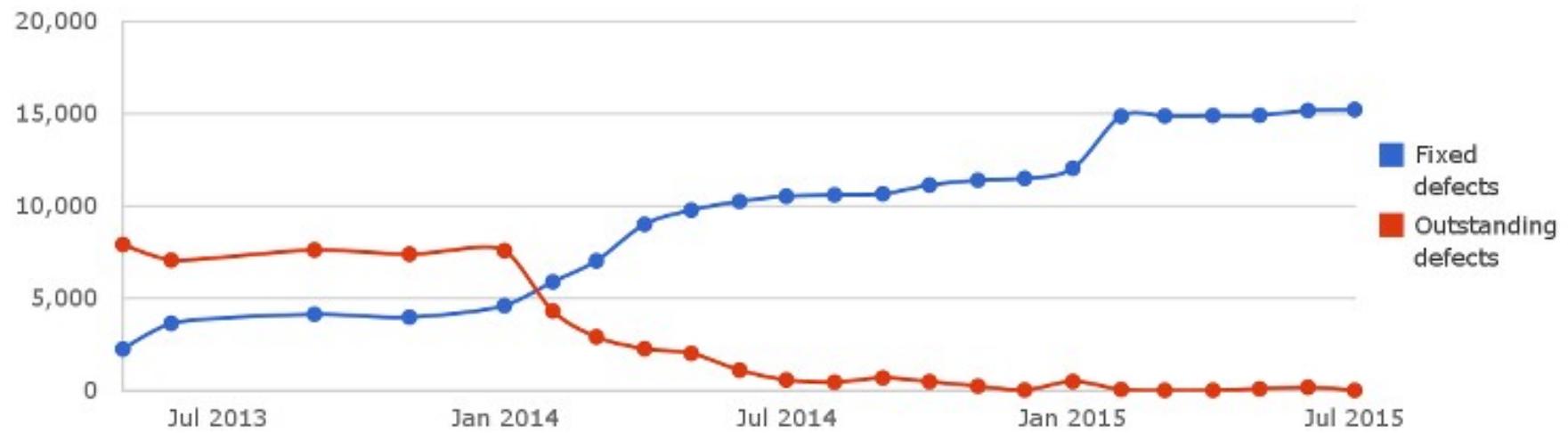
- Check crashes when opening and saving documents
- Sample size: 92000 documents
 - Most come from bug reports
- Periodicity: weekly

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
 - Density measured in defects every 1000 lines
 - Average for similar sized projects: 0,71

Static code analysis

Outstanding vs Fixed defects over period of time



Bug triaging

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

Regression detection tools

- Regression: a problem that was not present in previous versions
- Main tool to fix regressions: *bisect*
 - Binary search of the guilty commit
 - Recompilation cycle makes it unfeasible in LibreOffice
- LibreOffice tool: *bi-bisect (binary bisect)*
 - Binary repository from different development stages
 - Recompilation not necessary

Manual testing

- List of tests to be manually run
 - Tool: MozTrap
 - Testing rounds for every pre-release (betas, release candidates)
- “Freestyle” testing
- Bug hunting sessions



¡Thank you!



© 2014-2019 Igalia, S.L.