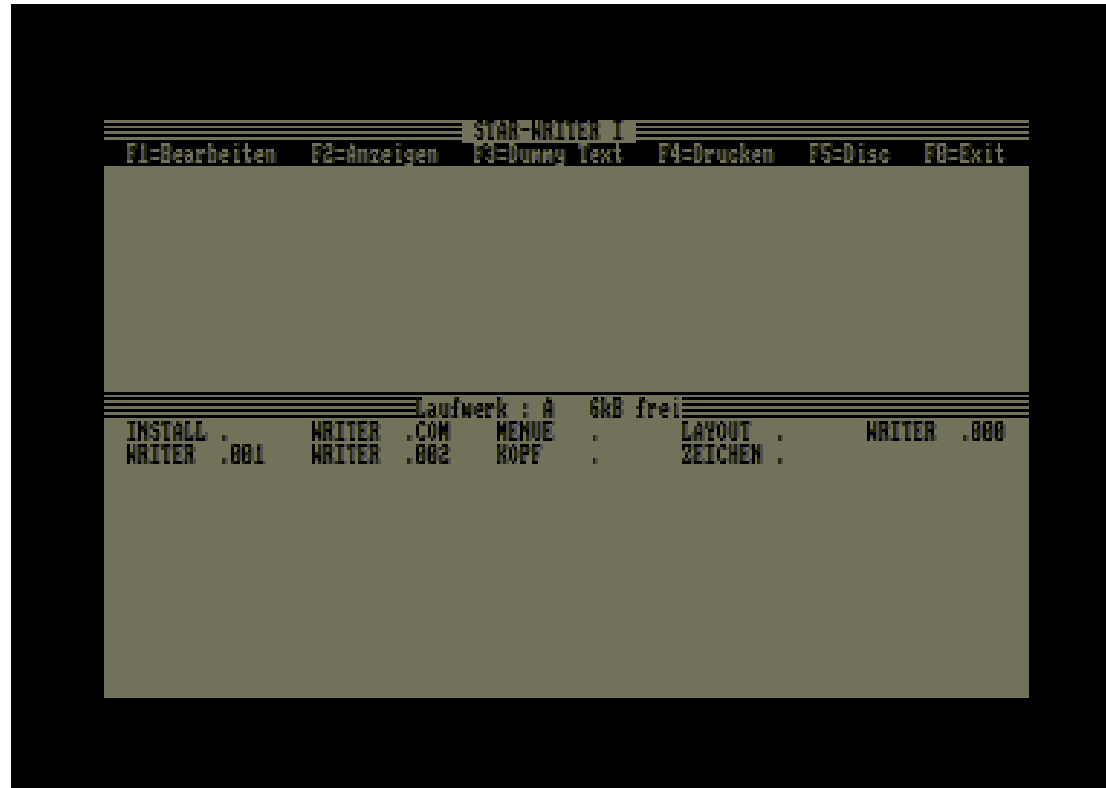


Project history

StarWriter 1.0, 1986



(source)

Early years (1980s)

- 1985: StarWriter for Z80 micros
- 1986: StarDivision founded in Germany
- Versions for Amstrad/Schneider Computers
 - CPC (CP/M operating system)
 - PC-1512 (MS-DOS)

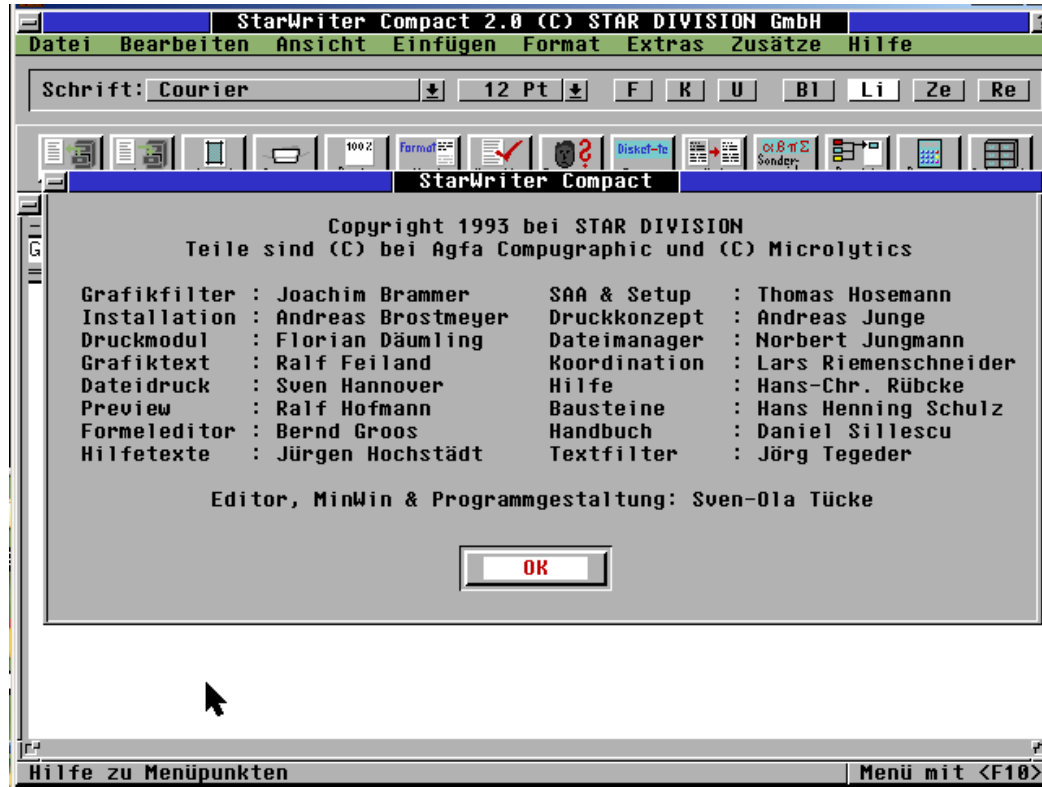


(by Bill Bertram, source)

Consolidation (1990s)

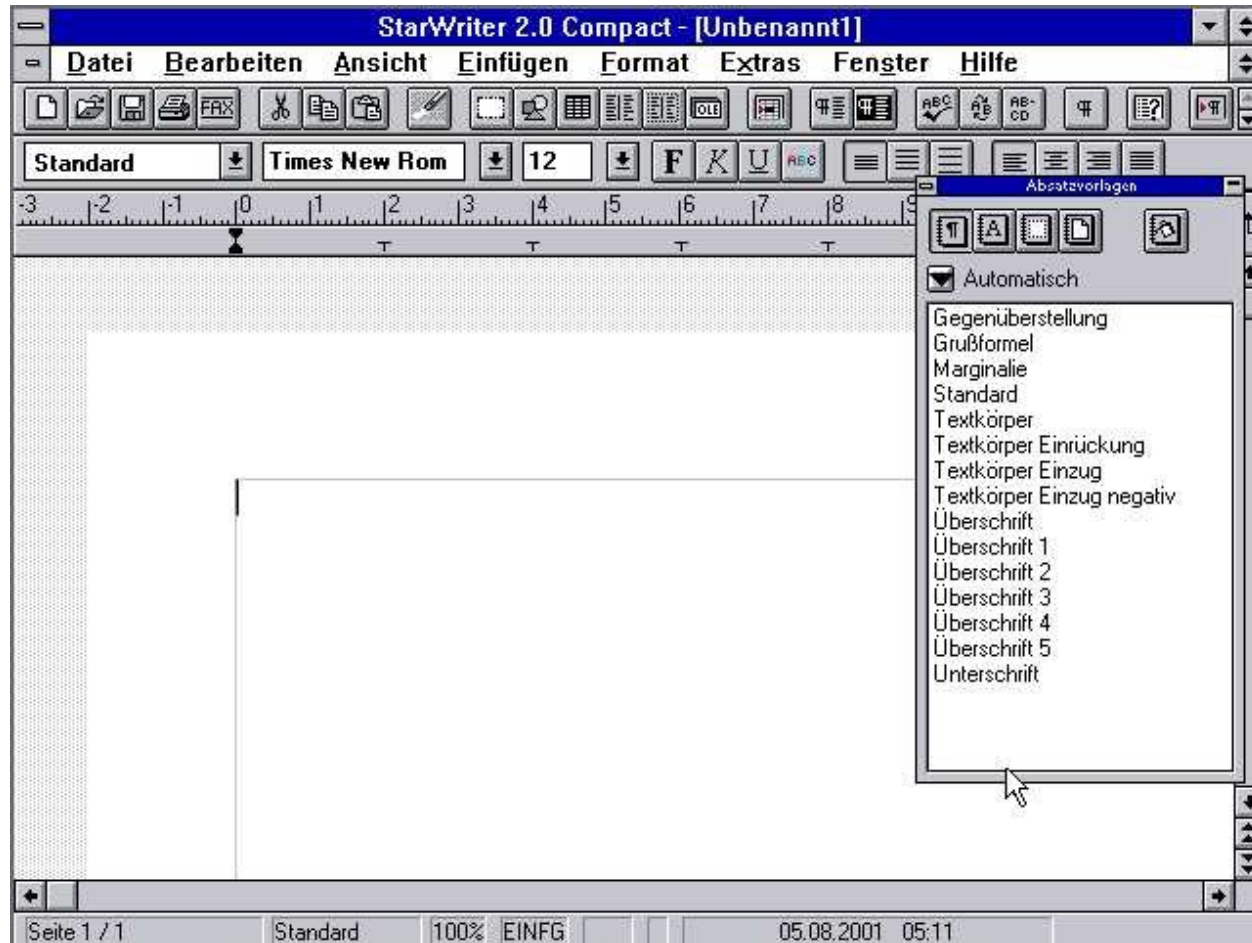
- StarOffice suite created
- Versions for:
 - MS-DOS, Windows 3.1, 95, NT (Microsoft, PC)
 - OS/2 (IBM PC)
 - Classic Mac (Apple)
 - Solaris (Sun)
 - Linux (PC)

StarOffice 2.0, 1994



(source)

StarOffice 2.0, 1994



StarOffice 5.2, 2000

StarOffice 5.2 - [kupfer.sdw]

file:///home/warmada/My-Data/Pongkor/soff/

Standard Times 12 B I U

Kupfer

Erzminerale

Chalkopyrit	CuFeS_2	34,5% Cu	D=4,2-4,3
Chalkosin	Cu_2S	80	5,7-5,8
Enargit	Cu_3AsS_4	48	4,4
Digenit	Cu_2S_2	78	5,7-5,8
Covellin	CuS	66	4,7
Cuprit	Cu_2O	89	6,2
Malachit	$\text{Cu}_2(\text{OH})_2\text{CO}_3$	72	4

- Bauwürdig 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 Metalles 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.
-

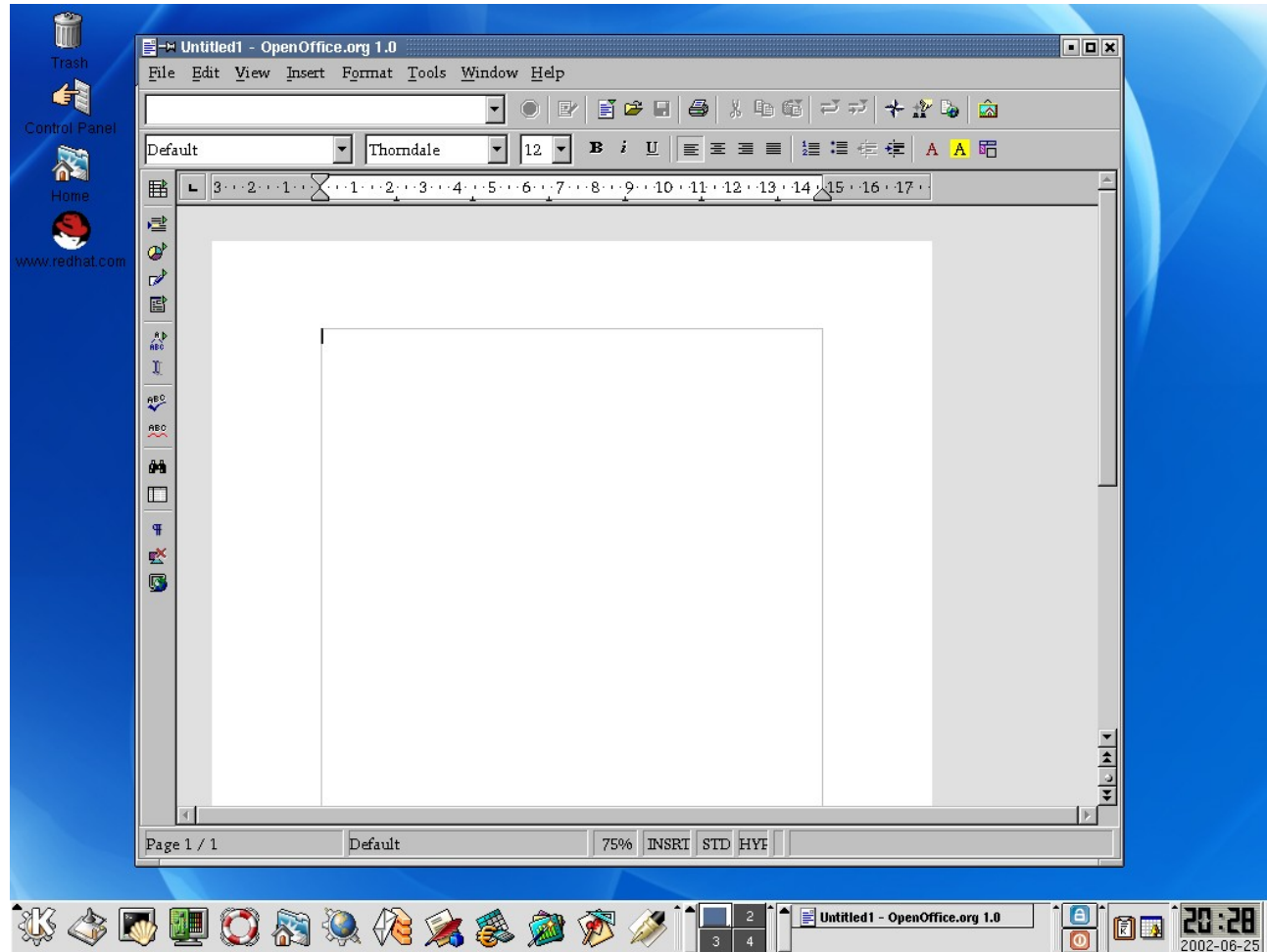
Page 1 / 1 Standard 111% INSRT STD HVP

Start kupfer.sdw 22:37

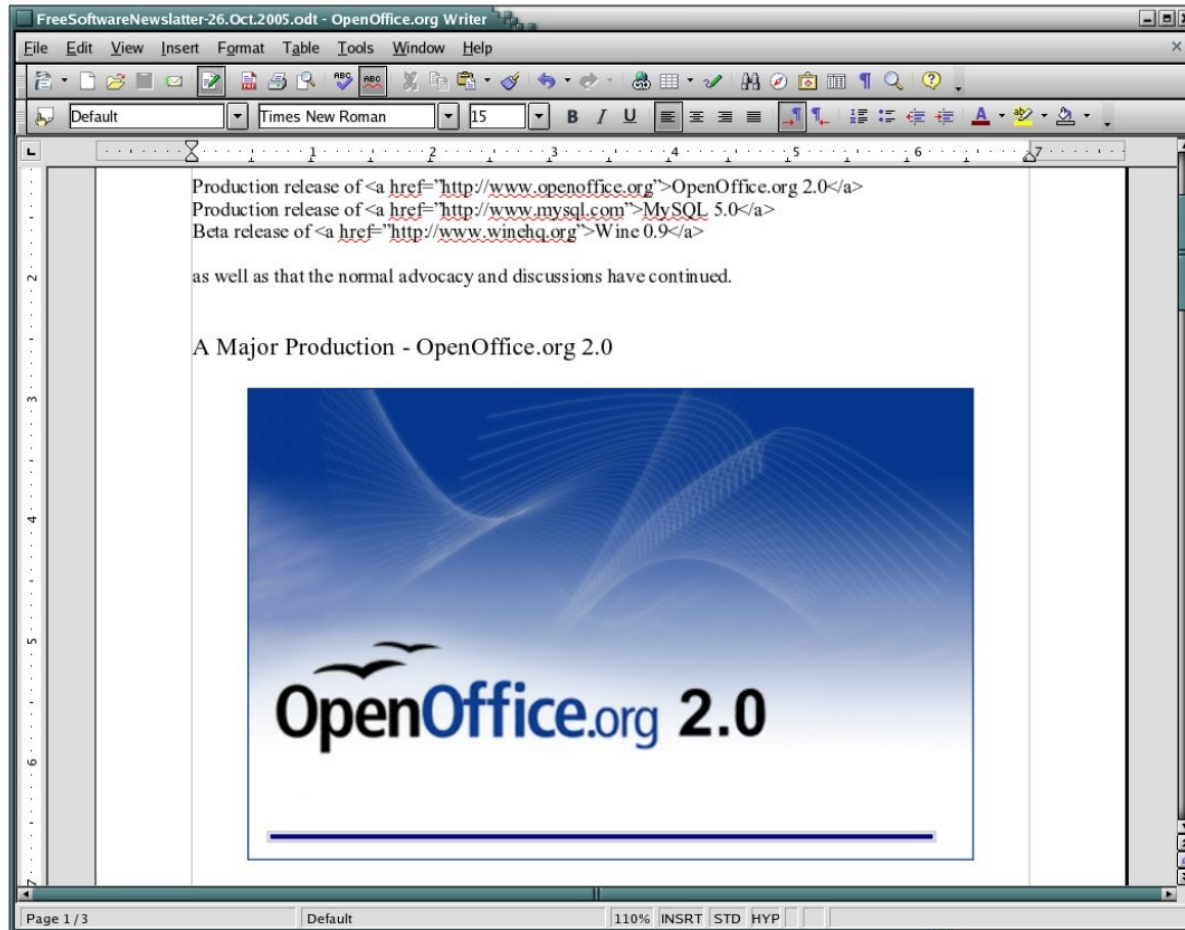
Under the Sun (2000s)

- 1999: Sun Microsystems acquires StarDivision for 60M\$
- 2000: Branded as OpenOffice, becomes Free Software
- 2002: OpenOffice 1.0
- 2005: OASIS standard, OpenOffice 2.0
- Consolidation as the main Linux office suite
 - Friction between Sun and the community

OpenOffice.org 1.0, 2002



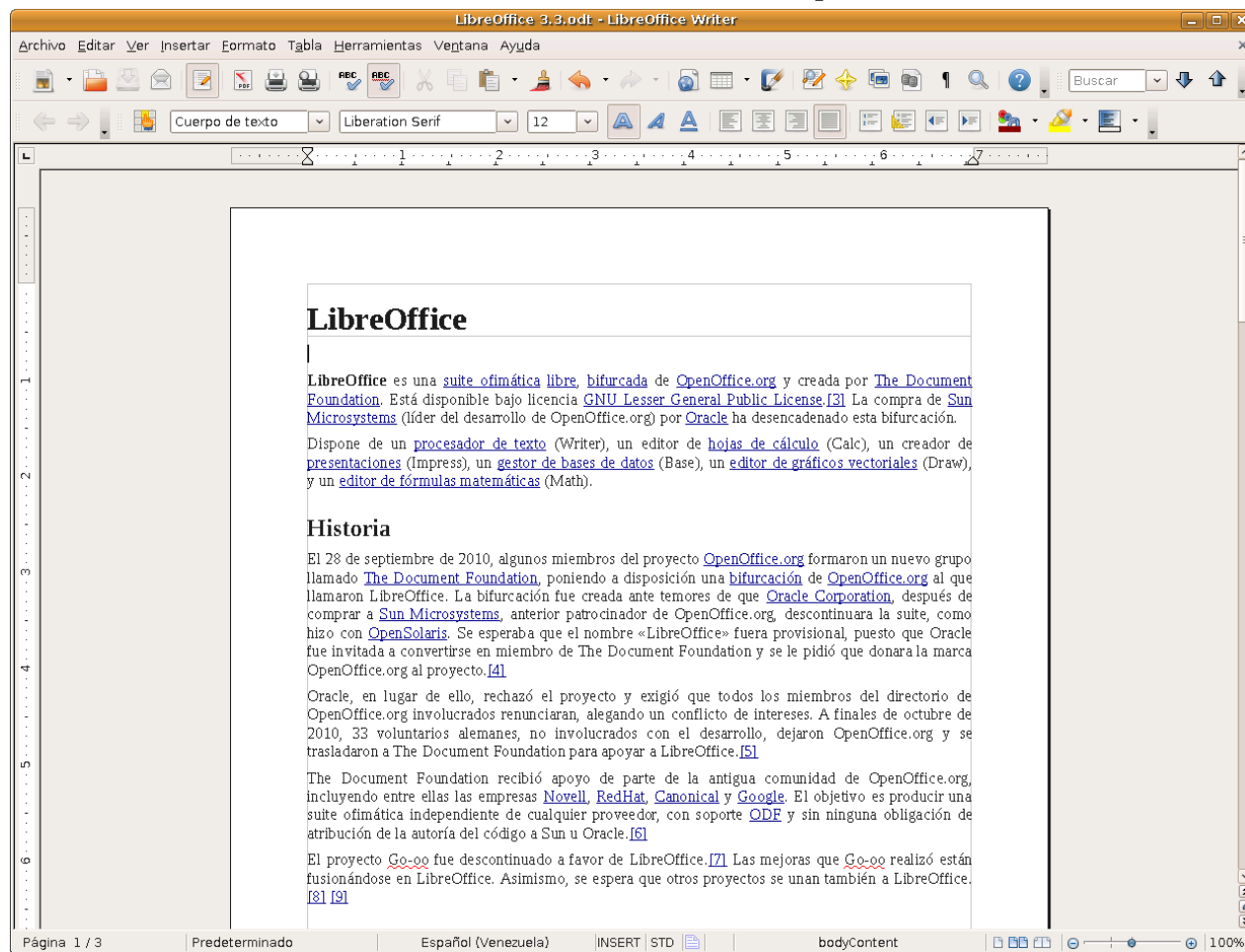
OpenOffice.org 2.0, 2005



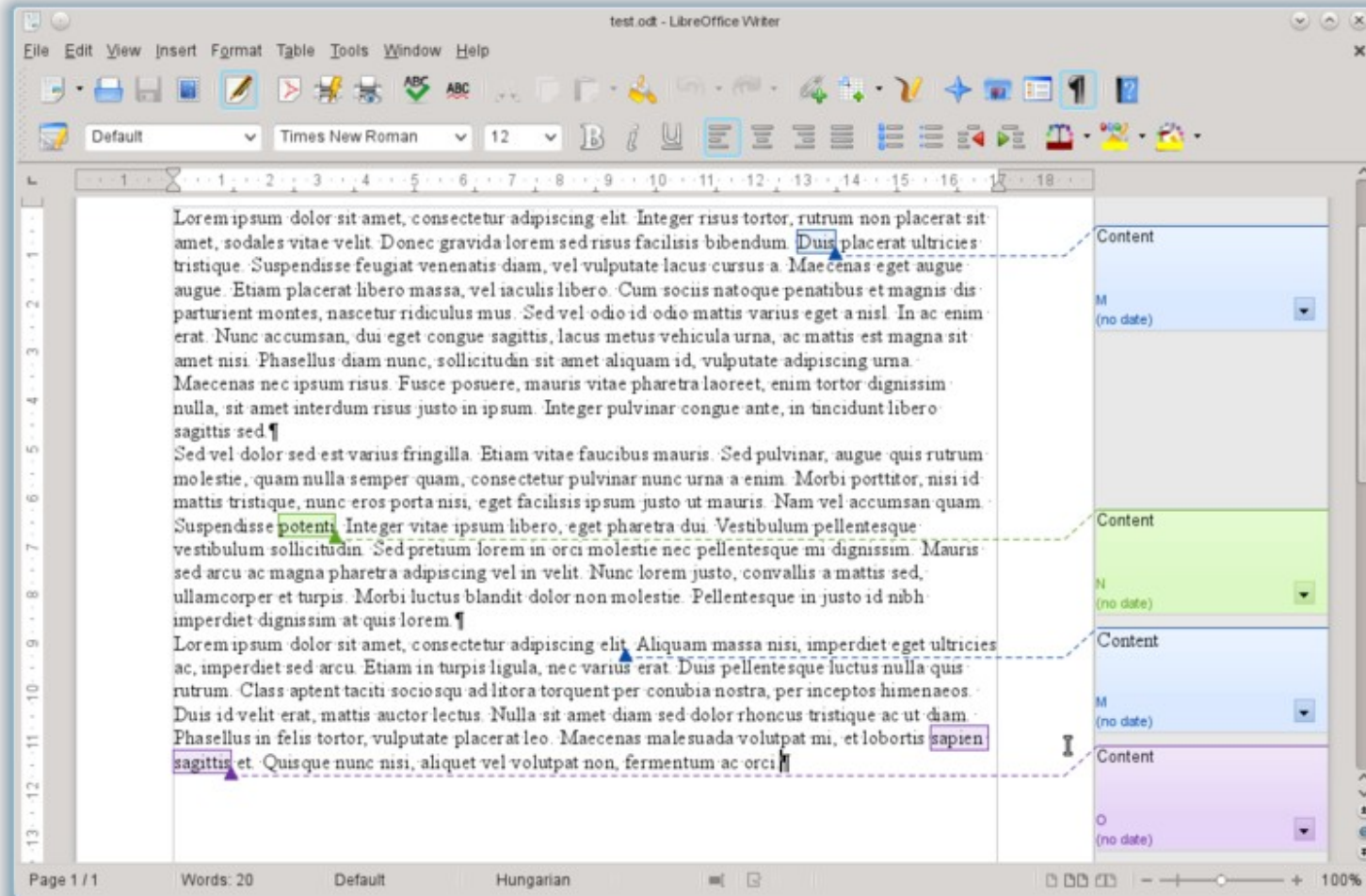
LibreOffice and TDF (2010-today)

- 2010: Oracle acquires Sun
- Growing discontent in the community
- 2010: birth of LibreOffice and The Document Foundation
 - Community led, vendor independent
- 2011: Apache OpenOffice
 - Oracle transferred ownership to Apache Foundation

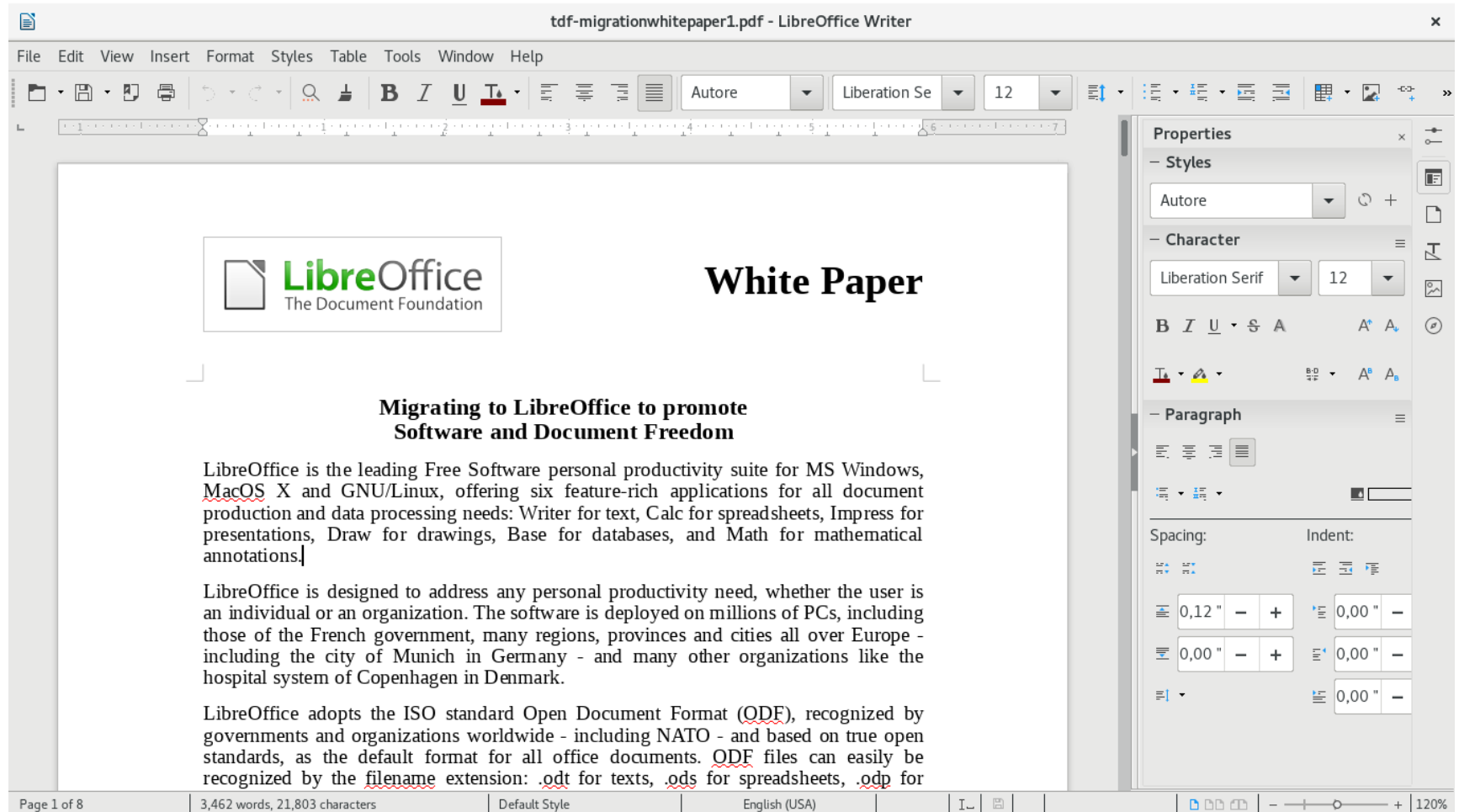
LibreOffice 3.3, 2010



LibreOffice 4.x, 2013-15



LibreOffice 5.x, 2015-17



tdf-migrationwhitepaper1.pdf - LibreOffice Writer

File Edit View Insert Format Styles Table Tools Window Help

Autore Liberation Se 12

LibreOffice
The Document Foundation

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

Properties

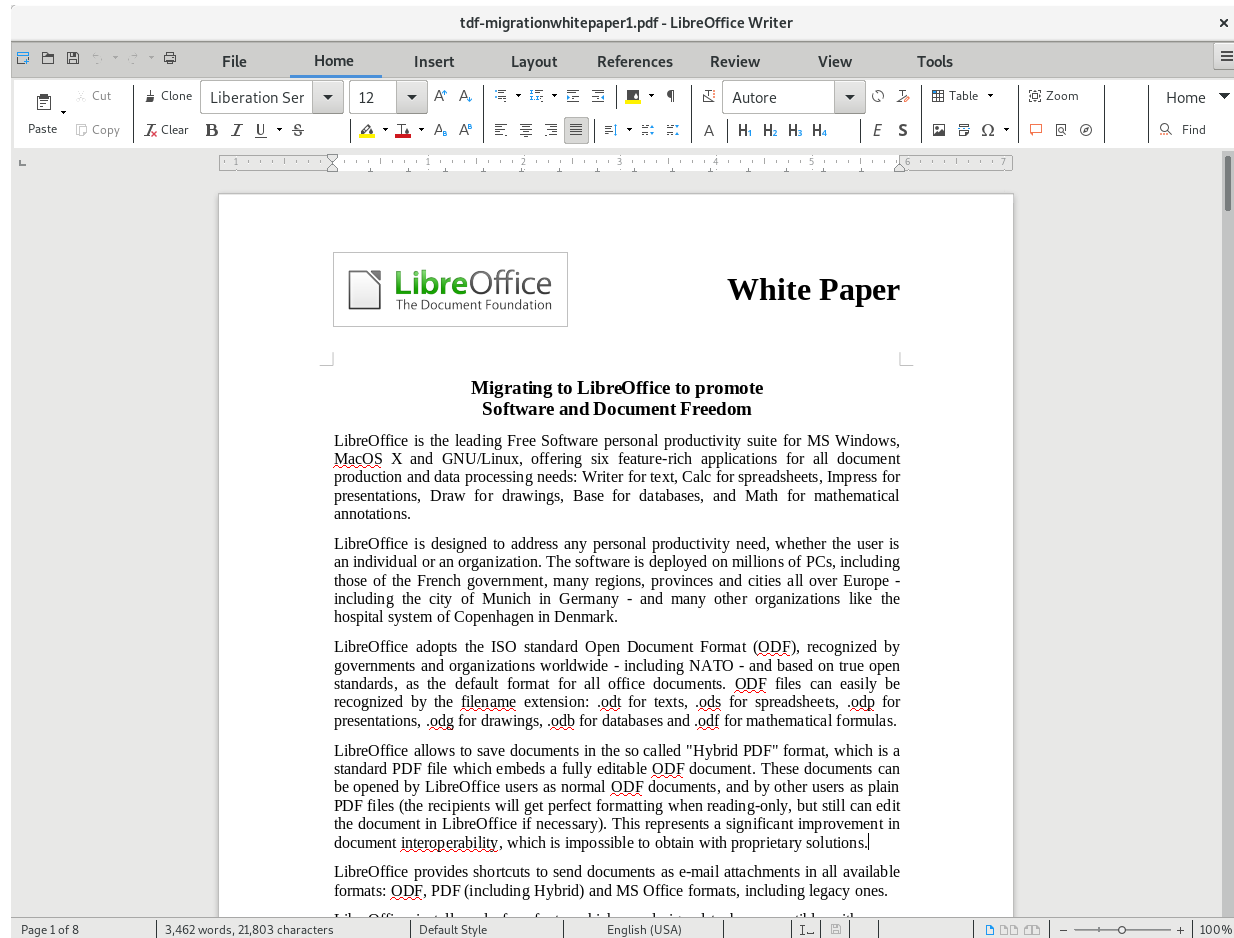
Styles: Autore

Character: Liberation Serif, 12

Paragraph: Spacing: 0,12", Indent: 0,00"

Page 1 of 8 | 3,462 words, 21,803 characters | Default Style | English (USA) | 120%

LibreOffice 6.x, 2018-2020



The screenshot displays the LibreOffice Writer interface. The title bar reads "tdf-migrationwhitepaper1.pdf - LibreOffice Writer". The menu bar includes File, Home, Insert, Layout, References, Review, View, and Tools. The Home tab is active, showing a toolbar with options like Liberation Ser font, size 12, bold, italic, underline, and text color. The document content features the LibreOffice logo and the title "White Paper". The main text discusses migrating to LibreOffice to promote software and document freedom, highlighting its features, user base, and support for the Open Document Format (ODF).

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.

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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 displays the LibreOffice Online web interface. At the top, a browser window shows the address bar with 'example.odt - Archivos' and various navigation icons. Below the browser is the LibreOffice Online application header, featuring the LibreOffice logo and a menu bar with options: Archivo, Editar, Ver, Insertar, Formato, Tabla, Herramientas, and Ayuda. A status bar indicates 'Última modificación: hace 4 años' and the file name 'example.odt'. The main editing area contains a toolbar with icons for saving, undo, redo, text formatting (bold, italic, underline, strikethrough, font color, background color), and alignment. 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, private and controlled solution.

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

At the bottom of the interface, a search bar is on the left, and a status bar on the right shows 'Página 1 de 1', '204 palabras, 1.239 caracteres', 'Insertar', 'Selección estándar', 'Alemán (Alemania)', and '2 usuarios'.

LibreOffice 7.x, 2020-

GS7201-IntroducingLO.odt - LibreOffice Writer

Text Body Liberation Sans 11 pt

File Edit Styles Font Paragraph Insert References Review View Form Extension Menu

What is LibreOffice?

LibreOffice is a freely available, fully-featured, open-source office productivity suite that is compatible with other major office suites and is available on a variety of platforms. Its native file format is Open Document Format (ODF), and it can also open and save documents in many other formats, including those used by several versions of Microsoft Office. For more information, see Appendix B, Open Source, Open Standards, OpenDocument.

LibreOffice includes the following components:

Writer (word-processor)

Writer is a feature-rich tool for creating letters, books, reports, newsletters, brochures, and other documents. You can insert graphics and objects from other components into Writer documents. Writer can export files to HTML, XHTML, XML, Portable Document Format (PDF), and EPUB; and it can save files in many formats, including several versions of Microsoft Word files. It also connects to your email client.

Calc (spreadsheet)

Calc has all of the advanced analysis, charting, and decision-making features expected from a high-end spreadsheet. It includes over 500 functions for financial, statistical, and mathematical operations, among others. The Scenario Manager provides "what if" analysis. Calc generates 2D and 3D charts, which can be integrated into other LibreOffice documents. You can also open and work with Microsoft Excel workbooks and save them in Excel format. Calc can also export spreadsheets in several formats, including for example Comma Separated Value (CSV), Adobe PDF and HTML formats.

Impress (presentations)

Impress provides all the common multimedia presentation tools, such as special effects, animation, and drawing tools. It is integrated with the advanced graphics capabilities of LibreOffice Draw and Math components. Slideshows can be further enhanced using Fontwork special effects text, as well as sound and video clips. Impress can open, edit, and save Microsoft PowerPoint presentations and can also save your work in numerous graphics formats.

Draw (vector-graphics)

Draw is a vector drawing tool that can produce everything from simple diagrams or flowcharts to 3D artwork. Its Smart Connectors feature allows you to define your own connection points. You can use Draw to create drawings for use in any of the LibreOffice components, and you can create your own clip art and then add it to the Gallery. Draw can import graphics from many common formats and save them in many formats, including PNG, GIF, JPEG, BMP, TIFF, SVG, HTML and PDF.

Base (database)

Base provides tools for developing database work with a simple interface. Base creates and edit

Page 5 of 26 8,424 words, 50,086 characters Default Page Style English (USA) SEC_DISPLAYAREA 110%

LibreOffice on WebAssembly

The screenshot shows the LibreOffice web interface in a browser window. The browser address bar shows `wasm-test.libreoffice.org`. The application title is "soffice". The menu bar includes File, Edit, View, Insert, Format, Styles, Table, Form, Tools, Window, and Help. The toolbar contains various editing and drawing tools. The document content is divided into three columns:

- Column 1: Text**

What is LibreOffice?

Do more – easily, quickly

LibreOffice is a powerful office suite; its clean interface and powerful tools let you unleash your creativity and grow your productivity. LibreOffice embeds several applications that make it the most powerful Free & Open Source Office suite on the market: Writer, the word processor, Calc, the spreadsheet application, Impress, the presentation engine, Draw, our drawing and flowcharting application, Base, our database and database frontend, and Math for editing mathematics.

Finally, documents that look good

Your documents will look professional and clean, regardless of their purpose: a letter, a master thesis, a brochure, financial reports, marketing presentations, technical drawings and diagrams.

Use documents of all kinds

LibreOffice is compatible with many document formats such as Microsoft® Word, Excel, PowerPoint and Publisher. But LibreOffice goes further by enabling you to use a modern open standard, the OpenDocument Format (ODF).

Free as in Freedom, now and forever

LibreOffice is Free and Open Source Software. Its development is open to new talent and new ideas. Our software is tested and used daily by a large and devoted user community; you, too, can [get involved](#) and influence its future development.

Table

A	B	C	D	E	F
I					
II					
III					
IV					
- Column 2: DrawShapes**

DrawShapes

Textframe

He heard quiet steps behind him. That didn't bode well. Who could be following him this late at night and in this deadbeat part of town? And at this particular moment, just after he pulled off the big time and was making off with the greenbacks. Was there another crook who'd had the same idea, and was now watching him and waiting for a chance to grab the fruit of his labor? Or did the steps behind him mean that one of many law officers in town was on to him and just waiting to pounce and snap those cuffs on his wrists?

3DShape
- Column 3: Fontwork**

Fontwork

NOTE

Chart

Row	Column 1	Column 2	Column 3
Row 1	9	3	4.5
Row 2	2.5	8.5	9.5
Row 3	3	1.5	3.5
Row 4	4.5	8.5	6

Page 1 of 3 | 312 words, 1,855 characters | Default Page Style | Czech | 71%

Apache OpenOffice 4.1.7, 2019

The screenshot displays the Apache OpenOffice 4.1.7 Writer application window titled "My Resume.odt - OpenOffice Writer". The interface includes a menu bar (File, Edit, View, Insert, Format, Table, Tools, Window, Help), a toolbar with various icons, and a Properties sidebar on the right. The main document area shows a resume for John Doe, with the following content:

John Doe 12 Main St.
Toronto, Ontario
A1A 1A1
E-mail: john@example.com Mobile: (555) 555-7540

EMPLOYMENT

IT Information Management Developer, XYZ Co.
January 2008 - May 2013

- 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 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 Views 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.
May 2007 - August 2007

- 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

The Properties sidebar on the right shows the Text and Paragraph sections, with the font set to "Port Lligat Slab" and size 10. The Paragraph section shows indentation settings. The Page section is also visible.

Page 1 / 2 | Default | English (USA) | INSR | STD | Level 1 | 90%

(source)

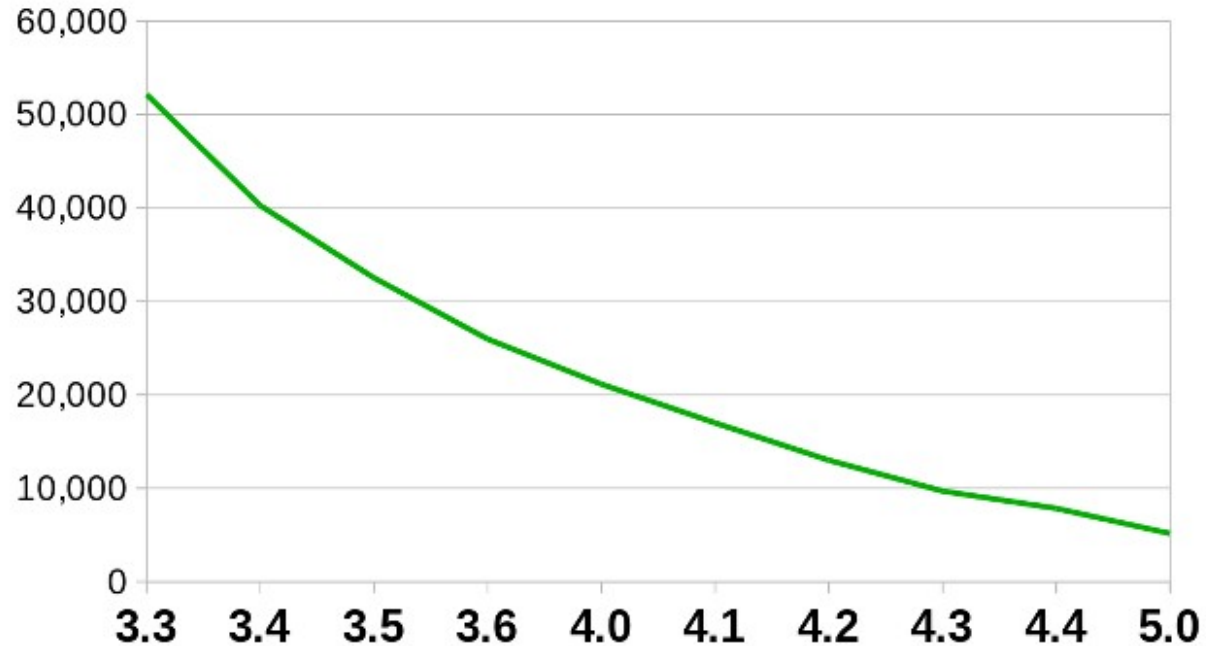
The project today

Development figures

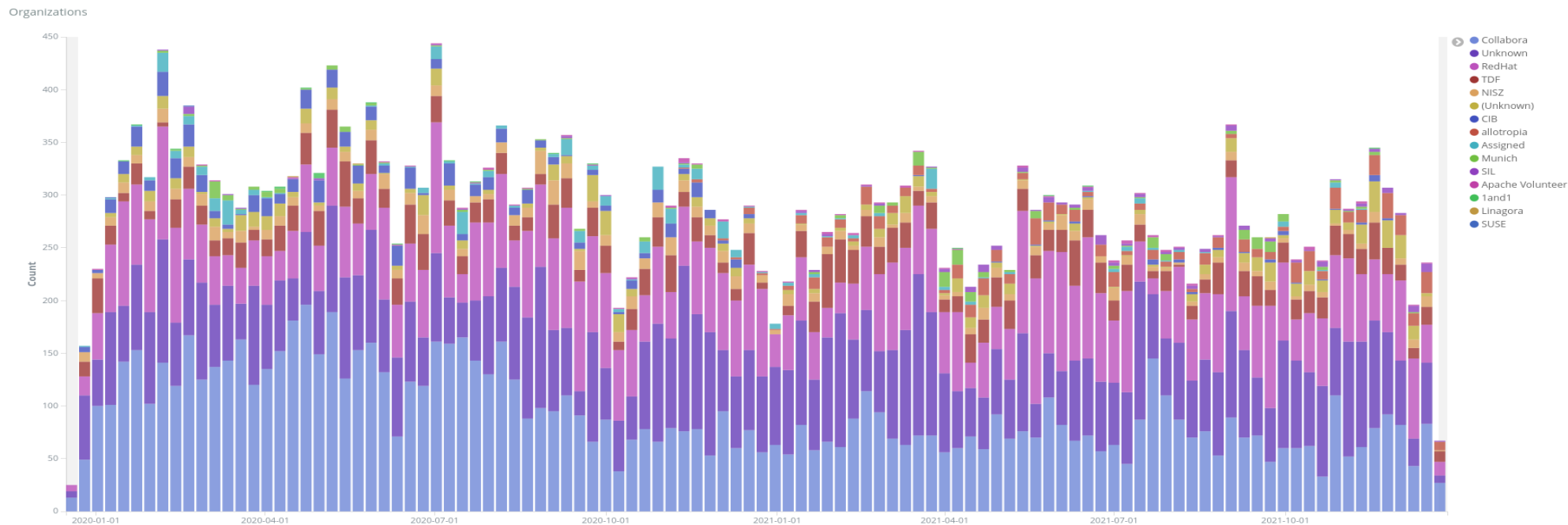
- Around 300 weekly commits by 50 different authors
- 9M lines of code
- ~30 years of history
 - “Exact history was lost before Sept. 18th, 2000, but old source code comments show that Writer core dates back until at least November 1990.”
- Still 50000 lines of German code comments when LibreOffice was forked!
 - [Bug closed](#) in 2018

Stats: German comments

Detected lines of German comment

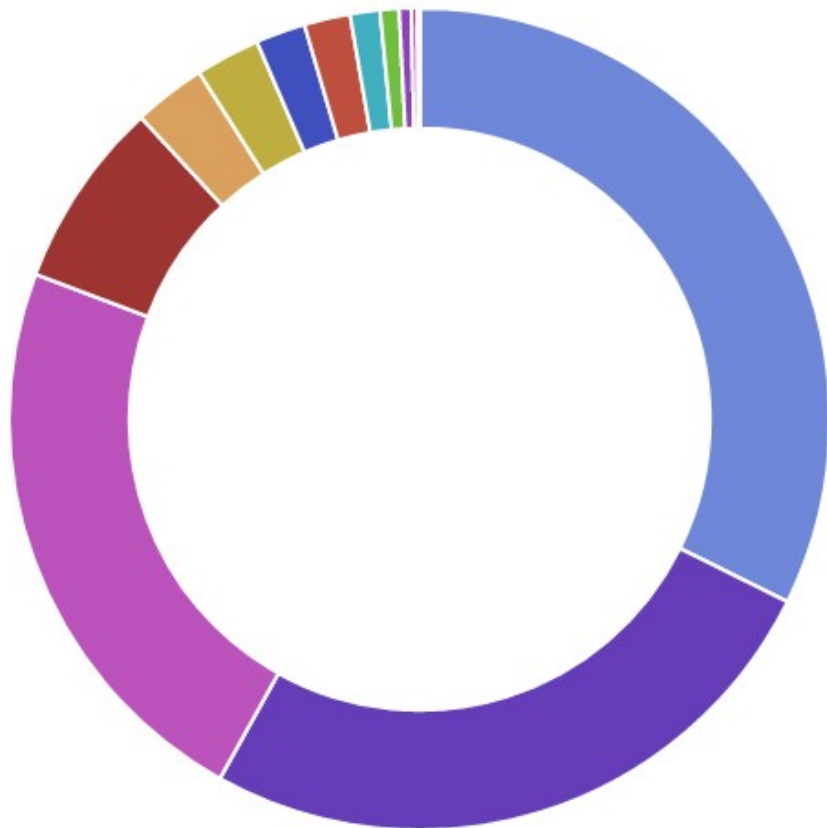


Stats: commits (Dec 19 – Dec 22)



Stats: commits per autor (Dec 19 – Dec 22)

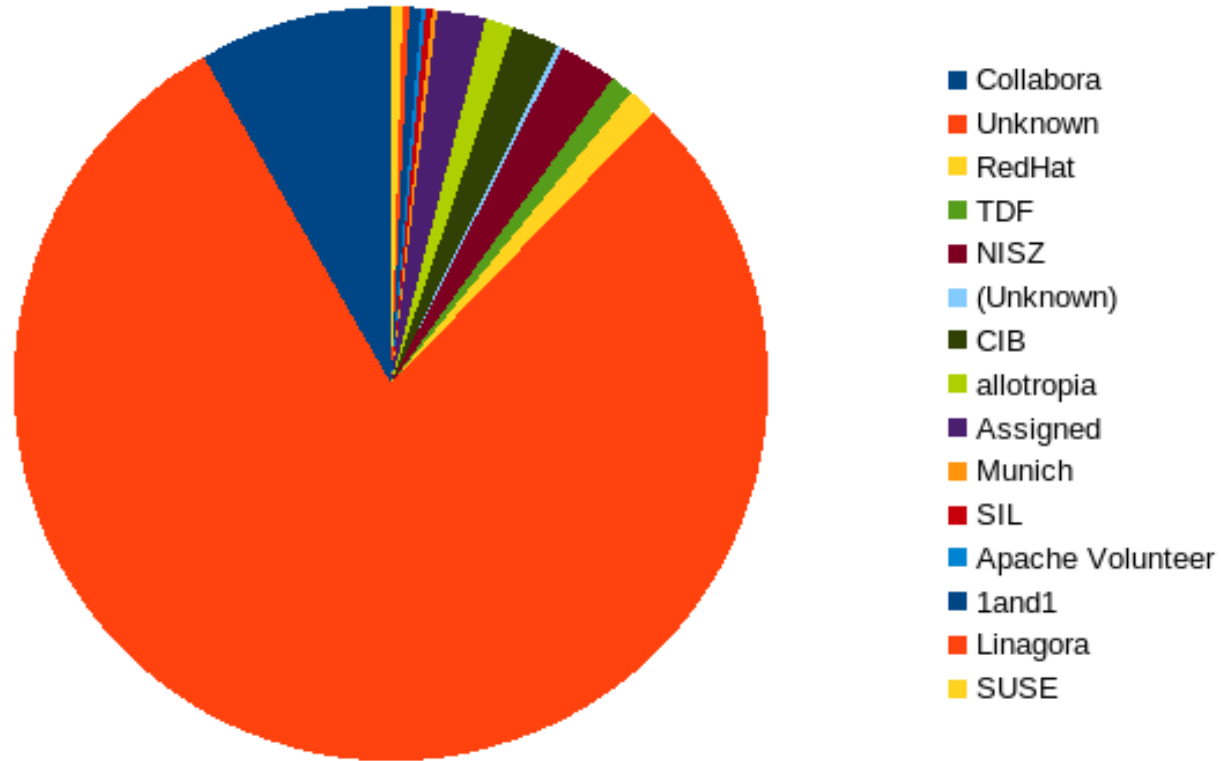
Organizations



- Collabora
- Unknown
- RedHat
- TDF
- NISZ
- (Unknown)
- CIB
- allotropia
- Assigned
- Munich
- SIL
- Apache Volunteer
- 1and1
- Linagora
- SUSE

(source)

Stats: authors (Dec 19 – Dec 22)



Release calendar

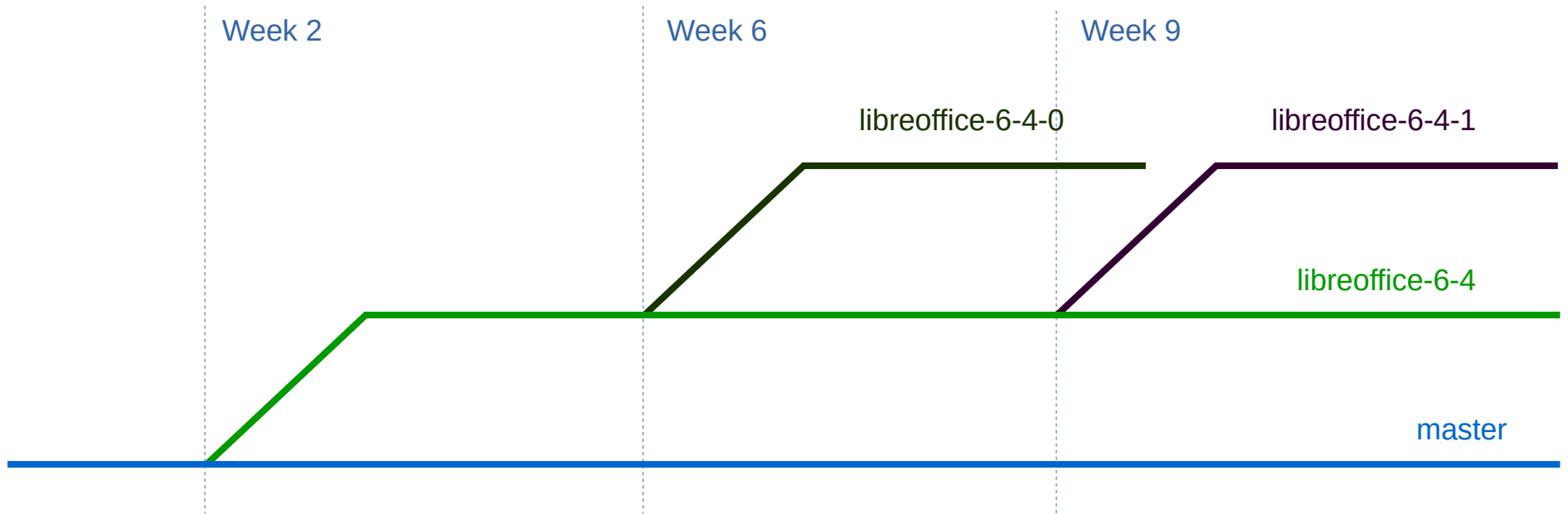
- *Release early, release often*
- Major release every six months (6.4.0)
 - Brings new features
- Minor release ~ every month (6.4.1, etc.)
 - Bugfixing only
- End of life: 9 months
- Always two versions coexisting
 - Right now: 7.2.4 and 7.1.8

Release calendar

- Example: 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, catching up MS Office releases
 - Document Liberation Project
- GPU-based rendering
- UX improvements (design team)
- Polish

Architecture

General considerations

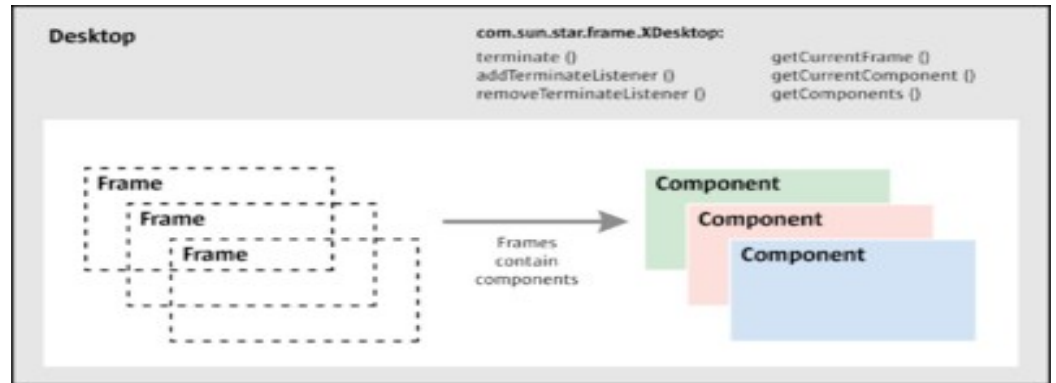
- There is not a global, application-wide design
 - Document filters: finite-state machine
 - VCL (visual components library): modeled after existing UI frameworks
 - Document model: Frame-Controller-Model

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

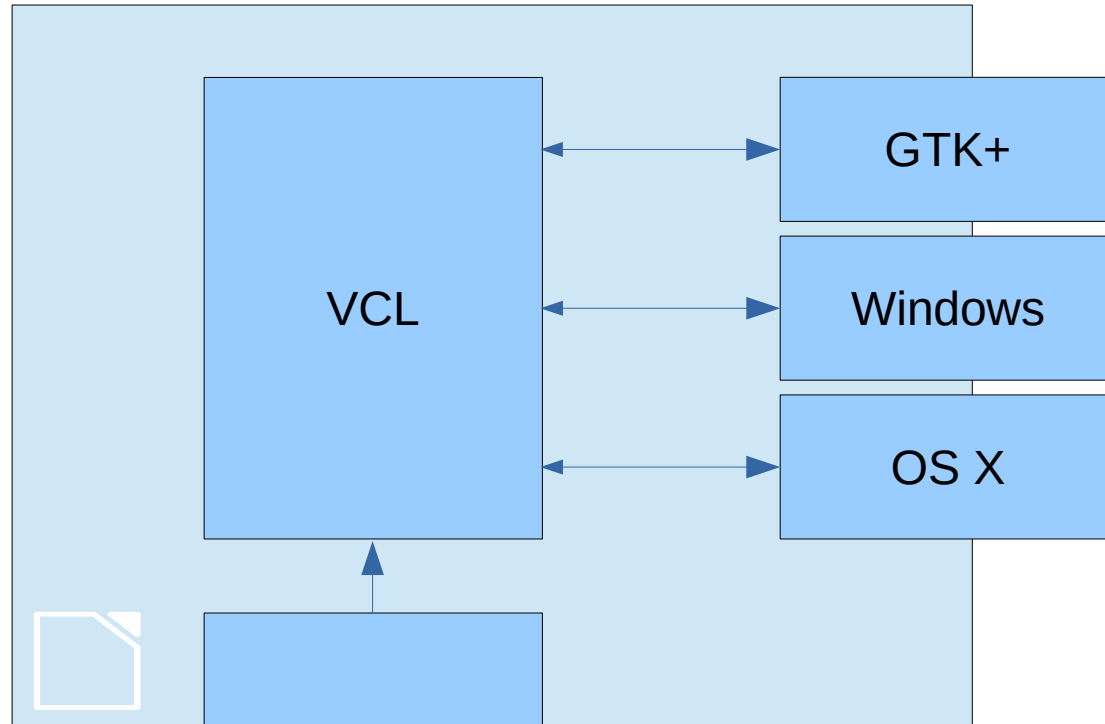
Other considerations

- 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

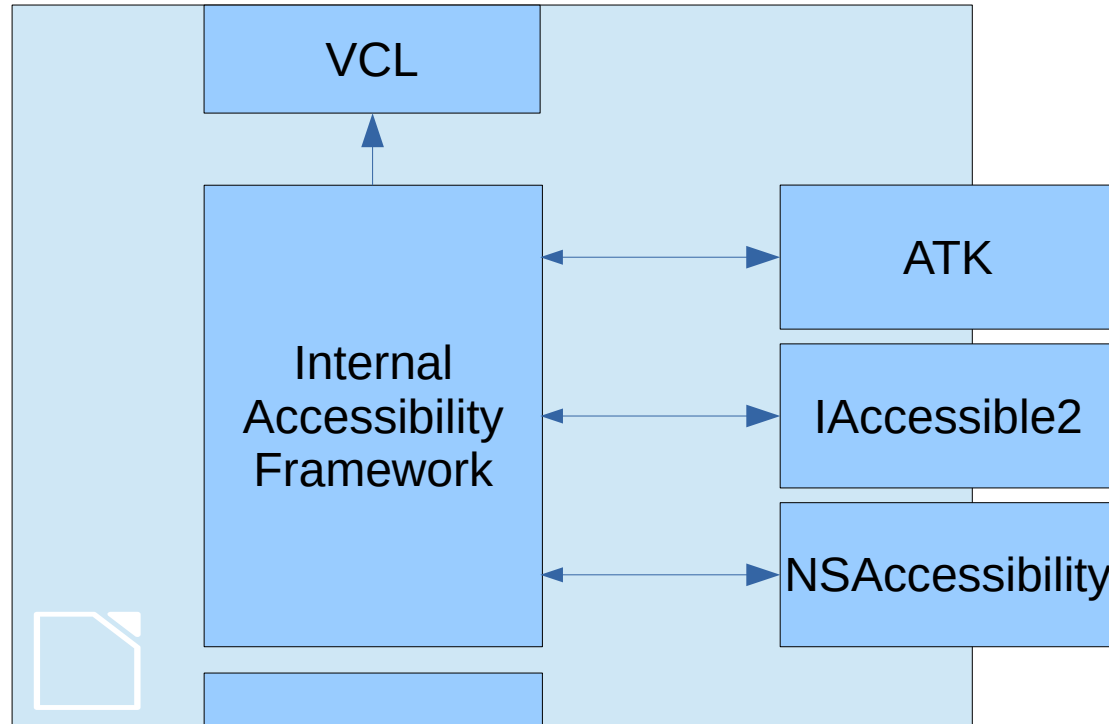
Visual components library

- 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



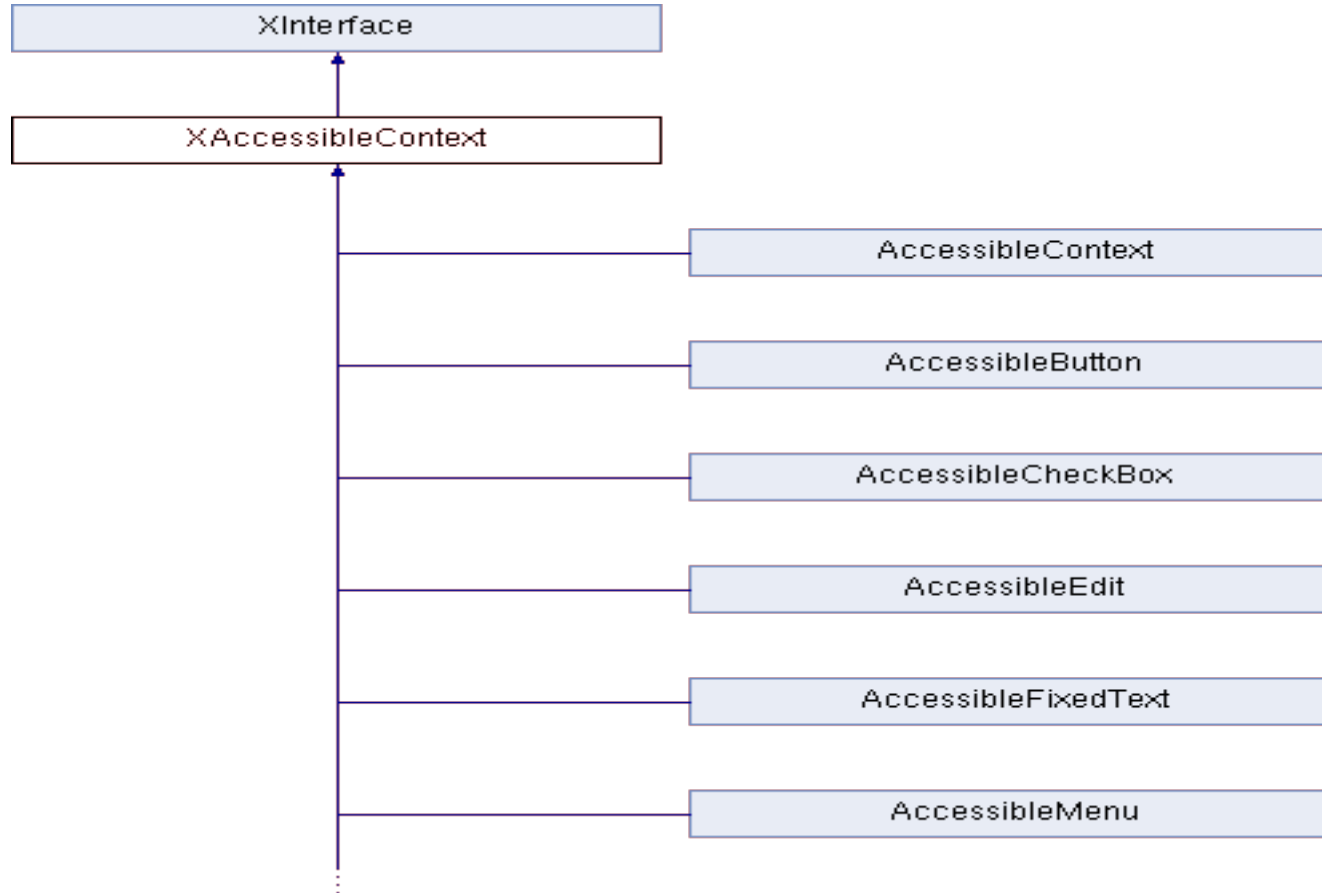
Accessibility framework



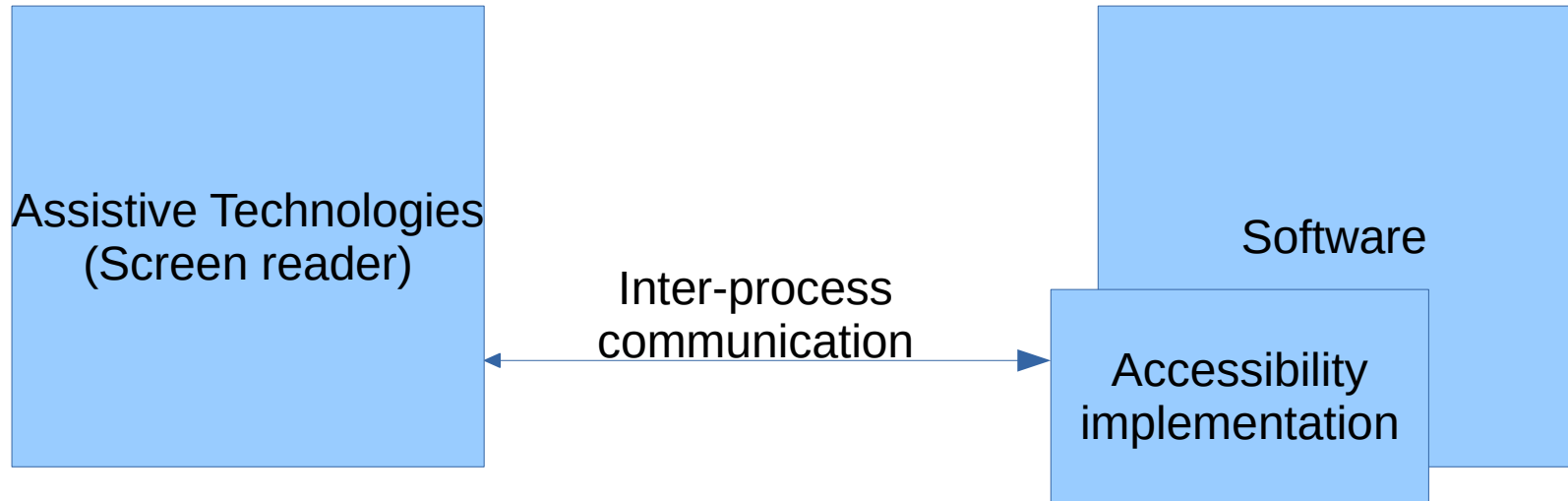
Accessibility framework

- 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)

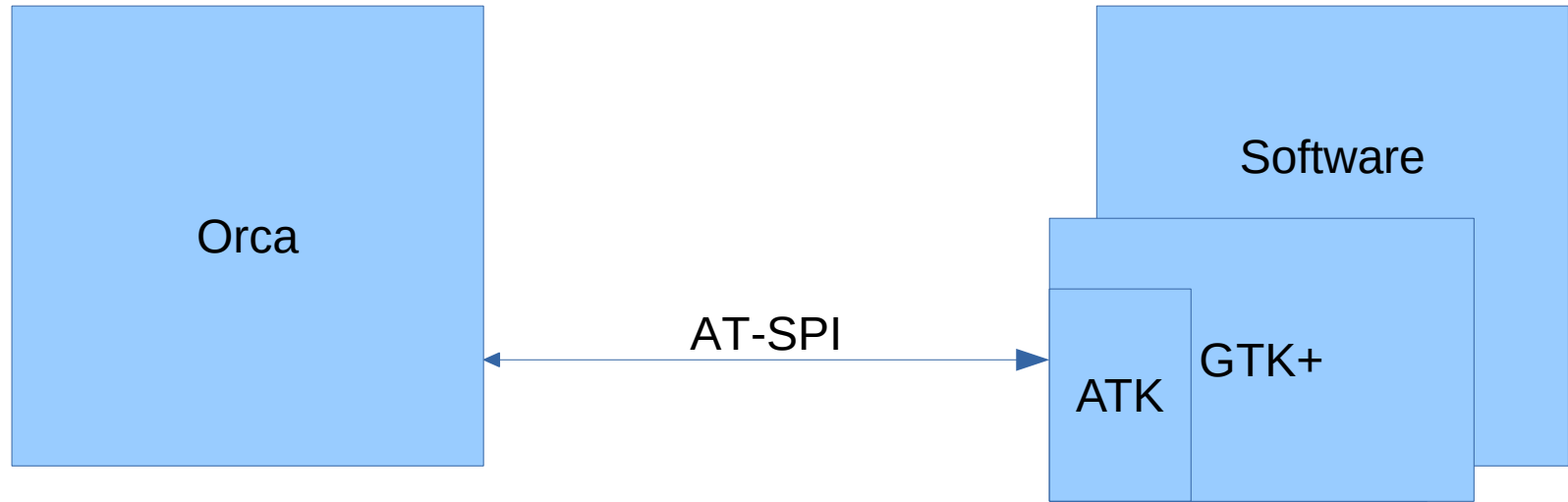
Interfaces involved in a11y



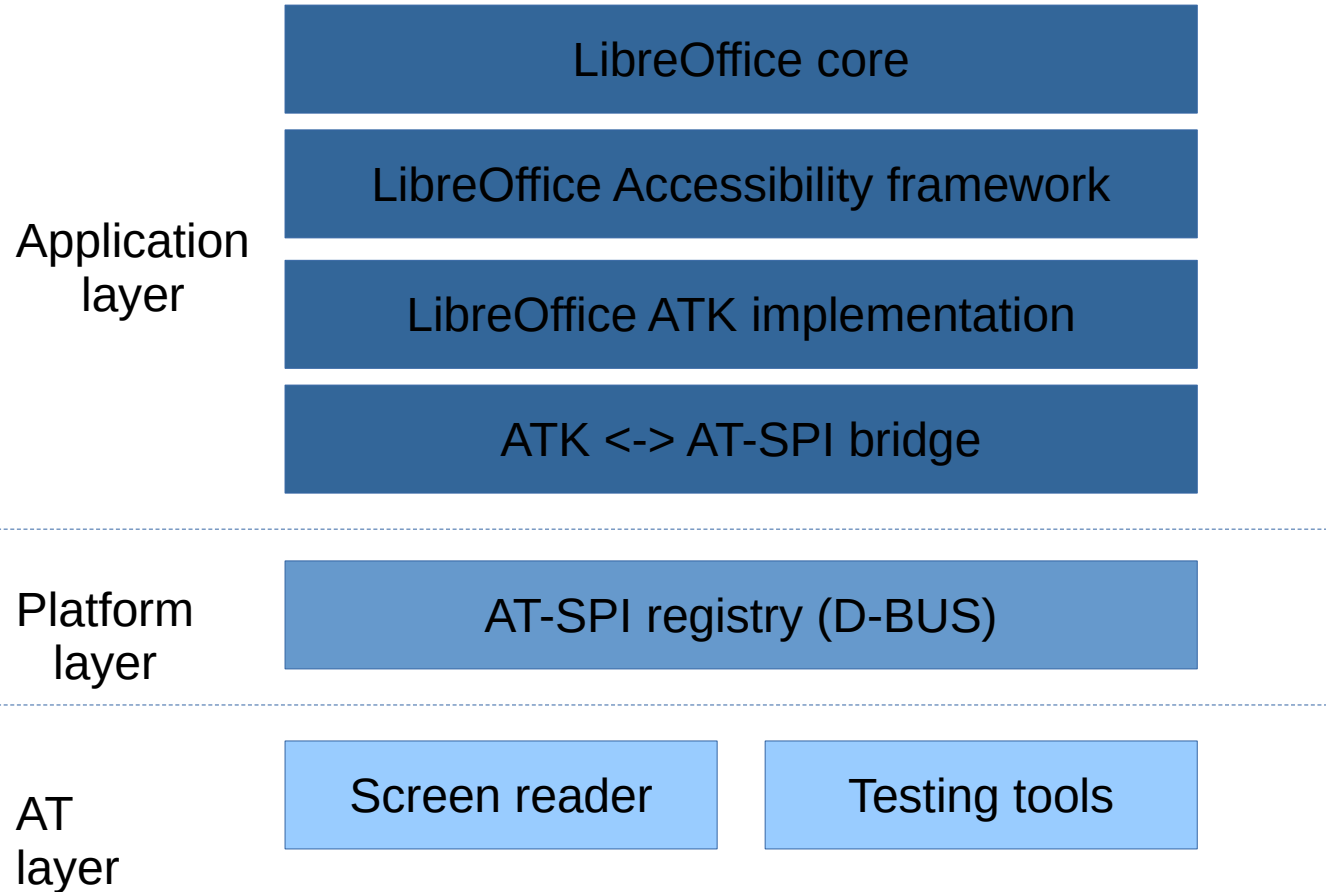
An abstract screen reader



Screen reader (GNOME)



Layers



Quality assurance

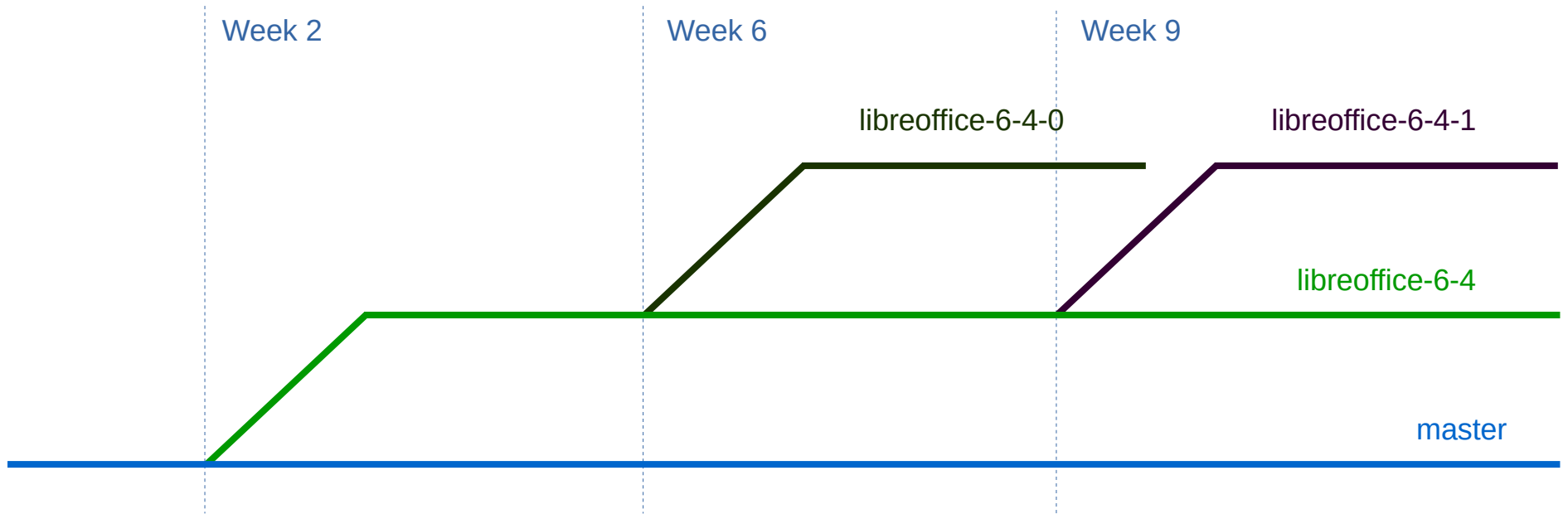
Techniques and tools

- 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**

Reviewers
CC [test_jenkins_mac](#)

Project [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/

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 from code review
 - All patches tested before landing
- Different platforms
 - All supported platforms and some more (Android, iOS)
- Different compilation options

Crashtests

- 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



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!

