



Collabora Productivity

Scaling and Securing LibreOffice Online

caging, taming and go-faster-striping a big beast.

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*“Stand at the crossroads and look; ask for the
ancient paths, ask where the good way is,
and walk in it, and you will find rest for your
souls...” - Jeremiah 6:16*



Overview

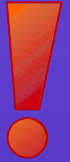
- The story of LibreOffice Online
 - What is it ? And a quick demo
- How it works
- Interesting Problems
 - Scaling – RAM, CPU, Bandwidth
 - Security Model
- Web Technology challenges
- Opportunities
- Getting involved
- LibreOffice 5.1 bits.



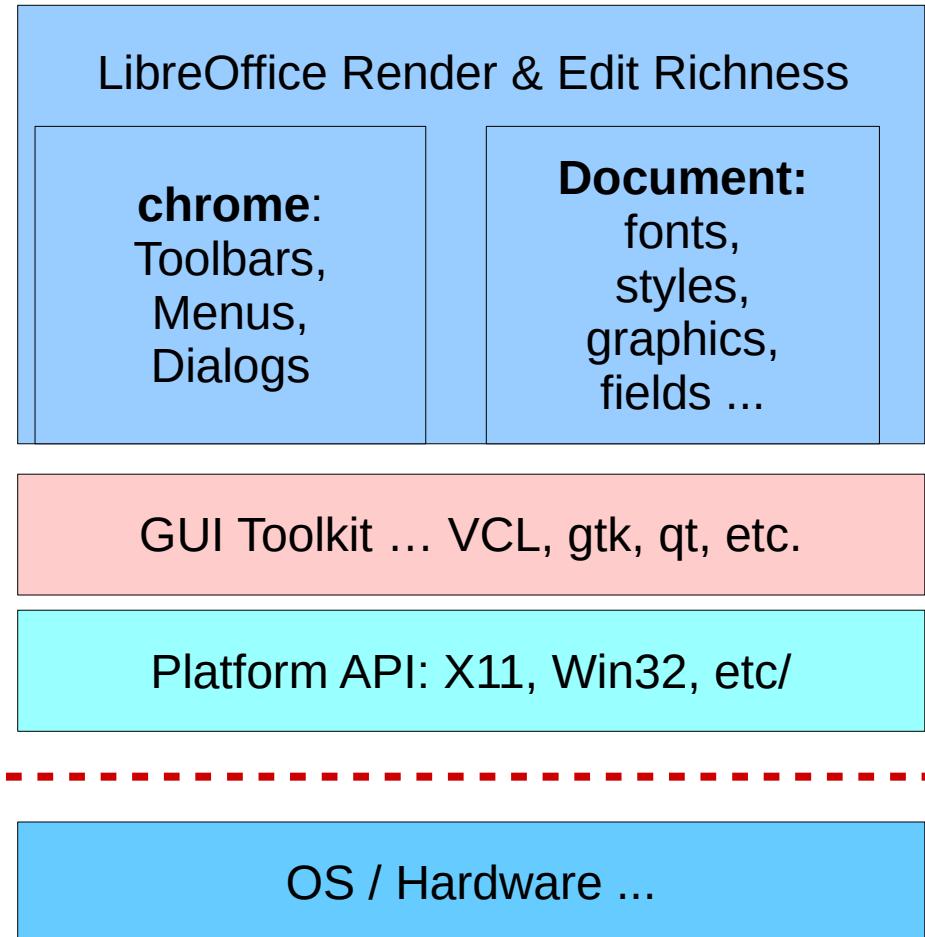
LibreOffice Online



Online vs. Desktop Remoting



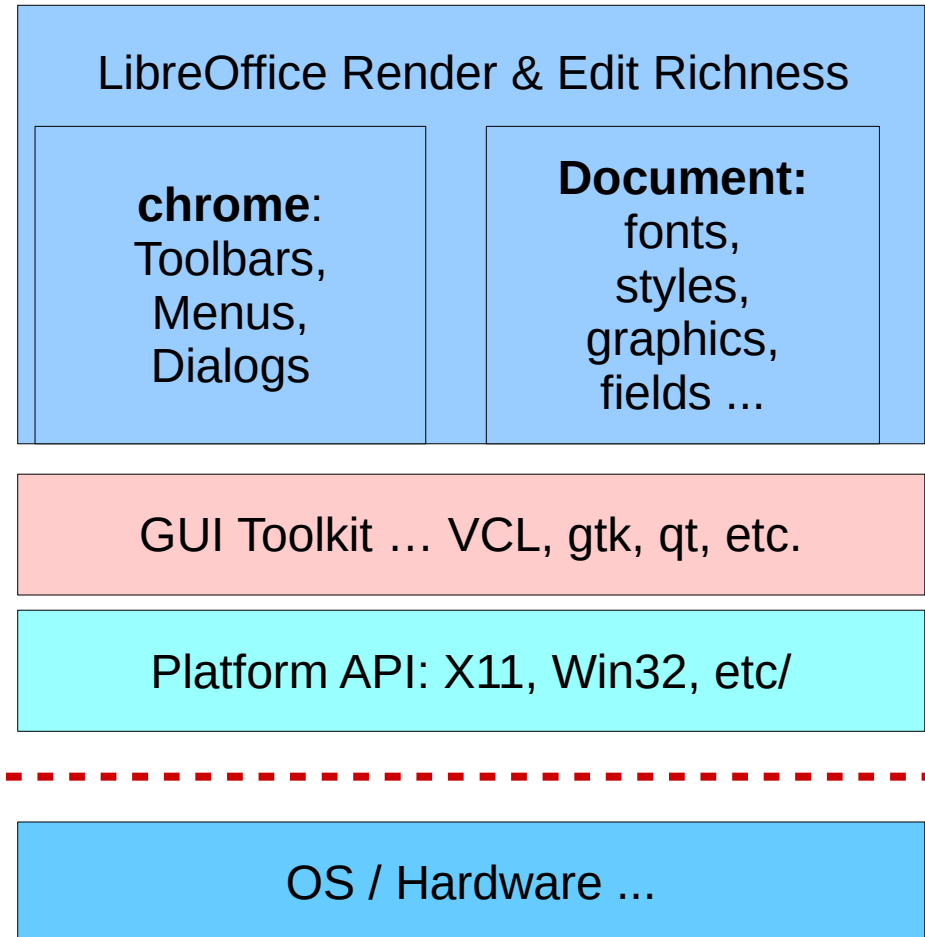
- LibreOffice remoting: a long history:
X11, NX, VNC, Citrix, CloudOn, Roll-App, Amazon Workspaces, EyeOS ...
- They cut near here: *semantic loss ... weight issues ...*



Desktop Remoting: Server



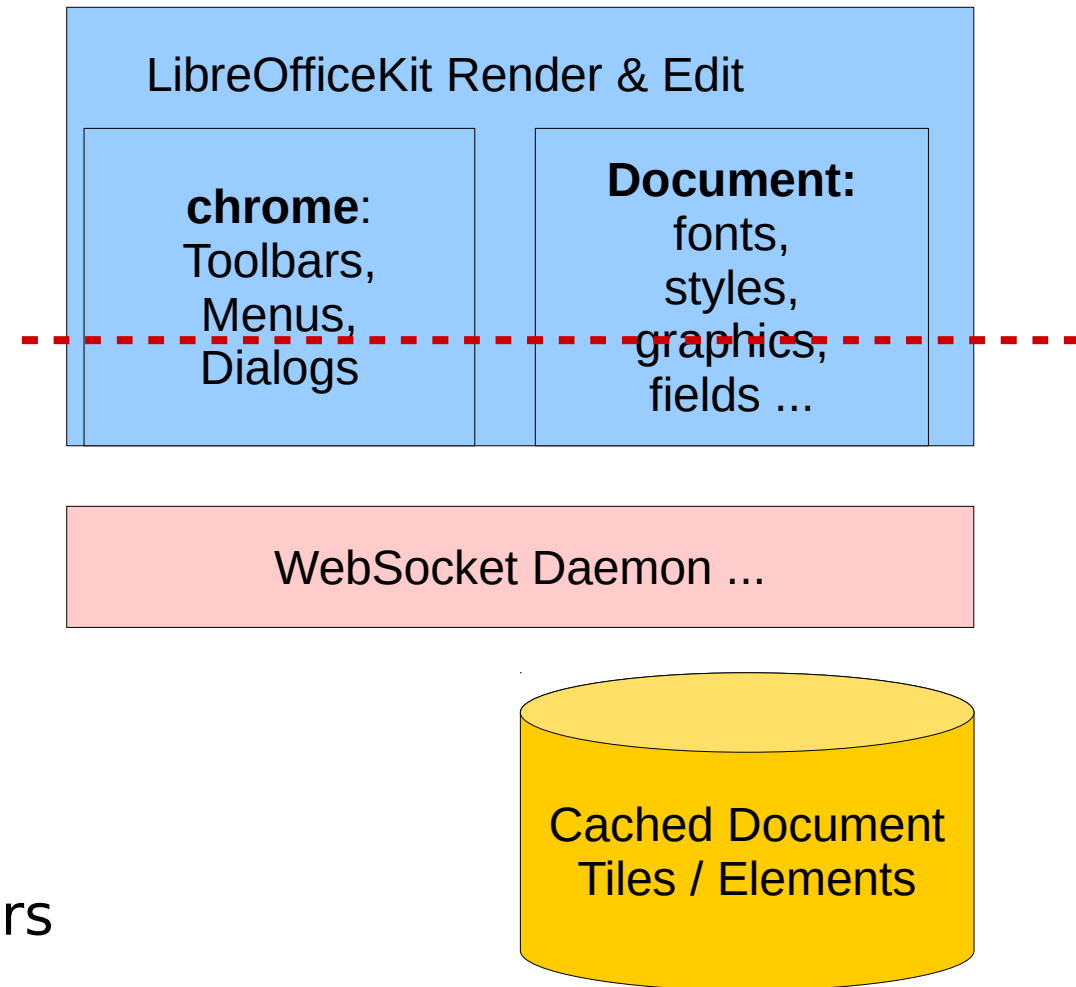
- How do they do that ?
 - back-inference
 - Hashing and comparing
 - Slow acceleration: learning what apps do ... and pre-populating.
 - eg. toolbars / popups.
- Seeing round corners is hard:
copyArea vs.
PgDown



LibreOffice Online: Server



- LibreOffice Online
 - Enabling even cleverer tricks.
- Huge insight into document model.
 - No need to even start the app.
 - Lifecycle control.
 - Full information ...
 - Sees round all corners

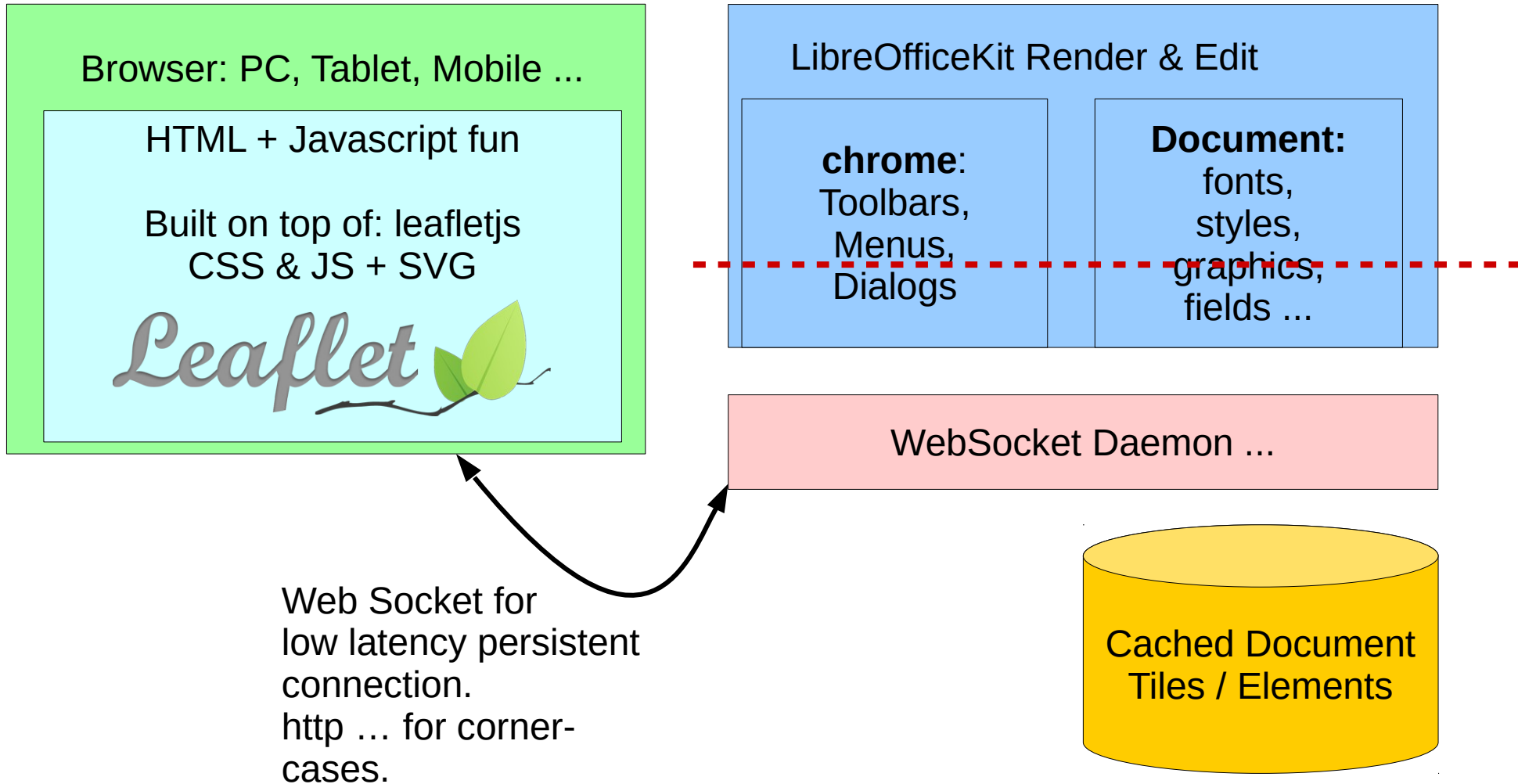


LibreOfficeKit – re-using a core

- A very simple C & C++ API for LibreOffice
- Exposes the core value of LibreOffice:
 - File format filters
 - Tiled rendering (converting documents to pixels)
 - Exposes editing, selections etc.
- A very simple ~header-only API – no linking
 - fully abstract: fn pointers, opaque structs etc.
 - No sockets opened, no plugins / simple init.
 - Global error messages.
- LibreOffice Online, Android, 'loconv' built on this.
- **Exposes format-conversion via http post ...**



Online design:



A quick demo.

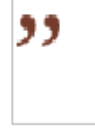


Designer • CV Graphic Designer / Communication Specialist



Hello !

“ I am a visual This is me editing ... specialist with a partistic projects I have developed a unique style and business-driven approach. I offer a full concept-to-publication service and no-commitment quotations. I look forward to discussing your business!



// Employment History

2015 Design Lead: Spring Catalogue, Wisconsin Cruises Inc.

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// Education

- 2011** Design Communications, Master's University of Maryland
- 2007** Graphics Design, Bachelor's University of Wisconsin-Madison

- All files
- Favorites
- Shared with you
- Shared with others
- Shared by link
- Deleted files
- Settings

Documents				Size	Modified
Name					
advanced-editing-embedded-content.odt				40 kB	18 hours ago
advanced-spreadsheet.xlsx				25 kB	18 hours ago
basic-editing.docx				41 kB	18 hours ago
basic-presentation.pptx				1.1 MB	18 hours ago
basic-presentation-transitions-animati... .odp				357 kB	18 hours ago
basic-spreadsheet.ods				20 kB	18 hours ago
Designer CV.odt				1.1 MB	18 hours ago
Example.odt				35 kB	18 hours ago

How it works ...



LibreOfficeKit API

- C and C++, in-process (easy debugging)
- Conversion operations
 - loadDocument(), saveAs(),
- Rendering-related
 - paintTile(), setPart(), getDocumentSize(), ...
- Operations on the document
 - postKeyEvent(), postMouseEvent(),
postUnoCommand(), paste(),
setTextSelection(), ...



loolwsd server

- loolwsd == LibreOffice OnLine WebSocket Daemon
- Daemon that on one hand talks to LibreOffice via LibreOfficeKit, and on the other to the client over websocket
- Responsible for setting up the connection, forking children (in chroots), tearing down
- Caching the tiles on two levels
 - State of the saved document, current edits



WebSocket: Protocol

- Simple, text-based protocol
- Mostly a conversion of the LOK API and callbacks to text (and potentially binary data)
- Command on one line
 - Those sent by the server end with a colon
 - If there are binary data, they are sent after newline

load [part=<partNumber>] url=<url> [timestamp=<time>] [options=<options>]

key type=<type> char=<charcode> key=<keycode>

invalidate: part=<partNumber> x=<x> y=<y> width=<width> height=<height>

tile part=<partNumber> width=<width> height=<height> tileposx=<xpos> tileposy=<ypos> ...

tile: part=<partNumber> width=<width> height=<height> tileposx=<xpos> tileposy=<ypos> ...
<binaryPngImage>

Loleaflet – the client side

- Client side running in the browser is in JavaScript
 - Originally based on LeafletJS, but heavily modified
- LeafletJS
 - An open-source JavaScript library for mobile-friendly interactive maps
 - Uses tiles as well, saved us a lot of work with the infrastructure – we were able to see the first document relatively quickly
 - But then lots of work to make the editing work etc.



SVG overlays ...

- Layers over the document:
 - Cursor, Selection handles, etc.

- 1st bullet |
- **2nd bullet (bold)**

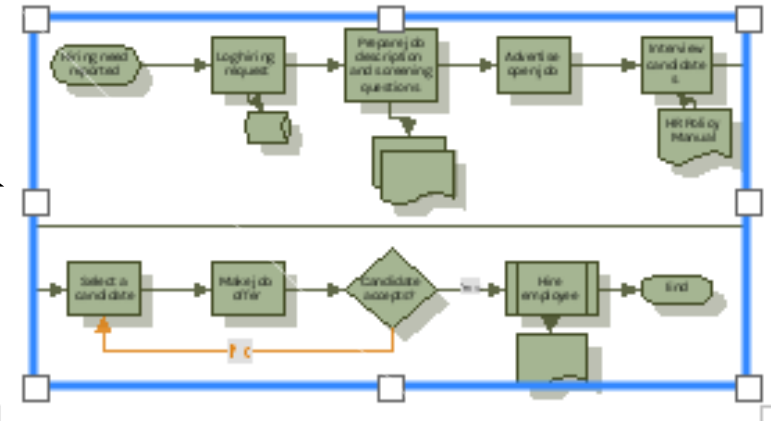
16	Red	Green
17	Red	Green
18	Richtext	
19	Arial Courier	8point 14point

Welcome

CODE is the unsupported, Development version of [Collabora CloudSuite's](#) commercial on-line component.

Copy and paste diagrams from Visio

Import flow-charts and illustrations from many third party applications.



Interesting problems:



Scaling: RAM



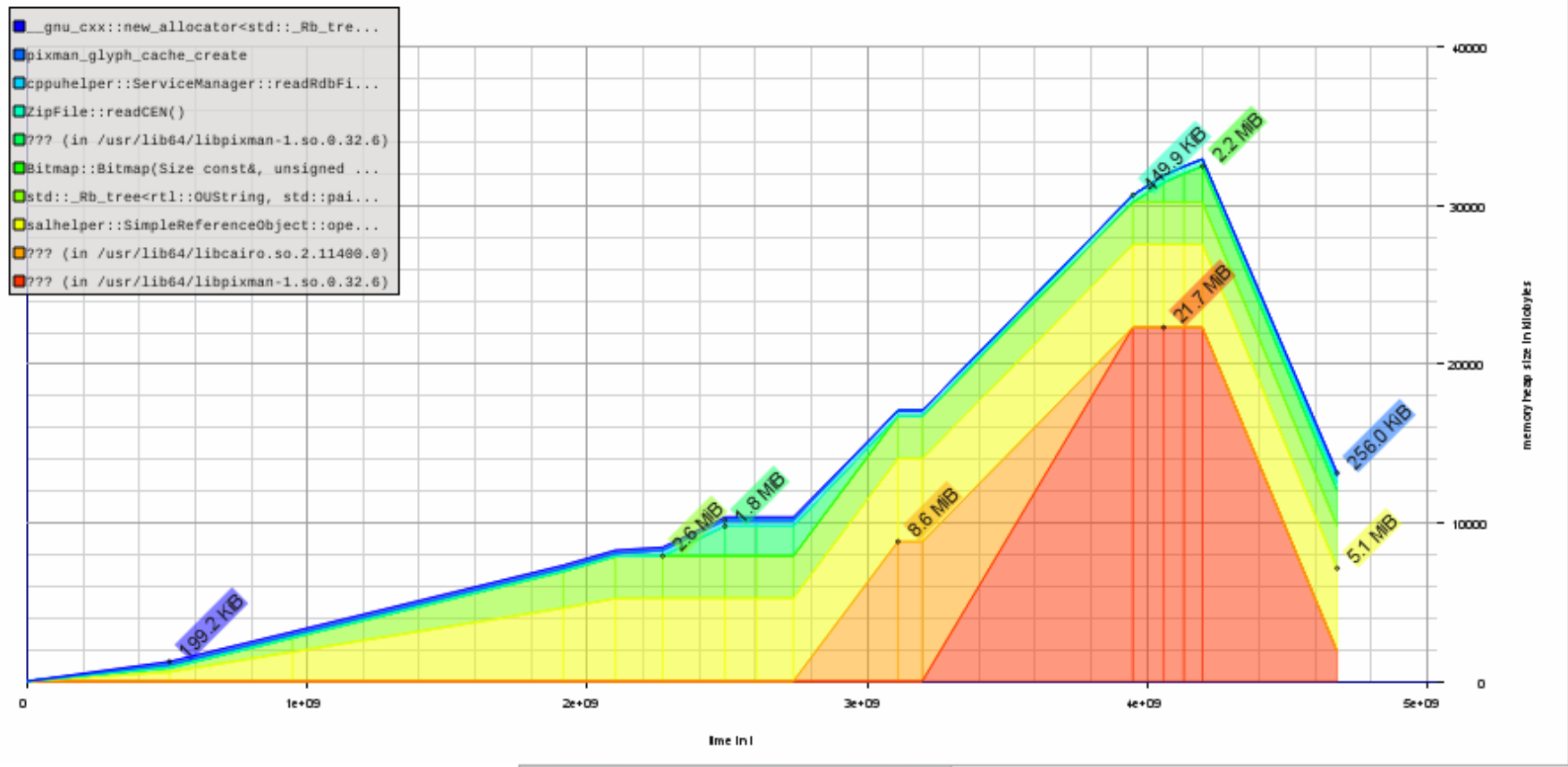
Quick goals:

- We aim for 1000 concurrent users on a (large) machine
 - 32Gb of RAM seems reasonable
 - 32Mb of RAM each.
- Sharing stuff across processes:
 - Gives us a 1000x memory win: worth doing ...
- Never optimize before profiling !
 - After a bit of that – fired up **Massif** ...



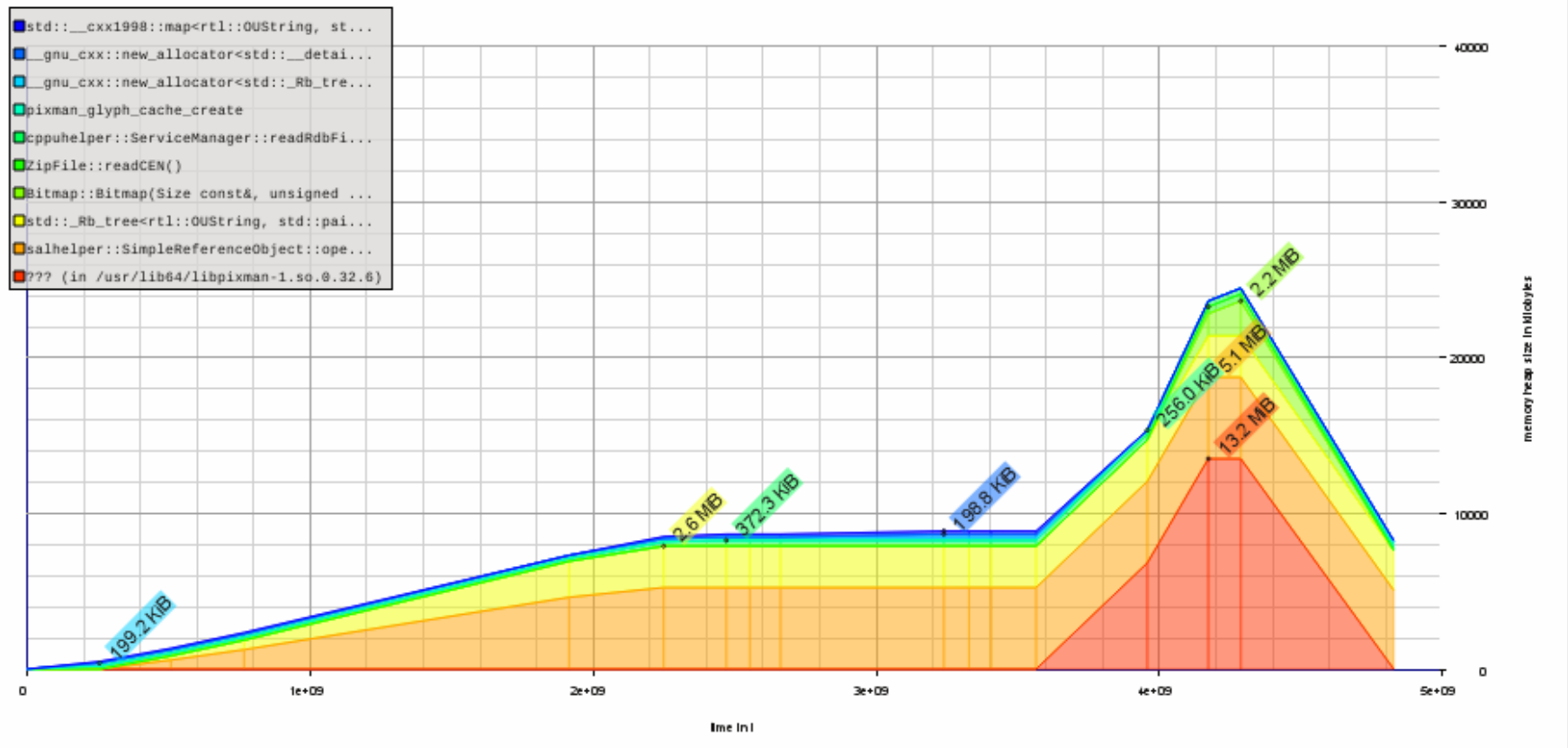
Tilebench: 38 Mb peak.

Memory consumption of /data/opt/libreoffice/master/workdir/LinkTarget/Executable/tilebench
Peak of 38.1 MiB at snapshot #48



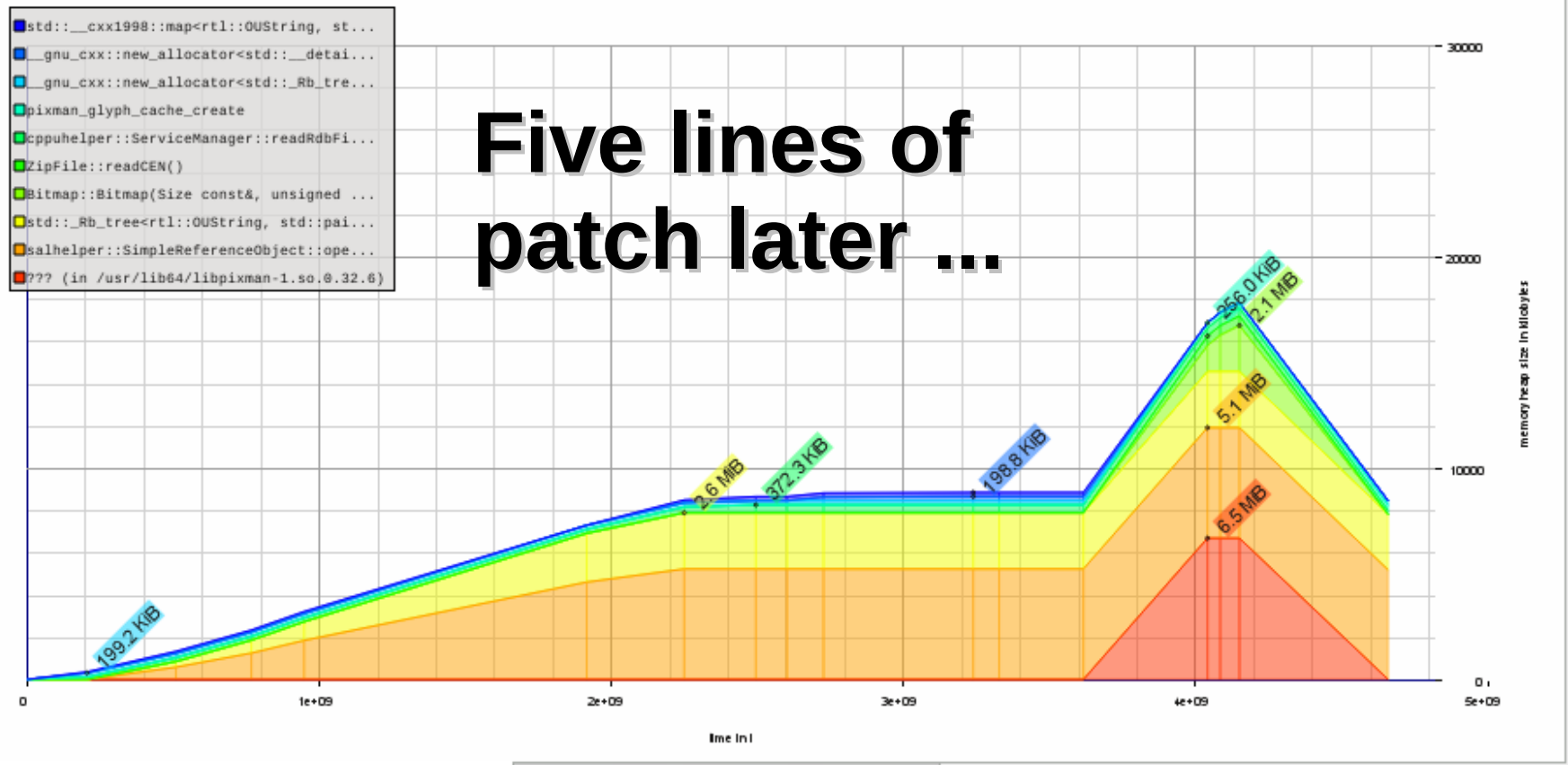
TileBench: #2 ~30Mb peak

Memory consumption of /data/opt/libreoffice/master/workdir/LinkTarget/Executable/tilebench
Peak of 29.6 MiB at snapshot #51



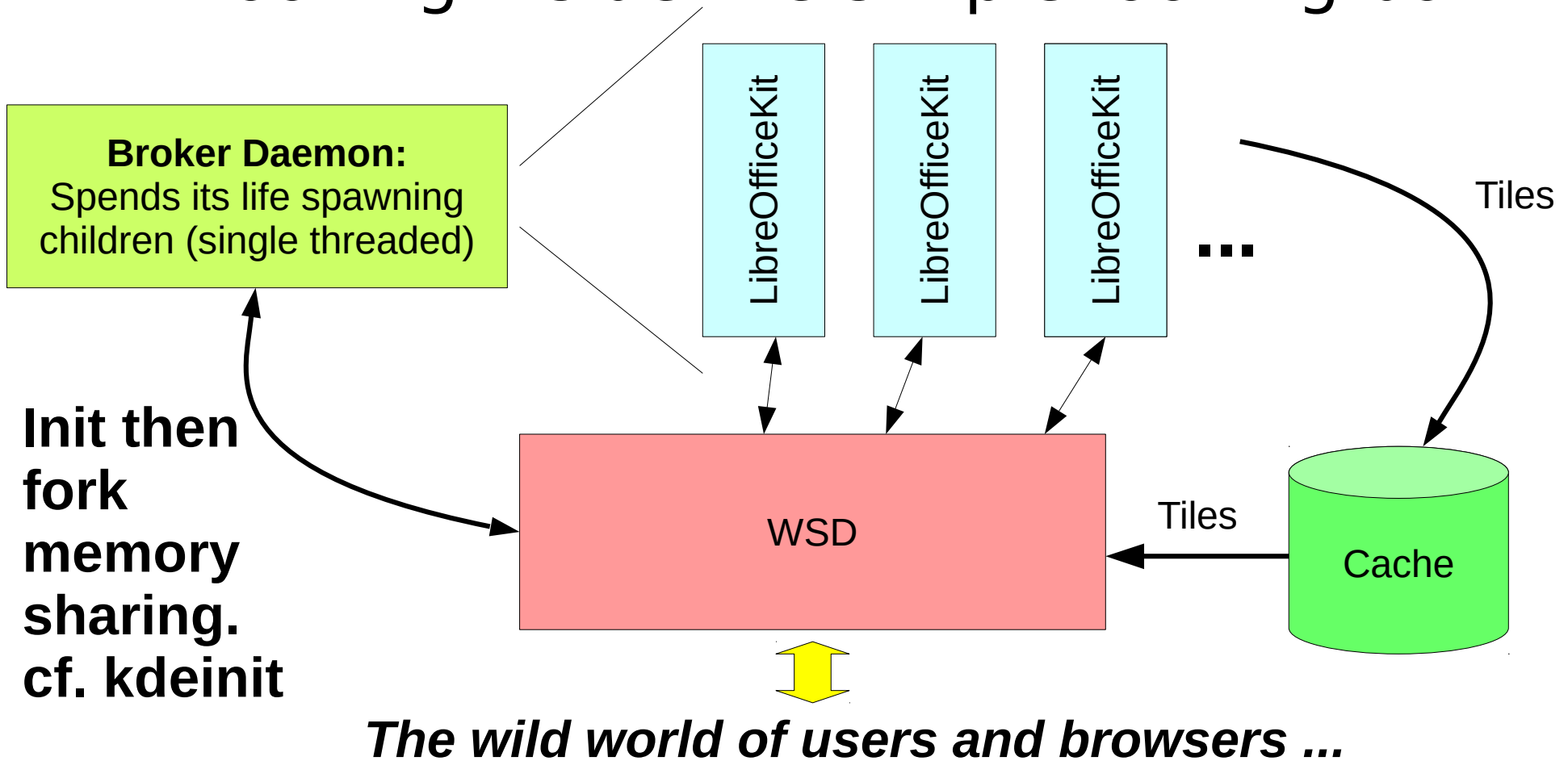
TileBench: #3 – 23Mb

Memory consumption of /data/opt/libreoffice/master/workdir/LinkTarget/Executable/tilebench
Peak of 22.8 MiB at snapshot #51



Web Socket Daemon: (WSD)

- Looking inside the simple looking box:



Approaching expected:

- Heap is only one way to burn RAM but still a popular way:

- Waste: 9Mb

- Left: 14Mb

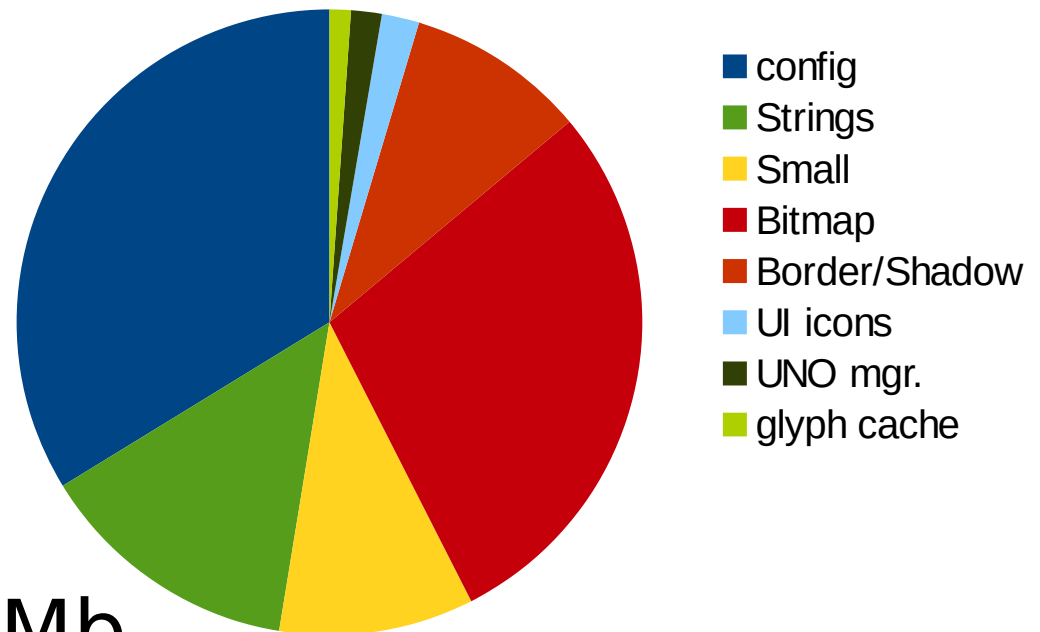
of which

12Mb

shareable → <5Mb ...

Breakdown of tilebench heap size by type (24Mb total)

red pieces are easy to remove.



```
bin/run tilebench `pwd`/instdir/program helloworld.odt # just a simple odt.
```

Sharing strings ...

- 3.3Mb of pre-init strings:
 - config keys & contents
 - font lookup tables, etc. ...
 - making those shareable: ideally in a single huge page.
 - Luckily: rtl::OUString etc. - immutable
- ```
typedef struct _rtl_uString {
 oslInterlockedCount refCount; /* opaque */
 ... but ...
#define SAL_STRING_INTERN_FLAG 0x80000000
#define SAL_STRING_STATIC_FLAG 0x40000000
#define SAL_STRING_REFCOUNT(a) ((a) & 0x3fffffff)
```
- Caring about > 1bn refs ? ... already allow STATIC strings.

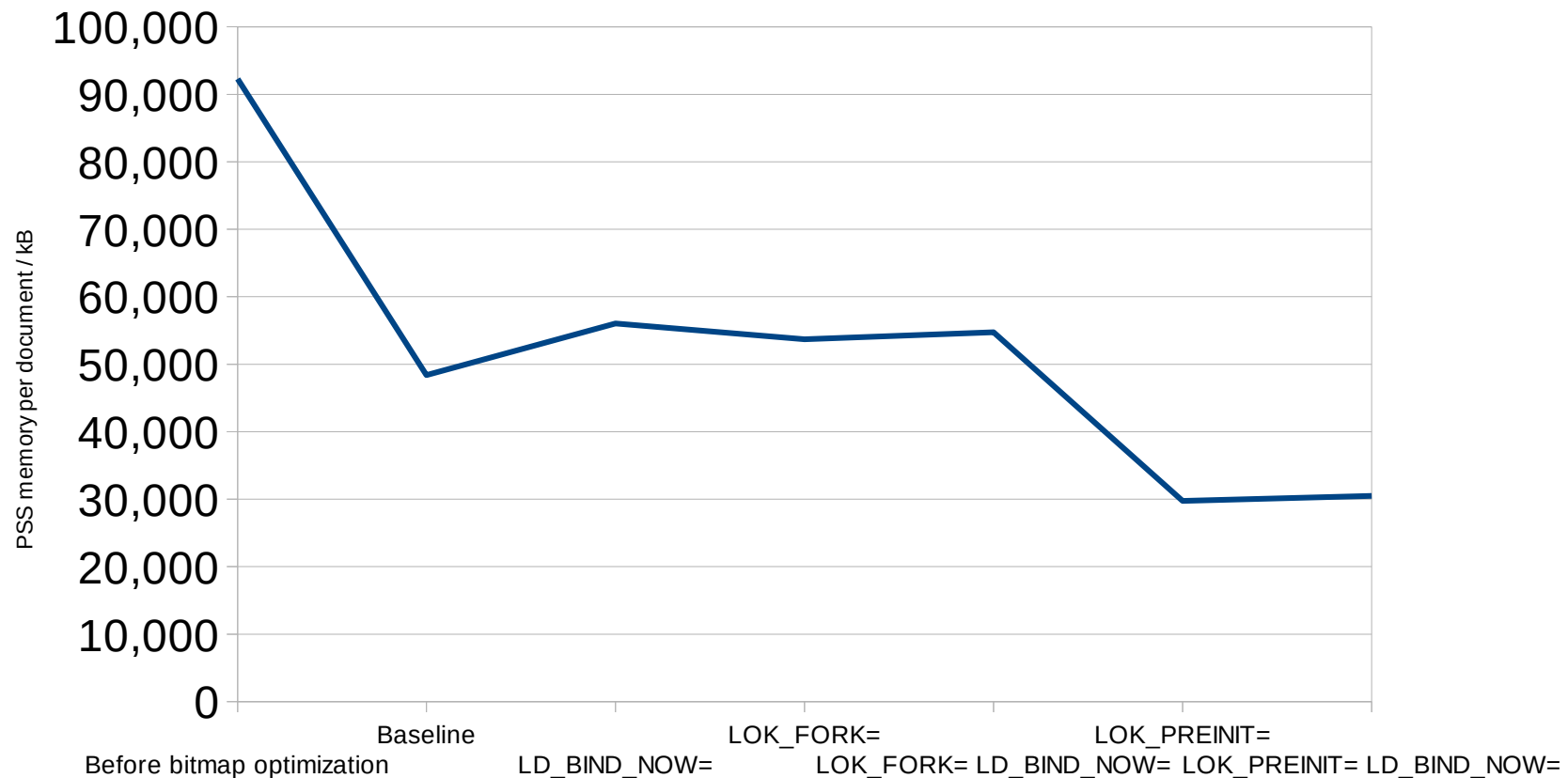


# ELF / Linking wastage

- Heap size – fine – but re-locatable object cost:
  - FLOSS habit of fragmenting libraries: simultaneously creating package management issues. Why use 1 DSO when 10 will do ?
  - Extra partially used 4k rw page per DSO, avg. 50% is wasted (I suspect)
- libmerged: an 88Mb monster DSO – check pmap.
  - The “Mac” way → OS is one big shared library ...
  - Even then: 200 of these for this process you’re seeing.
    - 800k of which proly 400k wasted ... less used for LOK though.
  - **Linker support: 22 - 4Mb pages, or 22,000 4k pages [urk?]**
- Link everything into a single blob ?
  - Unattractive: nice to support a single Linux build for Desktop & Server ...
- Still LD\_BIND\_NOW=1 etc. to save time & space:

# Proportional Set Size (pss)

- Pmap data for loolwsd + broker + **ten** lok instances: Broker: link + init + fork



# Memory: big documents ...

- Non-shared :
  - <5Mb heap – for “Hello World”
- For 100 pages of demo text:
  - 1.4Mb for paragraphs, strings, etc.
  - Text is cheap.
- If you paste huge images & embed movies into your documents – creates a problem.
  - Ultimately will need to clamp memory use ...
  - All file backed anyway already; with ancient internal swap / mgmt.



# Memory: final bits ...

- Overcoming the tab-pocalypse ...



*"You opened your 100'th tab: Achievement unlocked !"*

- Eventually I notice my machine crawling ... it takes longer to notice the cloud crawling.
- WSD – can save & prune processes in this case.
- JavaScript – heuristics: “page not visible in browser / tab switched ...”
- Experts in scheduling algorithms welcome ...
- Generic desktop remoting suffers here ...

# Scaling: CPU



# Towards a load avg. of zero ...

- Why do H/W vendors invest in ever deeper sleep-states ?
- Largo / Florida

Intel(R) Xeon(R) CPU E5-4650 v2  
@ 2.40GHz, 4 CPUs, 10 cores

800 active users

150-200 concurrent

Load avg:

Using X11 / NX ...

*Thanks to Dave*

```
top - 14:19:32 up 7:29, 2 users, load average: 0.60, 0.80, 0.78
Tasks: 1391 total, 1 running, 1390 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.3 us, 0.1 sy, 0.0 ni, 99.6 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem: 26411065+total, 36880952 used, 22722969+free, 189140 buffers
KiB Swap: 9764860 total, 0 used, 9764860 free, 3526312 cached Mem
```

| PID    | USER | PR | NI | VIRT    | RES    | SHR    | S | %CPU | %MEM | TIME+    | COMMAND   |
|--------|------|----|----|---------|--------|--------|---|------|------|----------|-----------|
| 86552  |      | 20 | 0  | 12.447g | 0.011t | 45068  | S | 0.0  | 4.5  | 0:53.04  | masterpdt |
| 89793  |      | 20 | 0  | 13.415g | 6.805g | 125696 | S | 2.3  | 2.7  | 7:54.25  | soffice.k |
| 31159  |      | 20 | 0  | 4495136 | 1.581g | 139092 | S | 5.6  | 0.6  | 30:59.60 | googleear |
| 35734  |      | 20 | 0  | 4143008 | 1.333g | 124484 | S | 5.3  | 0.5  | 24:40.55 | googleear |
| 74706  |      | 20 | 0  | 3230716 | 606456 | 125676 | S | 5.6  | 0.2  | 14:47.34 | googleear |
| 20829  |      | 20 | 0  | 7592088 | 510512 | 161408 | S | 0.0  | 0.2  | 4:49.21  | soffice.k |
| 116355 |      | 20 | 0  | 1760200 | 500264 | 44392  | S | 0.0  | 0.2  | 0:08.58  | masterpdt |
| 26801  |      | 20 | 0  | 42.250g | 420456 | 154224 | S | 0.0  | 0.2  | 2:52.37  | soffice.k |
| 88272  |      | 20 | 0  | 42.192g | 371516 | 148704 | S | 0.0  | 0.1  | 1:06.33  | soffice.k |
| 24190  |      | 20 | 0  | 7330740 | 368096 | 143548 | S | 0.0  | 0.1  | 6:48.05  | soffice.k |
| 117543 |      | 20 | 0  | 7436964 | 354408 | 134832 | S | 0.0  | 0.1  | 0:42.82  | soffice.k |
| 46157  |      | 20 | 0  | 7276644 | 342152 | 126184 | S | 1.0  | 0.1  | 4:23.39  | soffice.k |
| 21566  |      | 20 | 0  | 7355088 | 340784 | 143272 | S | 0.0  | 0.1  | 2:57.42  | soffice.k |
| 54868  |      | 20 | 0  | 7250684 | 326792 | 120936 | S | 0.0  | 0.1  | 0:52.84  | soffice.k |
| 56386  |      | 20 | 0  | 7289680 | 322064 | 116148 | S | 0.0  | 0.1  | 3:34.87  | soffice.k |
| 11796  |      | 20 | 0  | 7331612 | 321604 | 138284 | S | 0.0  | 0.1  | 1:59.15  | soffice.k |
| 89245  |      | 20 | 0  | 7218320 | 308048 | 127948 | S | 0.0  | 0.1  | 0:31.87  | soffice.k |
| 46041  |      | 20 | 0  | 7207120 | 302972 | 115220 | S | 0.0  | 0.1  | 4:09.68  | soffice.k |
| 93662  |      | 20 | 0  | 7304868 | 299580 | 136500 | S | 1.0  | 0.1  | 2:26.12  | soffice.k |
| 73311  |      | 20 | 0  | 7223712 | 297656 | 128772 | S | 0.0  | 0.1  | 1:40.76  | soffice.k |
| 10204  |      | 20 | 0  | 7296204 | 292440 | 135672 | S | 0.0  | 0.1  | 1:51.34  | soffice.k |
| 20307  |      | 20 | 0  | 7200936 | 292044 | 113516 | S | 0.0  | 0.1  | 1:24.02  | soffice.k |
| 68686  |      | 20 | 0  | 7225736 | 282368 | 137660 | S | 0.0  | 0.1  | 1:06.28  | soffice.k |
| 57598  |      | 20 | 0  | 7205280 | 282096 | 134160 | S | 0.0  | 0.1  | 1:34.12  | soffice.k |
| 102421 |      | 20 | 0  | 42.088g | 276480 | 125904 | S | 0.0  | 0.1  | 0:37.49  | soffice.k |
| 119211 |      | 20 | 0  | 7188368 | 262628 | 128456 | S | 0.0  | 0.1  | 0:29.19  | soffice.k |
| 88675  |      | 20 | 0  | 7180164 | 257700 | 130268 | S | 0.0  | 0.1  | 0:11.17  | soffice.k |
| 76798  |      | 20 | 0  | 7158516 | 253460 | 124216 | S | 0.3  | 0.1  | 2:50.35  | soffice.k |
| 79341  |      | 20 | 0  | 7251200 | 249744 | 135412 | S | 0.0  | 0.1  | 0:27.73  | soffice.k |
| 79886  |      | 20 | 0  | 7165688 | 247560 | 115164 | S | 0.0  | 0.1  | 1:14.84  | soffice.k |
| 22233  |      | 20 | 0  | 7157688 | 246092 | 127900 | S | 0.0  | 0.1  | 1:28.42  | soffice.k |





# Ongoing work here ...

- Vigna - horrendous C++ template mess, surprisingly inefficient:
  - blurring huge bit-masks bit-by-bit etc.
- Cairo conversion: Vigna is dead.
  - pixman for beautiful, fast, in-memory, anti-aliased rendering, using pixman – assembler accelerated etc.
  - Thanks to Caolan McNamara, RedHat
  - Happened after my screenshots:
    - if you see an slow, aliased horror here – it is already gone ...



# Scaling: Bandwidth



# Bandwidth demands ...

- Back of envelope calculations:

|                                                                   |                         |
|-------------------------------------------------------------------|-------------------------|
| Keystrokes per second (cf. <a href="#">wikipedia</a> ) 10 → 2 ... | 3.3 keys/s              |
| Tiles damaged per keystroke                                       | 2                       |
| Time spent by user editing documents vs. mail eg.                 | 50%                     |
| Tile compression ratio – pixels/byte – lots of white              | 8                       |
| Tile size: pixels (256x256)                                       | 65536                   |
| Raw Bandwidth requirement per user                                | <b>270 kbits/second</b> |

- Current (poor) numbers: cf. next slide:

|             |                    |
|-------------|--------------------|
| 2Gbit/sec   | <b>7500 users</b>  |
| 500Mbit/sec | <b>1,875 users</b> |

# Improving Bandwidth Use:

- Quick sanity check:
  - NX - “20kbit/s per user” ...
  - vs. our 270kbit/s estimate.
- Sub-optimal things we do / assume:
  - sending complete 256x256 tiles
    - send deltas instead ... - say a 24x24 pix delta per char
      - gives a nice factor improvement.
  - Glyph caching & compositing on the server:
    - Send, cache & stamp glyphs on the client;
    - Combine with latency hiding to give ~instant response.
  - Lots of scope for improvement here ... some ~10x ...
    - Optimizing things is fun.

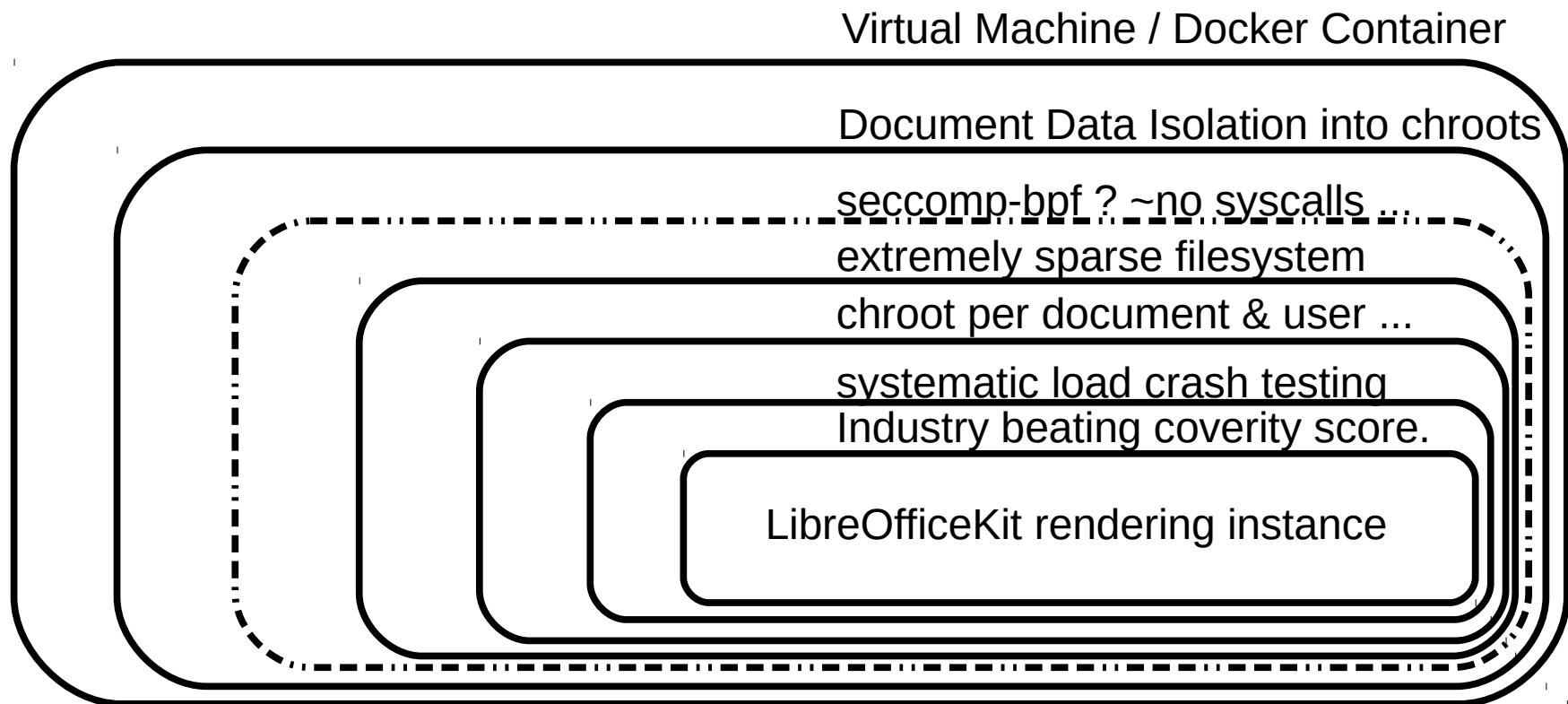


# Security ...



# Security: the onion ... but ...

- Layered approach to protecting infrastructure ...



# Web Technologies

# Browser Limitation: #1

- Copy
  - Very limited support in the browsers, doing just plaintext now – and even that has to be done in advance
  - Wait for selection changes to stop:  
~300ms or so ...
  - Fetch text content into a member variable.
  - As you touch ‘control’ - active hidden text area: do a select + focus on it ...
    - Populate hidden text area with “Dummy Text”
  - Then we get a copy event & can fill it with the text.





# Browser Limitation: #1.2

- Paste:
  - Easier → we don't have to pre-populate the text area
    - Still – so far text-only – needs expanding to new mime-types.
  - Notice text arrived; push to server and get new tiles etc.
- With the right API we could copy/paste charts, slides, equations, etc. - as RTF from PC MS Office ↔ Web LibreOffice etc.
  - Requires – proper content type negotiation etc. ...
  - Ability to do real work in the 'Copy' event(s)

# Browser Limitation: #2

- Printing:
  - Forgetting that it would be nice to know:
    - What printers we have, what page sizes, feed types, collation options etc. etc.
  - Print → PDF – easy, built-in
    - Already used as the CUPS meta-file format.
  - Can't directly start print
    - Perhaps understandable for the “print to default printer now !” use-case ...
  - But at least getting direct to the print dialog: we use a Chrome extension here.



# Deeper Demo: shared editing etc.



# Supporters with Vision

- IceWarp

*... creating a **free alternative** that **any provider can implement** without restrictions, the companies aim to restore fair competition to a market dominated by monopoly suppliers, to **drive innovation, compatibility** and **interoperability** through **open formats**, across **all platforms** and **for everybody**. - **Adam Pacit, IceWarp CEO***

- ownCloud

“Collabora is a great ... partner for ownCloud to deliver a **full LibreOffice Online** experience **integrated** with **ownCloud** ... Developers and Users will be able to easily **view** and **edit documents** while storing them **in ownCloud**. ” said **Frank Karlitschek, ownCloud Founder**

- Kolab

“For too long, closed and insecure solutions have been the industry standard for office and groupware productivity.” said **Kolab System’s CEO, Georg Greve**. “With this partnership Collabora and Kolab are taking the lead... with a product that **respects** users’ **freedoms**, **protects** their **privacy**, and **guarantees** their work will **not be locked away** in proprietary formats.”

- Watch this space ...



# Work of many people

- The following developers from Collabora have contributed to the LibreOffice online repository:
  - Andras Timar, Andrzej Hunt, Ashod Nakashian, Faruk Uzun, Henry Castro, Jan Holesovsky, László Németh, Marco Cecchetti, Mihai Varga, Michael Meeks, Miklos Vajna, Ozcan Esen, Pranav Kant, Tomaž Vajngerl, Tor Lillqvist
  - also - Caolán McNamara (RedHat),
- And few more to LibreOfficeKit
- And many more to LibreOffice itself :-)



# CODE: Collabora Online Development Edition ...

- Getting involved made super easy ...
- <https://www.collaboraoffice.com/code/>
  - Download the VMDK.bz2
  - Un-bz2
  - Tweak VirtualBox
  - ...
  - Profit ...
- What's in the box:
  - OwnCloud + Collabora Online + openSUSE
  - zypper up – to get the latest goodness ...

# Getting Involved

- Normal public dev list:  
[libreoffice@lists.freedesktop.org](mailto:libreoffice@lists.freedesktop.org)
  - For interested developers
- Source code:
  - \$ git clone git://gerrit.libreoffice.org/online
  - \$ git clone git://gerrit.libreoffice.org/core
  - <http://cgit.freedesktop.org/libreoffice/online/>
  - <http://cgit.freedesktop.org/libreoffice/core>
- ie. in the normal places.



# Getting Involved: things to do

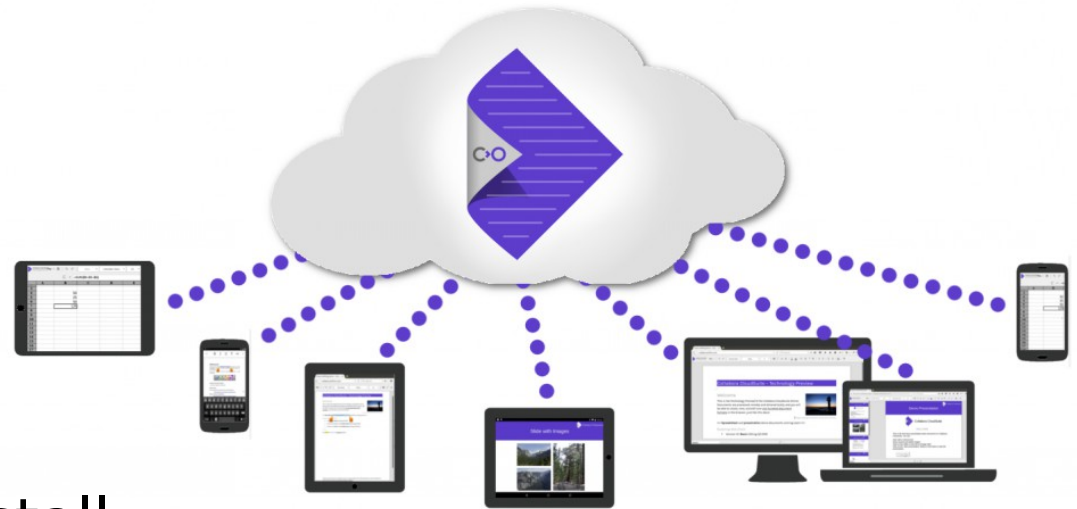
- Security – more work:
  - authentication options
  - Audit, Protocol fuzzing, valgrind regression testing.
  - seccomp-bf integration ...
- Latency Simulator
  - tune-ably slowing a socket – easy & fun hack.
- Monitoring, chat/stat services
- Proxy configuration & HA documentation ...
- Javascript ↔ UNO bridge
- Lots of work ongoing, but contributions appreciated





# ODF – sharing the goodness ...

- Ubiquity the goal:
- Web great for Deployment
  - Getting ODF everywhere without a PC / Mobile install.

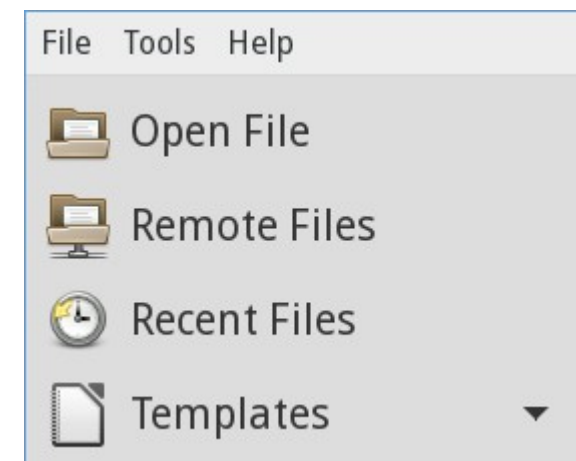
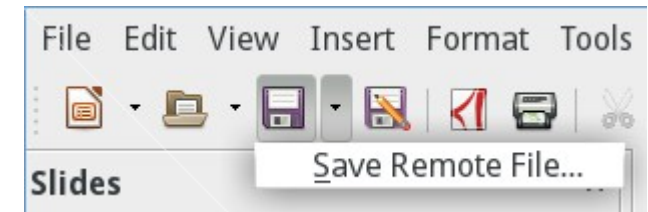
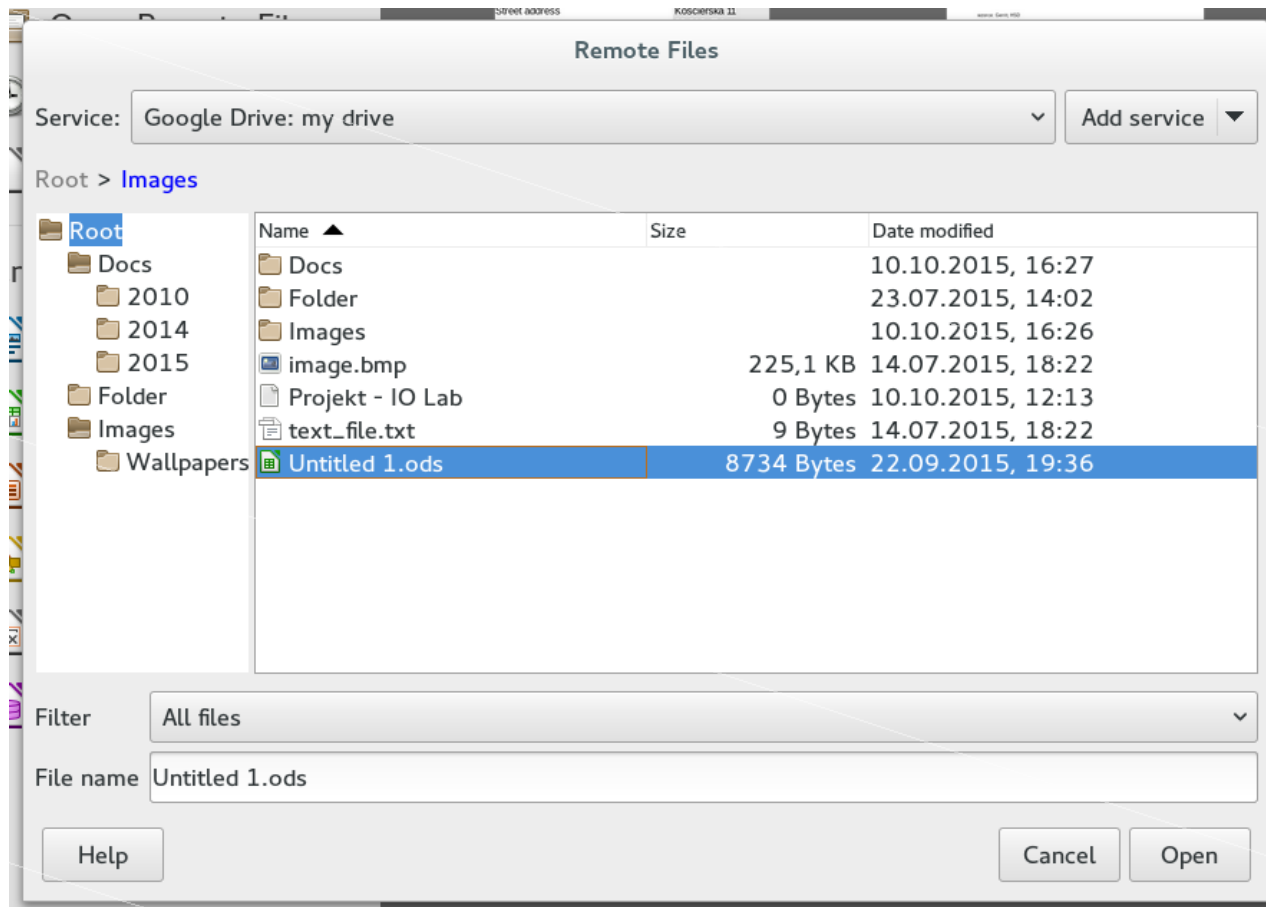


- An(other) end to: “I couldn’t open your document”
  - follow this link in your inbox for something beautiful – cf. Hybrid PDF, OOXML export etc.

# LibreOffice 5.1

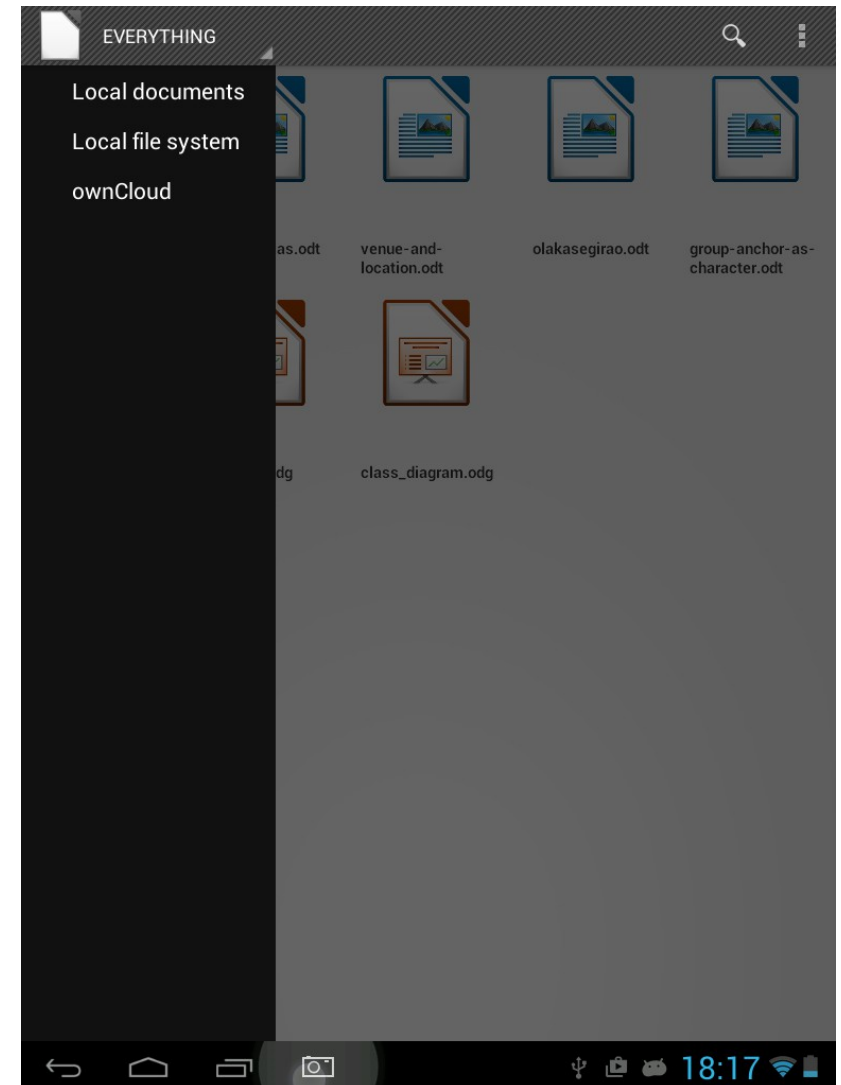
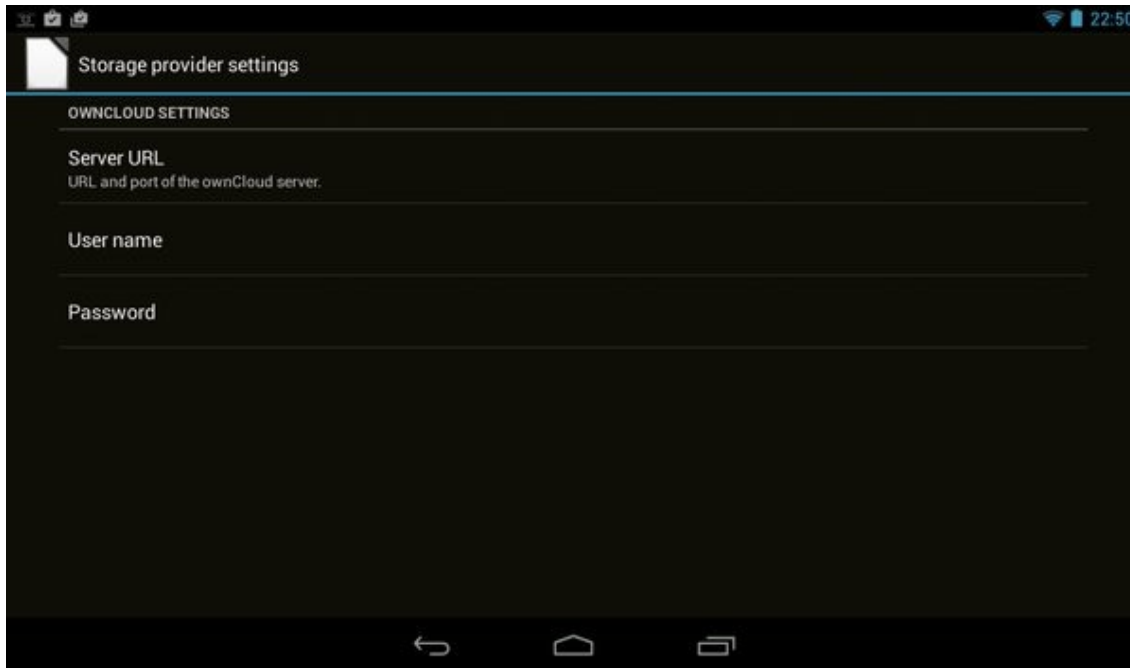


# Opening remote files



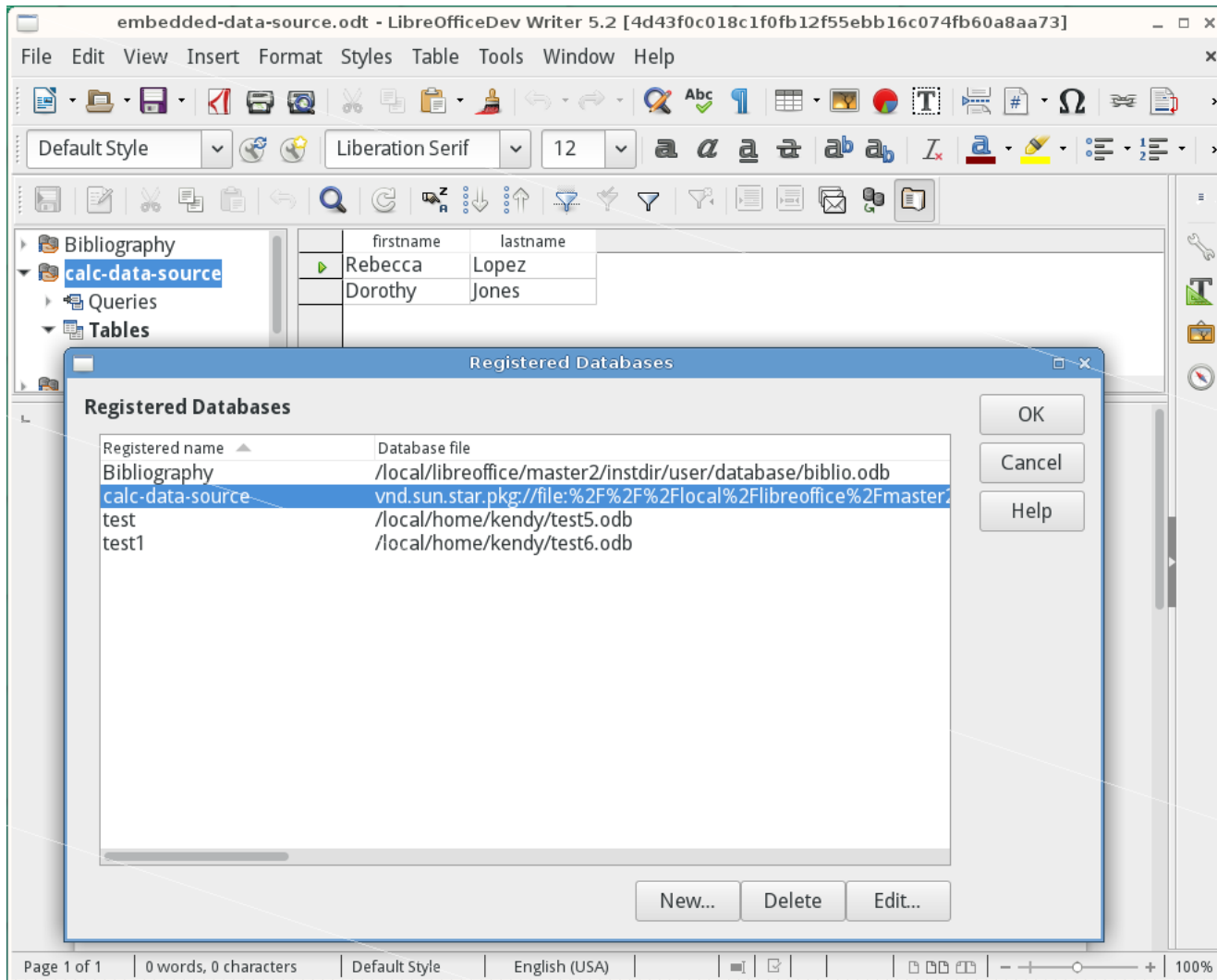
Thanks to: Szymon Kłos (GSoC), Maxim Monastirsky

# Android Owncloud integration



Thanks to: Jacobo Aragunde  
Pérez (Igalia)

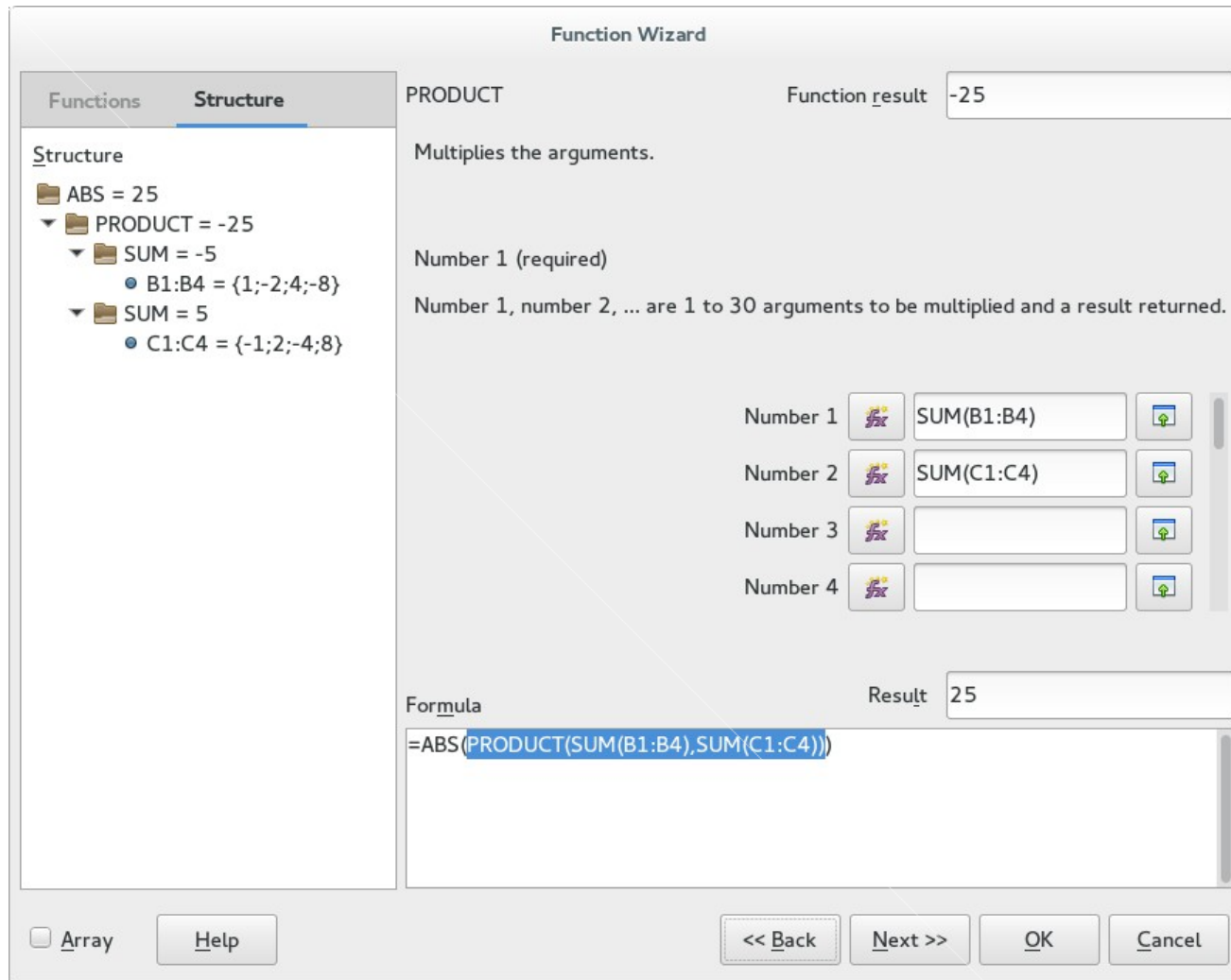
# Mail merge embedding



No more an external .odb file, the information about the data source is available directly in the document.

Thanks to: Miklos Vajna (Collabora)

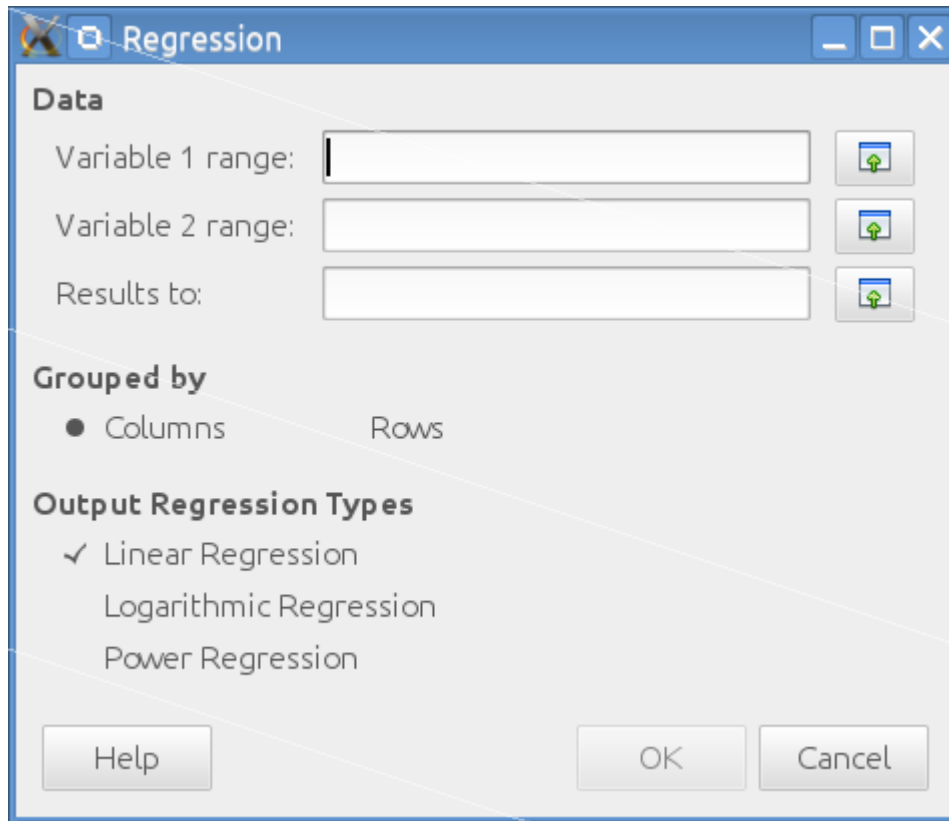
# Formula Wizard improvements



Now shows the values of parameters and results.

Thanks to: Benjamin Ni

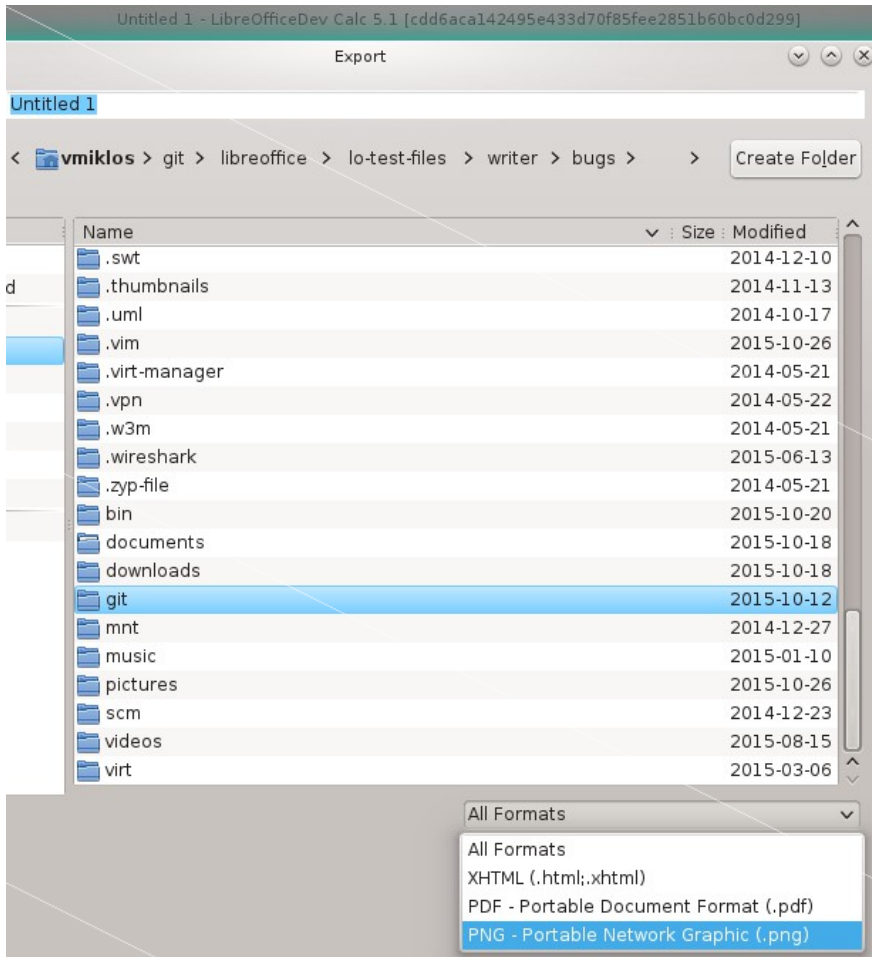
# New Statistics dialog



Calculating linear, logarithmic, and power regressions.

Thanks to: Tomaž Vajngerl  
(Collabora)

# PNG export in Calc



It already existed in Writer and Impress.

Thanks to: Miklos Vajna (Collabora)



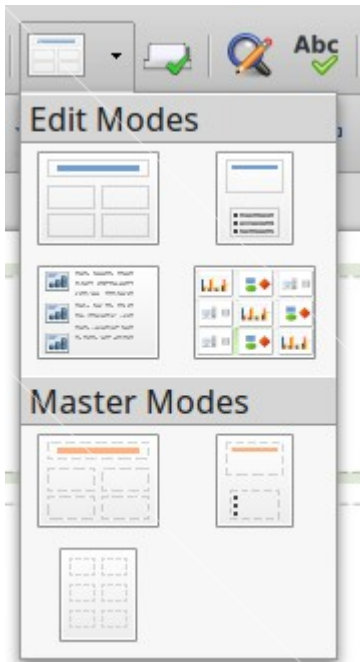
# Search formatted string in Calc

The screenshot shows the LibreOffice Calc interface with a spreadsheet and a 'Find & Replace' dialog box. The spreadsheet has columns 'Date', 'Credit', and 'Debit'. The 'Find & Replace' dialog box is open, showing the search criteria '₹56,750' and the 'Search formatted display string' checkbox checked. The dialog box also includes buttons for 'Find Next', 'Find All', 'Replace', and 'Replace All', as well as checkboxes for 'Match case' and 'Entire cells'. The status bar at the bottom of the window also shows the search criteria and the 'Search Formatted Display String' checkbox checked.

|    | A        | B       | C       | D | E | F | G | H | I |
|----|----------|---------|---------|---|---|---|---|---|---|
| 1  | Date     | Credit  | Debit   |   |   |   |   |   |   |
| 2  | 14/01/13 | ₹56,750 |         |   |   |   |   |   |   |
| 3  | 17/02/13 |         | ₹1,245  |   |   |   |   |   |   |
| 4  | 23/03/13 | ₹50,000 |         |   |   |   |   |   |   |
| 5  | 26/04/13 | ₹500    |         |   |   |   |   |   |   |
| 6  | 30/05/13 |         | ₹200    |   |   |   |   |   |   |
| 7  | 03/07/13 |         | ₹1,245  |   |   |   |   |   |   |
| 8  | 06/08/13 |         | ₹25,000 |   |   |   |   |   |   |
| 9  | 09/09/13 | ₹56,750 |         |   |   |   |   |   |   |
| 10 | 13/10/13 | ₹1,500  |         |   |   |   |   |   |   |
| 11 | 16/11/13 |         | ₹1,245  |   |   |   |   |   |   |
| 12 | 20/12/13 |         | ₹45,650 |   |   |   |   |   |   |
| 13 | 23/01/14 | ₹4,500  |         |   |   |   |   |   |   |
| 14 | 26/02/14 | ₹9,000  |         |   |   |   |   |   |   |
| 15 | 01/04/14 |         | ₹1,245  |   |   |   |   |   |   |
| 16 | 05/05/14 | ₹1,500  | ₹22,345 |   |   |   |   |   |   |
| 17 | 08/06/14 |         | ₹345    |   |   |   |   |   |   |
| 18 | 12/07/14 |         | ₹1,200  |   |   |   |   |   |   |
| 19 | 15/08/14 | ₹67,000 |         |   |   |   |   |   |   |
| 20 | 18/09/14 |         | ₹1,245  |   |   |   |   |   |   |
| 21 | 22/10/14 |         | ₹15,670 |   |   |   |   |   |   |
| 22 | 25/11/14 | ₹1,500  |         |   |   |   |   |   |   |
| 23 | 29/12/14 | ₹56,750 |         |   |   |   |   |   |   |
| 24 | 01/02/15 |         | ₹1,245  |   |   |   |   |   |   |
| 25 | 07/03/15 | ₹56,750 |         |   |   |   |   |   |   |
| 26 | 10/04/15 |         | ₹23,134 |   |   |   |   |   |   |

Thanks to: Dennis Francis

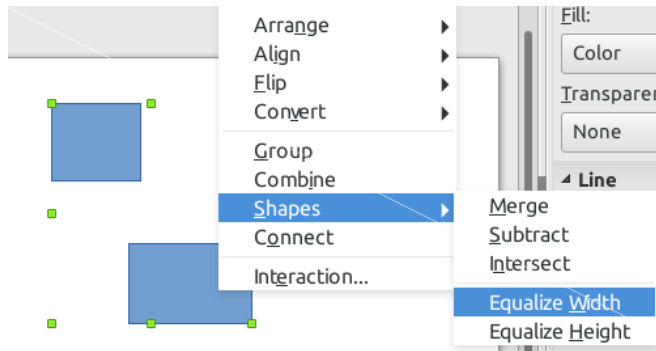
# Mode switching in Impress



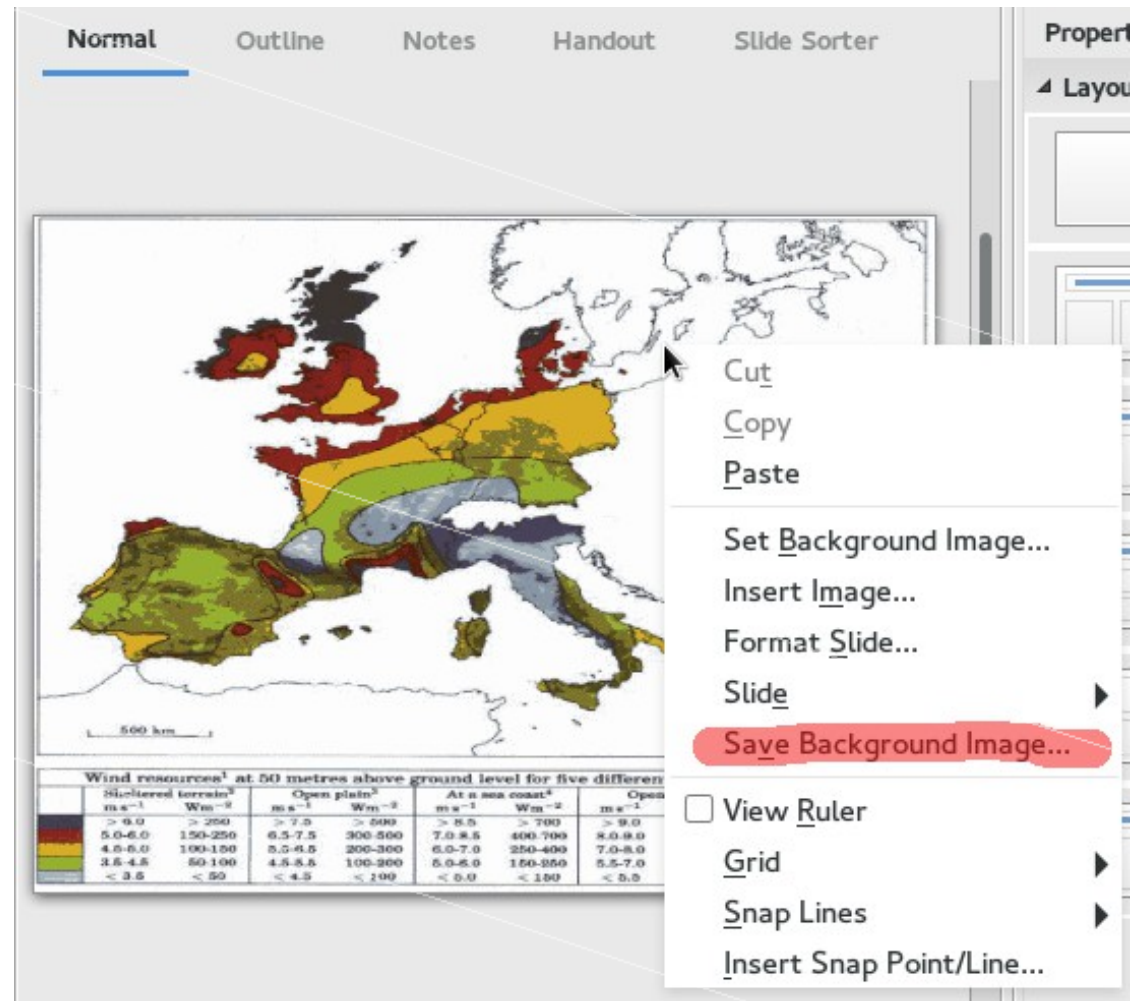
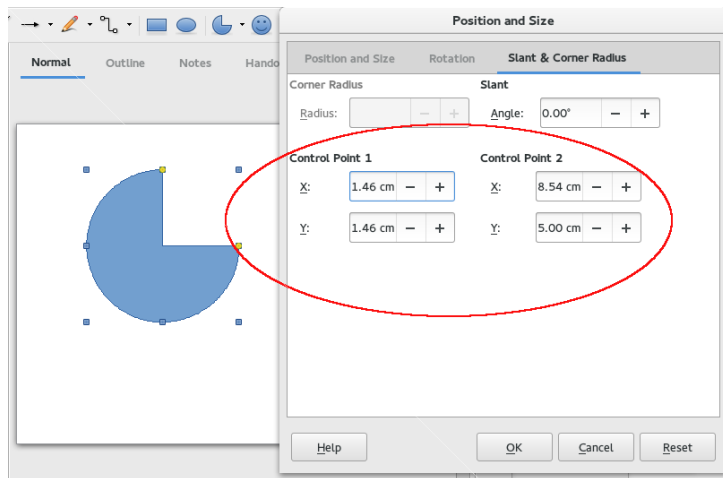
Simplified switching of modes in impress (between master slide and the slide content).  
More space for the slide itself, tabs for the modes not needed any more.

Thanks to: Philippe Jung

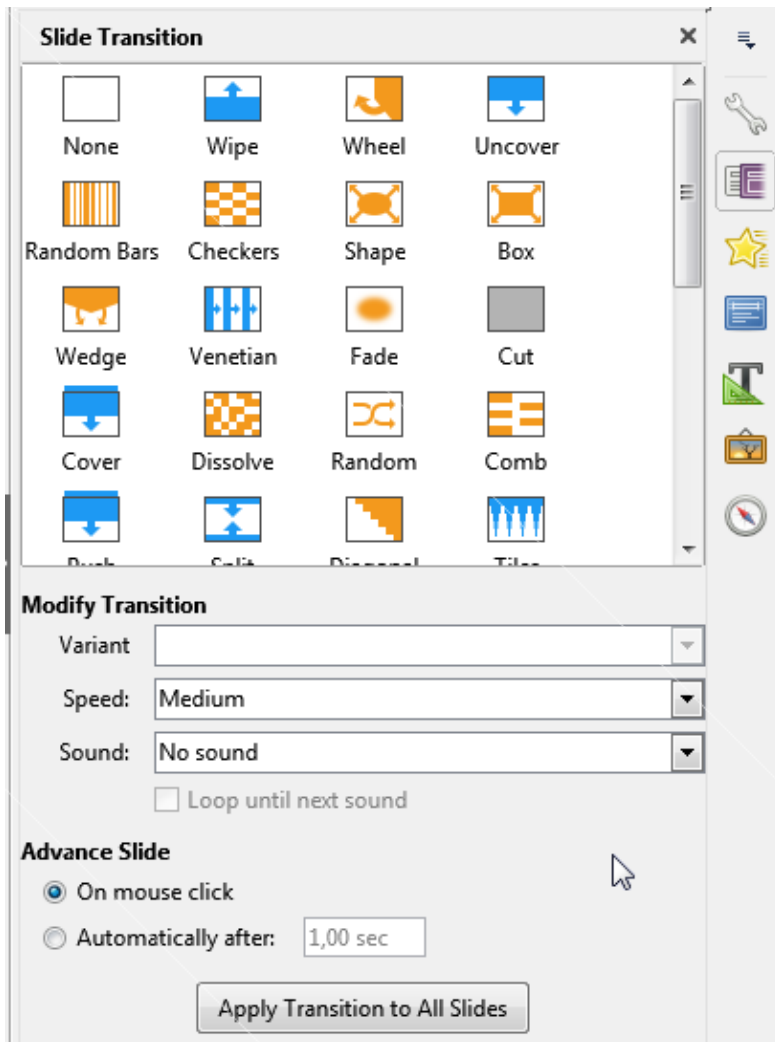
# UX improvements in Impress



Equalizing width / height, exact setting of control points, saving background image.  
Thanks to: Caolán McNamara



# More UX in Impress

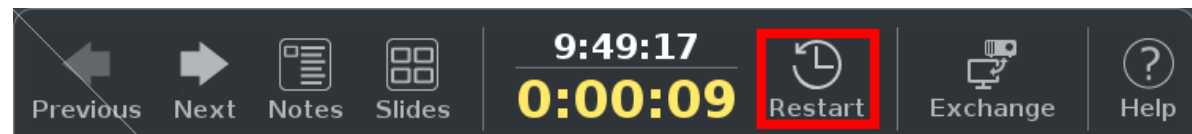


Reworked UI to choose transitions – with previews.

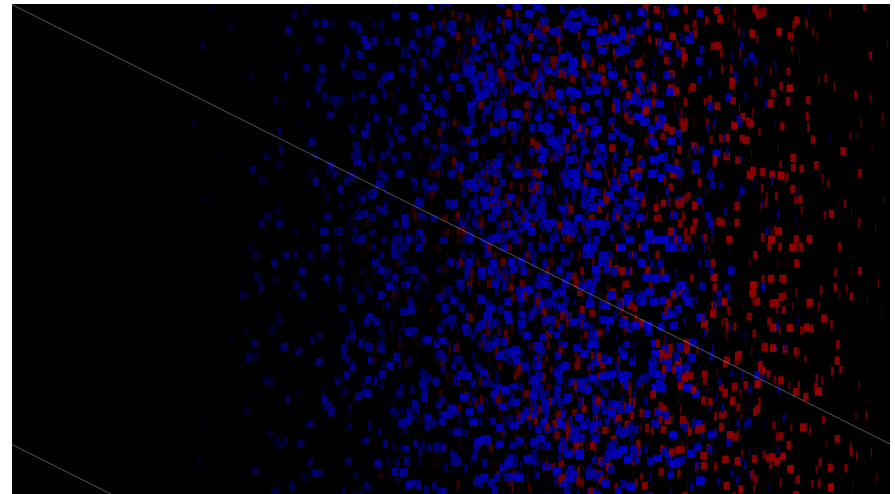
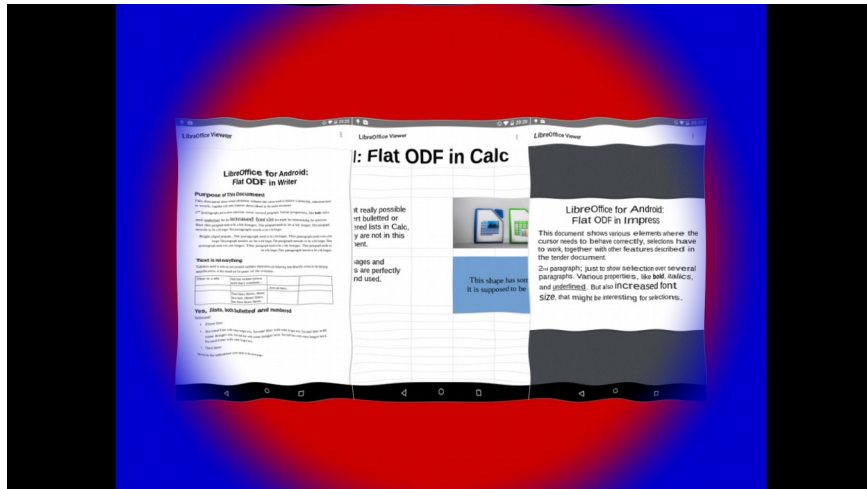
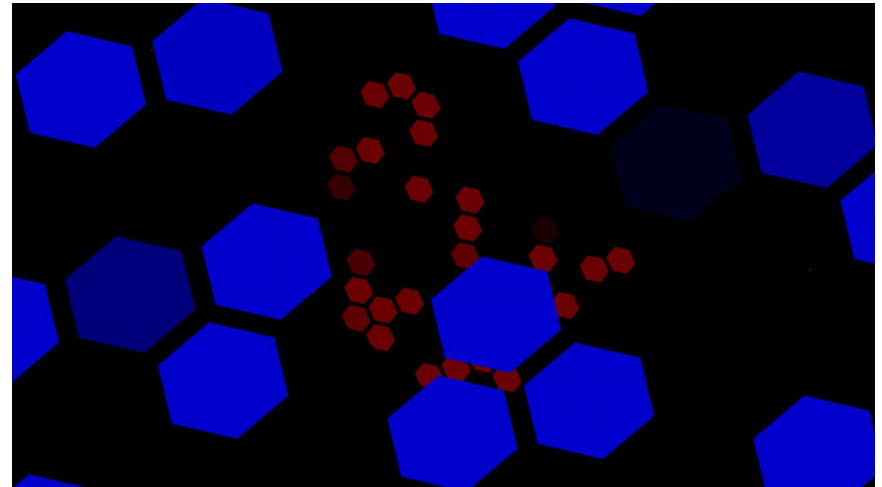
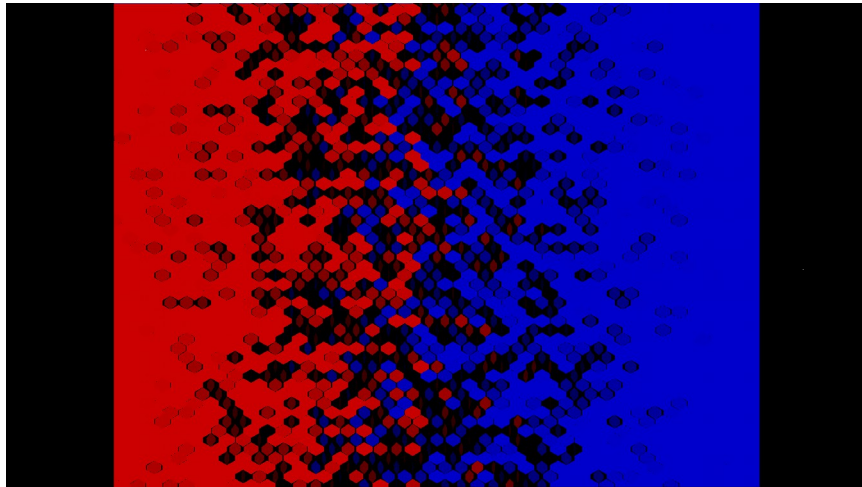
Thanks to: Tor Lillqvist (Collabora), Michael Meeks (Collabora), Andreas Kainz

Possibility to restart timer in the Presenter's console.

Thanks to: Miklos Vajna (Collabora)

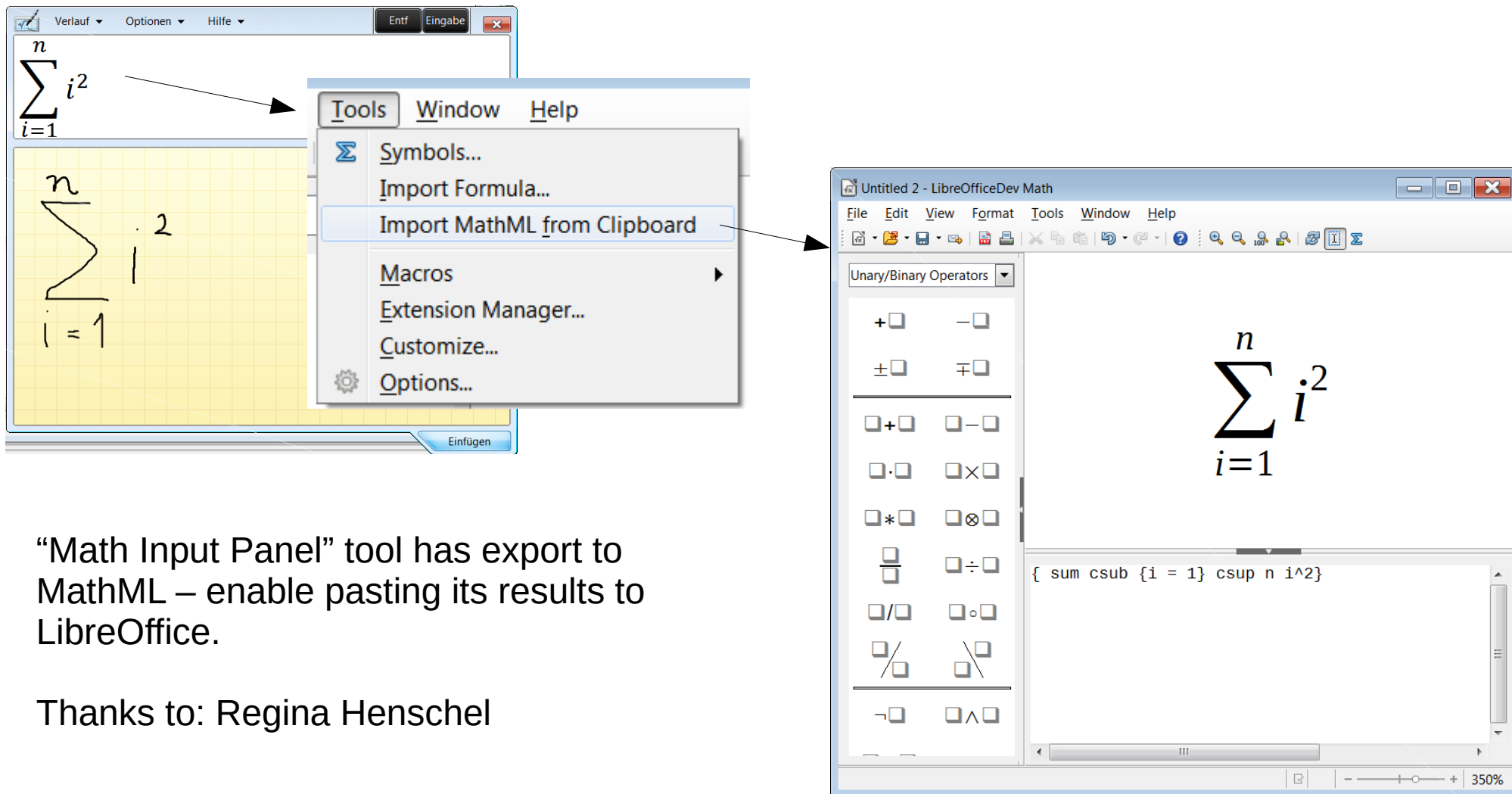


# New OpenGL transitions



Thanks to: Emmanuel Gil Peyrot (Collabora), Tomaž Vajngerl (Collabora)

# Pasting MathML to LibreOffice



The image shows two screenshots from LibreOffice. The left screenshot shows the "Math Input Panel" tool with a menu open. The menu includes options like "Symbols...", "Import Formula...", "Import MathML from Clipboard", "Macros", "Extension Manager...", "Customize...", and "Options...". An arrow points from the "Import MathML from Clipboard" option to the right screenshot. The right screenshot shows the "LibreOfficeDev Math" window with the same mathematical formula  $\sum_{i=1}^n i^2$  displayed. Below the formula, the MathML code is visible: `{ sum csub {i = 1} csup n i^2}`. The window also shows a toolbar with various mathematical operators and a zoom level of 350%.

“Math Input Panel” tool has export to MathML – enable pasting its results to LibreOffice.

Thanks to: Regina Henschel

# Import of Apple Keynote 6

→ Apple Keynote 6 import

Since version 5.1, LibreOffice can import Apple Keynote 6 presentations.

This is the first release: we can import many parts of content, but details (like formatting :-)) are sometimes lost.

Anyway, the main author of the code believes in the "release early, release often" idea :-)

Samples:

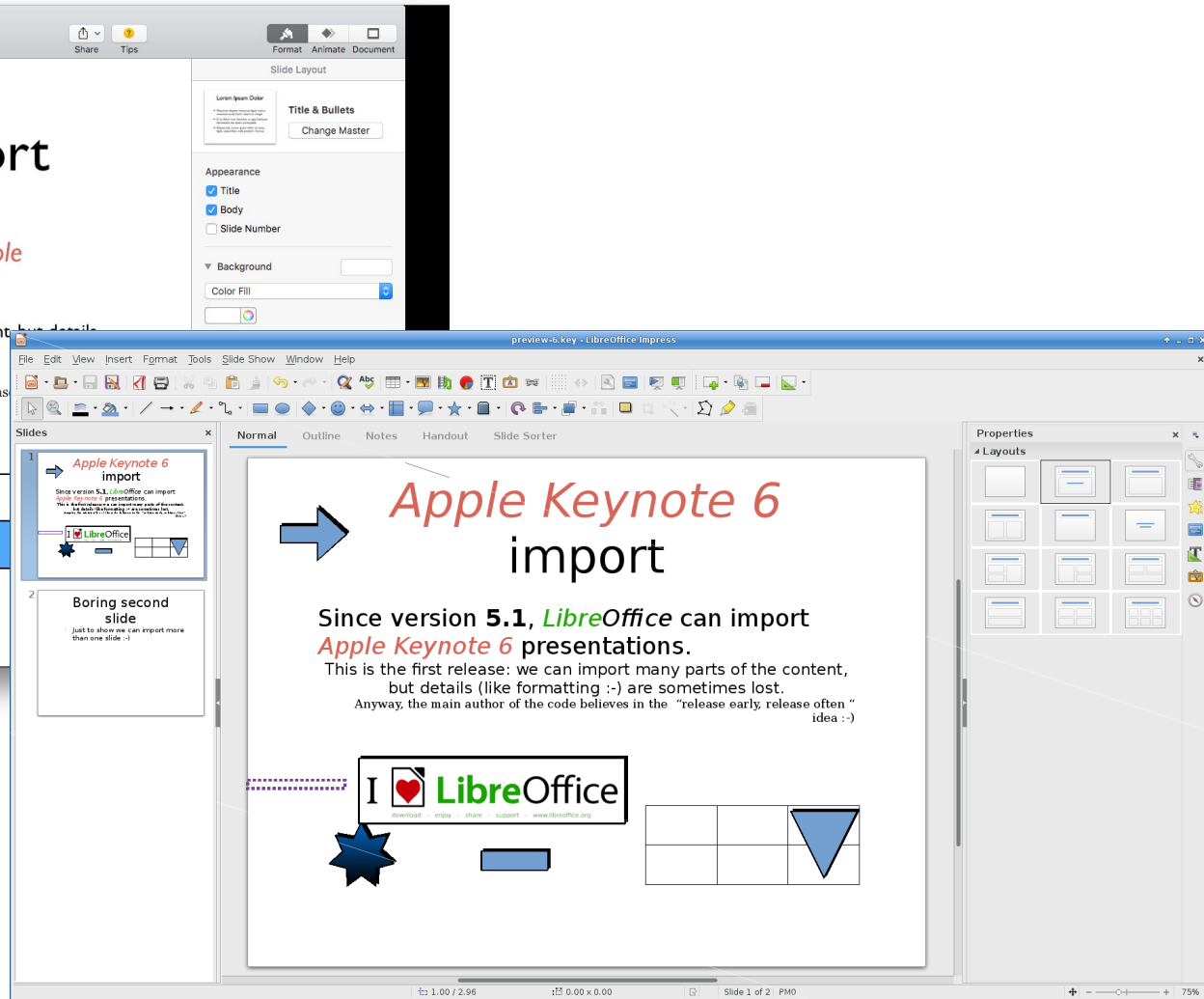


hello

A table

|   |   |
|---|---|
| 1 | 2 |
|---|---|

Thanks to: David Tardon (RedHat)



# OpenGL for all rendering

## Graphics Output

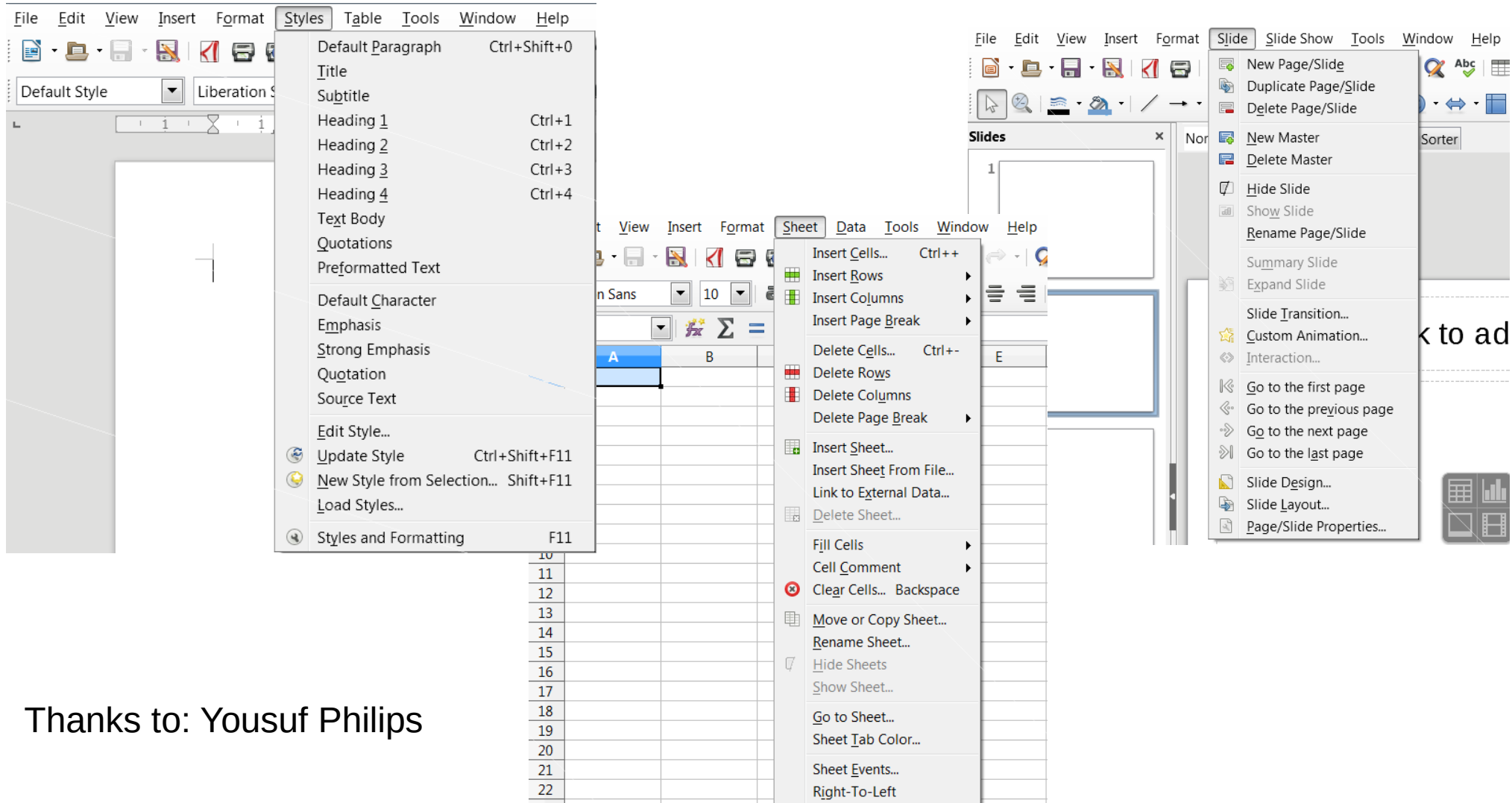
- Use hardware acceleration
- Use anti-aliasing
- Use OpenGL for all rendering (on restart)
- Force OpenGL even if blacklisted (on restart)

Current GL status: Enabled

Thanks to: Tor Lillqvist (Collabora), Michael Meeks (Collabora), Tomáš Vajngerl (Collabora), Miklos Vajna (Collabora), Jan Holesovsky (Collabora), Emmanuel Gil Peyrot (Collabora), Mike Kaganski (Collabora), Marco Cecchetti (Collabora), László Németh (Collabora), Luboš Luňák (Collabora)

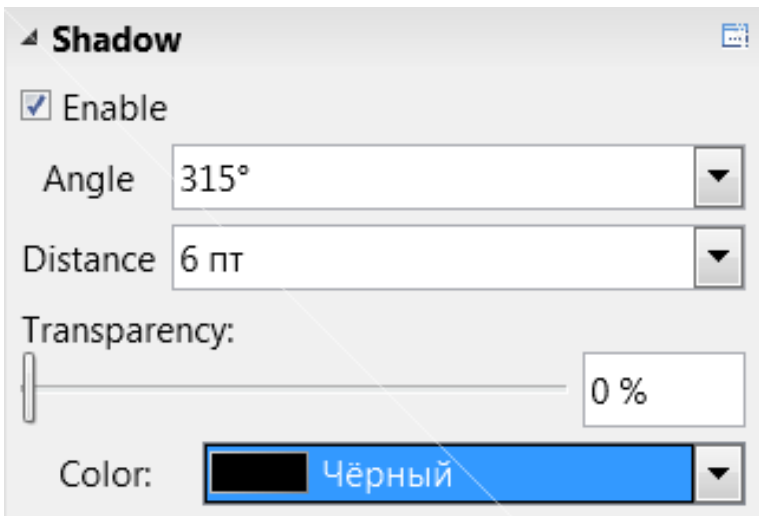
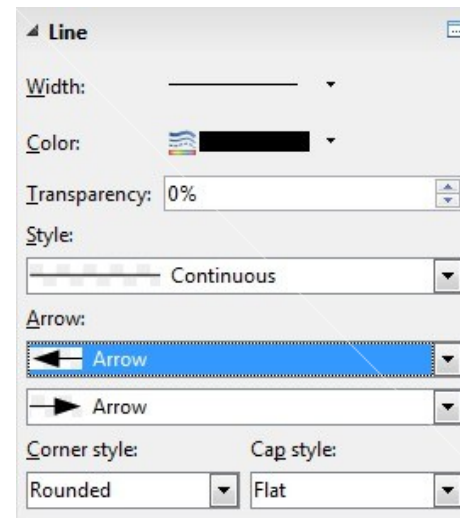
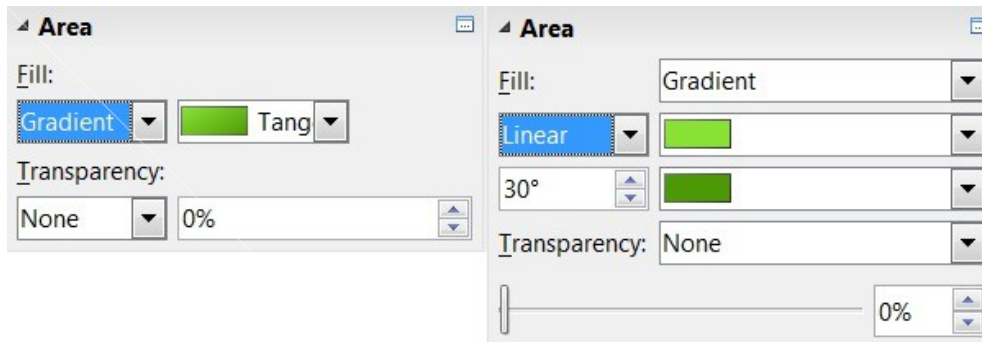


# Reorganization of menu bars

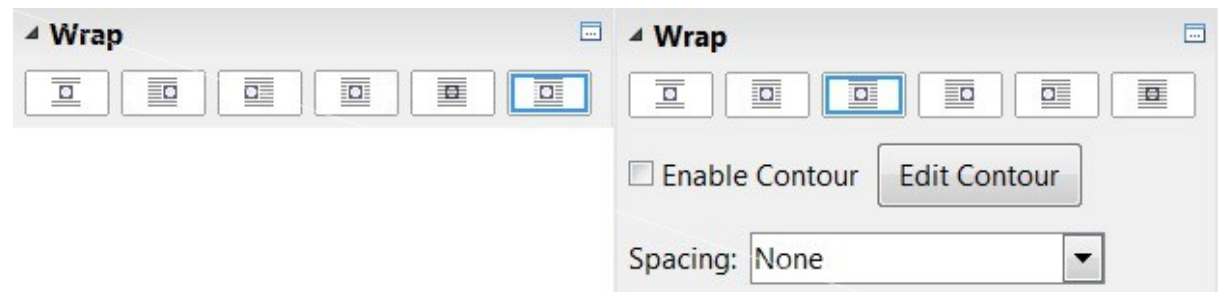


Thanks to: Yousuf Philips

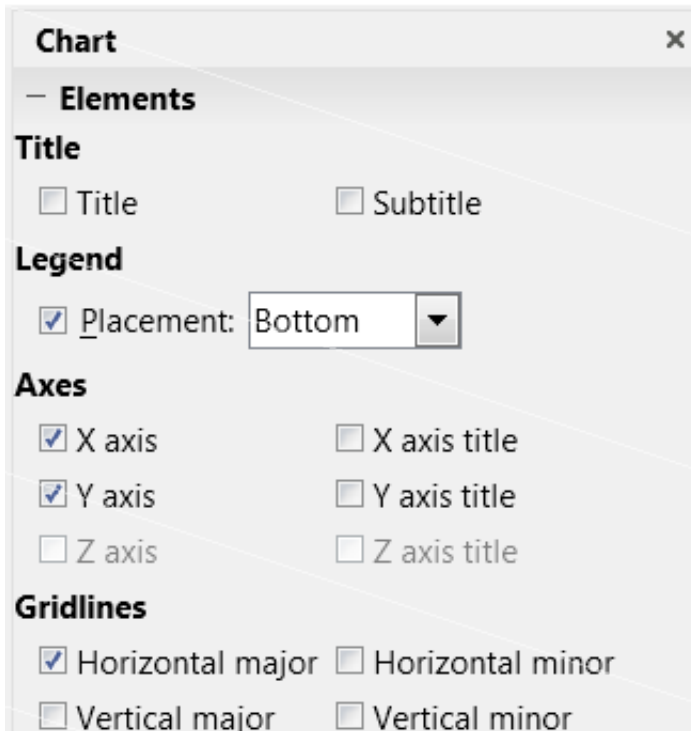
# Sidebar improvements



Before on the left, after on the right.  
Thanks to: Rishabh Kumar (GSoC), Yousuf Philips,  
Katarina Behrens (CIB)

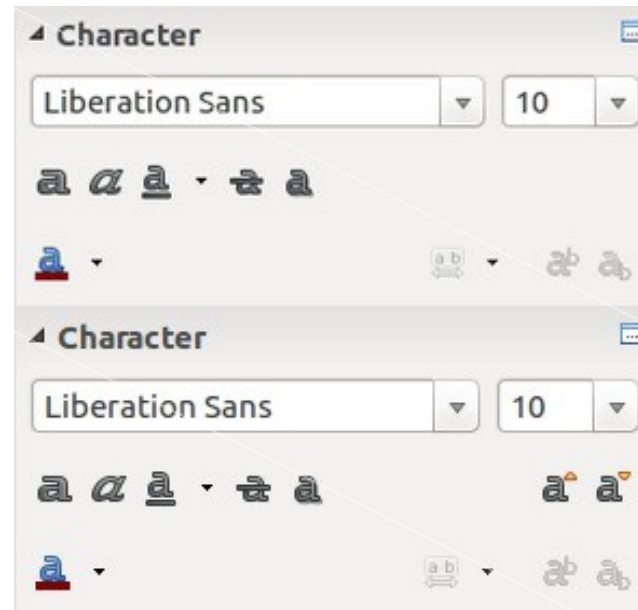


# More sidebar improvements



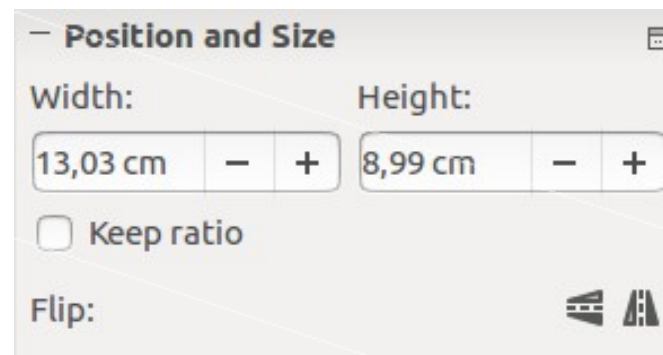
Charts can be controlled via sidebar now.

Thanks to: (Markus Mohrhard, Yousuf Philips, Heiko Tietze)



Character formatting improvements.

Thanks to: Maxim Monastirsky



Thanks to: Samuel Mehrbrodt (CIB)

# Conclusions

- LibreOffice:
  - A huge amount of work in the last year.
  - Progress is accelerating
  - Exciting times in the Cloud and beyond
  - Collabora CloudSuite – coming soon ! ...
- Many thanks for your support of LibreOffice
  - Without you, it couldn't be done & it wouldn't be fun.
- Interested in helping out
  - Mail me / grab me or others on IRC libreoffice-dev  
irc.freenode.org etc. ... please do get involved !



*Oh, that my words were recorded, that they were written on a scroll, that they were inscribed with an iron tool on lead, or engraved in rock for ever! I know that my Redeemer lives, and that in the end he will stand upon the earth. And though this body has been destroyed yet in my flesh I will see God, I myself will see him, with my own eyes - I and not another. How my heart yearns within me. - Job 19: 23-27*