Collabora Online & Mobile

By Michael Meeks
General Manager, Collabora Productivity
@mmeeks @CollaboraOffice

“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

Collabora Online – what is it?
Wrestling a legacy code base
The web: compound suffering
Mobile: easy?
Linux secure containment

Scaling & Performance
Business & FOSS Engineering
Tasters from the last year
How to get involved
Collabora Online

What’s that?
Collabora Online

Built with awesome LibreOffice Technology

Rich, FOSS, secure, interoperable, collaborative documents, on-premise ...

Let me show you some pixels:
Collabora Online 6.4: the enterprise-ready LibreOffice-based Online Office Suite that allows you to stay in control of your own documents, full control of your office files.

LibreOffice is the world’s most popular Open Source Office suite with over 200 million users. Collabora, a leading contributor to the project, and developer of the enterprise-ready, Long Term Supported edition of LibreOffice, Collabora Office, has now brought LibreOffice to the Cloud with Collabora Online.

With Collabora Online you now have access to a powerful, enterprise-ready and 100% Open Source Online Office suite functionality, with excellent
What is Collabora Online?

Documents + Spreadsheets + Slides
- Viewing and Collaborative editing
- Excellent interoperability with Microsoft formats
- DOCX, DOC, RTF, XLSX, XLS, PPTX, PPT
- Many other import filters / Viewing for
- PDF, Visio, Publisher ...
- Powerful WYSIWYG rendering
- On-premise Integration with your EFSS.
- Architecture – a bang on CPU threads & network ...

collaboraonline.com
4 week project timeline

<table>
<thead>
<tr>
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<td>complete sketches</td>
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<td>finalize presentation</td>
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Bars chart showing project progress:
- kai
- luka
- jenny

Timeline:
- Week 1: Research rainforest
- Week 2: Collect supplies for presentation, Complete sketches
- Week 3: Draft presentation
- Week 4: Finalize presentation
What is Collabora Online?

Built on top of LibreOffice Technology:

→ Excellent interop with Microsoft
→ cf. Office 365 / Google Docs ...

On-premise Integration with your EFSS:
ownCloud, Nextcloud, Seafile, EGroupware
or LMS: Moodle, or chat: Mattermost

Freedom applied → FLOSS giving Digital Sovereignty

Pragmatism: “The best line of code, is the one we didn’t have to write” x $10^7$ lines

Architecture – a bet on CPU threads & network … getting cheaper.
Open Document Freedom – sharing the goodness ...

Can share your ODF (and OOXML, DOC) formats with everyone

- Without caring about file-format

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.
Wrestling a legacy code-base

how did we do that thing?
LibreOfficeKit – wrap and re-use the 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.

Exposes the Multi-Window (MVCish) core of LibreOffice

- Ever wondered about: Window → “New Window”
  give it a try ...
Online design: a first cut...

Browser: PC, Tablet, Mobile ...

HTML + Javascript fun
Built on top of: leafletjs
CSS & JS + SVG

Leaflet nowadays being replaced by tuned, native canvas rendering

Webpack Daemon ...

LibreOfficeKit Render & Edit

chrome: Toolbars, Menus, Dialogs

Document: fonts, styles, graphics, fields ... 

Cached Document Tiles / Elements

Web Socket
low latency persistent connection.
http ... for corner-cases.
Fast local interactions: local overlays ... (SVG)

Layers over the document:

- Cursor, Selection handles, etc.
- 1st bullet
- 2nd bullet (bold)
The web: compound suffering

the bits you don’t want to know.
Horrible parts of the web

Keyboard input

- Totally unpredictable
- man months finding out that all the waffle about keyboard & text entry events:
  - Nonsense; no reliable re-construct of text entry from the events possible
  - Mind-blowing cross-browser brokenness [!]
- A hidden entry ... positioned with CSS – at the cursor (for ATs)
- Diff it from A→B, see what changed, emit events:
  - Requires a “<space>|<different-space>” to distinguish delete/backspace
- Then you fight the asynchronous keyboard to keep your text-entry clean.
Chrome / GDocs spreadsheet copy/paste
Office.com / Excel copy / paste ...
Web copy/paste is baroque & paranoid beyond belief.

APIs for copy/paste are very mixed

- In many browsers copy/cut can put ~anything (HTML/txt/RTF/IMG) on the clipboard ~whenever they like.
  - But they have to work-around layers of obsolete ‘security’ foo.
- 1. Find/focus/select content-editable
  - 2. `document.execCommand('copy')`
  - 3. catch events if you get them
    - 4. tweak your content-editable,
    - 5. retry from 1.
IE11 – had a great initial approach:
Google Chrome / Docs – joined up thinking?

Google Chrome’s

- Security team hardened by many issues → so rightly paranoid.

Google Doc’s

- Users cannot copy/paste using context menus → make a plugin for that.

The Security situation?

- Snooping is indeed bad:
  - IE11 solution was a good one.
  - Signed sites you trust ...?
HTML → plus back-channel to fetch the real data
Mobile: easy?

a decade of work & fun ...
New platform / form-factor fun

A decade getting here
- Cross compilation ...
- Android C++ system library dynamic patching.
- Android: fixed 96 DSOs
  - 45+ system libs
  - crash at the limit ...
- Faster linking, profiling

Native mobile UX
- Fennec seemed a good base
- Wrote in Java

Switch to Online
- Embedded Webkit → Online / LibreOfficeKit
- Easy! Except:
New User Experience

Re-using much of the LibreOffice sidebar

- glade XML → VCL → JSON → Re-layout
Linux containment
making this secure on servers
Fork & drop capabilities ...  
Everyone in their own chroot + seccomp-bpf + ...

- on your premise / Private network
- Virtual machine / Docker container
- Seccomp-bpf ~no sys-calls
- Extremely sparse filesystem
- Chroot per document
- Systematic load crash testing
- Industry beating coverity score
- LibreOfficeKit rendering instance

chroot

- no shell
- handful of NSS shared libraries, etc.
- fonts
- one document.

Pixels come out ...
Scaling & Performance

making this efficient on servers
Different optimizations

Online
- dlopen ~world (RTLD_BIND_NOW)
- Loads ~all config, dictionaries & hyphenation
- then forks children
  - Copy-on-write-ness (COW) everywhere.
- Burn memory in pre-init to save in children
- Burn CPU time on startup to save it later.

How to catch anti-social behaviour:
- Eg. touching / un-sharing pages:
Compare COW / shared memory pages: loolmap

Useful tool for eg. kdeinit, webservers?
heap page: 0x011e9000 (310/967) - touched: 17 - was shared - from [heap]

- par't -

0x0130  03 00 00 00 0a 00 00 00 4d 00 61 00 74 00 68 00 -
0x0140  4d 00 4c 00 20 00 32 00 2e 00 00 00 65 00 -
0x0150  00 00 00 00 00 00 00 61 00 00 00 00 00 00 00 -

Shows parent data / diff: here a ref-count in a Unicode string from 1->3
Also dumps all strings it can find with --strings

Totals for heap

- shared 23040 (92160kB)
- unshared 982 (3928kB)
- same but unshared 191 (764kB)
- dirtied bytes touched 30718 per page 31.28

→ staticize our pre-init strings

Would love help expanding the tool to track that to the respective allocations ...
Tilebench – simple test tool: 38 Mb peak.

Memory consumption of /data/opt/libreoffice/master/workdir/LinkTarget/Executable/tilebench

Peak of 38.1 MiB at snapshot #48
Amazing what you find: running on your machine now:

pixman/pixman-glyph.c (pixman_glyph_insert) – 40Mb  since May 2012
/* XXX: These numbers are arbitrary---we've never done any measurements. */
#define N_GLYPHS_HIGH_WATER  (16384)
#define N_GLYPHS_LOW_WATER   (8192)
How many glyph bitmaps to keep around.

cairo/src/cairo-scaled-font.c – since March 2009
/* XXX: This number is arbitrary---we've never done any measurement of this. */
#define MAX_GLYPH_PAGES_CACHED  512

Patches for internal versions to better manage the size of that ...
TileBench: with some optimization:

Five lines of patch later ...
COW sharing across processes is efficient:

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

- Red waste removed: 9Mb
- Remaining: ~14Mb

_of which_

- ~12Mb is shareable by forkit
- ~<5Mb ... base use
- Real-world guess: ~50Mb / doc.

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

- config
- Strings
- Small
- Bitmap
- Border/Shadow
- UI icons
- UNO mgr.
- glyph cache

Red pieces are easy to remove.
Simplicity & Scalability

Large deployments / HA pieces

- Scales with the network.

Simple architecture:

- No new HA Database
- No new message-bus
- No shared data storage

eg. 1&1 / GMX

- ~millions of users with access
Collaboration Protocol

- **Not** composable operations: CompSci → get all excited about this.
  - Horrors of async model sync. → consistency, save, perf. etc.

- Real-world use-cases:
  - 90% of the time → "One user working alone on the authoritative document"
  - ~10% of the time → "Lots of users in a call, co-editing / scoring / minuting"
  - ~0% of the time → conflicting edits with undo/redo on the same document

- Conflicts fundamentally not computer-resolvable always
  - Better to back-off & show the user

- Bring all the keystrokes & mouse movements
  - Into the same process – same memory space – same CPU
Real world: ~45k users – Collabora Online - SURFdrive

Usage

CPU

Free RAM: 13.5Gb → 11Gb

LCA 2022
Mobile: do the work on battery, or in the data-center?

Time to load & render blank files - Galaxy S4

- **DOCX**
  - Native JS: 40 seconds
  - Collabora: 10 seconds

- **XLSX**
  - Native JS: 25 seconds
  - Collabora: 10 seconds

- **PPTX**
  - Native JS: 30 seconds
  - Collabora: 10 seconds

First cut pre-optimized numbers

With data: larger spreadsheets 10x faster → 1000x faster.

Threaded, GPU accelerated spreadsheet core

Before (above) to after (left) – re-ordering & optimizing “Hello World” DOCX load - ~3.5s from start.
Progress this year

a taste of where we placed our investment bets
Quick try-out: built-in demo servers ...

Please make sure you understand that the following will happen if you set up the Collabora Online demo.

- The service will send users documents to Collabora and/or third party demo servers.
- This service is not intended for production use, hence the documents will show tile watermarks.
- The demo service may be under heavy load, and its performance is not representative in any way of the performance of an on-premise installation.
- These servers are used for testing and development, and may run test versions of the software. As such they may crash, burn, and re-start without warning.
- The users documents will not be retained by a third party after their session completes except in exceptional circumstances. By using the service, the user gives permission for Collabora engineers to exceptionally use such document data, solely for the purpose of providing, optimizing and improving Collabora Online. Such document data will remain confidential to Collabora and/or any third party providing a demo server.

At the first use and after an update, each user will get the warning, explaining all the above.

I agree, and use the demo server  I will setup my own server

Use a demo server

You can use a demo server provided by Collabora and other service providers.

Select a demo server

Friprogramvarusyndikatet — Sweden
Collabora Productivity Ltd. — Ireland
Collabora Productivity Ltd. — North California, USA
Collabora Productivity Ltd. — Tokyo, Japan
Collabora Productivity Ltd. — São Paulo, Brazil

Easy to test your new integration against
Built-in demo servers: iff safe & route-able ...

- Use a demo server

You can use a demo server provided by Collabora and other service providers for giving Collabora Online a try.

*Your NextCloud setup is not capable of connecting to the demo servers because:*

- it is a local setup (localhost)
- it uses an insecure protocol (http)

*For use cases like this, we offer instructions for a Quick tryout with NextCloud docker.*
Better: Nextcloud Hub / AppImage install ...

A lovely, simple one-click install ...

- A small / fast PHP forwarding proxy & an AppImage
- Please upgrade to a faster, native server quickly ...

Use your own server

Collabora Online requires a separate server acting as a WOPI-like Client to provide editing capabilities.

Use the built-in CODE - Collabora Online Development Edition

Easy to install, for personal use or for small teams. A bit slower than a standalone server and...
Polling websocket-aliases over keep-alive’d https://
Collabora Online Development Edition 6.4

Get your own online Office Suite up and running at home with CODE!

The development edition is aimed at home users and contains many of the latest and greatest developments. We want as many people as possible to try it out and get back control of their own online documents. We’d also love to get people involved in our efforts to make Online even better. So download Collabora Online Development Edition, enjoy using it at home.

CODE v6.4 – A leap in usability & Numbering

CODE v4.2.7 → CODE v6.4
Eclectic Notebookbar UX choices: to taste

Can collapse to just a menu ...
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Online commits
By affiliation (last year)

Collabora: 3218
97%

Others: 5
QB: 15
1&1: 21
Volunteers: 28

PDF Search, Collaboration & Annotation
Import SmartArt Graphics in Collabora Online 6.4

- a
  - b
  - c
- X
  - y
  - z
- empty
Online 6.4.x ...

rapid fire
incremental goodness
Collabora Productivity
LCA 2021

Improved chart editing sidebar functionality
Calc: Improved sheet movement:
Calc: customize & create Pivot Tables
Calc: define & manage range names & print ranges

Define Name

Define the name and range or formula expression.
Name:
_COUNTRY_REGION_Country

Range or formula expression:
$'Sorted Data'.S$3:S$27

Scope:
Document (Global)

Manage Names

Manage Names

Name

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<th>Range or formula expression</th>
<th>Scope</th>
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Scope:

Manage Names

Add
Delete
Help
Cancel
OK
Collabora Productivity
LCA 2021

Calc: Statistical tools for data analysis

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Sampling
Descriptive Statistics
Analysis of Variance (ANOVA)
Correlation
Covariance
Exponential Smoothing
Moving Average
Regression
Paired t-test
F-test
Z-test
The pieces you can’t see

Performance

- faster rendering
- Snappier interactive editing of cells
- Bind-mounting of document jails (instead of hard-linking)
- Improved watermark caching
- Slide content pre-fetching
- On-demand slide thumbnail fetching.
- Significant PDF rendering improvements
- Significant thumbnail / download speedups

Misc

- iOS multi-document support
- Substantial cypress automated test coverage.
- Cluster debugging / warnings ... check matching ServerIds

And much much more ...

- 3600+ commits.
- Innumerable bug-fixes & improvements
Mobile 6.4.x ...

bringing goodness to your phone
# 4 week project timeline

**Date:** 11/11/20

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**Employers**

- Kai: Research Rainforest
- Luka: Collect supplies for presentation
- Jenny: Complete sketches
- Ali: Draft presentation
- Luka: Finalize presentation

**Chart:**

- **Kai:** 100.00%
- **Luka:** 50.00%
- **Jenny:** 30.00%
Android: start of a Dark Mode for the Online shell.
500k installs
Available for iOS, Android & Chrome OS
ChromeBooks:
Collabora Office 4.2.5

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LibreOffice is the world's most popular Open Source Office Suite with over 100 million users. Collabora, a leading contributor to the project, and developer of the enterprise-ready, Long Term Supported edition of LibreOffice, Collabora Office, has now brought LibreOffice to the Cloud with Collabora Online already back in 2016 - and it is still doing most of the work - e.g. 97% of commits if from Collabora.

With Collabora Online you now have access to a powerful, enterprise-ready and 100% Open Source Online Office Suite functionality, with excellent support for all popular office file formats and collaborative editing features.
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Collabora Online comes with Long Term Support and can be integrated in any web-based solution, such as File Share and Sync solutions, Document Management Systems, Groupware or custom build software.

All Long Term Support releases are supported for 3 years, with a perpetual license, annual subscription to security maintenance and updates, an SLA and Level 3 (code fix) support (other levels are not supported). And there are more benefits.
UX integration:

Letting you theme your your integration to match (cf. blog)
Getting style guide: a how-to...
ui_defaults: posted with the iframe:

```
<input name="ui_defaults" value="TextRuler=false;StatusBar=false" type="hidden"/>
```

‘;’ delimited options in a post field.

- `uiMode=classic/notebookbar` – select menu/toolbars
- `StatusBar=false` - hide status bar
- `TextStatusBar=false` - hide status bar only for Text
- `Sidebar=false` - hide sidebar by default
- `Ruler=false` - hide ruler by default … etc.

other prefixes: Presentation/Spreadsheet
css_variables: posted with the iframe:

```html
<input name="css_variables" value="co-color-main-text=#000;--co-body-bg=#FFF--co-txt-accent=#38257a;" type="hidden"/>

`;` delimited options in a post field, default (for now) are:

--co-primary-element: #4c566a
--co-primary-element-light: #706aab
--co-txt-accent: #38257a
--co-primary-text: #ffffff
--co-border-radius: 3px
--co-body-bg: #ffffff
--co-color-main-text: #000000
```
~ Papagaio ~

- papagaios
- periquitos

~ Papagaio ~
Welcome to the Collabora Online Demo

Thank you for your interest in the Collabora Online demo. Collabora Online is an open source on-premise office suite solution based on LibreOffice Online. It enables you to collaboratively edit, save and write text files, spreadsheets and presentations online. Collabora Online works on any modern browser and offers excellent interoperability for all popular office formats.

There are two versions of Collabora Online. The scale-able and supported enterprise-ready Collabora Online and CODE — the Collabora Online Developers Edition. While Collabora Online is aimed at professional business users, CODE is perfect for home users that want to start to run their online office suite in an own private environment or tech-enthusiast, that want to be among the first to see and test new features. Learn more about the differences here.

One more thing before you start! This demo runs on our servers and grants you access to the latest snapshot from
After: theming / palette & settings ...

- Ruler off by default
- Sidebar was here ...
- Lighter document background

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Business & FOSS Engineering

time to market, branding & who dares pays ...
Engineering - Business / Community

How to fill this gap

- Paris → GDK-Broadway based prototype
  - 2011
- Collabora Online 1.0
  - 2016
  - Eur million(s)

Engineering choices

- Getting a product bootstrapped
  - "ship it when it’s perfect"
  - vs.
  - "release early & iterate to perfection"
- Technical / release schedule choices.
- Economics / Marketing / Sales ...
The awesome LibreOffice community of friends.

(who still disagree sometimes)
Putting in the investment ...

Online commits
By affiliation (last year)

Collabora
3218
97%

5 Others
15 CIB
21 1&1
28 Volunteers

collaboraonline.com

LCA 2021 .. 79
Moving our development to github

Clear brand story
- Helps to drive investment and avoid user / customer confusion
- Unwinds LibreOffice vs. Collabora brand conflict

Removed reminder for users in CODE

Developer pool growth ...

Continue to support, work on LibreOffice
- TDF doing well – Eur 1.3m raised last year from Desktop +~30%

Tackles the “Free Compliments” problem
- At least marketing-wise ...

Similar to Nextcloud/ownCloud/pydio/seafile/etc.
- A clear flow of users through their projects
- An obvious place for support
- Clear credit given in the product name
- No complex structures necessary.

FLOSS company assets: cash + their brands
- ROI is important → in marketing.
Example new Online volunteer contributions

Lots of Design / CSS work
- Thanks to Andreas Kainz

Improving icon-sets
- Thanks to Rizal Muttaqin

Python tooling improvements
- Thanks to Alan Verdugo, corleone77, Batuhan Görkem Benzer, Kuesji Koesnu and Mücahid Aydin

Javascript code cleanups & wins
- Thanks to Dilaver Demirel, Pelin Kuran, Buğra Kurt, Irina Hristova, Rashesh Padia and Ayhan Yalçınsoy

FreeBSD port improvements
- Thanks to Gleb Popov

C++ core code cleanups
- Thanks to Jan Dagefoerde, Yusuf Keten

Easy to contribute – with gitpod
How to get involved ...

Easy wins left & right for many skills
It is easy to get involved:

LibreOffice features:
http://www.libreoffice.org/

Code
https://git.libreoffice.org/core

Get involved:
• https://www.libreoffice.org/community/get-involved/
• C++, python, l10n and more
• https://translations.documentfoundation.org/

Collabora Online
https://collaboraonline.github.io/

Easy Hacks:
https://github.com/CollaboraOnline/online
• C++, Javascript, CSS, Design ...
https://hosted.weblate.org/projects/collabora-online/

Forum:
https://forum.collaboraonline.com/

Weekly dev. meetings
Making Open Source ROCK
Conclusions:

Easy to deploy on your existing:
- Nextcloud, ownCloud, Moodle, Seafile, Mattermost, EGroupware ...

Regain control of your data & documents today

Easy to integrate into your web app

Server load-wise, small compared to EFSS

Improving at significant pace

Created by Collabora
- with the generous help of many
- easy to contribute to

based on LibreOffice Technology

Thanks for your support!
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