

Bringing Collabora Online to your web-app *its easy ...*

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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*



What is Collabora Online ?

Documents + Spreadsheets + Slides

- Viewing and Collaborative editing; **Web, Tablet, Phone**

Excellent interoperability with Microsoft formats

- DOCX, DOC, RTF, XLSX, XLS, PPTX, PPT

Many other filters - PDF, Visio, Publisher ...

Powerful WYSIWYG rendering, built on **LibreOffice** core

On-premise Integration with your existing EFSS.

- ownCloud, Nextcloud, Seafile, pydio,
or LMS: Moodle, or chat: Mattermost etc.

Architecture – a bet on CPU threads & network ... getting cheaper.





How to get something running fast:

- Install CODE on a dedicated server
 - <https://www.collaboraoffice.com/code/>
- Setup the SSL for the https access
- Install the integration between your document storage and the Online
 - Or if your are integrating yourself, implement the REST endpoints
 - And modify your webapp to add iframe for the Online
- Enjoy the success! :-)

Or maybe you have an additional need before you are completely happy with Online in your webapp?



Or build it yourself ...

```
$ git clone  
https://git.libreoffice.org/online
```

```
$ make run
```

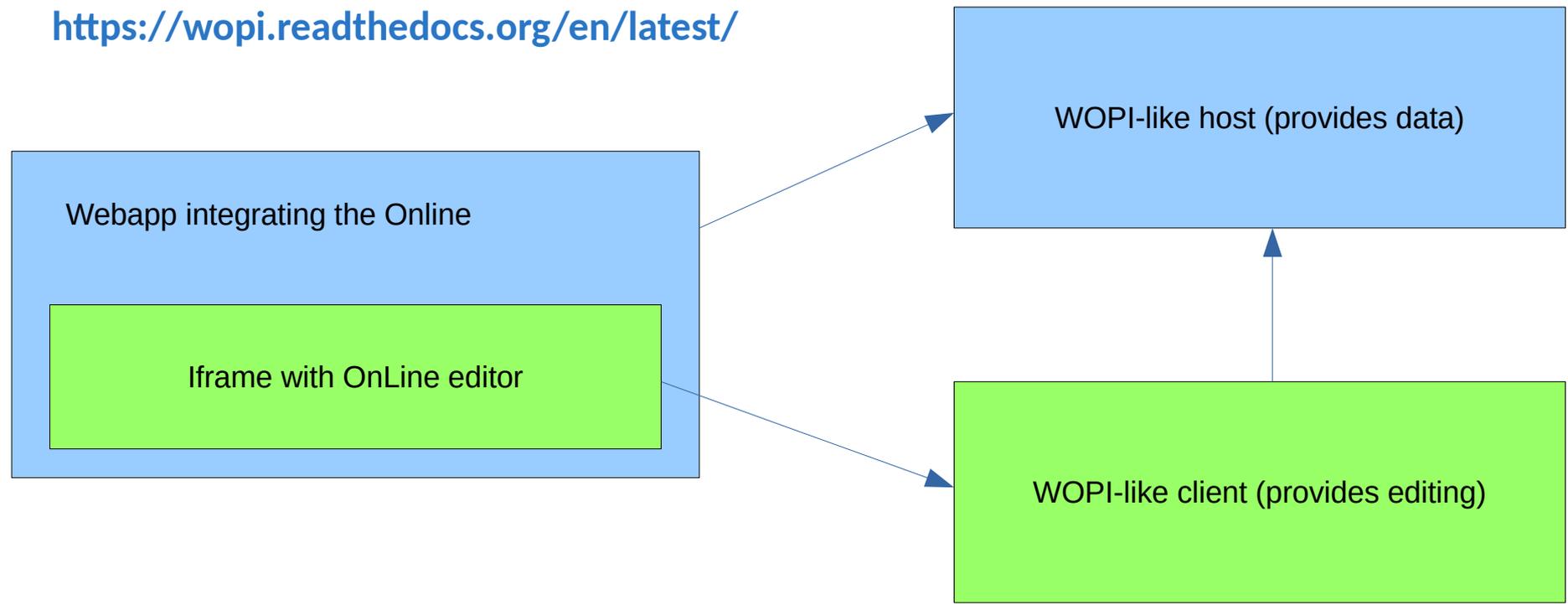
Launch one of these in your browser: ...

File access & Auth like WOPI



The Online uses a WOPI-like protocol

<https://wopi.readthedocs.org/en/latest/>





REST endpoints

To download the file:

- GET `https://<WOPI host URL>/<...>/wopi*/files/<id>/contents?access_token=<token>`

Upload back:

- POST `https://<WOPI host URL>/<...>/wopi*/files/<id>/contents?access_token=<token>`

CheckFileInfo to provide information about the file:

- `https://<WOPI host URL>/<...>/wopi*/files/<id>?access_token=<token>`



Security token

To be able to access files securely, an authentication token has to be passed to the Online

- From the Online point of view, it can be any random number / string that will be passed as part of the URL when accessing the document storage

Should be generated according to the user who is logged in + the document

- But don't make it possible to guess the token!
- The ideal is to maintain a list on the server + have a random number (mapped to the element in the list) as the token



JavaScript part – embedding the iframe

The Connector connects to the discovery service

- To get the information about how to initiate the iframe, the 1st call has to be an access to a “discovery” xml
 - In theory, different document types can be served by different servers

Then create the iframe that contains the Online

- Has to be provided with the access token via a POST request
- And then only gets called back when the document is closed again



Recommended steps

- Add WOPI REST endpoints to your web service, for the moment returning only a “Hello World” message.
- Implement the CheckFileInfo endpoint
- Now you can see a constructed document containing just “Hello World” in the Online in a simple HTML page:
 - ```
<html><body>
 <form action="WOPIsrc=https://<WOPI host URL>/<...>/wopi/files/<id>" enctype="multipart/form-data" method="post">
 <input name="access_token" value="test" type="hidden"/>
 <input type="submit" value="Load Collabora Online"/>
 </form></body></html>
```
- In your webapp, create an iframe that embeds the Online
- Implement the real access\_token handling
- Update the REST endpoints to actually load real data
- Implement the PutFile endpoint to really save the data

PostMessage magic ...



# Tweak loolwsd.xml

```
<net desc="Network settings">

 <frame_ancestors desc="Specify who is allowed to
 embed the LO Online iframe (loolwsd and WOPI host
 are always allowed). Separate multiple hosts
 by space.">localhost:*</frame_ancestors>
```

A little inelegant, but tests cross-site-scripting bits by default.

postMessage:

[https://localhost:9980/loleaflet/dist/framed.doc.html?file\\_path=../../hello-world.ods](https://localhost:9980/loleaflet/dist/framed.doc.html?file_path=../../hello-world.ods)

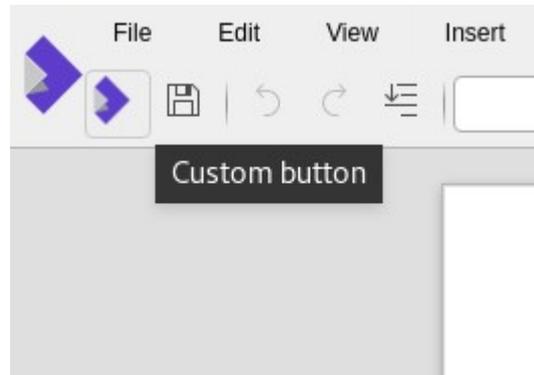




# Extending without Touching the Online Code

**Sometimes the functionality is too specific to the integration via `postMessage`**

- It's possible to add a button to the toolbar via a message
- And react on the user pressing it
- See [liferay.com/leaflet/reference.html](https://liferay.com/leaflet/reference.html)





## postMessage API

**For signalling from the iFrame back to the parent frame.**

- You can use this after all the JS is loaded – which is signalled by App>LoadingStatus with Status “Frame\_Ready”. When that happens, the parent has to send Host\_PostmessageReady.
- Then for inserting a button, the host can use Insert\_Button
- Each time the button is pressed, the host receives a message Button\_Clicked with the id of the button.



# CheckFileInfo extensions – to enable or disable features

Most of them were added thanks to a customer request:

- **HidePrintOption, HideSaveOption, HideExportOption:** Hide the appropriate options in the file menubar
- **DisableExport:** Disables export functionality in backend. If set to true, HideExportOption is assumed to be true
- **DisableCopy:** Disables copying from the document in libreoffice online backend. Pasting into the document would still be possible. However, it is still possible to do an "internal" cut/copy/paste.
- **DisableInactiveMessages:** Disables displaying of the explanation text on the overlay when the document becomes inactive or killed. With this, the JS integration must provide the user with appropriate message when it gets Session\_Closed or User\_Idle postMessage's.
- **DownloadAsPostMessage:** Indicate that the integration wants to handle the downloading of pdf for printing or svg for slideshows or experted document, because it cannot rely on browser's support for downloading.
  - When this is set to true, the user's eg. Print action will trigger a postMessage called Download\_As, with the following JSON in the Values:
- **EnableOwnerTermination:** If set to true, it allows the document owner (the one with OwnerId =UserId) to send a 'closedocument' message (see protocol.txt)
- **UserExtraInfo:** JSON object that contains additional info about the user, namely the avatar image.
  - Example: 'UserExtraInfo' => [ 'avatar' => 'http://url/to/user/avatar', 'mail' => 'user@server.com' ]
  - Note: There is strict Content Security Policy that restricts image resources (img-src), therefore the avatar URL must not violate the CSP, otherwise it will show as broken images.
- **WatermarkText:** If set to a non-empty string, is used for rendering a watermark-like text on each tile of the document

# Examples:

*give in to peer pressure: all your friends have !*



# Alfresco

## Alfresco connector available thanks to Arawa

- Introduced by Philippe Hemmel at this conference
- Implemented in Java
- To match their integration needs, Collabora has implemented support for monitoring the loolwsd health
  - Several Online nodes can connect to one central place that collects the state



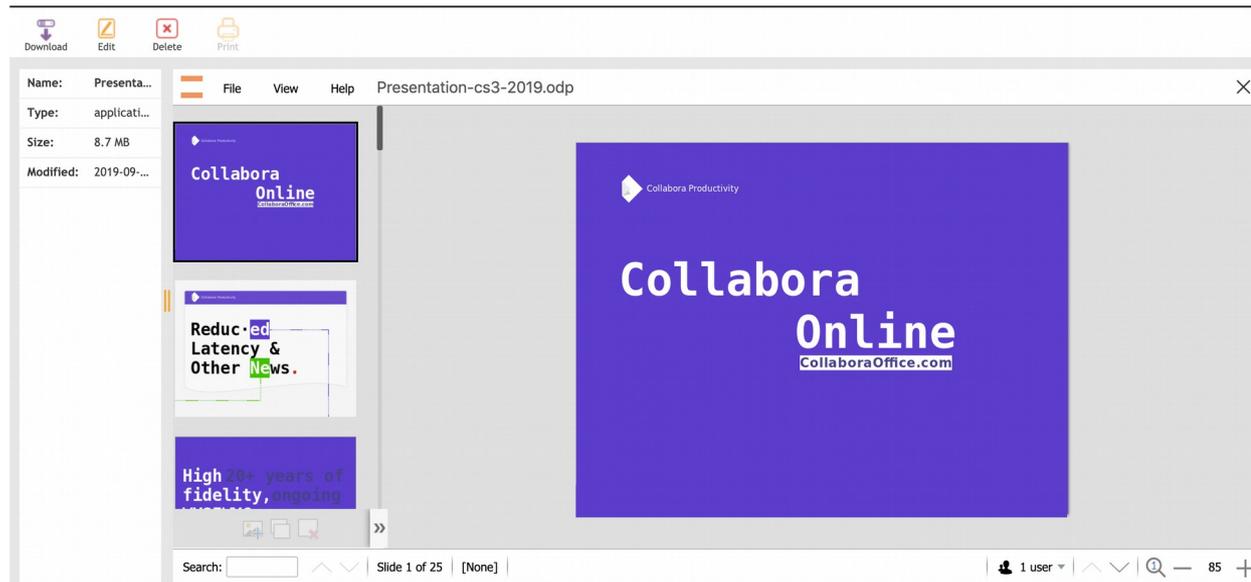




# Kolab

Connector available thanks to Kolab themselves.

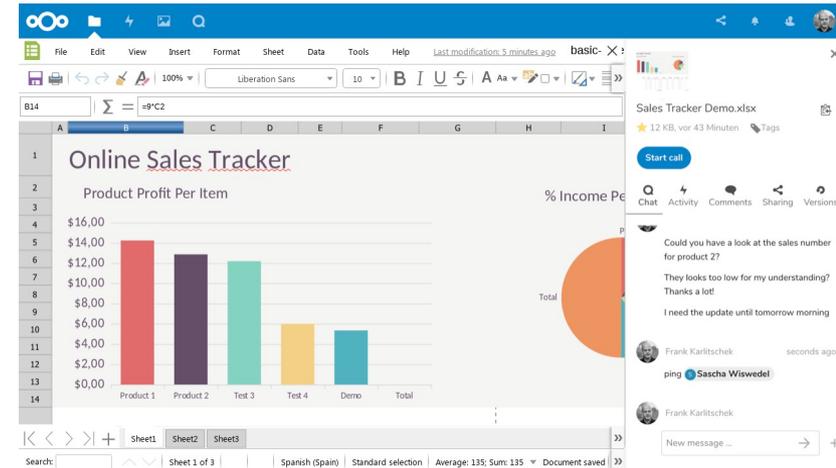
- <https://git.kolab.org/source/wopi/>
- To match their integration, we had to expose various functionality via postMessage
  - Like closing all the views from the master view, downloading or printing



# Nextcloud

Connector originally developed by Collabora, but now with features from Nextcloud

- <https://github.com/nextcloud/richdocuments>
- Implemented in PHP and JavaScript
- Many features in the Online were implemented to match the Nextcloud's integration needs, like:
  - Specification of avatars in CheckFileInfo
  - Support for templates – TemplateSource in CheckFileInfo
  - /hosting/capabilities – for early check of whether a particular version supports some features or not
  - And many more...

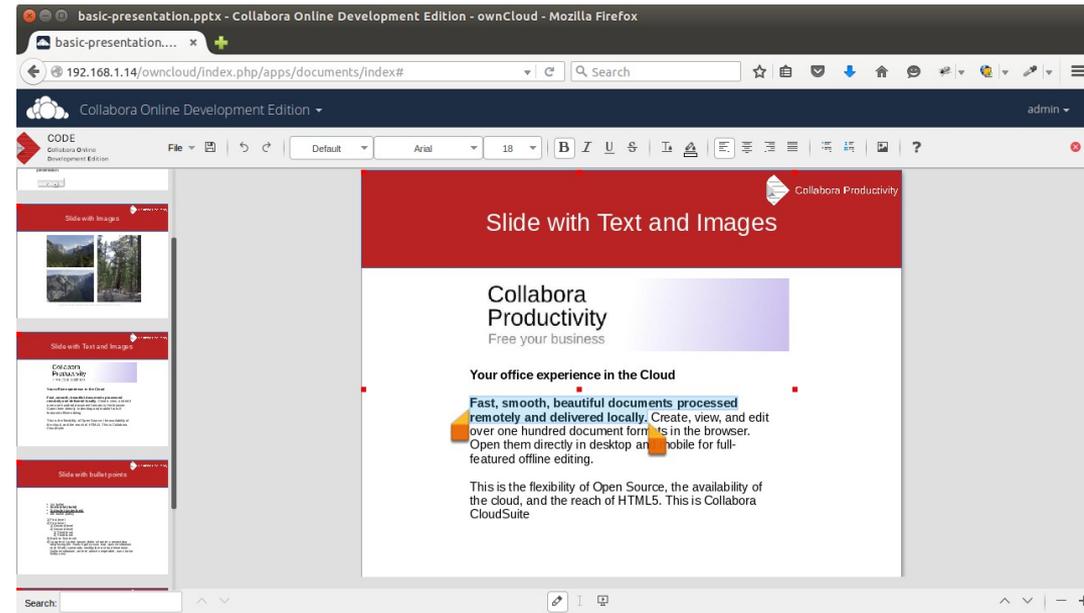




# ownCloud

Originally implemented by Collabora, now with features from ownCloud.

- <https://github.com/owncloud/richdocuments>
- Implemented in PHP and JavaScript
- To match their integration needs, we are improving Watermarking substantially
  - So that each user in a document can have a different, dedicated watermark

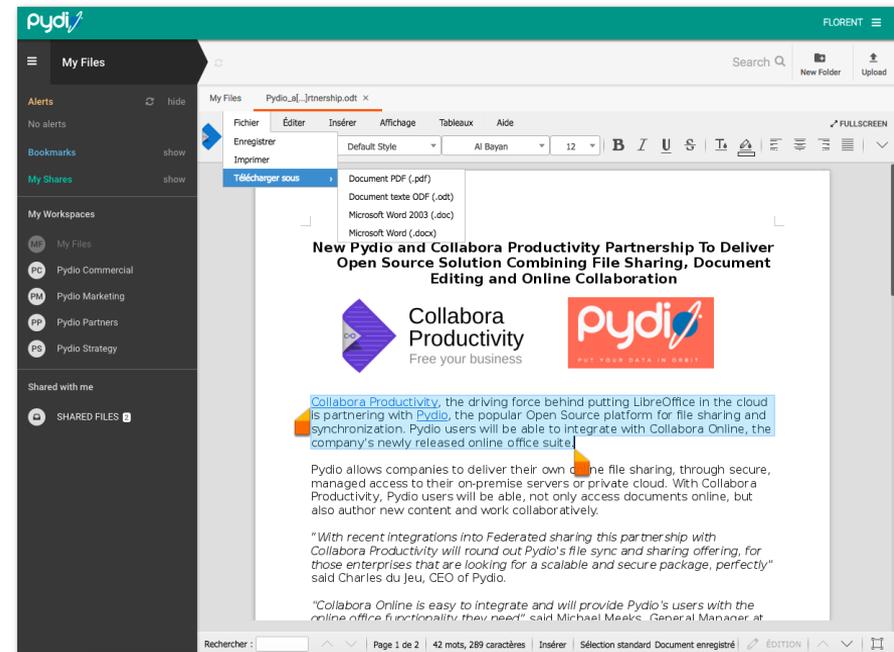




# Pydio

## Available thanks to Pydio

- <https://github.com/pydio/pydio-core/tree/develop/core/src/plugins/editor.libreoffice>
- Implemented in PHP and JavaScript
- To match their integration needs, we had to extend what characters can be used in the `access_token`





# Roove

## Connector implemented by SoftDistribution

- For their integration, we had to improve Save as and full-screen handling of presentations.

The screenshot displays the 'roove Text' web interface. At the top, a blue header bar contains the 'roove Text' logo, 'powered by Collabora', 'Collabora Online', and a user profile for 'Eloy'. Below the header is a menu bar with options: Datei, Bearbeiten, Ansicht, Einfügen, Format, Tabelle, Extras, Hilfe. A status bar indicates 'Letzte Bearbeitung: vor 40 Sekunden'. The main editing area features a rich text editor with a toolbar including undo, redo, bold, italic, underline, link, text color, and background color. The document content includes a 'Collabora Productivity' logo, the text 'Collabora Online v 4.0', and a paragraph: 'Collabora Online 4.0: 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.' Below this, it mentions 'LibreOffice is the world's most popular Open Source Office suite with over 120 million users'. A sidebar on the right shows a chat window with three messages from 'john' and 'jane'. The bottom status bar shows 'Suchen:', 'Seite 1 von 2', '281 Wörter, 1.915 Zeichen', 'Standardauswahl', 'Englisch (USA)', '1 Benutzer', and '100%' zoom.



# Mattermost

The screenshot shows a Mattermost channel interface with a document editor embedded. The document editor has a menu bar (File, Edit, View, Insert, Format, Table, Tools, Help) and a toolbar with various editing tools. The document content includes a title "Title", the text "Some text", and a bar chart with three columns. The status bar at the bottom of the editor shows "Page 1 of 1", "3 words, 14 characters", and "Powered by Collabora Online".

**Bar Chart Data:**

Group	Column 1	Column 2	Column 3
Group 1	9	3	4.5
Group 2	2.5	8.8	9.5
Group 3	3	1.5	3.8
Group 4	4.5	9	6.2

I love to help people do this

*just contact me*

Implemented for  
Collabora Online 4.2  
*(due ~Feb)*  
*shipping in CODE now*



Rich text editor toolbar with icons for undo, redo, bold, italic, underline, strikethrough, text color, background color, bulleted list, numbered list, link, unlink, insert image, insert table, insert chart, insert video, insert audio, insert link, insert unlink, and a right-pointing arrow.

CS3: Collabora Online Secure, On-premise, Collaborative Editing

What is Collabora Online ?

The Collabora Online Vision

MS Office Online browser stopgap

Full Feature -> the things the feature matrix hides

Interoperability & Collaboration

Slide content: 

# 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 WYSIWG rendering

**On-premise** Integration with your EFSS.

Architecture – a bet on CPU threads & network ...

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What is Collabora Online ?  
★ Entrance: Fly In

Animation settings panel:

- Category: Entrance
- Effect: Fly In (selected)
- Start: On click
- Direction: From bottom
- Duration: 0.50 sec
- Delay: 0.0 sec



Click to add Title

Click to add Text      Click to add Text

Click to add Text

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**Slide**

Format: Screen 16:9

Orientation: Landscape

Background: None

Master Slide: Content\_Context\_Image\_2

Master Background

Master Objects

Master View

**Layouts**



Layout ▾ Carlito ▾ 18 ▾ **B** *I* U ~~S~~ **A**

Title Area for AutoLayouts

**Click to edit the title text format**

Click to edit the outline text format

- Second Outline Level
  - Third Outline Level
    - Fourth Outline Level
      - Fifth Outline Level
        - Sixth Outline Level
          - Seventh Outline Level
            - Eighth Outline Level
              - Ninth Outline Level

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^ Used in This Presentation

^ Recently Used

^ Available for Use



# Cleaner theming: status bar

## ***How can I check spelling in my language?***

Choose menu **Tools** → **Languages** and select the language for the whole document or set **languages** for the selected text and for the current paragraph.

## ***How can I remove the red wavy lines in my document?***

Choose menu **Tools** and uncheck **Automatic Spell Checking**.

## ***What is the blue wavy underline in some words in the text?***

Grammar errors in the text is marked with the blue wavy underline. Click on the right mouse button to open a menu with suggestions to correct the grammar and grammar rules. Select the right suggestion to change the text.

## ***Is here a thesaurus?***

Yes. Click in the word you want and choose **Tools** → **Thesaurus**. A dialog of suggestions for replacements.

- None (Do not check spelling)
- English (UK)
- English (USA)**
- French (France)
- German (Germany)
- Italian (Italy)
- Italian (Switzerland)
- Portuguese (Brazil)
- Portuguese (Portugal)
- Russian
- Spanish (Spain)
- Reset to Default Language

Search



Page 1 of 1

Selected: 1 word, 9 characters

Insert

Standard selection

English (USA) ▾



100% ▾





# Chart OLE editing highlight & Chart Sidebar

The screenshot displays a spreadsheet application window titled "spreadsheet.xlsx" with a menu bar (File, Edit, View, Insert, Format, Sheet, Data, Tools, Help) and a toolbar. The main area shows a spreadsheet with columns C through K and rows 3 through 32. A chart is embedded in the spreadsheet, showing two data series: Y (1) (blue squares) and Y (2) (red circles). The chart is a scatter plot with a grid background. The sidebar on the right is titled "Chart Type" and shows the chart type as "XY (Scatter)". The sidebar includes options for "Line type" (Straight), "Sort by X values", "Elements" (Titles, Legend, Axes, Gridlines), "Area", and "Line". A legend is visible, and the "Bottom" option is highlighted in the legend placement menu.

	C	D	E	F	G	H	I	J	K
3									
4		Y (1)	Y (2)						
5		0.0000	0.0000						
6		0.2756	0.3445						
7		0.5299	0.6624						
8		0.7431	0.9289						
9		0.8988	1.1235						
10		0.9848	1.2310						
11		0.9945	1.2432						
12		0.9272	1.1590						
13		0.7880	0.9850						
14		0.5878	0.7347						
15		0.3420	0.4275						
16		0.0698	0.0872						
17		-0.2079	-0.2599						
18		-0.4695	-0.5868						
19		-0.6947	-0.8683						
20		-0.8660	-1.0825						
21		-0.9703	-1.2129						
22		-0.9994	-1.2492						
23		-0.9511	-1.1888						
24		-0.8290	-1.0363						
25		-0.6428	-0.8035						
26		-0.4067	-0.5084						
27		-0.1392	-0.1740						
28		0.1392	0.1740						
29		0.4067	0.5084						
30									
31									
32									

### CONDITIONAL FORMATTING FOR F36:F38

Conditions

Condition 1

All Cells Data Bar

Minimum Automatic Maximum Automatic

More Options...

Add Delete Up Down

Cell Range

Range: F36:F38

Help OK Cancel

### DATA BAR

Entry Values

Minimum: Automatic 0

Maximum: Automatic 0

Bar Colors

Positive: #504999

Negative: Red

Fill: Gradient

Axis

Position of vertical axis: Automatic

Color of vertical axis: Black

Bar Lengths

Minimum bar length (%): 0

Maximum bar length (%): 100

Display bar only

fx Σ = =IF(A4+B4>5,CONCATENATE(IF(D4="M", "mr ", "mrs "),F4,IF(G4>"", CONCATENATE(" ", G4, " ")))

A	B	C	D	E	F	G	H	I
n1	n2	opgev	M/V	Firstname	Voorletter	extr name	Family name	NameForAddress
3	4	M		John	J.	de	Wouder	Mr C. de Wouder
3	4	V		Josina	J.	van der	Koop	Mrs J. van der Koop

### FUNCTION WIZARD

CONCATENATE Function result "Mrs J. van der Koop"

Combines several text items into one.

Text1 (required)  
Text for the concatenation.

Text1

Text2

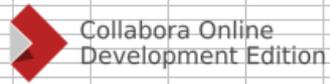
Text3

Text4

Formula Result "Mrs J. van der Koop"

`=IF(A4+B4>5,CONCATENATE(IF(D4="M", "mr ", "mrs "),F4,IF(G4>"",CONCATENATE(" ",G4," "),"),H4),"false")`

Array



Why use it online, LibreOffice

Huge Project - Great Team

Huge international LibreOffice project

Most Powerful Core

Use of Online & the desktop client

- To get up to date features & functions available
- Huge amount of 3rd party tool integrations
- 200+ languages in interface and large amount
- Building new environments in the Web
- At last, it's all available
- Desktop client performance e.g. performance and lighting



Character

Paragraph

Area

Shadow

Image

Brightness: 15% Contrast: 0%

Color mode: Default Transparency: 0%

5% 0%

-15% Red 1.00

Line

Width: - none -

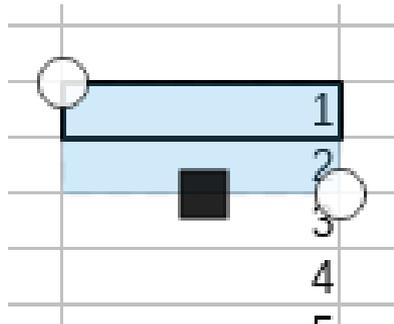
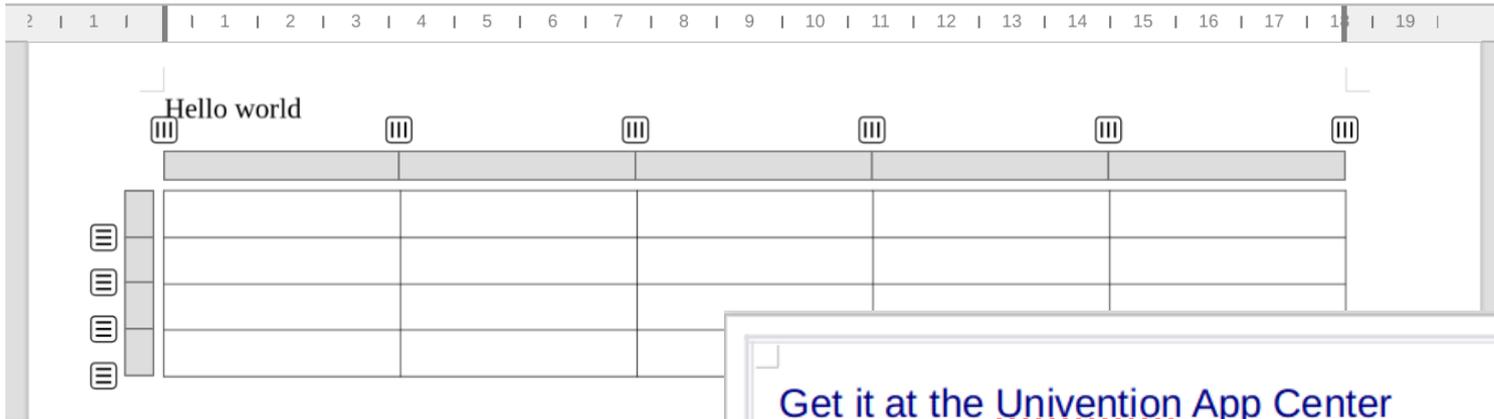
Color: [Color Picker]

Transparency: 0%

Position and Size



# Many more wins: eg. touch resizing handles, URL popup



## [Get it at the Univention App Center](#)

The easiest way to install CODE for a quick tryout is to download it as a virtual appliance from the Univention App Center. This appliance contains the Collabora Online Development Edition, and the additional software you need to get you up and running in minutes. You can choose between two types of integration, **CODE + Nextcloud** or **CODE + ownCloud**. Each appliance is available in four formats: **KVM**, **VirtualBox**, **Docker**, and **VMware ESXi**.

<https://hub.docker.com/r/collabora/code/>

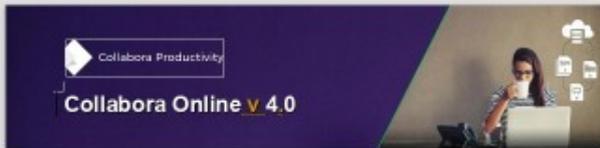
## [Grab CODE docker image from Docker Hub](#)

The collabora/code Docker image can be installed to any x86-64 host (e.g. on Linux and Windows 10), and it is fully configurable. For more information about setup and configuration for deployment, please read the CODE Docker page. If you want to try it out quickly, you can set up CODE docker image with file sharing integration in less than 5 minutes in a very basic way, following these instructions: quick tryout with ownCloud or quick tryout with Nextcloud.

# Collabora Online Mobile

*with a Nextcloud customer*





**Collabora Online: 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.**

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LibreOffice is the world's most popular Open Source Office suite with over 120 million users. Collabora, a leading contributor to the project, and developer of the enterprise-ready Long Term Supported edition of LibreOffice, has now brought LibreOffice to the Cloud with Collabora Online.

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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.

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### Character

### Paragraph

Default Style >

Font Name Karla >

Font Size 12 >

### Character

### Paragraph



Background Color >

Spacing:

### Highlight Color

No color



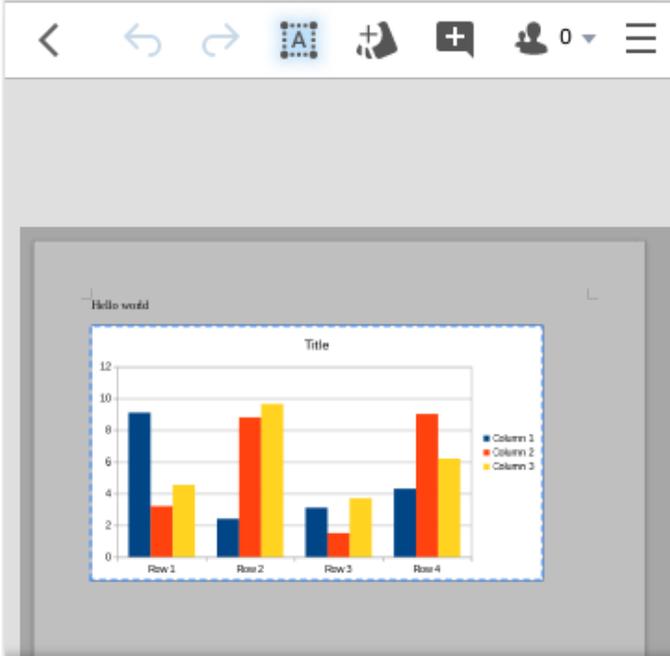
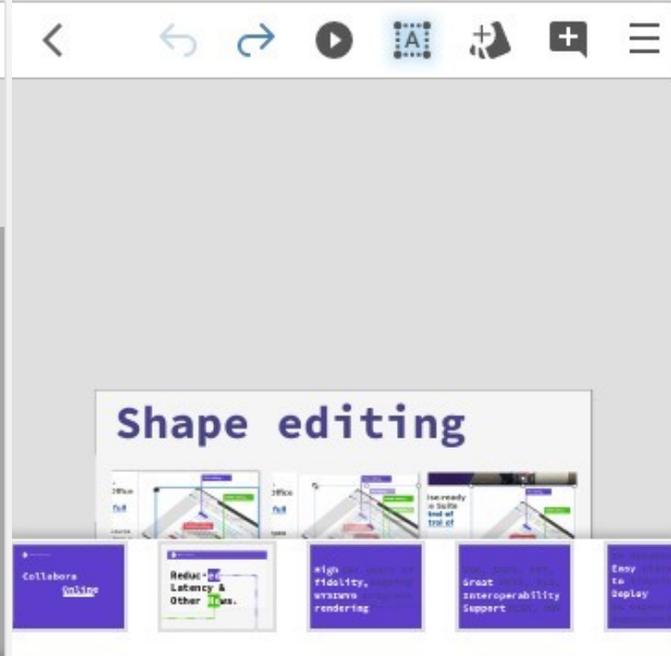


Chart Type

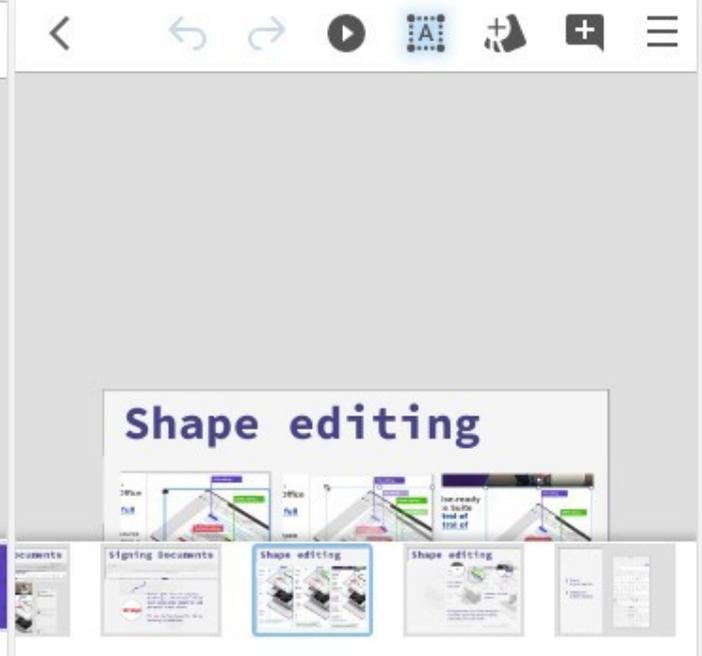
Chart Type:

Column >

3D Look



Slide      Layouts



Slide      Layouts

Format:

Screen 4:3 >

Orientation:

Landscape >

Background:

- File >
- Download as >
- Edit >
- Track Changes >
- View >
-  About

< Download as

-  PDF Document (.pdf)
-  ODF text document (.odt)
-  Word 2003 Document (.doc)
-  Word Document (.docx)
-  Rich Text (.rtf)

40% 05:36

< ↶ ↷     

Segment

Seg

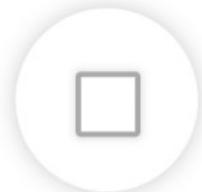
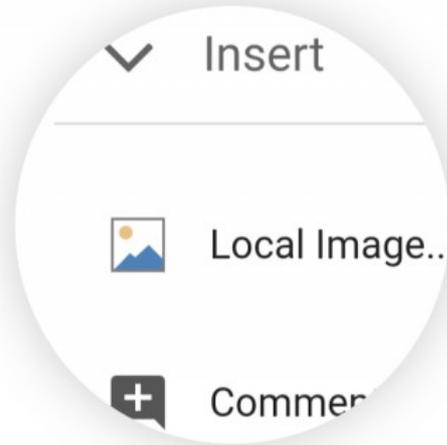
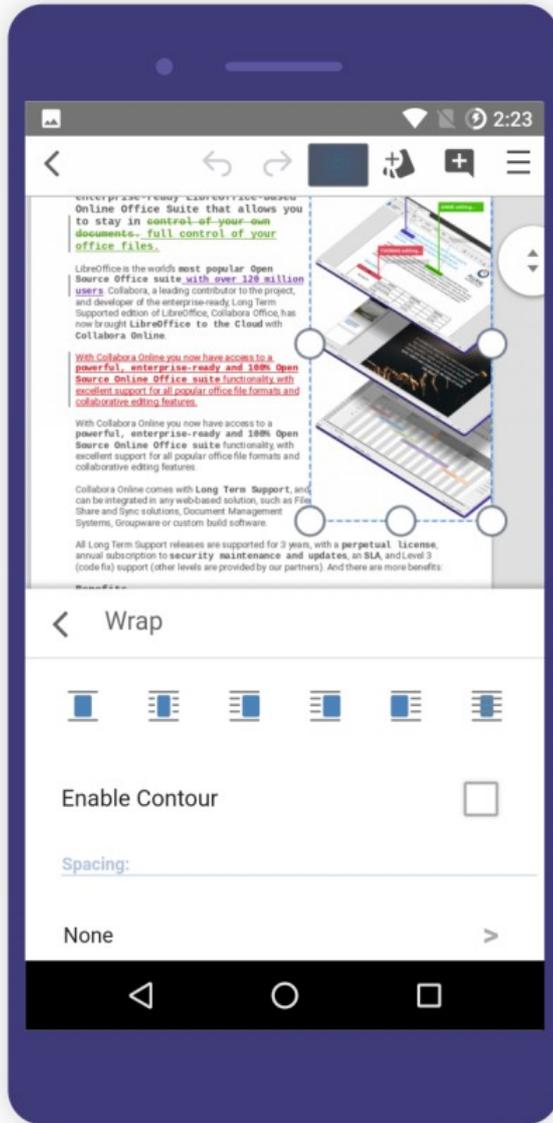
1 2 3 4 5 6 7 8 9 0

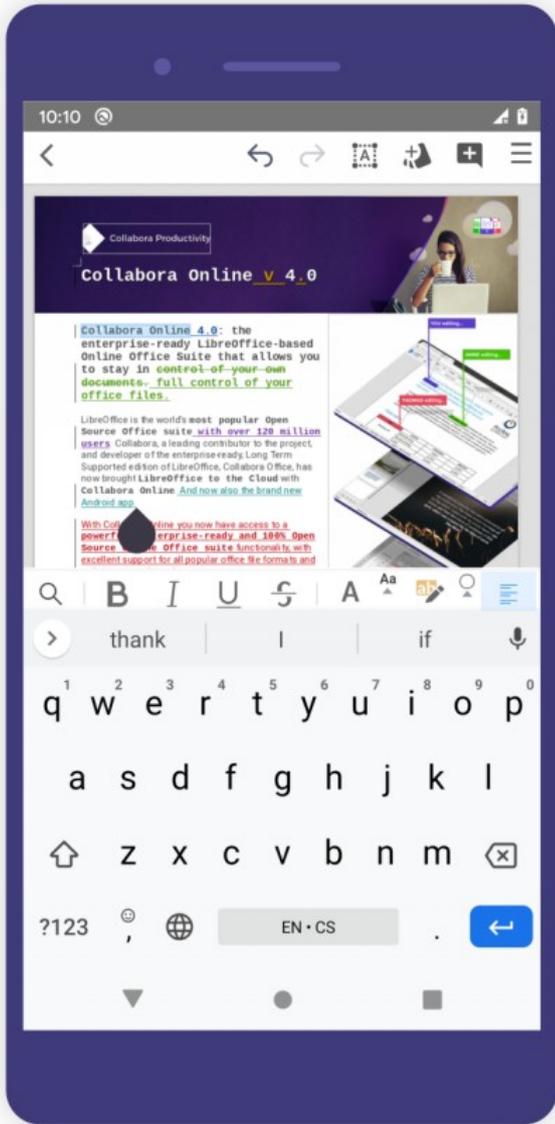
q w e r t y u i o p

a s d f g h j k l

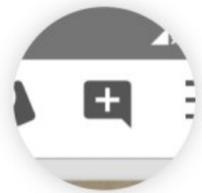
↑ z x c v b n m 

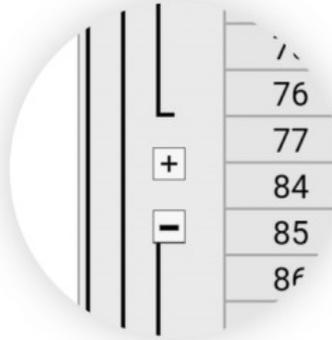
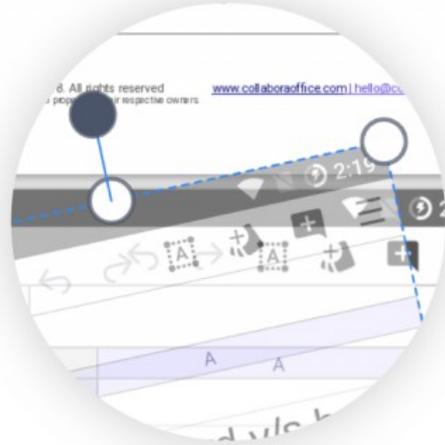
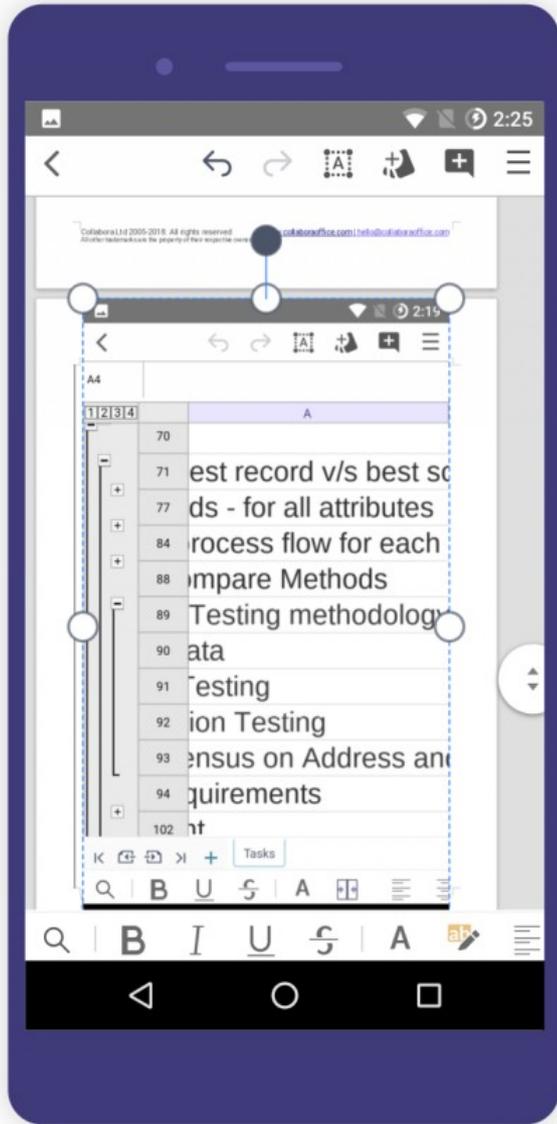
Sym  English(US)  Go





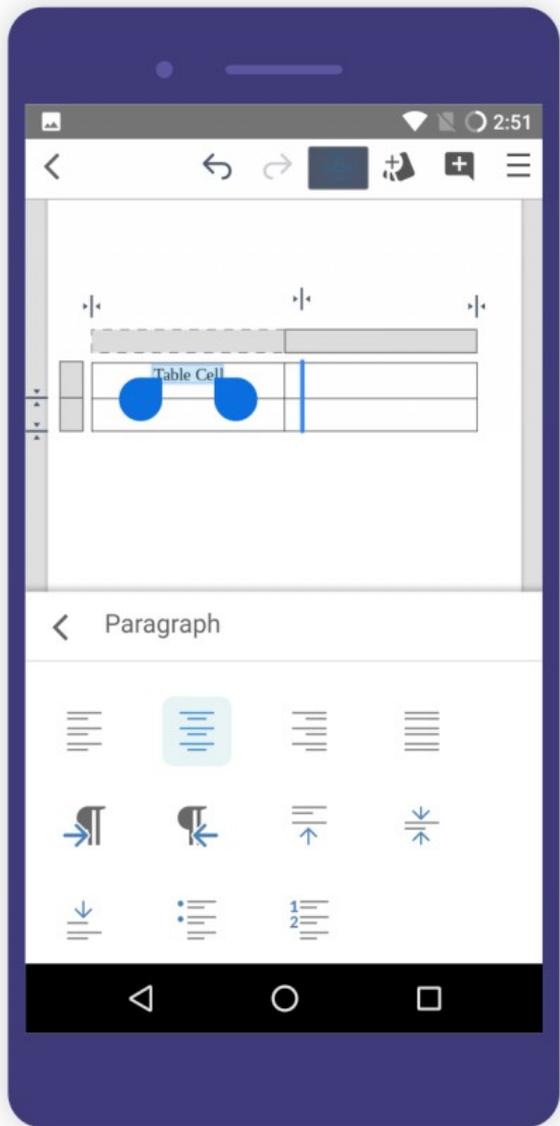
collabora or



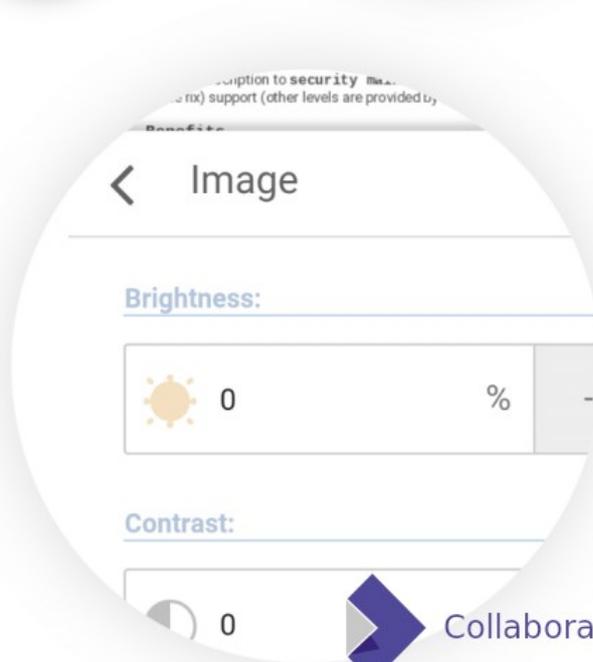
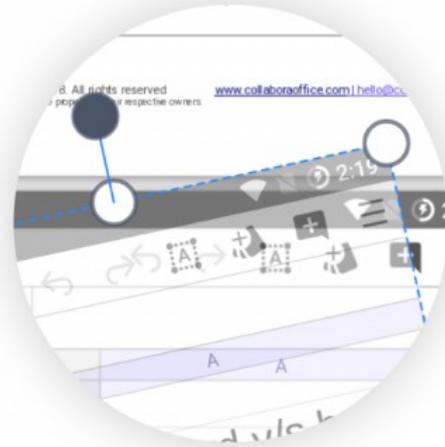
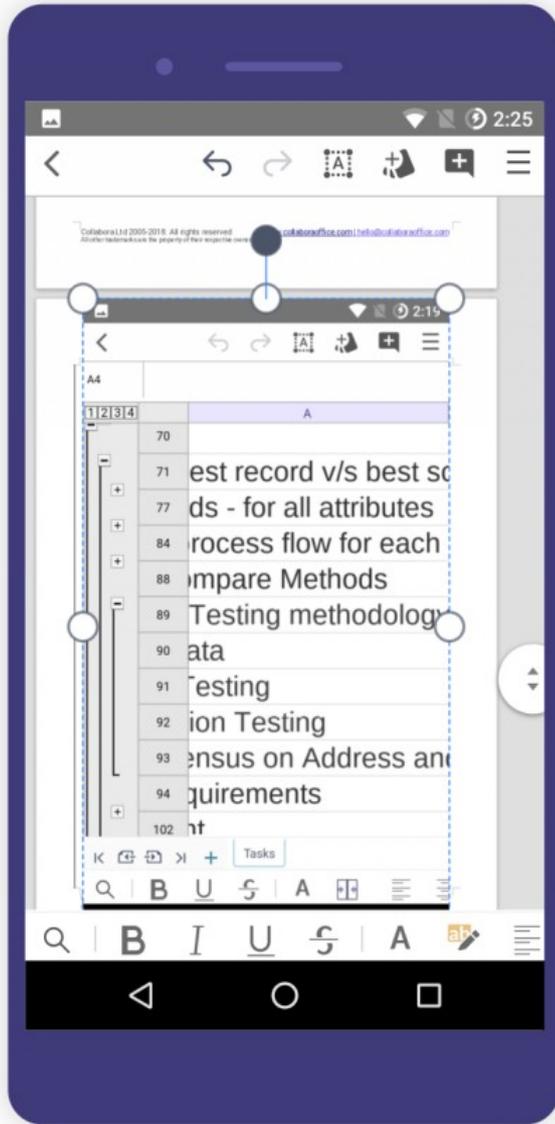


Collabora Office





Collabora Office

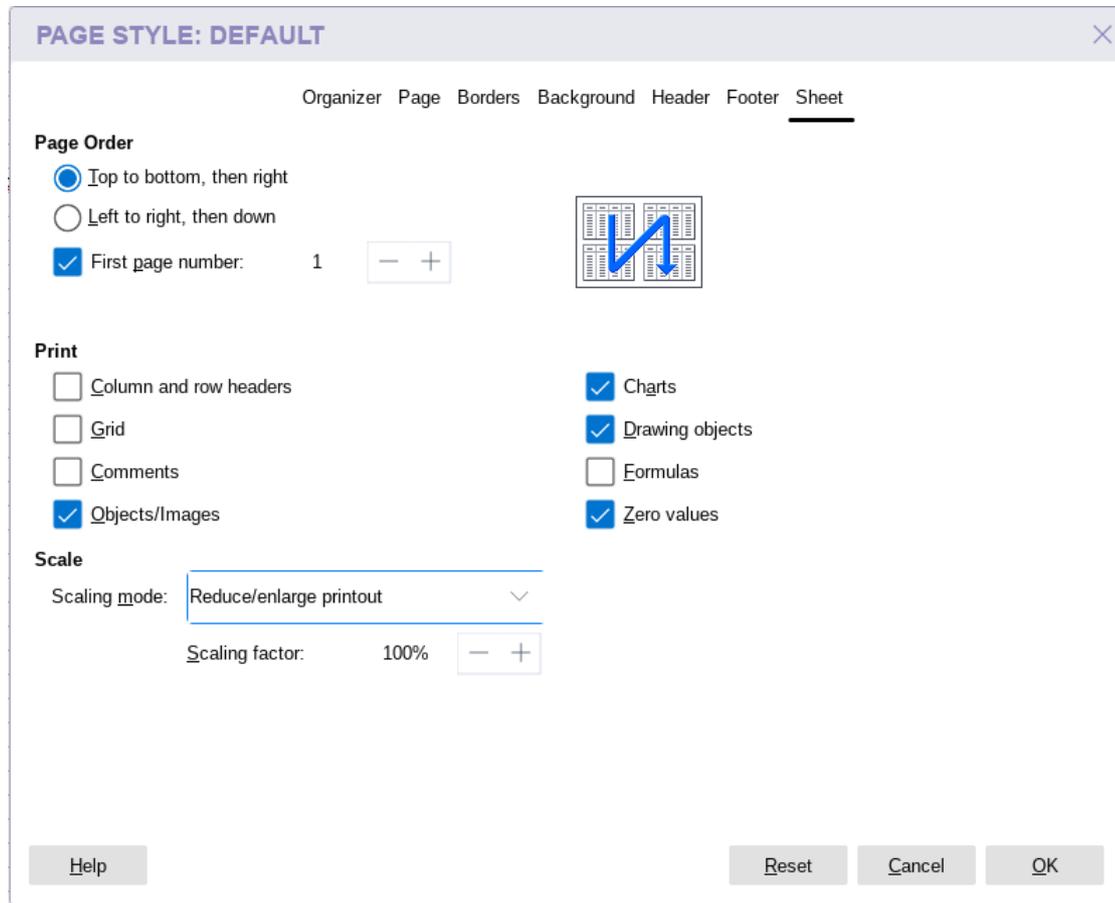




# Online / Widget theming implementation ...

## Custom look & feel

- Custom SVG branding of individual widgets
- Building on native widget framework.
- ~easy to re-use for other platforms (volunteer?)





# Native iOS version for tablets ...

## Co-Developed with Adfinis

- A great partner !

19.16 Tue 10 Sep 4G 75%

File Edit View Insert Format Table Tools Help

Karla 10.5 B I U S A Aa

### Enterprise Product Overview

Collabora Online is a software component (what is that?) (just asking haha) which can be integrated into your web application and enables scaleable viewing and collaborative editing of office documents in dozens of file formats. Collabora Online provides unparalleled file format support, collaborative editing and rendering capabilities.

#### Key Feature Summary

- View and collaboratively edit text documents, spreadsheets, presentations & more
- Interoperability with Microsoft formats: DOCX, DOC, RTF, XLSX, XLS, PPTX, PPT
- Native Open Document formats ODT, ODS, ODP
- Import filters/viewers for PDF, Visio, Keynote, Numbers, Pages
- Localization
  - Collabora Online is fully translated for these language codes: en-US, fr, it, de, es, pt-BR, ja, ko and contains significant translation for 27 other languages
- Basic editing features
  - Download as PDF, Open-Document or MS Office format
  - Undo / redo & document repair
  - Rich character & paragraph formatting
  - Insert charts, tables, images, comments
- Spell-checking & Thesaurus
- Enterprise features
  - Text Documents
    - What You See Is What You Get (WYSIWYG) editing.
    - Easy to visualize document headers, footers,



image positioning

- Rich page styling, including columns
- red-lining / change-tracking.

Text Body

Character

Karla 10.5

Paragraph

Spacing: Indent:

0.00 cr 1.27 cr

0.25 cr 0.00 cr

-0.64 cr



# Native iOS version for tablets ... with Adfinis

## Co-Developed with Adfinis

- A great partner !

19:17 Tue 10 Sep

File Edit View Insert Format Sheet Data Tools Help

Font

M3

112

	A	B	C	D	E	F	G	H	I	J
1										
2				GuitarMoonShop.com						
3				01/01/2016 - 12/31/2016						
4										
5				<b>Top Keywords</b>						
6				Guitar Straps						
7				Bass Guitar Pick						
8				Gibson Acoustic						
9				Marshall Amp						
10				Les Paul Guitar						
11				Gibson Acoustic						
12				Peavey Amp						
13				Fender Black amp						
14				Hollowbody guitar						
15				Mesa Boogie amp						
16										
17										
18										
19										
20				<b>Page</b>	<b>Backlinks</b>		<b>Indexed URLs</b>	<b>URLs</b>		
21					953			637		
22										
23				page-1/	30					
24				page-2/	79					
25				page-3/	97					
26				page-4/	285					
27				page-5/	18					

Dashboard Data

**Shadow**

Enable

Angle: 0°

Distance: 0 pt

Transparency: 0%

Color: Black

**Line**

Width: none

Color: [Color Picker]

Transparency: 0%

**Position and Size**

Position X: 8.30 cm

Position Y: 3.07 cm

Width: 14.38 cm

Height: 6.43 cm

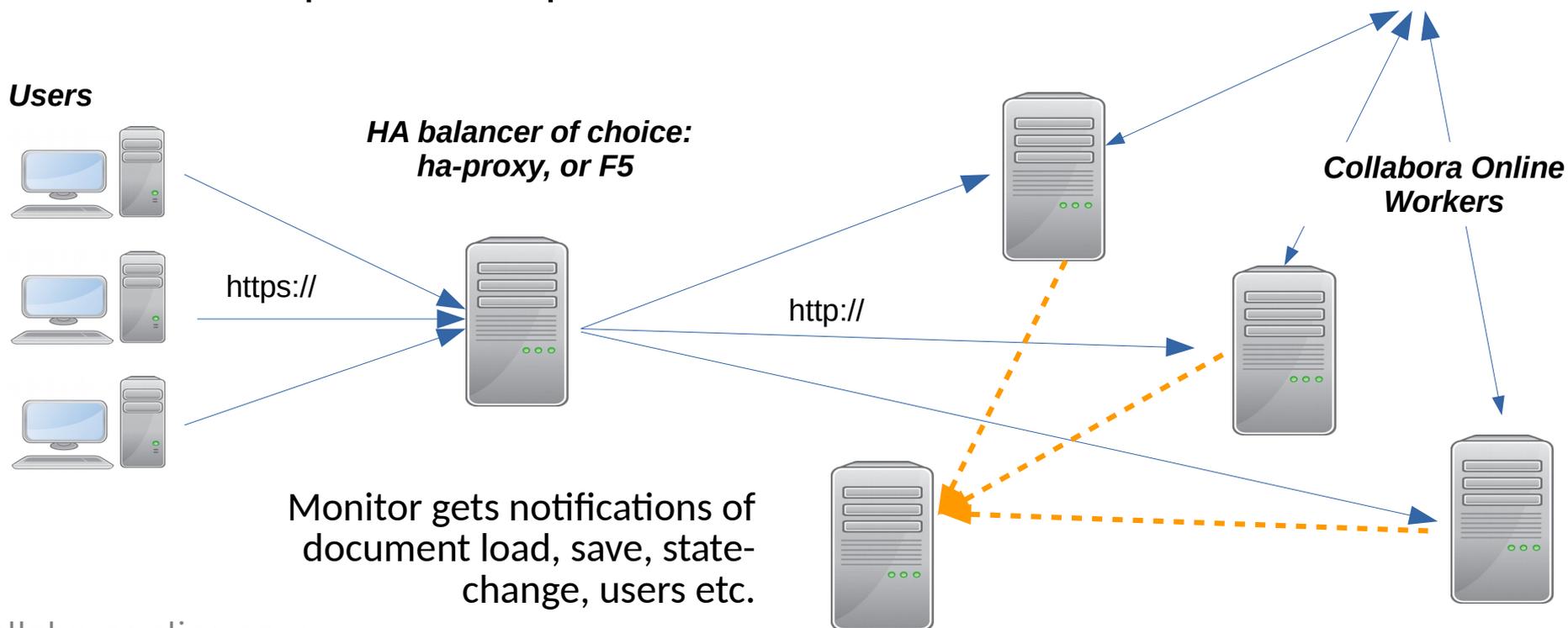
Keep ratio



# Monitoring APIs:

Either **poll** each server: new Prometheus text-based format compatible end-point thanks to 1&1

**EFFS Data Store via WOPI-like API**





# The pieces you can't see

## Integration improvements

- Masses of new extensible API to embed Online into your application

## Performance

- Loading time, dialog rendering time
- Improved PDF rendering
- Unipoll – code simplification.
- Profiling infrastructure

## UX / infra changes

- Rich Copy/Paste support
- Many new dialogs converted to async
- Multi-window focus re-work.

## Security & Anonymization

- Anonymized logging
- 3<sup>rd</sup> party penetration testing

**And much much more ...**

# Deployment & HA

*some distinctives*



# Digital Sovereignty

*or :don't let your document data out of your site [sic]*



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

Document data is held in your server room.

Not sent to every single device to be controlled by the browser + JS + local debugger.

C'bra sends pixels to clients.



# Real Secure View: send only watermarked pixels ...

## Enable Secure View

Set default share permissions for all users (available for shares without edit permission)

can print/export

Secure View (with watermarks)

Set watermark text for Secure View. To include the user email address dynamically, use the {viewer-email} variable. Click outside the text field to save.

Strictly confidential. Only for {viewer-email}

## Granular permissions

- Edit, Print, Share, Download
- Watermarked PDFs if print allowed.

collaboraonline.com

**Simple, Elegant, Federated**  
**No central points of failure:**  
corporate or technical

*for ownCloud*

The screenshot shows a dark blue interface with a watermark that reads "Strictly confidential. Only for mejmeeks@gmail.com". In the center, there is a white diamond icon and the text "Collabora Productivity". Below that, it says "Collabora Online v 4.0". At the top, there is a toolbar with icons for undo, redo, and other editing functions. A white box in the top right corner of the screenshot says "Watermarked Editing".

**Collabora Online 4.0:** the enterprise-ready LibreOffice-based Online Office Suite that

# Simplicity & Scalability

## Large deployments / HA pieces

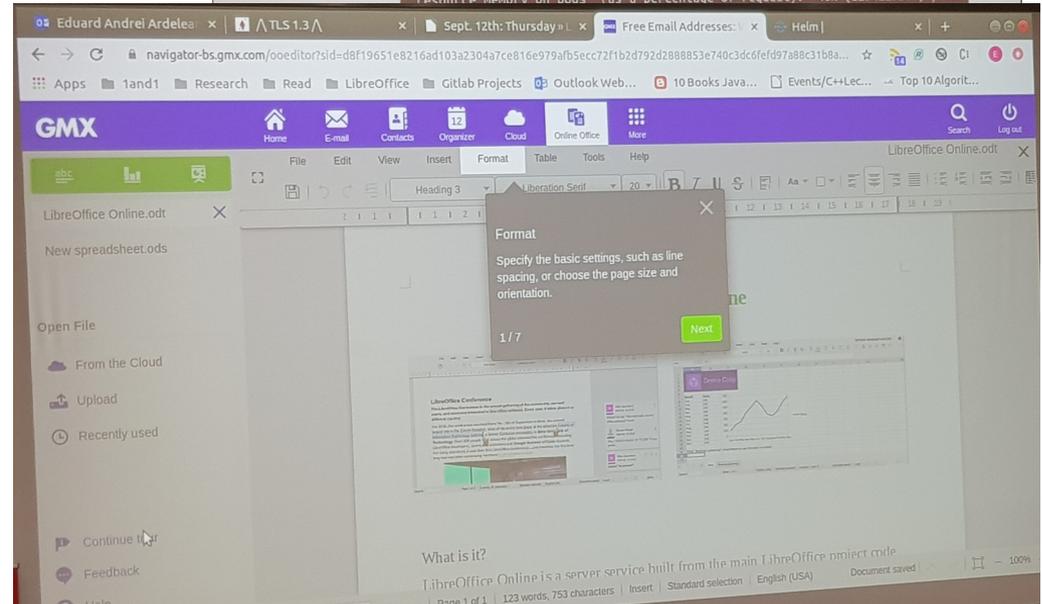
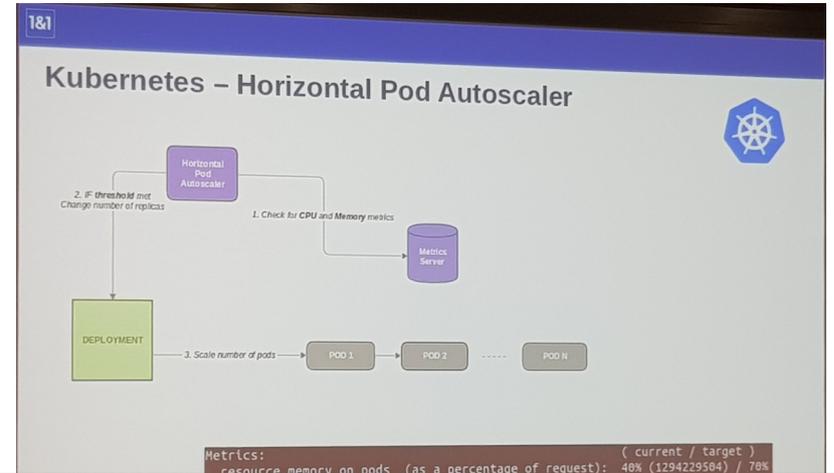
- Scales with the network.

## Simple architecture:

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

## eg. 1&1 / GMX

- ~millions of users with access



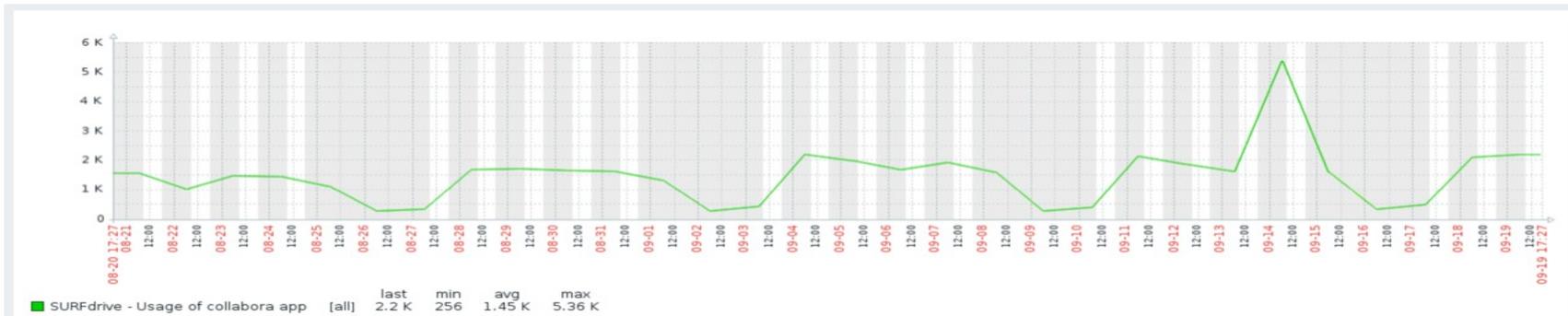
# Collaboration Protocol

- **Not** composable operations: CompSci → get all excited about this.
- 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

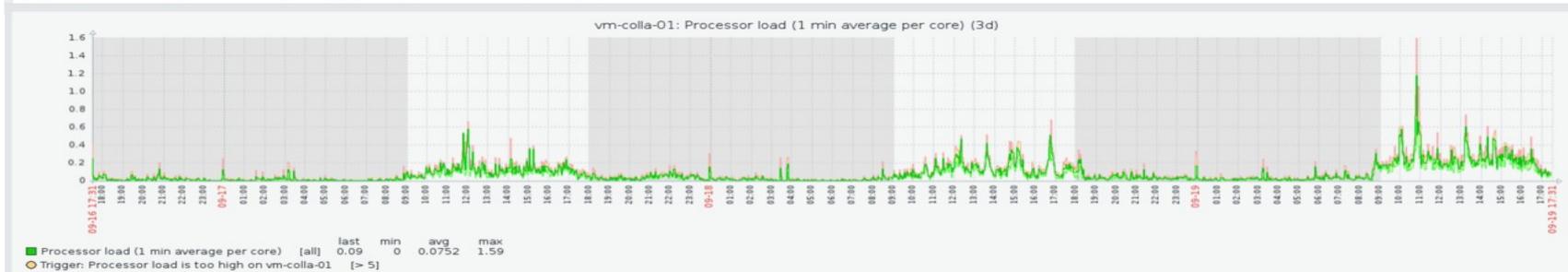


# Real world: ~45k users - Collabora Online - SURFdrive

Usage



CPU

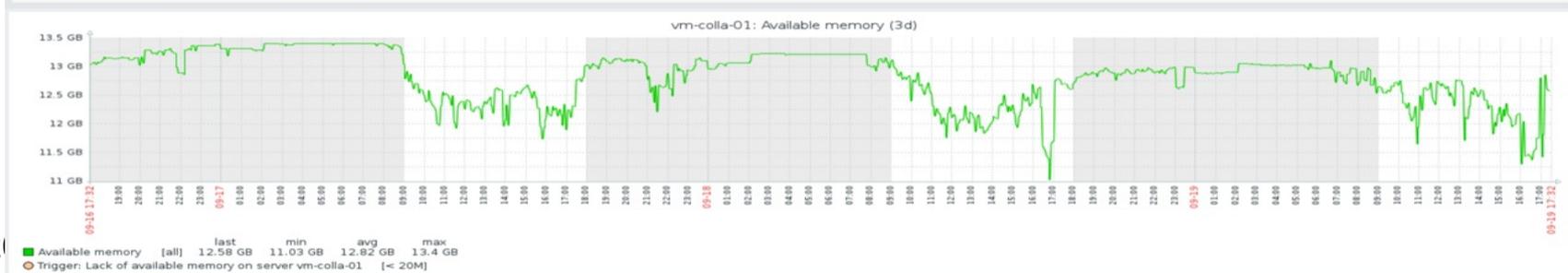


Free RAM:  
13.5Gb

→

11Gb

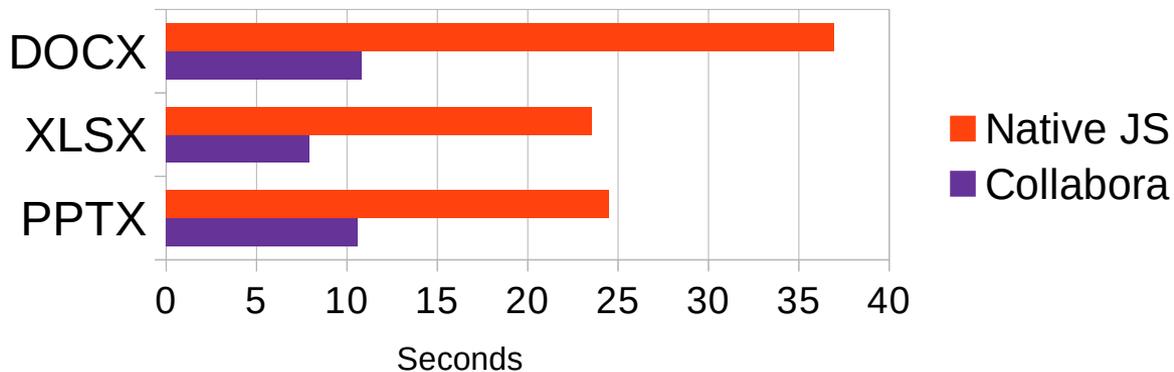
CS3-2021





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

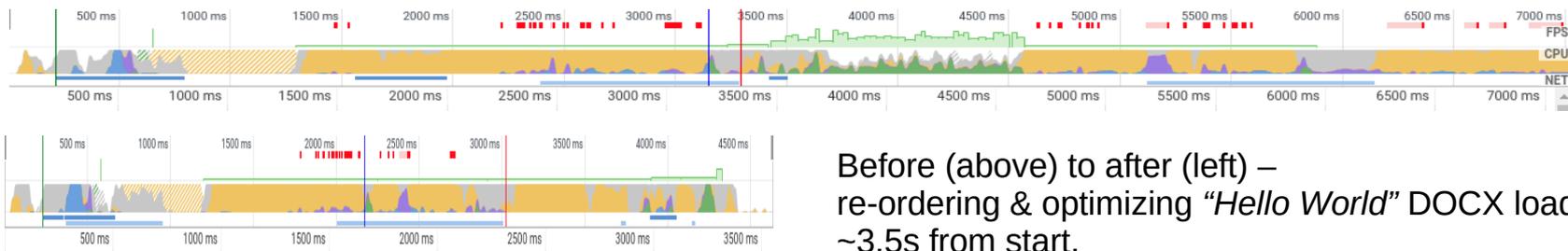
Time to load & render blank files - Galaxy S4



First cut pre-optimized numbers

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

Threaded, GPU accelerated  
spreadsheet core





# Conclusions

- Our mission applied
- Easy to deploy & scale
- Easy to integrate
- Gorgeous, interoperable Document collaboration
- Architected for Digital Sovereignty
- Rapid improvement
- Backed by large, diverse community & Berlin based Stiftung.
- Built with LibreOffice ...
- Contact me:  
[michael.meeks@collabora.com](mailto:michael.meeks@collabora.com)

*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*