

LibreOffice: Development and Future ...

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[mmeeks](#),[#libreoffice-dev](#), <irc.freenode.net>

*“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*



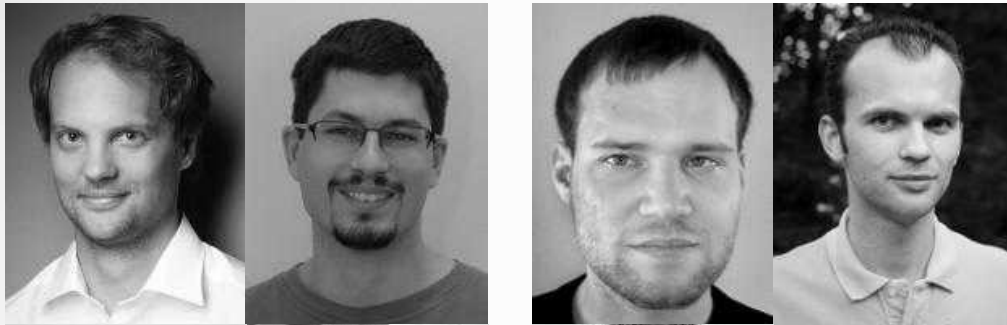
Agenda / outline

- ▼ The Hungarian contribution
 - ▼ people who speak your language ...
- ▼ Development update & details
- ▼ Sample bug fix
- ▼ Demos of the future / prototypes
 - ▼ LibreOffice on-line, on Android, Collaborative editing, liblibreoffice

Hungary's contribution to LibreOffice

LibreOffice: started here

Budapest, Sep 2, 2010



Mokka cafe – thanks: Kálmán Kémenczy



Outstanding Hungarian Contributors ...

- ✓ Andras Timar
 - ✓ ESC member, 110n leader
- ✓ Miklos Vajna
 - ✓ superstar interoperability hacker
- ✓ László Németh
 - ✓ spell, complex text, DTP, LibreLogo & more ...
- ✓ Gábor Kelemen
 - ✓ exemplary localisation
- ✓ Kálmán „KAMI” Szalai
 - ✓ Oxygen Office creator
- ✓ Robert Nagy
 - ✓ OpenBSD hacker
- ✓ János M. Uray
 - ✓ Gergő Mocsi
- ✓ Ádám Csaba Király
 - ✓ Tamás Zolnai
- ✓ Andras Bartek
 - ✓ Istvan Turi
- ✓ Gábor Stefanik
 - ✓ Bálint Dózsa
- ✓ Kálmán Kémenczy
 - ✓ Bence Babati
- ✓ Dávid Vastag
 - ✓ Szabolcs Dezsi
- ✓ Peter Rabi
 - ✓ Gabor Jenei
- ✓ Bence Tomcsik
 - ✓ Daniel Mihalyi
- ✓ Krisztian Pinter

Development distinctives

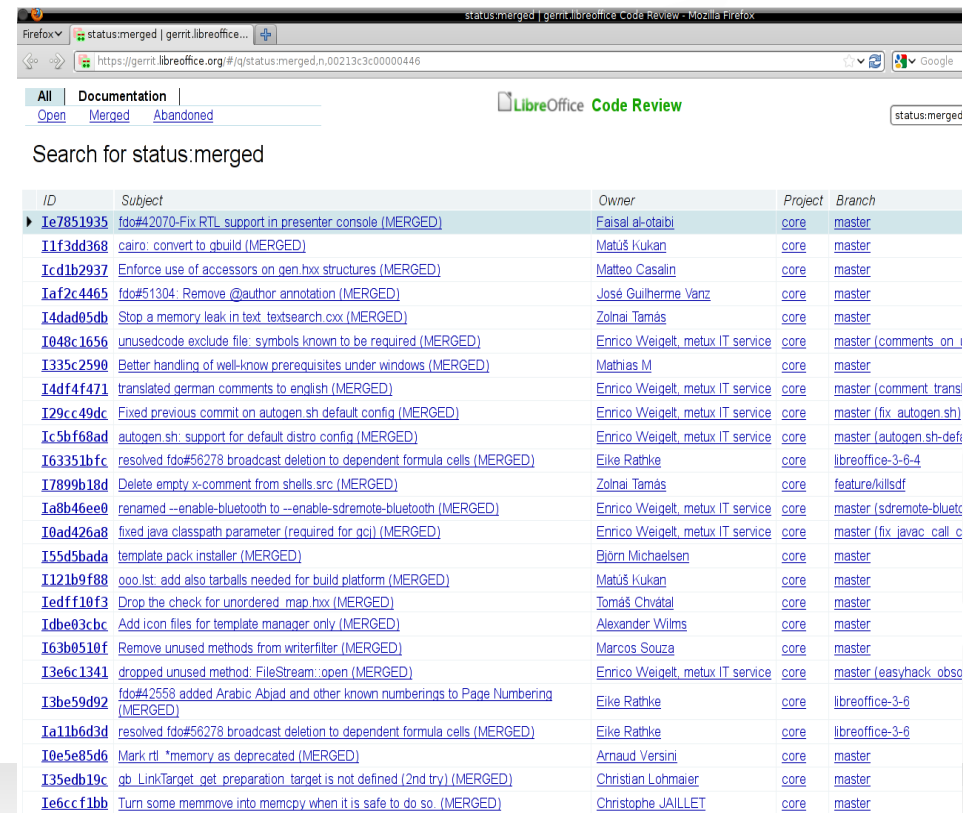
Permission free, low friction on-ramp

- ▼ Easy hacks page
 - ▼ We want your first patch to be non-controversial, and easy, so you're up-to-speed and included outright:
 - ▼ http://wiki.documentfoundation.org/Development/Easy_Hacks
 - ▼ **changes are most welcome !**
- ▼ Open Mailing lists
 - ▼ No subscription required
 - ▼ No Reply-To: mangling – *'I get a reply not just the list'*
 - ▼ Mail your patch and you're done ...
- ▼ Documentation <http://docs.libreoffice.org/>
 - ▼ 200+ READMEs files with overview in git modules ...
 - ▼ migration of comments to doxygen format

Gerrit – permission free commmits

- ▼ Gerrit - <https://gerrit.libreoffice.org>
 - ▼ Magic to turn an openID account (eg. Gmail)
 - ▼ Into **no-ask** git commit / push access to gerrit
 - ▼ Submit to patch queue backed by mailing-list
 - ▼ Code inclusion is: git fetch / cherry-pick FETCH_HEAD
 - ▼ Test build integration on it's way.

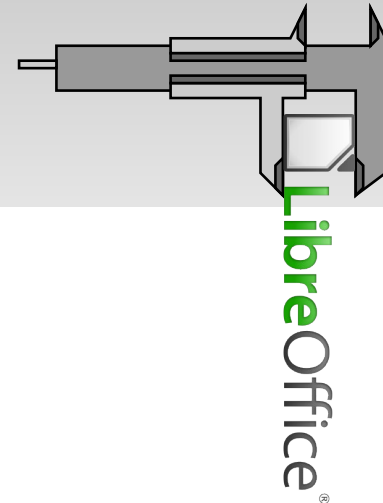
▼ *Thanks to*
Norbert Thiebaud
Bjoern Michaelsen
David Ostrovsky



The screenshot shows the LibreOffice Code Review interface in a browser. The page title is "status:merged | gerrit.libreoffice.org". The URL is "https://gerrit.libreoffice.org/#/q/status:merged,n:00213c3c00000446". The page has tabs for "All", "Documentation", "Open", "Merged", and "Abandoned". The "Merged" tab is selected. A search bar contains "status:merged". Below the search bar is a table of merged patches.

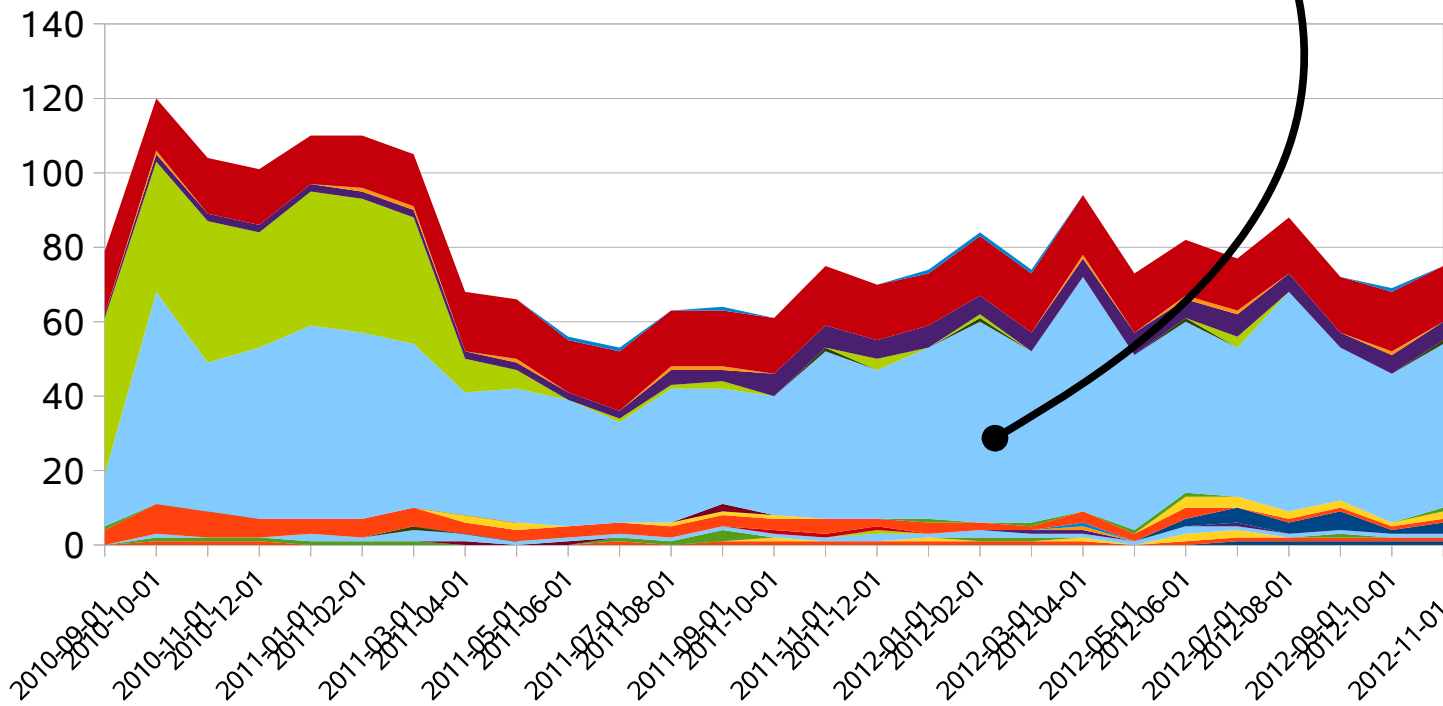
ID	Subject	Owner	Project	Branch
Te7851935	fdo#42070-Fix RTL support in presenter console (MERGED)	Faisal al-otaibi	core	master
I1f3dd368	cairo: convert to gbuild (MERGED)	Matuš Kukan	core	master
Icd1b2937	Enforce use of accessors on gen.hxx structures (MERGED)	Matteo Casalin	core	master
Iaf2c4465	fdo#51304: Remove @author annotation (MERGED)	José Guilherme Vanz	core	master
I4dad05db	Stop a memory leak in text_textsearch.cxx (MERGED)	Zolnai Tamás	core	master
I048c1656	unusedcode exclude file: symbols known to be required (MERGED)	Enrico Weigelt, metux IT service	core	master (comments on)
I335c2590	Better handling of well-know prerequisites under windows (MERGED)	Matthias M	core	master
I4df4f471	translated german comments to english (MERGED)	Enrico Weigelt, metux IT service	core	master (comment trans)
I29cc49dc	Fixed previous commit on autogen.sh default config (MERGED)	Enrico Weigelt, metux IT service	core	master (fix autogen.sh)
Ic5bf68ad	autogen.sh: support for default distro config (MERGED)	Enrico Weigelt, metux IT service	core	master (autogen.sh-def)
I63351bfc	resolved fdo#56278 broadcast deletion to dependent formula cells (MERGED)	Elke Rathke	core	libreoffice-3-6-4
I7899b18d	Delete empty x-comment from shells.src (MERGED)	Zolnai Tamás	core	feature/killsdf
Ia8b46ee0	renamed --enable-bluetooth to --enable-sdremote-bluetooth (MERGED)	Enrico Weigelt, metux IT service	core	master (sdremote-bluet)
I0ad426ac	fixed java classpath parameter (required for qci) (MERGED)	Enrico Weigelt, metux IT service	core	master (fix javac call c)
I55d5bada	template pack installer (MERGED)	Björn Michaelsen	core	master
I121b9f88	ooo.lst: add also tarballs needed for build platform (MERGED)	Matuš Kukan	core	master
Iedff10f3	Drop the check for unordered_map.hxx (MERGED)	Tomáš Chvátal	core	master
Idbe03cbc	Add icon files for template manager only (MERGED)	Alexander Wilms	core	master
I63b0510f	Remove unused methods from writerfilter (MERGED)	Marcos Souza	core	master
I3e6c1341	dropped unused method: FileStream::open (MERGED)	Enrico Weigelt, metux IT service	core	master (easyhack obsc)
I3be59d92	fdo#42558 added Arabic Abjad and other known numberings to Page Numbering (MERGED)	Elke Rathke	core	libreoffice-3-6
Ia11b6d3d	resolved fdo#56278 broadcast deletion to dependent formula cells (MERGED)	Elke Rathke	core	libreoffice-3-6
I0e5e05d6	Mark rtl_*memory as deprecated (MERGED)	Arnaud Versini	core	master
I35edb19c	qb_LinkTarget_get_preparation_target is not defined (2nd try) (MERGED)	Christian Lohmaier	core	master
Ie6ccf1bb	Turn some memmove into memcopy when it is safe to do so. (MERGED)	Christophe JAILLET	core	master

Code contributors ...



- Steadily diversifying and growing the team ...
New guys since we launched

Active code comitters breakdown by month



- Tata Consultancy Services
- SIL
- Oracle
- New Contributors
- Linagora
- Known contributors
- Intel
- Funky
- CodeWeavers
- Canonical
- Assigned
- ALTA
- SUSE
- RedHat
- Nou & Off
- Munich
- Lanedo
- KACST
- IBM
- Collabora
- CodeThink
- Bobiciel
- Apache V
- Aentos

Reliable out-of-master builds ...



Lots of big / fast /
ccache enabled
tinderbox slaves.

Android (x86, ARM),
iOS, (many) Linux
x86, x86_64,
Windows, Mac

Building & up-loading
binaries as well for
QA.

Thanks to
Norbert Thiebaud
Bytemark & more

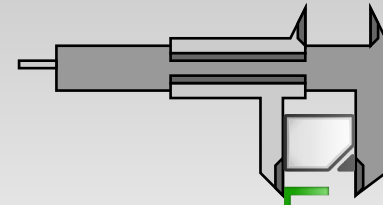
Large, fun and growing community

Many other contributors to enjoy working with:



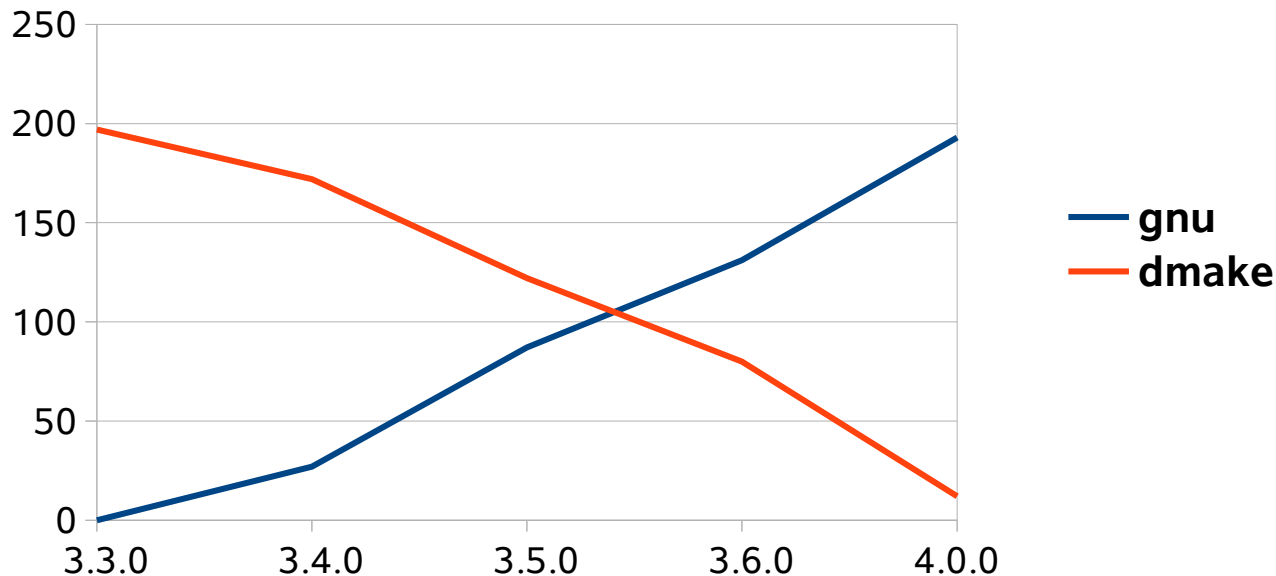
Making the code readable / hackable

Using a standard make tool (gnumake)



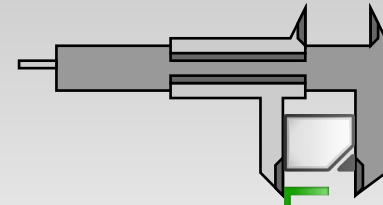
- ▼ Now complete work to kill '**dmake**' – **4.1 is clean.**
- ▼ Faster, more standard & hack-able
- ▼ Huge parallelism possible for builds on big-iron.
- ▼ Enables library merging → one monster lib.

gnumake vs. dmake by module count



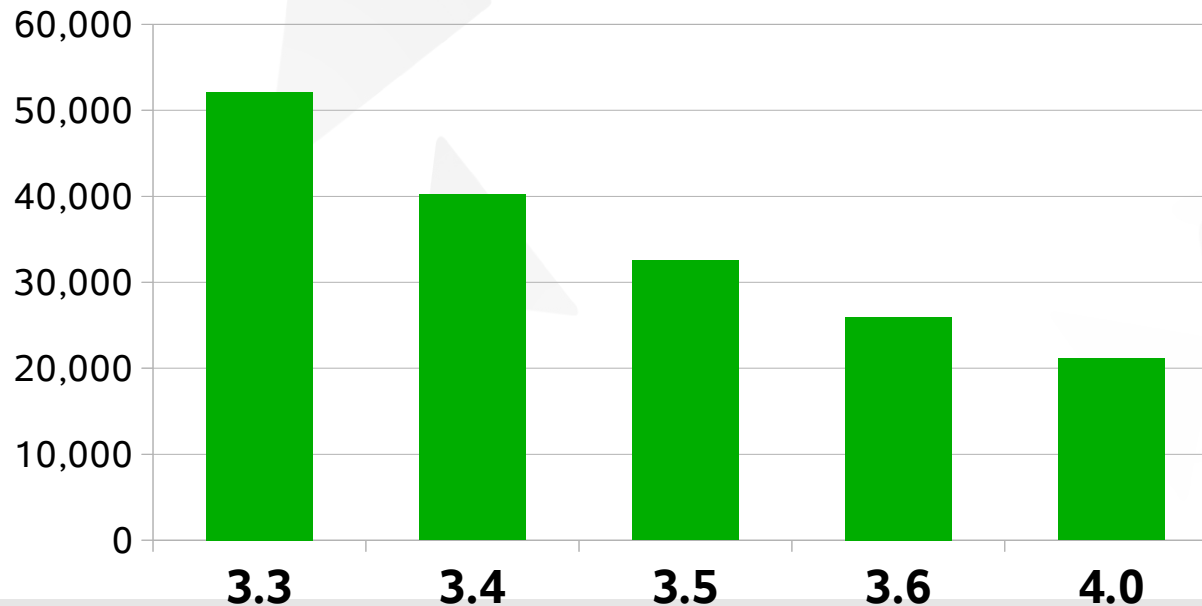
With thanks to
David Tardon
(RedHat)
Peter Foley,
Matúš Kukan
David Ostrovsky
Pierre-Eric
Pelloux-Prayer
(Lanedo)
and more ...

Translating German Comments



- ▼ Makes things **significantly** easier for non-Germans ...
- ▼ **~20k lines done - ~20k to go ~40%...**
- ▼ **Making the code more internationally accessible ...**
 - ▼ Lots of comment translators distracted by code hacking...

Detected lines of German comment

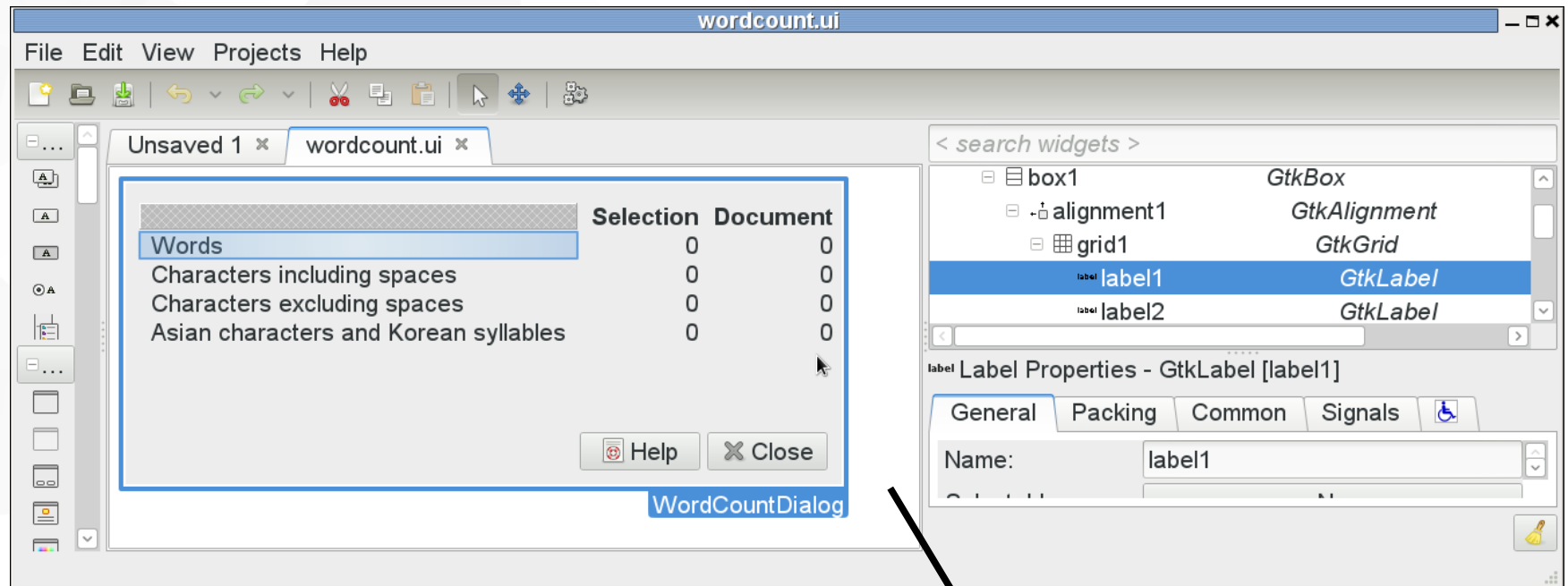
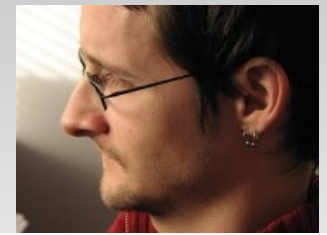


With thanks to (recent translators):

Philipp Weissenbacher
Philipp Riemer
Samuel Mehrbrodt
Enrico Weigelt
Lennard Wasserthal
Albert Thuswaldner
Oliver Günther
Markus Maier
Peter Baumgarten

and many more !

Catching up to 1995: layout

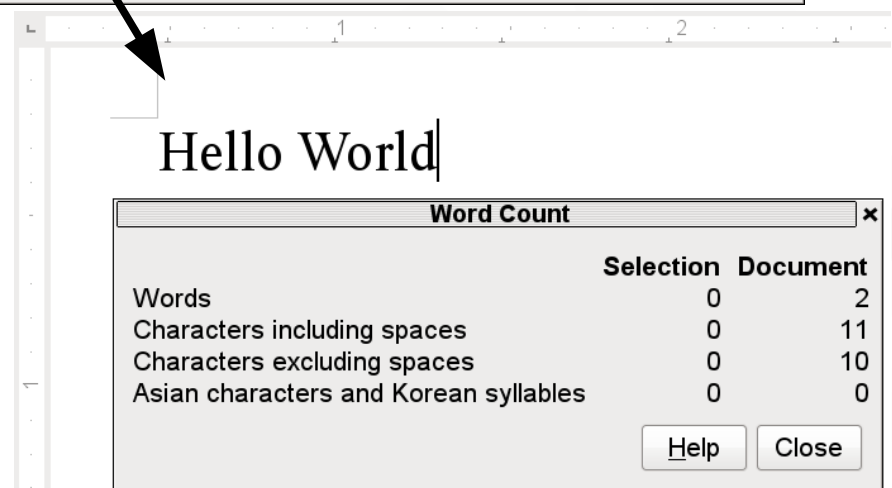


Thanks to **Caolan McNamara, Gokul, Joren De Cuyper**

Sizing, positioning, Designer tweaking, much improved 110n

Start of a long process:

100 (of 500) dialogs converted

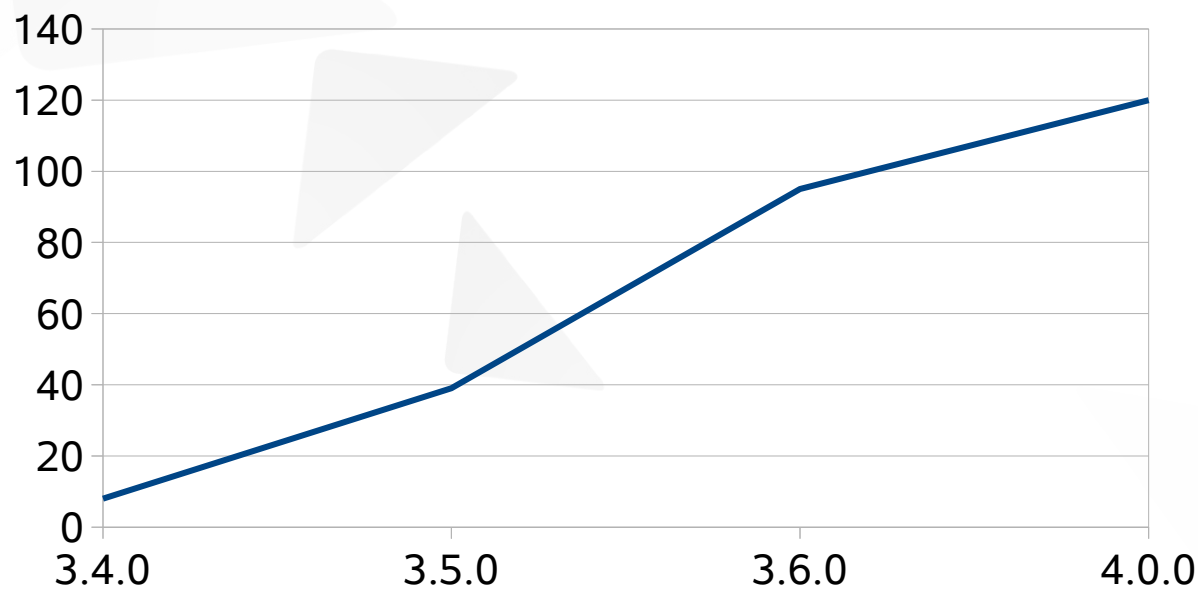


Unit testing for quality ...



- ▼ Improved quality through unit testing
 - ▼ Coverage & number of tests increasing rapidly
 - ▼ security regressions, document layout, formulae calcs etc.

Count of types of gnumake enabled unit tests
(each runs a battery of tests)



With many thanks to
Markus Mohrhard
(above)
Miklos Vjana
Kohei Yoshida
(SUSE)
Artur Dorda
Daniel Bankstone
(GSOC)
Caolan McNamara
Michael Stahl
(Redhat)
And many more
Who got tired of fixing
The same bugs ...

Bugzilla Assistant on freedesktop

- Connected to Help menu “Send Feedback”
- pre-populates version, component, etc. for you
- Avoids ~unusable default bugzilla / file bug UI
- Thanks to:
Loic Dachary & Rob Snelders



Bug

Bug Submission Assistant

Thank you for using LibreOffice. We regret that you seem to have found a bug in our software, but we are glad that you decided to report it. This assistant will lead you step by step through the bug reporting process.

1 Sign in

2 Component

3 Details

4 Description

5 Submit

Select component Spreadsheet

Component Spreadsheet

For problems concerning the spreadsheet application. If applicable, please use one of the following key words in the Summary for more detailed specification: [CONFIGURATION](#), [EDITING](#), [FILEOPEN](#), [FILESAVE](#), [FILTER](#), [FORMCONTROLS](#), [FORMATTING](#) [Read more ... >](#)

Sub component EDITING

Version 4.0.0.0.beta1

Operating system All

Latest known-working version: None

Subject:

Long description:

Problem description:

Steps to reproduce:

1.
2.
3.

Th ...

Bug Submission Assistant is published under GNU GPL v2+. Download the sources with git clone <http://cgit.freedesktop.org/libreoffice/website>.

Release often, and predictably on-time ...

- ▼ A **time based, six-monthly** release train ...
 - ▼ **synchronized** with the Linux distributions cadence
 - ▼ ie. a normal Free Software project
 - ▼ rapid fire, (**monthly**) bug-fix releases: ~1x per 2 weeks.
- ▼ Any bugs only **partially fixed**: can be re-fixed in < a month.

LibreOffice Releases

By using a time-based release schedule and maintaining two parallel branches, LibreOffice will always be available both for early adopters and conservative users, with the most appropriate version for each group's specific needs and habits.

3.3 Family	3.3.2		3.3.3			3.3.4					
3.4 Family		3.4.0		3.4.1	3.4.2		3.4.3		3.4.4		
3.5 Family								3.5.0		3.5.1	3.5.2
Developers	daily snapshots of master / self-built versions										
Bleeding Edge	3.3.2	3.4.0		3.4.1			3.4.3	3.5.0		3.5.1	
Stable			3.3.3	3.4.1	3.4.2				3.4.4	3.5.1	3.5.2
Very Stable	3.3.2		3.3.3				3.4.3		3.4.4		
Rock Solid			3.3.3		3.3.3	3.3.4			3.4.4		3.4.4

Worked examples of a fix

The problem: a bug ...

“My Document doesn't work”

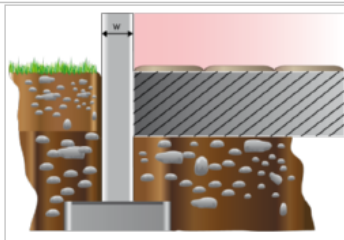
An RTF document
it doesn't import properly;
missing an image.

Systemdesign
Viale della Stazione, 18 - Chions (PN)

CALCOLO DELLA TRASMITTANZA CONTROTERRA secondo UNI EN ISO 13370

Pavimento appoggiato su terreno:

AV 2 contro terra		Codice: P2
Area del pavimento	67,47	m ²
Perimetro disperdente del pavimento	38,00	m
Spessore pareti perimetrali esterne	390	mm
Conduttività termica del terreno	2,00	W/mK



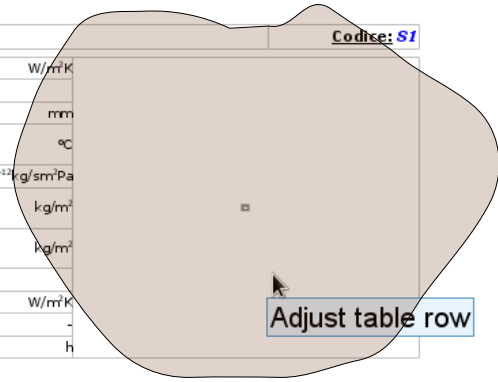
Systemdesign
Viale della Stazione, 18 - Chions (PN)

CARATTERISTICHE TERMICHE E IGROMETRICHE DEI COMPONENTI OPACI secondo UNI EN 12831 - UNI EN ISO 6946 - UNI EN ISO 13370

Descrizione della struttura: copertura

Codice: S1

Trasmittanza termica	0,190	W/m ² K
Spessore	309	mm
Temperatura esterna (calcolo potenza invernale)	-6,0	°C
Permeanza	1,511	10 ⁻¹² kg/sm ² Pa
Massa superficiale (con intonaci)	93	kg/m ²
Massa superficiale (senza intonaci)	93	kg/m ²
Trasmittanza periodica	0,067	W/m ² K
Fattore attenuazione	0,351	-
Sfasamento onda termica	-11,7	h



Stratigrafia:

N.	Descrizione strato	s	Cond.	R	M.V.	C.T.	R.V.
-	Resistenza superficiale esterna	-	-	0,040	-	-	-
1	Tegola canadese	20,00	0,230	-	1200	0,92	-
2	Impermeabilizzazione in cartone catramato	2,00	0,500	-	1600	1,00	-
3	OSB3	25,00	0,150	-	850	2,10	-
4	Intercapedine debolmente ventilata Av=600 mm ² /m	50,00	-	-	-	-	-
5	USB Elephant	0,60	0,220	-	397	1,70	33
6	DUROCK C 80mm	80,00	0,038	-	150	1,03	1
7	HARDROCK B-ERGY 80mm	80,00	0,036	-	110	1,03	1
8	Barriera vapore in fogli di polietilene	1,00	0,500	-	980	1,80	100000
9	Legno di abete flusso perpend. alle fibre	25,00	0,120	-	450	2,70	643
10	Legno di abete flusso perpend. alle fibre	25,00	0,120	-	450	2,70	643
-	Resistenza superficiale interna	-	-	0,100	-	-	-

Legenda simboli

s	Spessore	mm
Cond.	Conduttività termica, comprensiva di eventuale maggiorazione	W/mK
R	Resistenza termica	m ² K/W
M.V.	Massa volumica	kg/m ³
C.T.	Capacità termica specifica	kJ/kgK
R.V.	Fattore di resistenza alla diffusione del vapore in capo asciutto	-

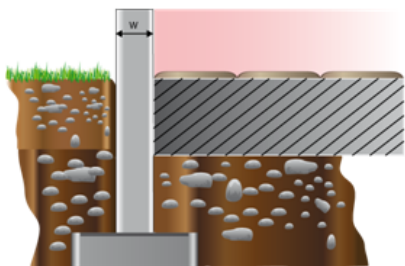
COLO DELLA TRASMITTANZA CONTROTERRA secondo UNI EN ISO 13370

poggiato su terreno:

terra

ento **67,47** m²
 ardente del pavimento **38,00** m
 perimetriali esterne **390** mm
 mica del terreno **2,00** W/mK

Codice: **P2**

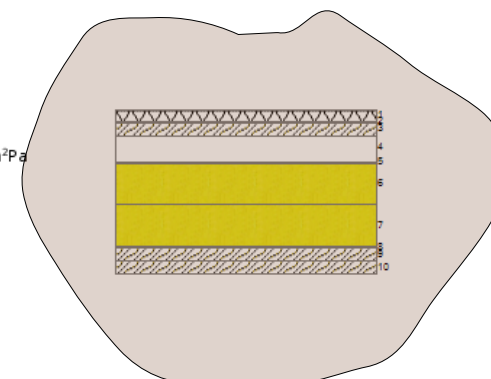


CARATTERISTICHE TERMICHE E IGROMETRICHE DEI COMPONENTI OPACHI secondo UNI EN 12831 - UNI EN ISO 6946 - UNI EN ISO 13370

Descrizione della struttura: **copertura**

Codice: **S1**

Trasmittanza termica	0,190	W/m ² K
Spessore	309	mm
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Trasmittanza periodica	0,067	W/m ² K
Fattore attenuazione	0,351	-
Sfasamento onda termica	-11,7	h



Stratigrafia:

N.	Descrizione strato	s	Cond.	R	M.V.	C.T.	R.V.
-	Resistenza superficiale esterna	-	-	0,040	-	-	-
1	Tegola canadese	20,00	0,230	-	1200	0,92	-
2	Impermeabilizzazione in cartone catramato	2,00	0,500	-	1600	1,00	-
3	OSB3	25,00	0,150	-	850	2,10	-
4	Intercapedine debolmente ventilata Av=600 mm ² /m	50,00	-	-	-	-	-
5	USB Elephant	0,60	0,220	-	397	1,70	33
6	DUROCK C 80mm	80,00	0,038	-	150	1,03	1
7	HARDROCK ENERGY 80mm	80,00	0,036	-	110	1,03	1
8	Barriera vapore in fogli di polietilene	1,00	0,500	-	980	1,80	100000
9	Legno di abete flusso perpend. alle fibre	25,00	0,120	-	450	2,70	643
10	Legno di abete flusso perpend. alle fibre	25,00	0,120	-	450	2,70	643
-	Resistenza superficiale interna	-	-	0,100	-	-	-

Legenda simboli

s	Spessore	mm
Cond.	Conduttività termica, comprensiva di eventuale maggiorazione	W/mK
R	Resistenza termica	m ² K/W
M.V.	Massa volumica	kg/m ³
C.T.	Capacità termica specifica	kJ/kgK
R.V.	Fattore di resistenza alla diffusione del vapore in capo asciutto	-

Digging deeper for a solution:

Turns out to be un-related to RTF

A badly formed PNG image ...

Data chunk has a completely bogus length

```
+ // fdo#61847 truncate over-long, trailing chunks
  const sal_Size nStreamPos = mrPNGStream.Tell();
  if( nStreamPos + mnChunkLen >= mnStreamSize )
-   return false;
+   mnChunkLen = mnStreamSize - nStreamPos;
```



Systemdesign
Viale della Stazione, 18 - Chions (PN)

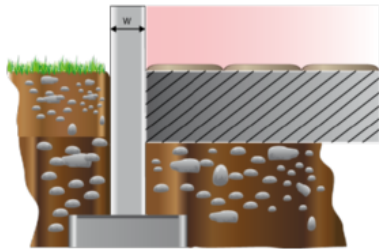
**CALCOLO DELLA TRASMITTANZA CONTROTERRA
secondo UNI EN ISO 13370**

Pavimento appoggiato su terreno:

AV 2 contro terra

Area del pavimento	67,47	m ²
Perimetro disperdente del pavimento	38,00	m
Spessore pareti perimetrali esterne	390	mm
Conduttività termica del terreno	2,00	W/mK

Codice: P2



A satisfying
fix on master.
Not all that easy
of course.

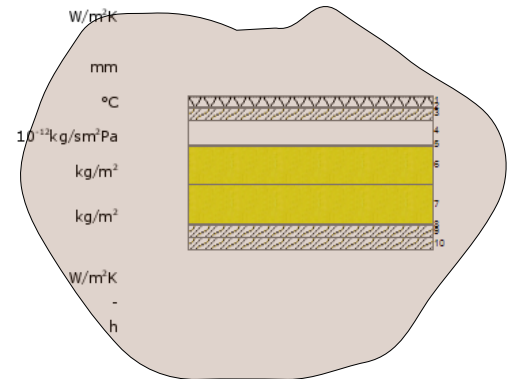
Systemdesign
Viale della Stazione, 18 - Chions (PN)

**CARATTERISTICHE TERMICHE E IGROMETRICHE DEI COMPONENTI OPACHI
secondo UNI EN 12831 - UNI EN ISO 6946 - UNI EN ISO 13370**

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Stratigrafia:

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3	OSB3	25,00	0,150	-	850	2,10	-
4	Intercapedine debolmente ventilata Av=600 mm ² /m	50,00	-	-	-	-	-
5	USB Elephant	0,60	0,220	-	397	1,70	33
6	DUROCK C 80mm	80,00	0,038	-	150	1,03	1
7	HARDROCK ENERGY 80mm	80,00	0,036	-	110	1,03	1
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9	Legno di abete flusso perpend. alle fibre	25,00	0,120	-	450	2,70	643
10	Legno di abete flusso perpend. alle fibre	25,00	0,120	-	450	2,70	643
-	Resistenza superficiale interna	-	-	0,100	-	-	-

Legenda simboli

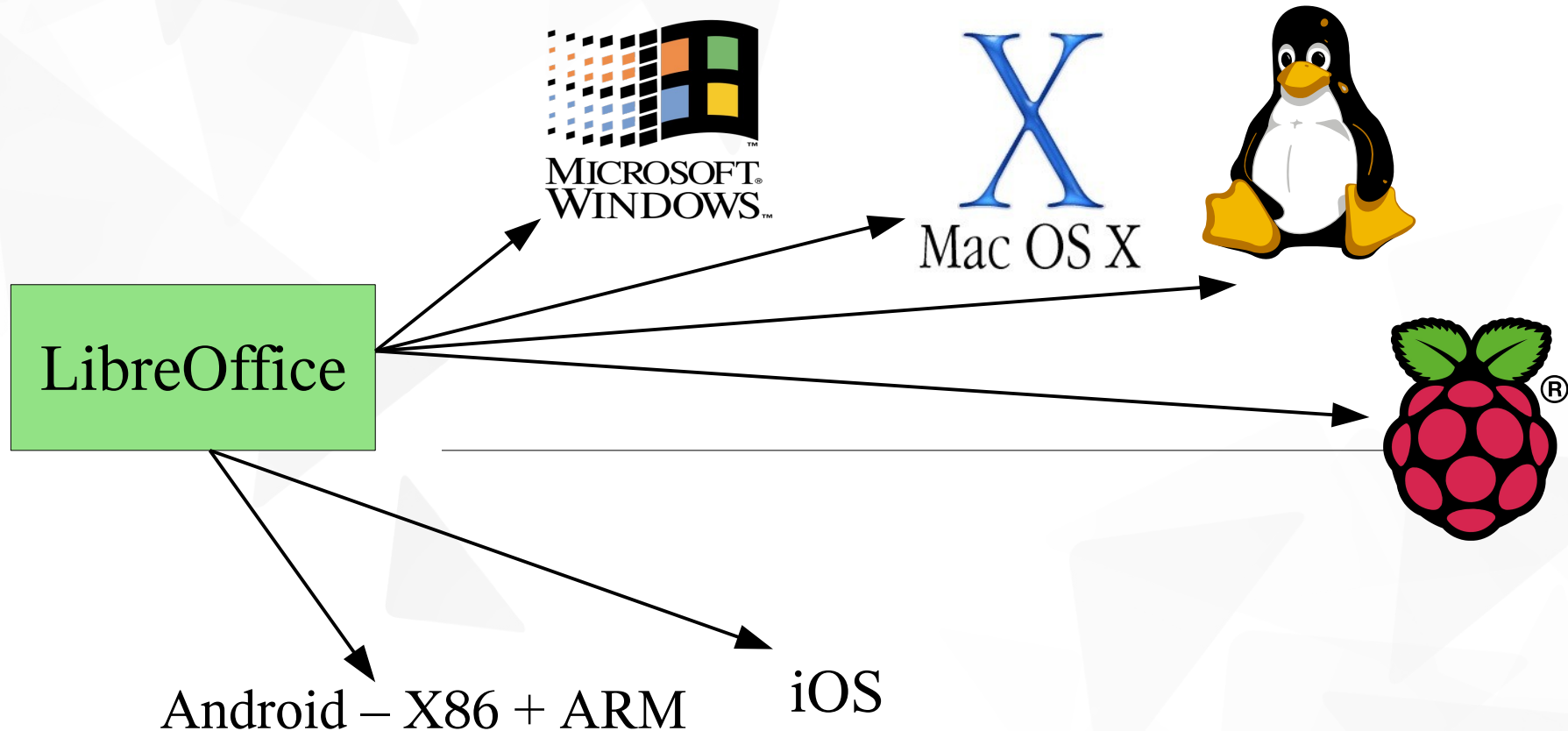
s	Spessore	mm
Cond.	Conduttività termica, comprensiva di eventuale maggiorazione	W/mK
R	Resistenza termica	m ² K/W
M.V.	Massa volumica	kg/m ³
C.T.	Capacità termica specifica	kJ/kgK
R.V.	Fattore di resistenza alla diffusione del vapore in capo asciutto	-



Future / research pipeline ...
(or some things we're slowly working on)

Targetting many platforms ...

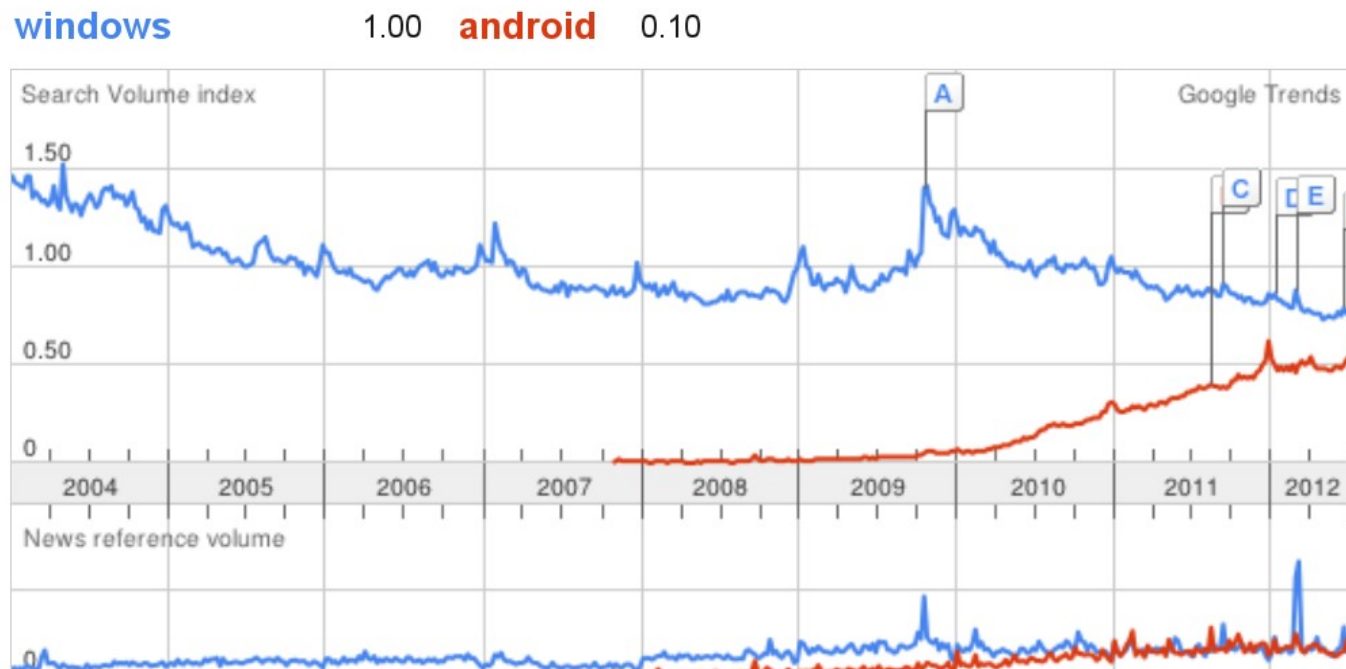
Current tinderbox targets: not all shipping



Android & mobile platforms (something in your pocket)

Who did all of this ?

- ▼ I'm a fraud ! The real work & glory should be addressed to:
Tor Lillqvist's hours of toil
- ▼ Why do it ? - futures ...



The man himself ...

Thanks to:
<http://trends.google.com/>



LibreOffice Desktop

File Edit View Insert Format Table Tools Window Help

New Open Save Document as E-mail Edit File Export Directly as PDF Print File Directly Page Preview Spelling and Grammar AutoSpellcheck Cut Copy Paste

Styles and Formatting Default Style Liberation Sans 12 Bold Italic Underline Align Left Centered Align Right Justified Left-To-Right Right-To-Left Numbering On/Off

Hello libreoffice !

Tab

q

w

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r

t

y

u

?123

a

s

d

f

g

h

↑

z

x

c

v

b

n

⌘

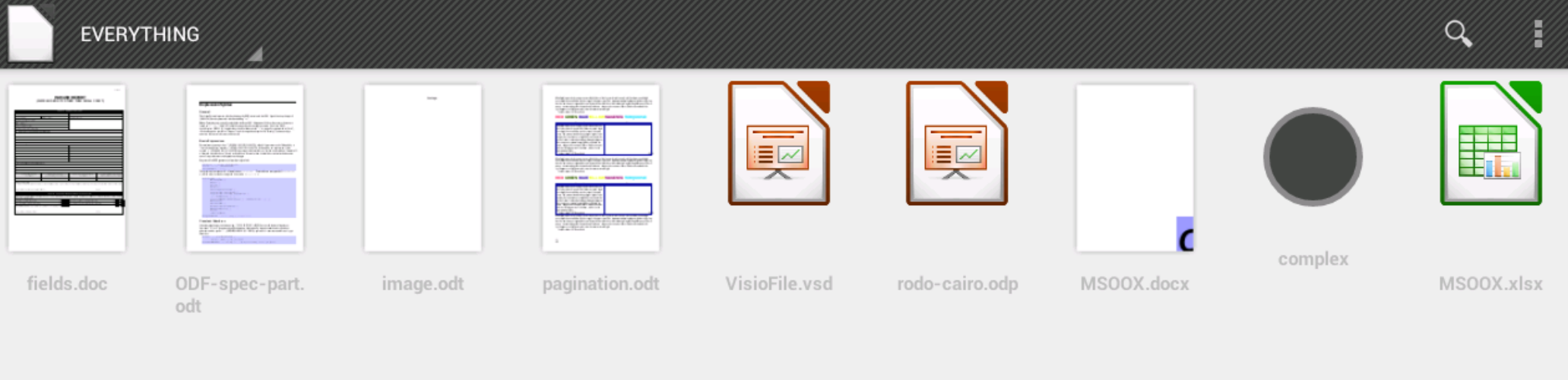
:-)

/ @



- ▶ The UI is not ideal even for a desktop.
- ▶ This is a proof of porting / concept hack **not** the headline

1:53 3G



- ▼ *Iain Billett's* GSOC project
 - ▼ an android viewer app ...
 - ▼ with a document collection manager / shell

Flower Office Presentation

Date: Freitag, 21. Juli 2006

Time: 10:00 - 12:30 a.m.

Location: Room 103
Saargalerie Building A3
66125 Saarbrücken

Type of meeting First Presentation

Meeting called by Flower Power Company

Chairperson Product Manager

Attendees IRMs of the European Commiss

Topics

Num	Topic	Responsible	Time
1.	Presentation of the company	Executive director	10:00
2.	Presentation of Flower Office	Product manager	10:30
3.	Demonstration of Flower Office	Marketing staff	11:30
4.	Answers and Questions	Product manager	12:00

- Pages are rendered to textures by something like a 'liblibreoffice'
- The Java native app renders textures / page numbnails etc.



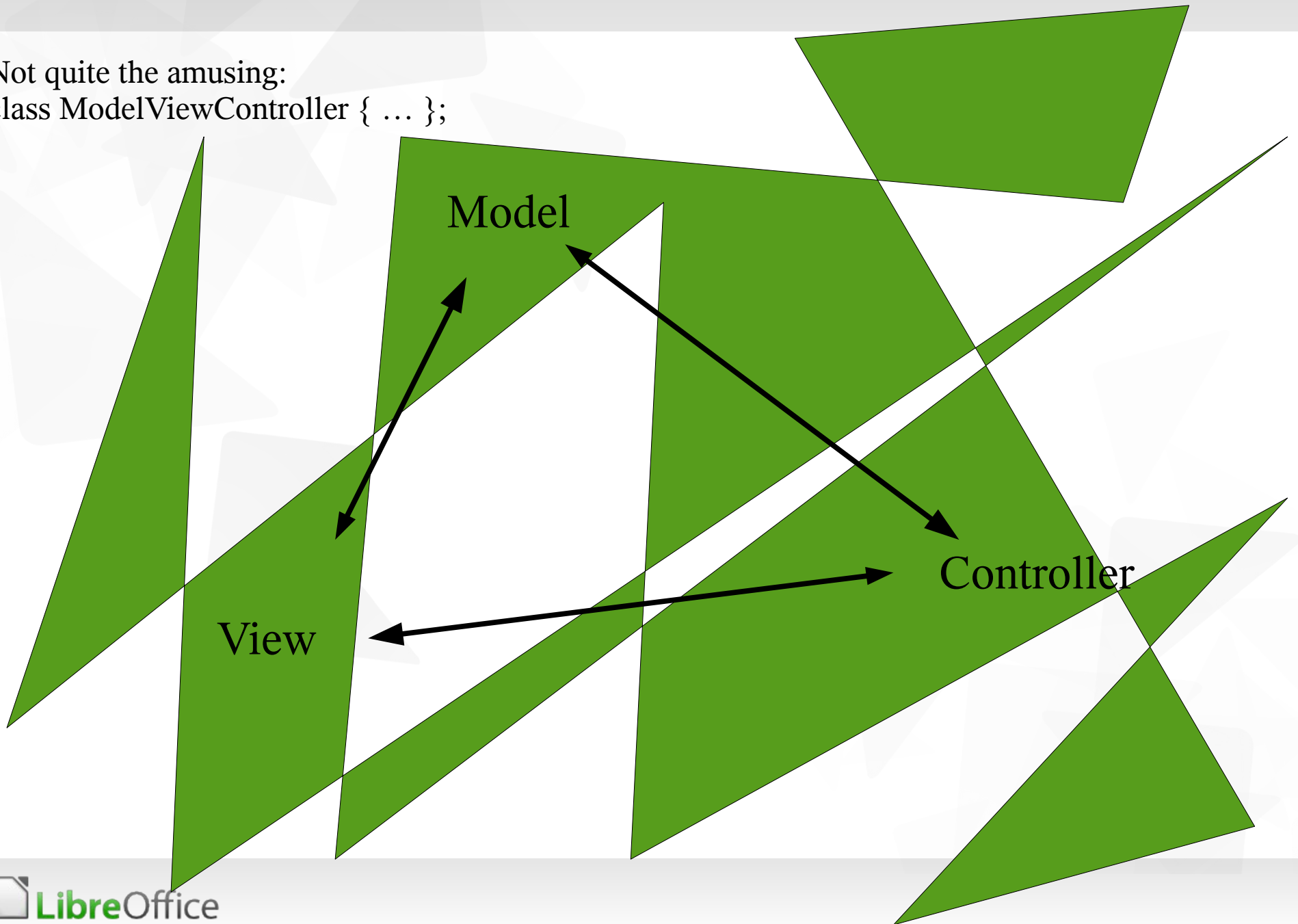
Interactive Collaboration

with a rare view of our architecture

Actual simplified internals diagram

Not quite the amusing:

```
class ModelViewController { ... };
```

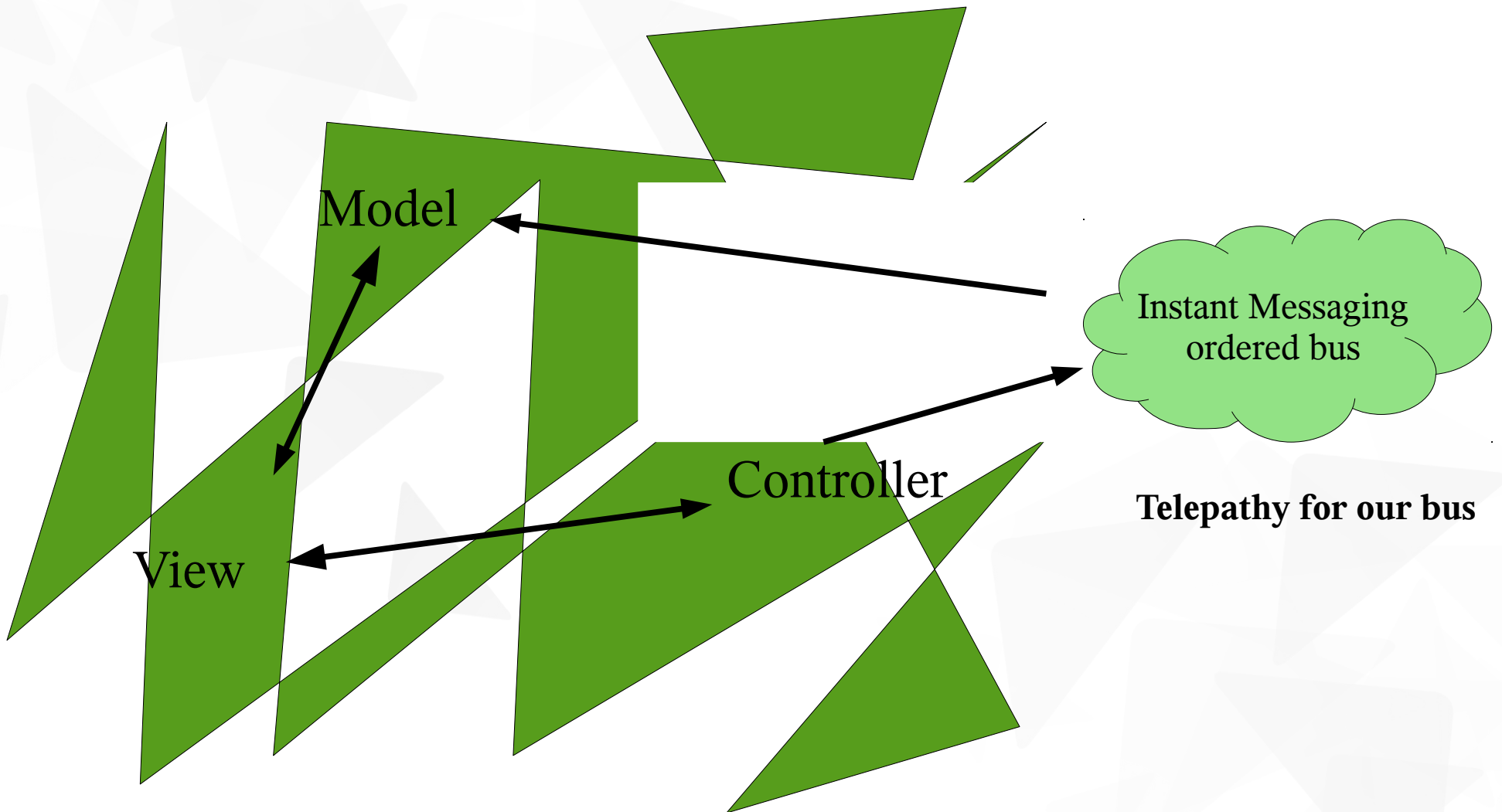


So what can we do ?

- ▼ Make some hard up-front design decisions:
 - ▼ Ordering is King
 - ▼ It doesn't matter what you do **but**
 - ▼ **always** do everything, everywhere in the same order, on every client – and we will have consistent documents.
 - ▼ Interactive conflicts can be dealt with by users as they occur: both edit the same cell, and see who wins ...

Collaboration prototype design:

By no means perfect but functional.



Some consequences

- ▼ Constraints:
 - ▼ cell editing is applied asynchronously ...
 - ▼ eg. enter “foo” in A1
 - ▼ edit sent to the IM bus
 - ▼ user moves to another cell
 - ▼ apply all messages from IM bus in order
 - ▼ “foo” entered into A1 ...
 - ▼ Potential latency issue
- ▼ Implementable is feasible in linear time
 - ▼ No blue-sky monster re-work necessary ...
- ▼ **DEMO – Thanks to:**
 - Matus Kukan (GSOC), Will Thompson (Collabora),
Eike Rathke (RedHat), Michael Meeks (SUSE)*

LibreOffice on-line ...
(getting pixels to users)

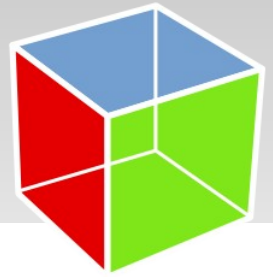
Cloud Office / HTML5 prototype ...

- ▼ Rendering using the **HTML5 Canvas** ...
- ▼ Communication using Web-Sockets (**now with v7**)
 - ▼ very simple plain-text event / control protocol
 - ▼ **compressed png** for screen updates ...
- ▼ Bandwidth usage **low** for simple tasks:
 - ▼ We can see what is re-rendered as we type:
 - ▼ But really as we type a character: only **this** is sent:
 - ▼ And that tiny rectangle is png compressed ...
 - ▼ CopyArea on the client for scrolling.

Hello World this is me typi



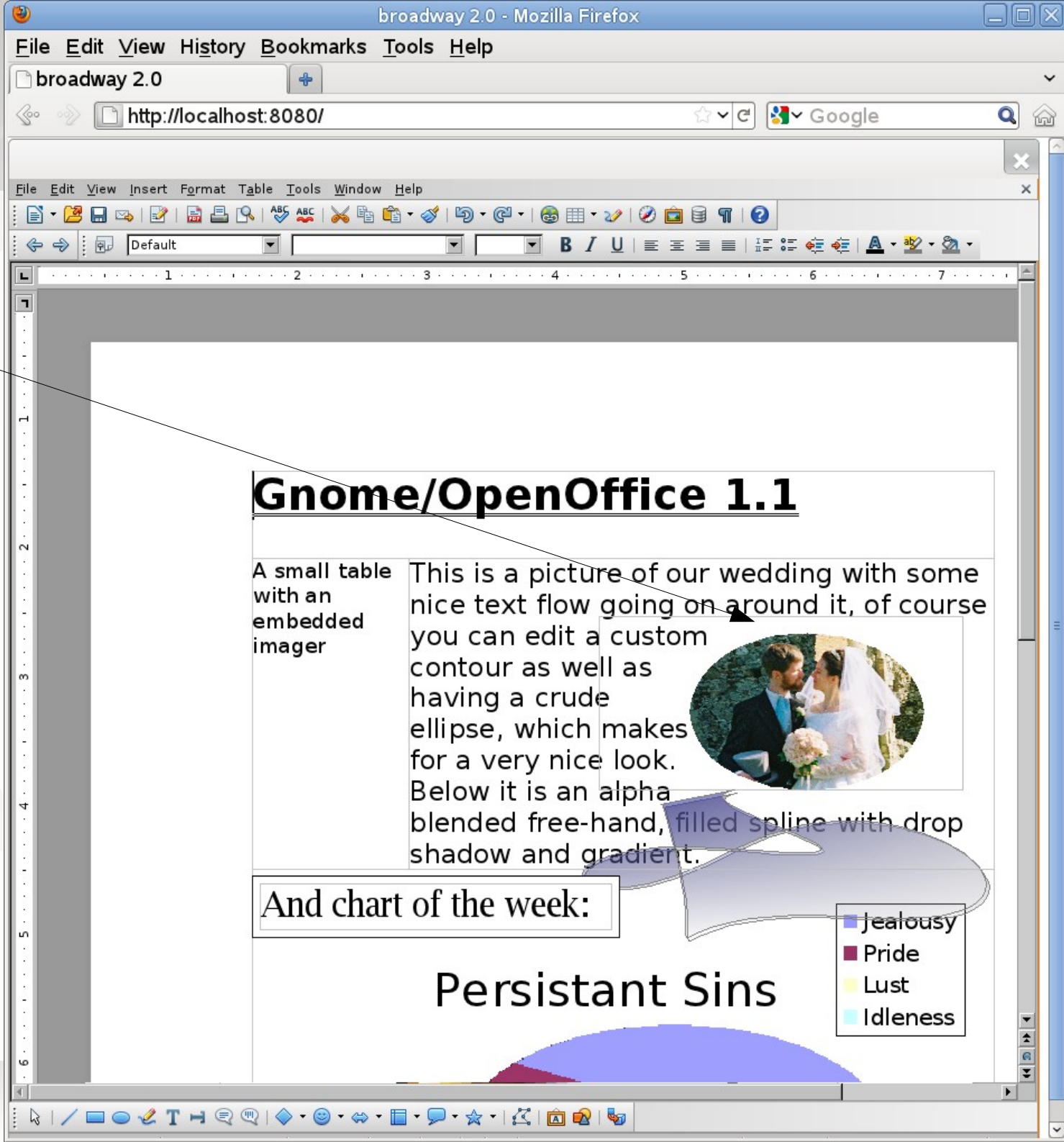
Cloud Office ... technologies ...



- ▼ Uses gtk+ 3's / broadway backend to render (via some javascript shims) in the browser:
 - ▼ All intelligence and rendering on the 'server' app.
 - ▼ **broadway.js** - < 3k LOC ...
- ▼ **Still a prototype**
 - ▼ rendering performance improving, but lumpy in places.
- ▼ This approach allows a full-feature experience
 - ▼ ie. complex text-layout, large, complex spreadsheets, WYSIWYG (eg. edit your footnotes on the page), VBA macros, Pivot Tables etc.
- ▼ Also a number of challenges:
 - ▼ Good APIs for printing etc.

Example:

Custom contoured picture, with text fill



It can't possibly perform!

- ▶ LibreOffice in-use in multi-user remote/X environments
- ▶ Load avg 0.05/0.3/0.34 for 73 live users in writer, and 10 in calc.
- ▶ 4 CPU Quad-Core estimated 200-300 concurrent users.
- ▶ If rented servers in the cloud are truly cheaper it should be cheap.

```
xterm (on linux-i3od)
top - 12:11:29 up 5:35, 2 users, load average: 0.05, 0.30, 0.34
Tasks: 693 total, 1 running, 687 sleeping, 0 stopped, 5 zombie
Cpu0  : 30.5%us, 4.4%sy, 0.0%ni, 63.8%id, 0.0%wa, 0.3%hi, 1.0%si, 0.0%st
Cpu1  : 1.3%us, 0.3%sy, 0.0%ni, 98.4%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu2  : 5.9%us, 1.3%sy, 0.0%ni, 92.8%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu3  : 2.3%us, 1.0%sy, 0.0%ni, 96.7%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu4  : 13.3%us, 2.3%sy, 0.0%ni, 84.1%id, 0.0%wa, 0.0%hi, 0.3%si, 0.0%st
Cpu5  : 0.7%us, 0.3%sy, 0.0%ni, 99.0%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu6  : 4.0%us, 1.0%sy, 0.0%ni, 96.0%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu7  : 0.3%us, 0.0%sy, 0.0%ni, 99.7%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu8  : 5.6%us, 1.0%sy, 0.0%ni, 93.5%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu9  : 0.3%us, 2.0%sy, 0.0%ni, 97.7%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu10 : 5.3%us, 2.6%sy, 0.0%ni, 92.1%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu11 : 1.0%us, 0.3%sy, 0.0%ni, 98.7%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu12 : 1.3%us, 0.3%sy, 0.0%ni, 98.3%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu13 : 0.3%us, 0.3%sy, 0.0%ni, 99.3%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu14 : 0.3%us, 0.0%sy, 0.0%ni, 99.7%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu15 : 0.3%us, 1.6%sy, 0.0%ni, 98.0%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Mem:  48394M total, 34196M used, 14198M free, 263M buffers
Swap: 20489M total, 0M used, 20489M free, 1845M cached

  PID USER      PR  NI  VIRT  RES  SHR  S %CPU %MEM    TIME+  COMMAND
 27496      20    0 631m 104m 68m  S   43  0.2    0:01.31 soffice.bin
26196      20    0 12.8g 1.6g 91m  S    5  3.4    2:28.24 soffice.bin
 2313      20    0 12.7g 238m 89m  S    4  0.5    0:13.94 soffice.bin
27547      20    0 160m 19m 10m  S    3  0.0    0:00.10 oooorunning.py
  412      20    0 12.8g 1.6g 85m  S    3  3.4    2:48.94 soffice.bin
27489      20    0 157m 19m 10m  S    3  0.0    0:00.09 ooolaunching.py
32029      20    0 12.8g 363m 92m  S    3  0.8    0:44.87 soffice.bin
13937      20    0 1069m 484m 91m  S    2  1.0    0:41.75 soffice.bin
27175      20    0 655m 122m 76m  S    2  0.3    0:03.40 soffice.bin
23915      20    0 13.0g 419m 96m  S    2  0.9    0:18.95 soffice.bin
15997      20    0 12.8g 451m 92m  S    1  0.9    1:47.29 soffice.bin
17200      20    0 12.7g 254m 87m  S    1  0.5    0:50.27 soffice.bin
18159      20    0 13.1g 561m 93m  S    1  1.2    9:23.87 soffice.bin
21149      20    0 12.9g 1.7g 108m S    1  3.6    2:55.13 soffice.bin
26885      20    0 653m 117m 73m  S    1  0.2    0:03.79 soffice.bin
32663      20    0 12.9g 353m 96m  S    1  0.7    1:19.61 soffice.bin
27434      20    0 8940 1672 852  R    1  0.0    0:00.39 top
  819      39   19    0    0    0  S    0  0.0    0:04.30 kipmi0
 1677      20    0 12.8g 257m 90m  S    0  0.5    0:37.73 soffice.bin
2805      20    0 69968 4820 2772 S    0  0.0    0:14.48 cupsd
2813      20    0 12.8g 320m 82m  S    0  0.7    0:14.27 soffice.bin
2826      20    0 3840 516 372  S    0  0.0    0:08.05 nsod
 4783      20    0 12.8g 372m 81m  S    0  0.8    0:18.36 soffice.bin
 5916      20    0 12.8g 327m 86m  S    0  0.7    0:23.40 soffice.bin
11115      20    0 12.7g 200m 87m  S    0  0.4    0:17.43 soffice.bin
12105      20    0 12.9g 331m 92m  S    0  0.7    0:14.43 soffice.bin
12279      20    0 662m 120m 69m  S    0  0.2    0:07.60 soffice.bin
12412      20    0 1098m 551m 86m  S    0  1.1    0:38.52 soffice.bin
19568      20    0 13.0g 1.7g 96m  S    0  3.6    2:06.37 soffice.bin
20246      20    0 12.8g 528m 82m  S    0  1.1    0:22.29 soffice.bin
21063      20    0 833m 292m 79m  S    0  0.6    0:32.10 soffice.bin
26972      20    0 13.2g 607m 99m  S    0  1.3    1:37.90 soffice.bin
27879      20    0 12.8g 382m 98m  S    0  0.8    1:32.71 soffice.bin
29839      20    0 690m 151m 80m  S    0  0.3    0:50.05 soffice.bin
32005      20    0 12.8g 420m 96m  S    0  0.9    1:05.29 soffice.bin
   1 root      20    0 8072 748 628  S    0  0.0    0:02.45 init
   2 root      15  -5    0    0    0  S    0  0.0    0:00.00 kthreadd
   3 root      RT -5    0    0    0  S    0  0.0    0:00.01 migration/0
   4 root      15  -5    0    0    0  S    0  0.0    0:07.35 ksoftirqd/0
   5 root      RT -5    0    0    0  S    0  0.0    0:00.00 watchdog/0
   6 root      RT -5    0    0    0  S    0  0.0    0:00.02 migration/1
   7 root      15  -5    0    0    0  S    0  0.0    0:07.57 ksoftirqd/1
   8 root      RT -5    0    0    0  S    0  0.0    0:00.00 watchdog/1
   9 root      RT -5    0    0    0  S    0  0.0    0:00.05 migration/2
  10 root      15  -5    0    0    0  S    0  0.0    0:02.41 ksoftirqd/2
  11 root      RT -5    0    0    0  S    0  0.0    0:00.00 watchdog/2
  12 root      RT -5    0    0    0  S    0  0.0    0:00.10 migration/3
  13 root      15  -5    0    0    0  S    0  0.0    0:01.81 ksoftirqd/3
  14 root      RT -5    0    0    0  S    0  0.0    0:00.00 watchdog/3
  15 root      RT -5    0    0    0  S    0  0.0    0:00.10 migration/4
  16 root      15  -5    0    0    0  S    0  0.0    0:03.08 ksoftirqd/4
  17 root      RT -5    0    0    0  S    0  0.0    0:00.00 watchdog/4
```

LibLibreOffice ...
Encouraging wider re-use ...

LibLibreOffice – prototype ...

- ▼ A tiny static library
 - ▼ At run-time, dynamically links / exposes LibreOffice functionality
- ▼ A virtual / abstract & much simplified programming interface:

```
class LibLibreOffice
{
public:
    virtual bool initialize (const char *installPath) = 0;
    virtual LODocument *documentLoad (const char *url) = 0;
    virtual bool          documentSave (const char *url) = 0;
    ...
};
LibLibreOffice *lo_init (const char *install_path);
```

- ▼ Planned for document conversion, Document indexing
- ▼ Ultimately for a tiled document renderer for 'Documents'

Conclusions ...



- **LibreOffice is growing & executing**
 - Improving for developers: still lots to do ...
 - Improving for users: still a long way to go ...
- **We have fertile work for new contributors**
 - Want to make a real difference ? Apply here ...
- **Please do get involved in whatever way you can:**
 - **Bug triage, QA, coding, web-design ... appreciated.**
 - **Thank you 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



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