R + Org-mode = awesome!

Org-mode for science, reproducible research, organization

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Pre-warning

This presentation was *a lot* harder than I thought it would be!

- Org-mode is great, but perhaps intimidating (emacs, setup…)
- Emacs itself can be quite a barrier to entry
- Background knowledge needed for feature `x` to make sense
- There's a gazillion features I would love to talk about but can't

My approach

- Overview of some features
- Demo of an Org file
- Export with a few backends

The life of a product developer

Stuff I do in the course of my work (probably not that different from you!):

Direct

- write up experimental plans
- do experiments
- collect/analyze data
- writeup reports/presentations
- share/collaborate with others

Indirect

- record all sorts of info
- meeting notes
- manage todos
- store contact info/notes
- what to work on and when
- emails

What the hell does emacs have to do with it?

Believe it or not, I *learned Emacs* for `org-mode`. To date, it's the *only* solution I'm aware of that allows for all of the following in one place:

- notes
- todos/time stamping/deadlines
- tags/properties
- embedded code + execution
- export to multiple formats, with images, links, table of contents, automatically generated code blocks and/or results…

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Pretty cool!

Some competition

I've always been a note taker, as I like to refer to the past… you never know what might be useful in the future! I tried all sorts of programs:

recording work

- Word/Writer
- zim (personal wiki)
- Evernote
- TiddlyWiki
- RStudio?

Todos

- `todo.txt`
- Chandler
- iGTD
- TiddlyWiki
- tracks

Ok, so what is it?

`Org-mode` is a major mode for the Emacs text editor.

- it uses markup to allow for structuring

```
* ok, so what is it?                          # heading

=Org-mode= is a major mode for the Emacs text editor.
- it uses markup to allow for structuring     # list
```

Markup

heading

subheading

- unordered list

1. ordered list

bold, *italic*, underline, footnote [1], superscripts^{x} and subscripts$_{y}$, link

[1] Footnote goes here

Markup

```
* heading
** subheading
- unordered list
1. ordered list
*bold*, /italic/, _underline_, footnotes[fn:1],
superscripts^x and subscripts_y,  [[https://www.google.com][link]]

* Footnotes
Footnote goes here [fn:1]
```

Todos

do something

[1/2] meta task

- ☒ thing 1
- ☐ thing 2

another thing

Todos

```
** todo do something
** todo [1/2] meta task          :proj:
   - [X] thing 1
   - [ ] thing 2
** done another thing
```

Time stamps

Can add further information to notes (logs, deadlines, etc.)

Notes about meeting with Dude

[2016-01-18 Mon]

Did blah blah blah

do something

Time stamps

Can add further information to notes (logs, deadlines, etc.)

```
** Notes about meeting with Dude
[2016-01-18 Mon]

Did blah blah blah

** todo do something
   DEADLINE: <2016-01-21 Thu>
```

Tables/spreadsheet!

- Formulas: `$` refers to column; `@` refers to row
- Emacs `calc` has format specifiers built in

id	x	y
a	2	1.33
b	4	5.33
c	6	12.00

Tables/spreadsheet!

```
#+tblname: dat_1
| *id* | *x* | *y* |
|------+-----+-----|
| a    |   2 |   4 |
| b    |   4 |  16 |
| c    |   6 |  36 |
#+TBLFM: $3=$2^2/3; %.2f
```

Inline code

I had `10` apples and I ate `4`. I must have `6` left.

Inline source code

```
I had src_R[:session r]{x <- 10; x} apples and I
ate src_R[:session r]{y <- 4; y}. I must have
src_R[:session r]{x - y} left.
```

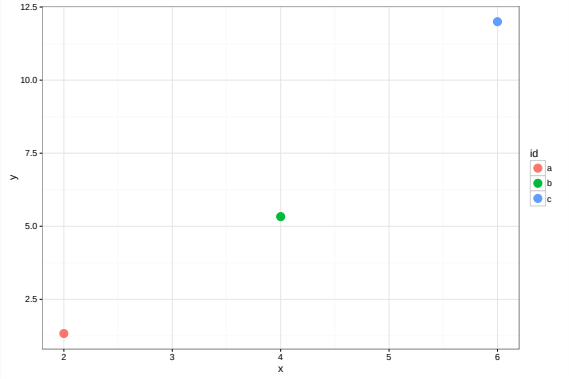
Source blocks

```
#+name: code-ex1
#+header: data = dat_1
#+begin_src R :session r :exports results :results output

library(ggplot2)
sum(data$y)

#+end_src
```

```
[1] 18.66
```

Plotting

```
p <- ggplot(data, aes(x = x, y = y, colour = id))
p + geom_point(size = 4) + theme_bw()
```



Plotting

```
#+name: dat1_plot
#+header: :var data = dat_1 :file ./plots/dat1_scatter.pdf
#+header: :width 9 :height 6
#+begin_src R :session r :exports both :results output graphics

p <- ggplot(data, aes(x = x, y = y, colour = id))
p + geom_point(size = 4) + theme_bw()

#+end_src
```

Formatting results

```
#+begin_center
#+attr_latex: :height 5cm
#+RESULTS: dat1_plot
[[file:./plots/dat1_scatter.pdf]]
#+end_center
```

Agenda

Like a search engine for your files

- Extracts todos, time stamps, tags, etc.
- Can apply filters (keywords + the above)
- Create custom views (only todo keyword `x`)

Demo time!

Some tips

If you find this intriguing but intimidating, start small

- Start journaling in Org
- Track todos
- Edit a text file in Emacs
- Create one document via export
- Only customize and learn new features as needed

Ask for help

- The mailing list is awesome!
- SO has quite a few Org questions

Extra stuff

- Manage contacts with org-contacts
- Text based file manager: Sunrise Commander
- A tour of Emacs
- Taskjuggler, an Org-mode compatible project planner
- Draw in LaTeXwith TikZ/pgf
- Beamer metropolis theme (beamer that doesn't look like it)
- Using `git` (Emacs wiki and magit, a pretty popular tool)

Learning Org

- Org-mode manual: http://orgmode.org/manual/
- Worg, the Org-mode wiki: http://orgmode.org/worg/
- Org-mode mailing lsit: http://orgmode.org/community.html
- Compact Org-mode guide: http://orgmode.org/guide/
- Org-mode shortcut reference card: http://orgmode.org/orgcard.pdf
- Brent Hanson's personal collection of settings, tips, and tricks: http://doc.norang.ca/org-mode.html

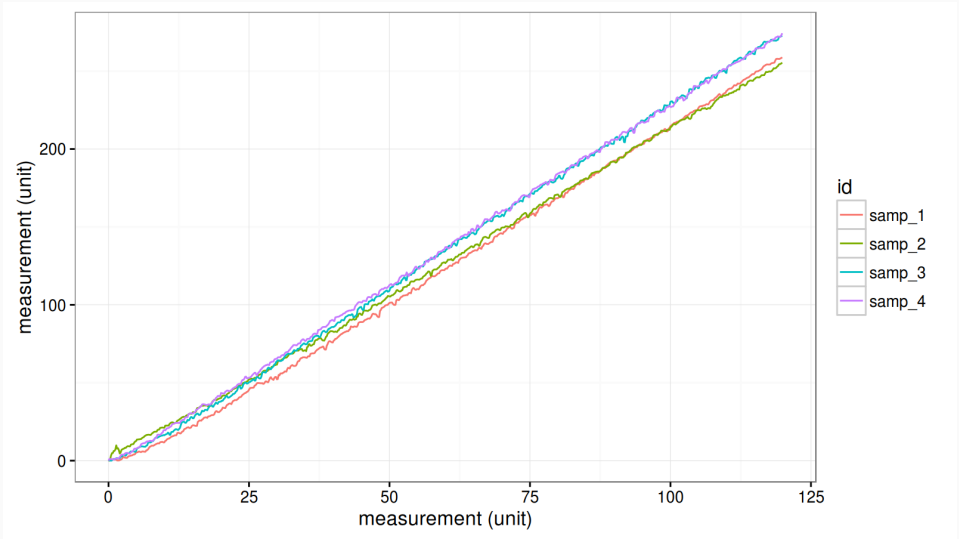
References

- Schulte, Eric; Davison, Dan; Dye, Thomas S; Dominik, Carsten. *A Multi-Language Computing Environment for Literate Programming and Reproducible Research*. Journal of Statistical Software. http://www.jstatsoft.org/article/view/v046i03
- Dye, Thomas S. *Structure and Growth of the Leeward Kohala Field System: An Analysis with Directed Graphs*. PlosONE. http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0102431

Examples

- 2015 Google Developer Fest presentation
- 2014 Google Developer Fest presentation
- Hobby analysis of a multi-level marketing company

the plot


measurement (unit)
200
100
0
0
25
50
75
100
125
measurement (unit)
id
samp_1
samp_2
samp_3
samp_4