Literate DevOps

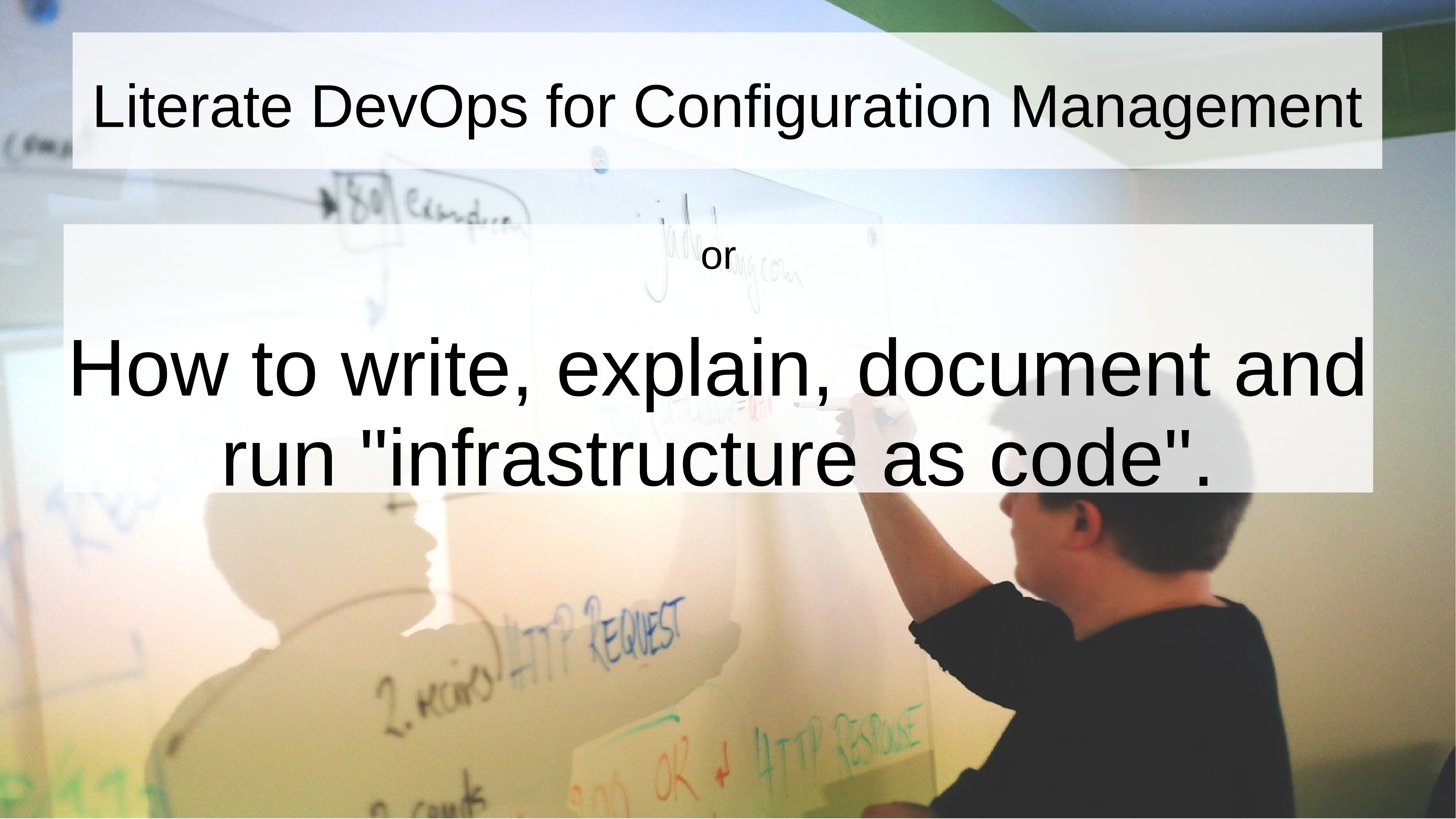
FOSDEM 2016

Marc Hoffmann
fosdem2016@h-rd.org

Literate DevOps for Configuration Management

or

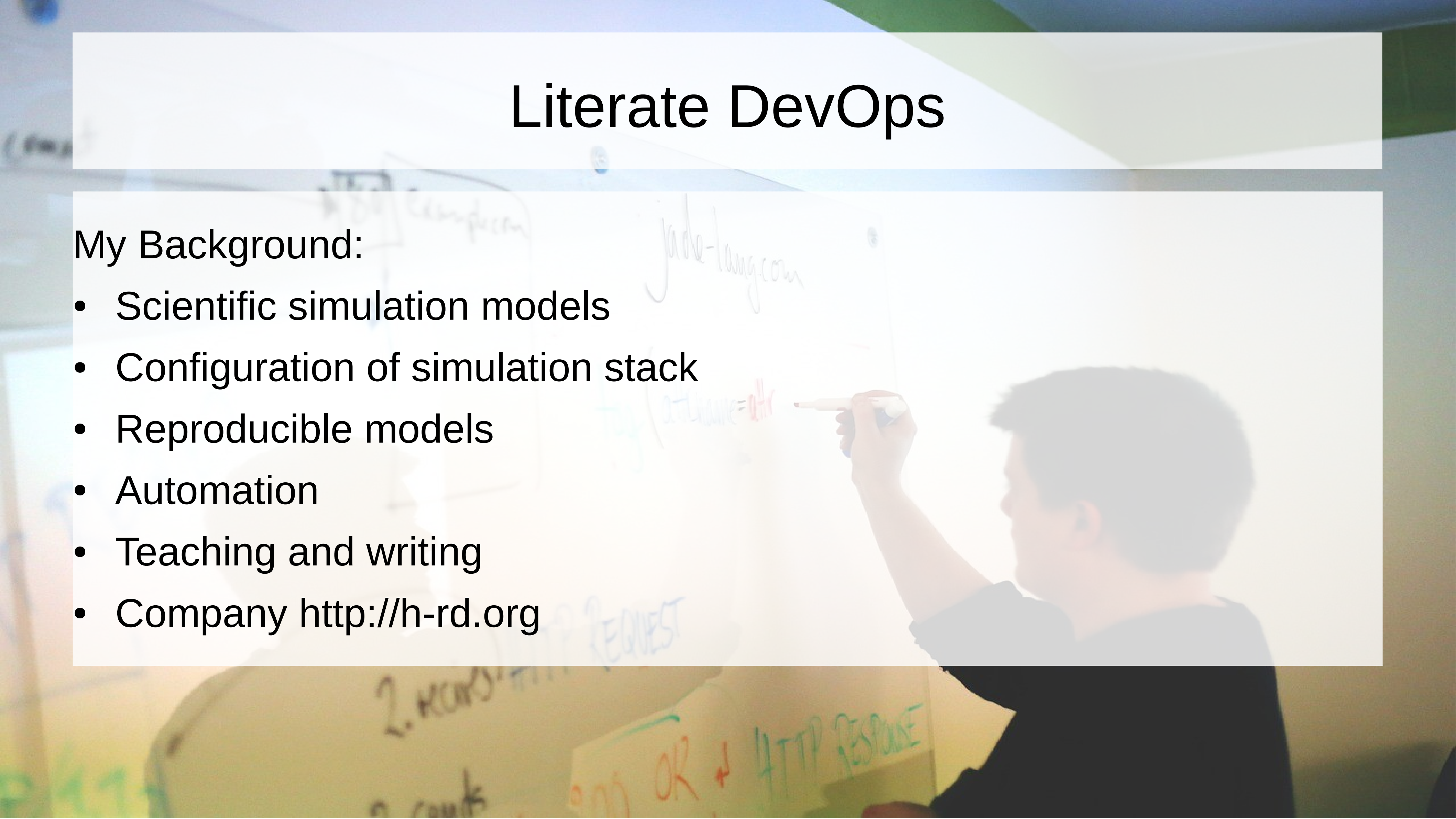
How to write, explain, document and run "infrastructure as code".



Literate DevOps

My Background:

- Scientific simulation models
- Configuration of simulation stack
- Reproducible models
- Automation
- Teaching and writing
- Company http://h-rd.org



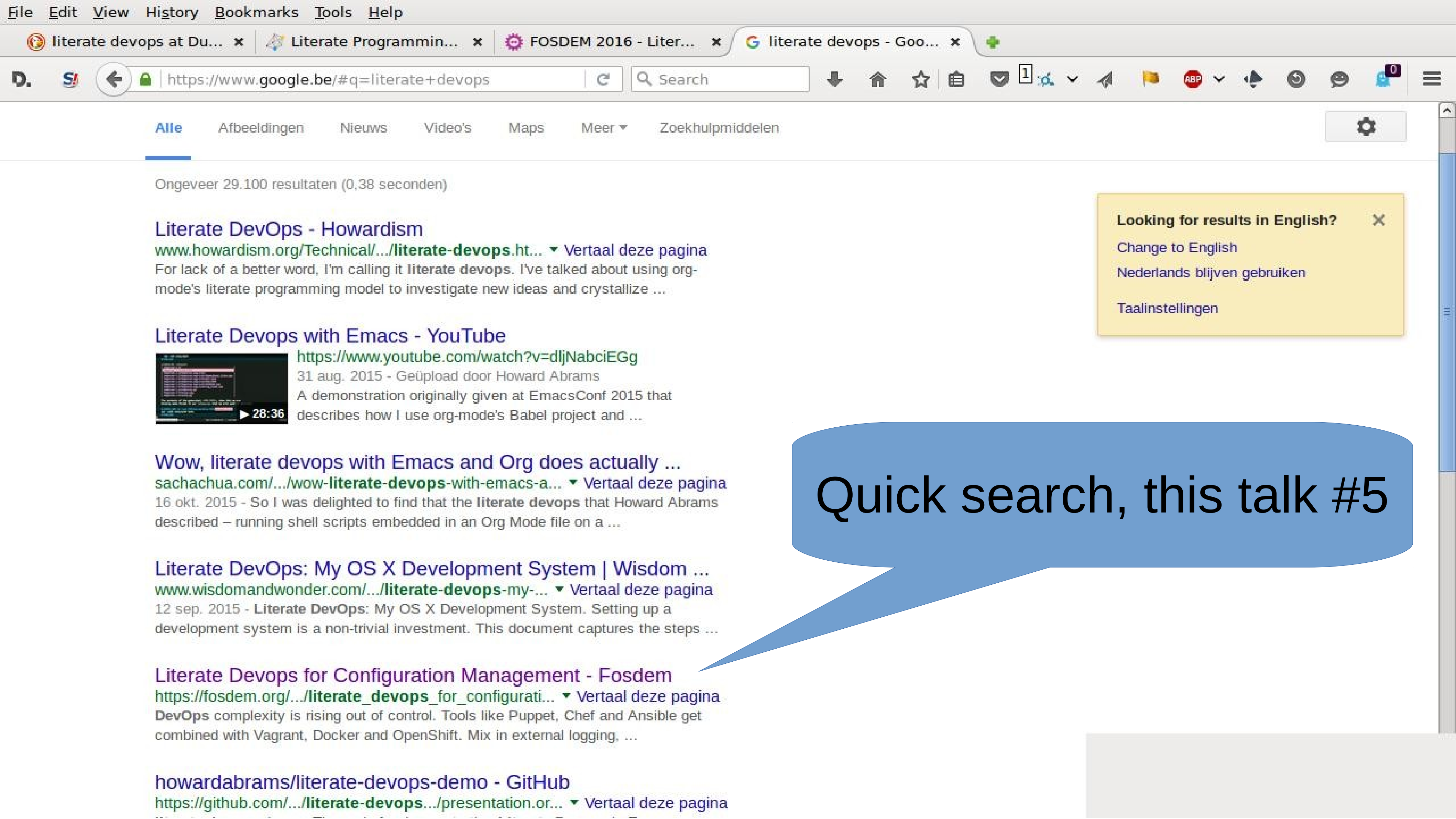
About this Talk

Literate DevOps

Ideas by:

- Howard Abrams
- Donald Knuth
- Carsten Dominik

Mistakes by me :-)



Ongeveer 29.100 resultaten (0,38 seconden)

Literate DevOps - Howardism
www.howardism.org/Technical/.../literate-devops.ht... ▾ Vertaal deze pagina
For lack of a better word, I'm calling it **literate devops**. I've talked about using org-mode's literate programming model to investigate new ideas and crystallize ...

Literate Devops with Emacs - YouTube
https://www.youtube.com/watch?v=dljNabciEGg
31 aug. 2015 - Geüpload door Howard Abrams
A demonstration originally given at EmacsConf 2015 that describes how I use org-mode's Babel project and ...

Wow, literate devops with Emacs and Org does actually ...
sachachua.com/.../wow-literate-devops-with-emacs-a... ▾ Vertaal deze pagina
16 okt. 2015 - So I was delighted to find that the **literate devops** that Howard Abrams described – running shell scripts embedded in an Org Mode file on a ...

Literate DevOps: My OS X Development System | Wisdom ...
www.wisdomandwonder.com/.../literate-devops-my-... ▾ Vertaal deze pagina
12 sep. 2015 - **Literate DevOps**: My OS X Development System. Setting up a development system is a non-trivial investment. This document captures the steps ...

Literate Devops for Configuration Management - Fosdem
https://fosdem.org/.../literate_devops_for_configurati... ▾ Vertaal deze pagina
DevOps complexity is rising out of control. Tools like Puppet, Chef and Ansible get combined with Vagrant, Docker and OpenShift. Mix in external logging, ...

howardabrams/literate-devops-demo - GitHub
https://github.com/.../literate-devops.../presentation.or... ▾ Vertaal deze pagina

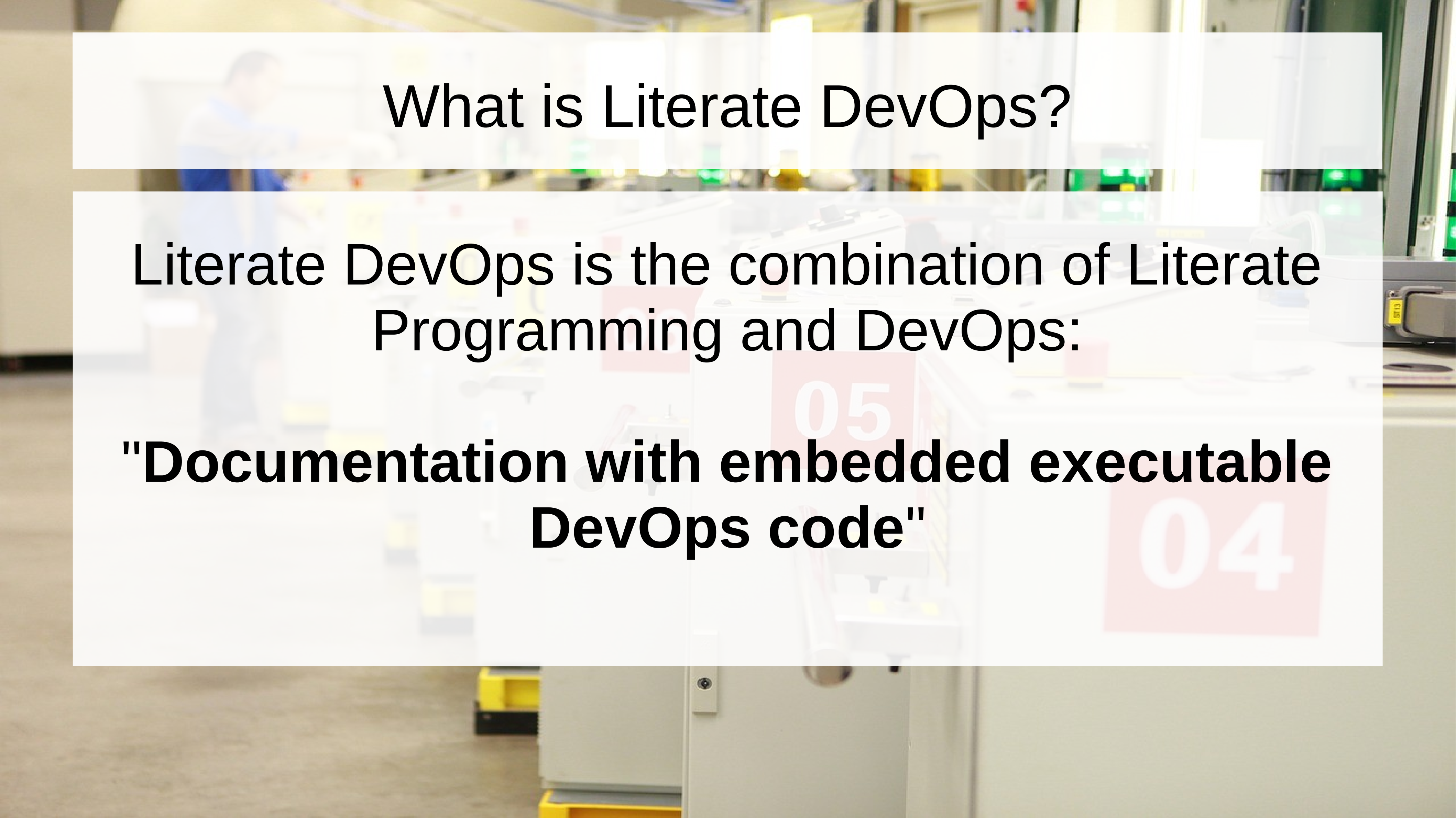
Looking for results in English?
Change to English
Nederlands blijven gebruiken
Taalinstellingen

Quick search, this talk #5

“Standard” DevOps

Two phases:

1. Bang head until server works
2. Capture effort into some automation tool like Puppet or Chef



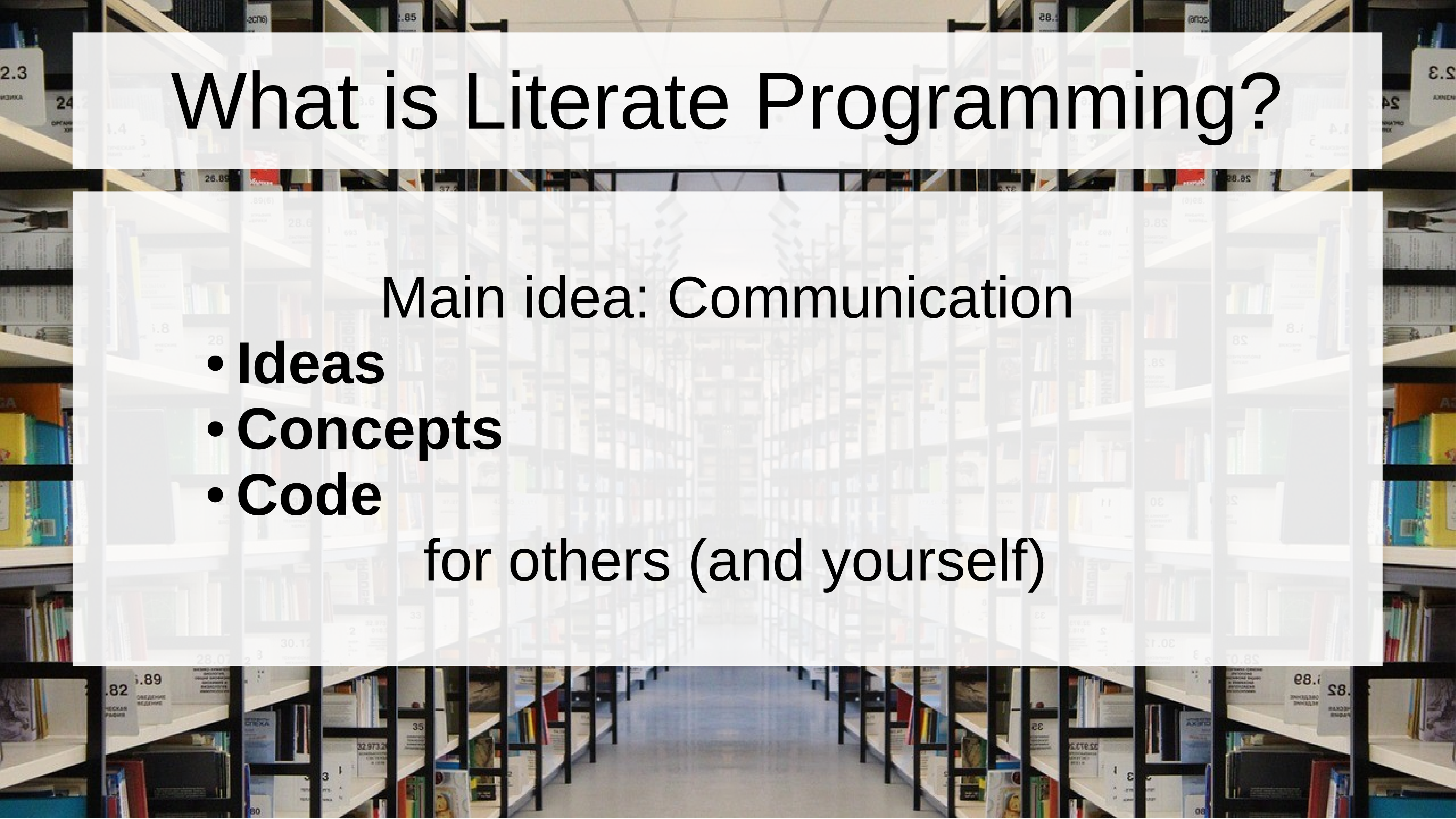
What is Literate DevOps?

Literate DevOps is the combination of Literate Programming and DevOps:

"**Documentation with embedded executable DevOps code**"

What is Literate Programming?

- Documents with "commented out" code vs code with comments
- Invented by Donald Knuth in the 1980's



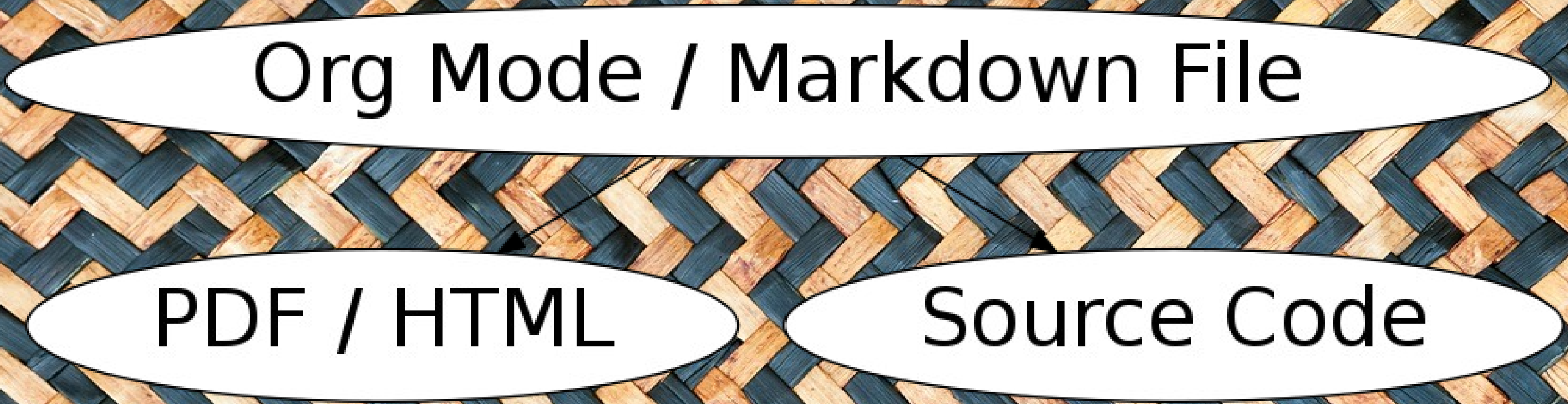
What is Literate Programming?

Main idea: Communication

- **Ideas**
- **Concepts**
- **Code**

for others (and yourself)

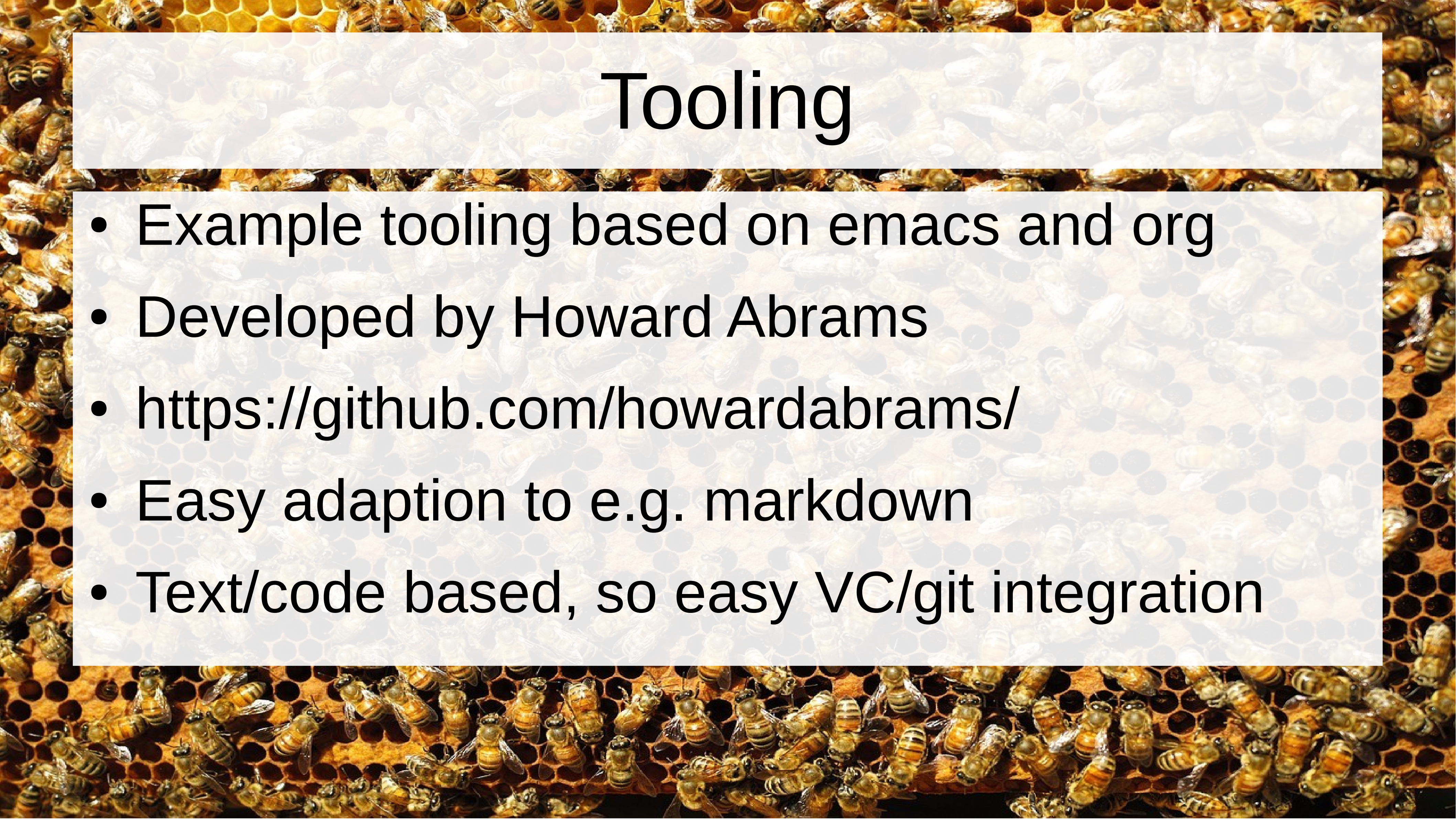
How it works



Org Mode / Markdown File

PDF / HTML

Source Code



Tooling

- Example tooling based on emacs and org
- Developed by Howard Abrams
- https://github.com/howardabrams/
- Easy adaption to e.g. markdown
- Text/code based, so easy VC/git integration

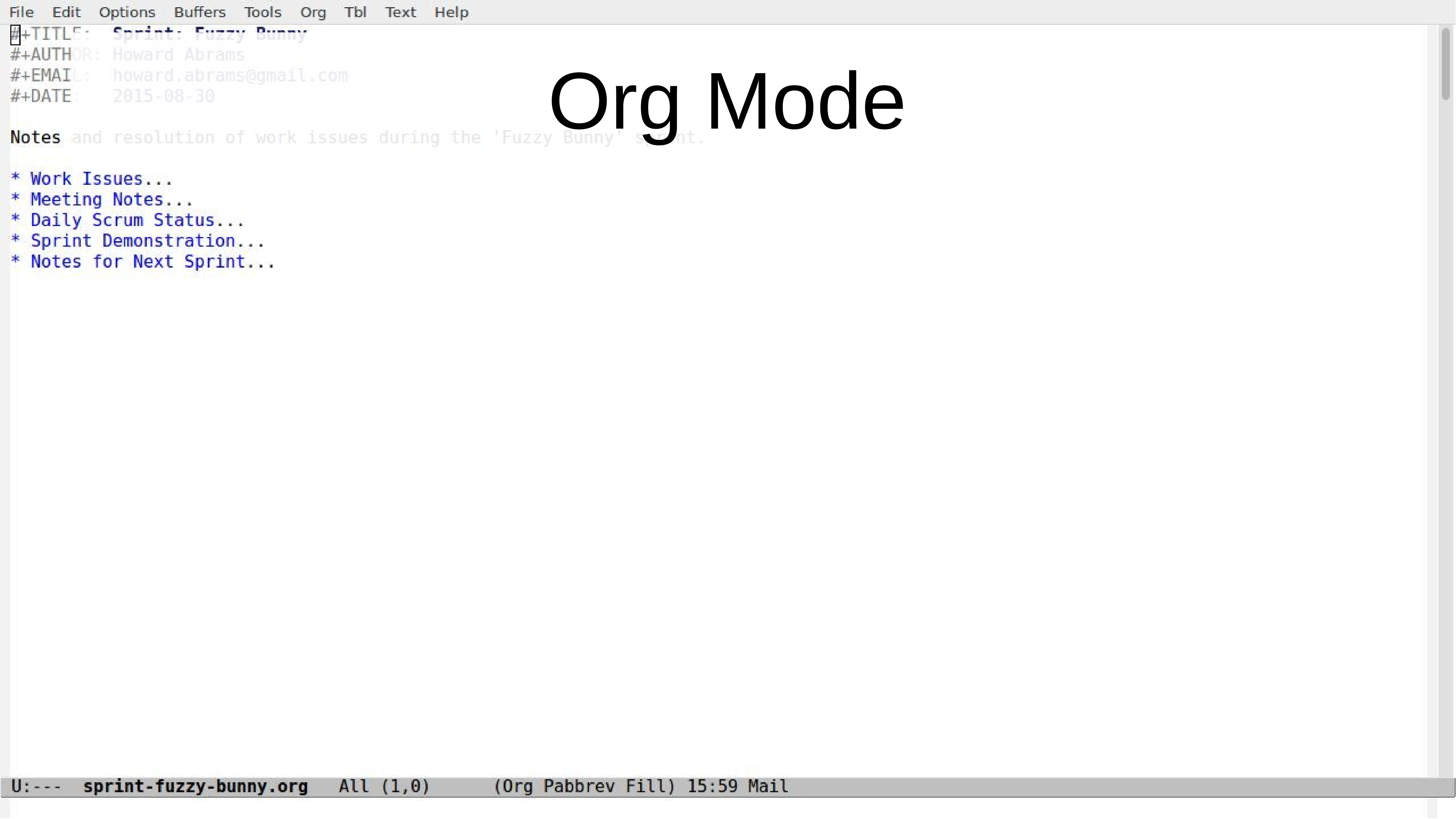
Emacs and Org

- Emacs is THE extensible editor
- Org is an interactive writing/scripting/organizing/hyperlinking application for Emacs **http://orgmode.org**
- Interactive code execution in org document by `Ctrl–C Ctrl–C`
- Batch code and documentation export to html, markdown and code
- Great for DevOps idempotence: Apply and test recipes/manifests again and again with easy `Ctrl–C Ctrl–C` for learning

Org Mode

- Great at thought collection and organization
- Hyperlinks for documents, code, remote execution
- System is build from small, simple parts
- Executable literate programming
- Mix (weave) code from multiple languages

Org Mode



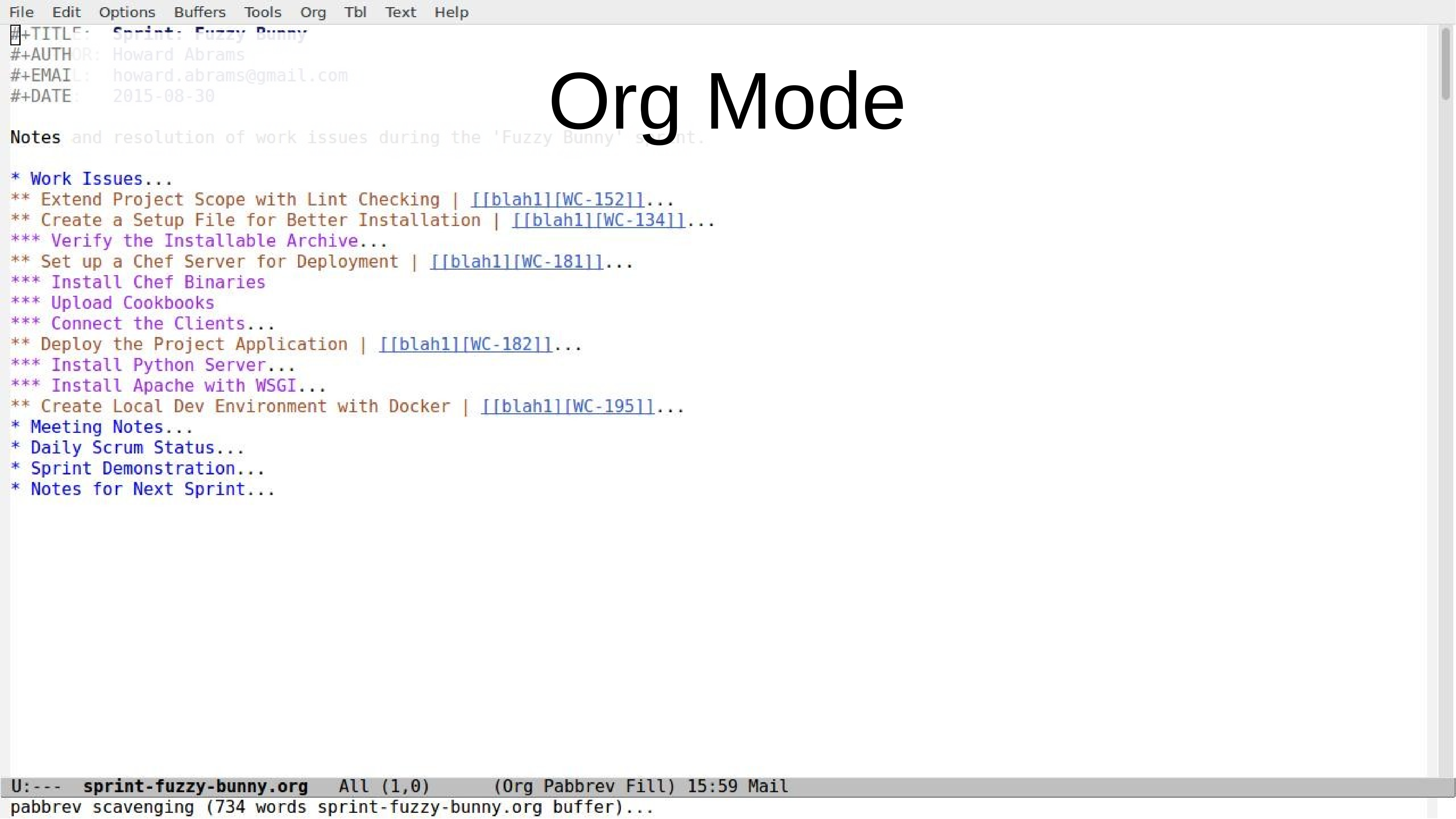
```
#+TITLE:  Sprint: Fuzzy Bunny
#+AUTHOR: Howard Abrams
#+EMAIL:  howard.abrams@gmail.com
#+DATE:   2015-08-30

Notes and resolution of work issues during the 'Fuzzy Bunny' sprint.

* Work Issues...
* Meeting Notes...
* Daily Scrum Status...
* Sprint Demonstration...
* Notes for Next Sprint...
```

```
U:---  sprint-fuzzy-bunny.org   All (1,0)      (Org Pabbrev Fill) 15:59 Mail
```

Org Mode



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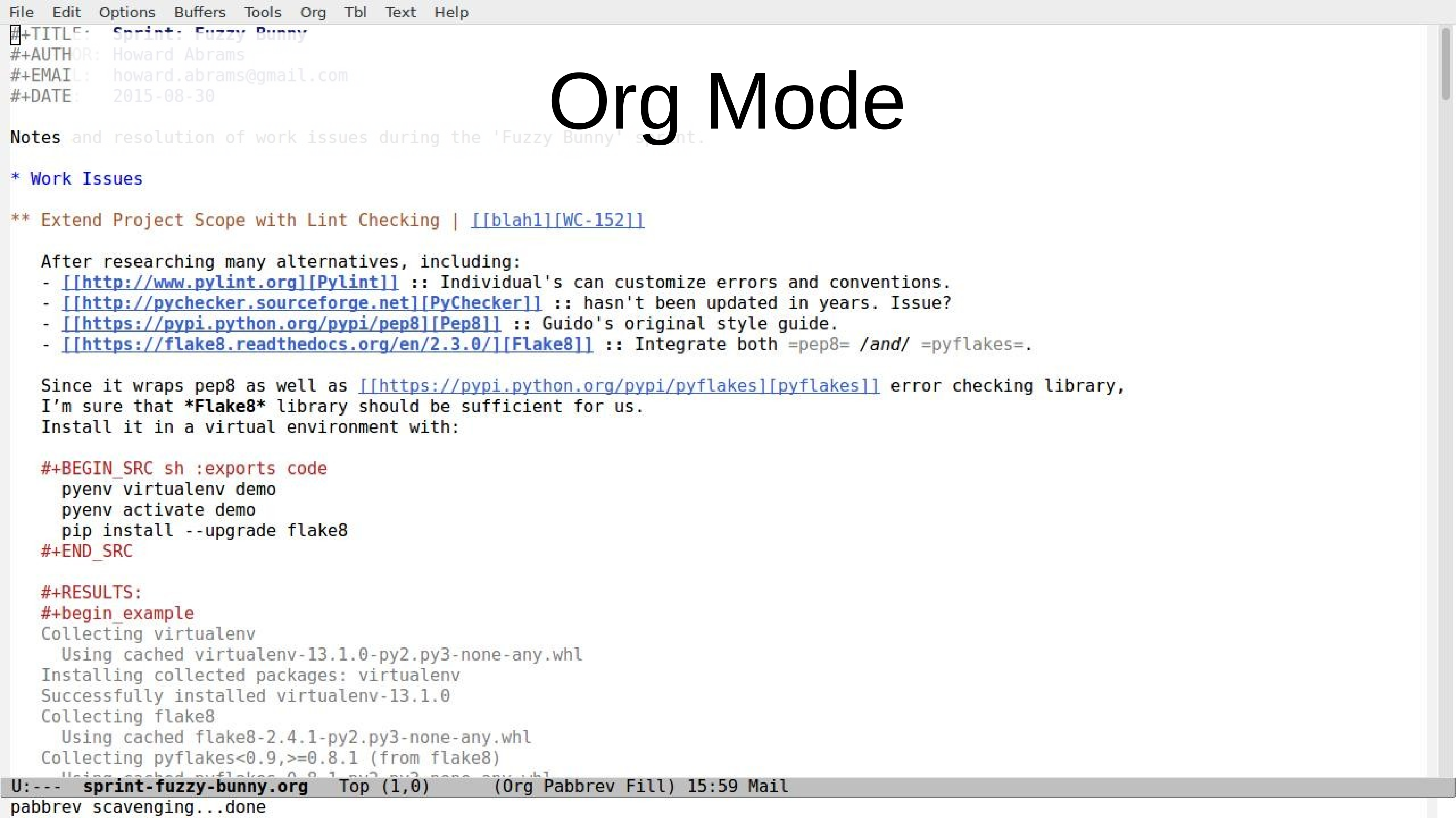
Notes and resolution of work issues during the 'Fuzzy Bunny' sprint.

* Work Issues...
** Extend Project Scope with Lint Checking | [[blah1][WC-152]]...
** Create a Setup File for Better Installation | [[blah1][WC-134]]...
*** Verify the Installable Archive...
** Set up a Chef Server for Deployment | [[blah1][WC-181]]...
*** Install Chef Binaries
*** Upload Cookbooks
*** Connect the Clients...
** Deploy the Project Application | [[blah1][WC-182]]...
*** Install Python Server...
*** Install Apache with WSGI...
** Create Local Dev Environment with Docker | [[blah1][WC-195]]...
* Meeting Notes...
* Daily Scrum Status...
* Sprint Demonstration...
* Notes for Next Sprint...

U:---  sprint-fuzzy-bunny.org   All (1,0)      (Org Pabbrev Fill) 15:59 Mail
pabbrev scavenging (734 words sprint-fuzzy-bunny.org buffer)...
```

Org Mode



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Notes and resolution of work issues during the 'Fuzzy Bunny' sprint.

* Work Issues

** Extend Project Scope with Lint Checking | [[blah1][WC-152]]

   After researching many alternatives, including:
   - [[http://www.pylint.org][Pylint]] :: Individual's can customize errors and conventions.
   - [[http://pychecker.sourceforge.net][PyChecker]] :: hasn't been updated in years. Issue?
   - [[https://pypi.python.org/pypi/pep8][Pep8]] :: Guido's original style guide.
   - [[https://flake8.readthedocs.org/en/2.3.0/][Flake8]] :: Integrate both =pep8= /and/ =pyflakes=.

   Since it wraps pep8 as well as [[https://pypi.python.org/pypi/pyflakes][pyflakes]] error checking library,
   I'm sure that *Flake8* library should be sufficient for us.
   Install it in a virtual environment with:

   #+BEGIN_SRC sh :exports code
     pyenv virtualenv demo
     pyenv activate demo
     pip install --upgrade flake8
   #+END_SRC

   #+RESULTS:
   #+begin_example
   Collecting virtualenv
     Using cached virtualenv-13.1.0-py2.py3-none-any.whl
   Installing collected packages: virtualenv
   Successfully installed virtualenv-13.1.0
   Collecting flake8
     Using cached flake8-2.4.1-py2.py3-none-any.whl
   Collecting pyflakes<0.9,>=0.8.1 (from flake8)
     Using cached pyflakes-0.8.1-py2.py3-none-any.whl
U:---  sprint-fuzzy-bunny.org   Top (1,0)     (Org Pabbrev Fill) 15:59 Mail
pabbrev scavenging...done
```

Advanced Features

- Remote shell access through ssh
- Remote file access through "tramp"
- Remote sudo

```
/ssh:bastion.example.com|ssh:server.example.com/var/www/index.html
```

ssh access | (piped through bastion) to file on server

Cross Platform

- Emacs: Linux, Windows, OSX, *BSD, ARM, …
- no X required, terminal
- non-interactive, command line exec

What is Literate Programming?

Code with comments:

```
  /* my comments */
  var my_code = "abc";
  /* my next comment */
```

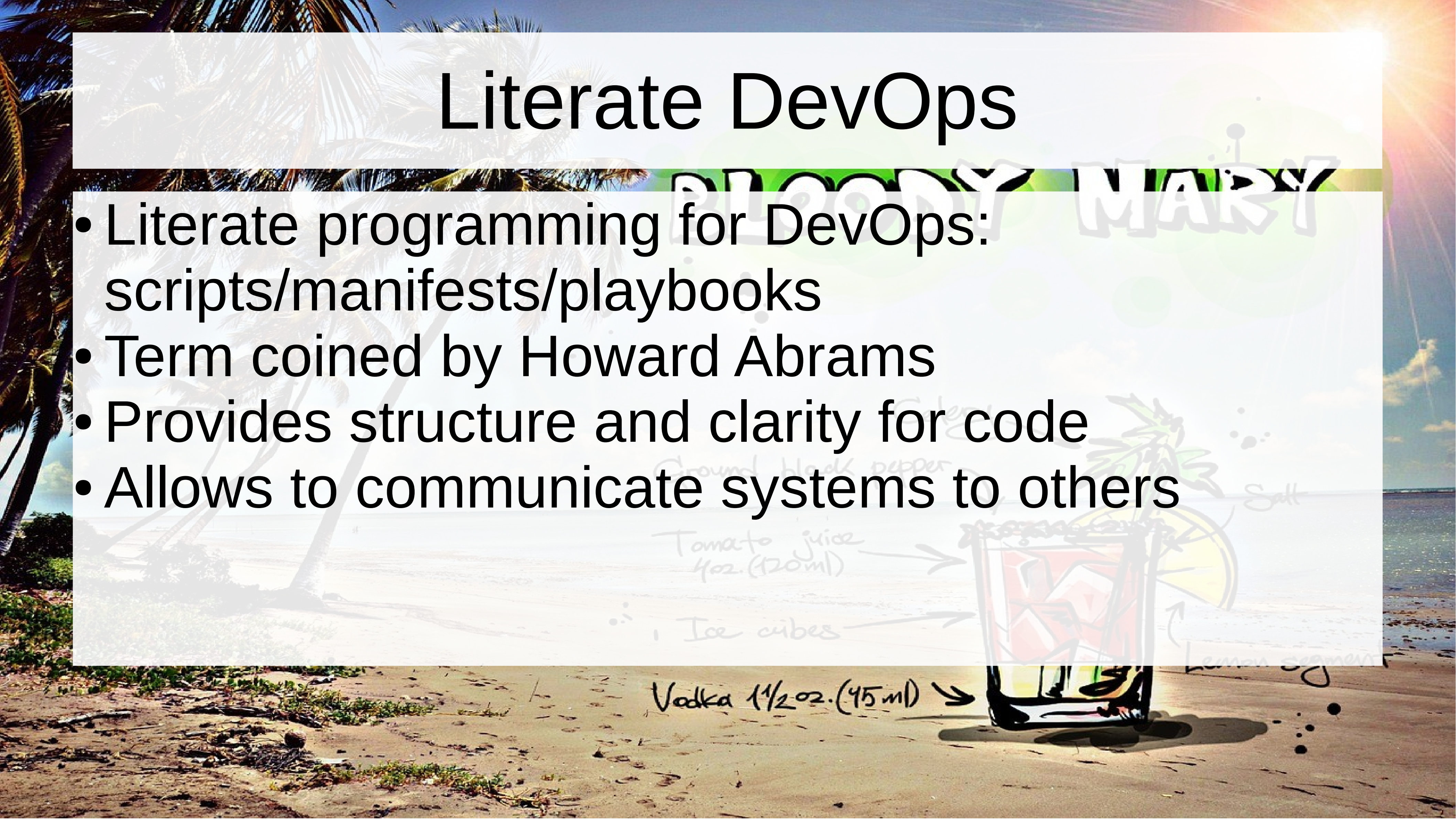
What is Literate Programming?

```
Code with comments:
#+BEGIN_SRC
  /* my comments */
  var my_code = "abc";
  /* my next comment */
#+END_SRC
```

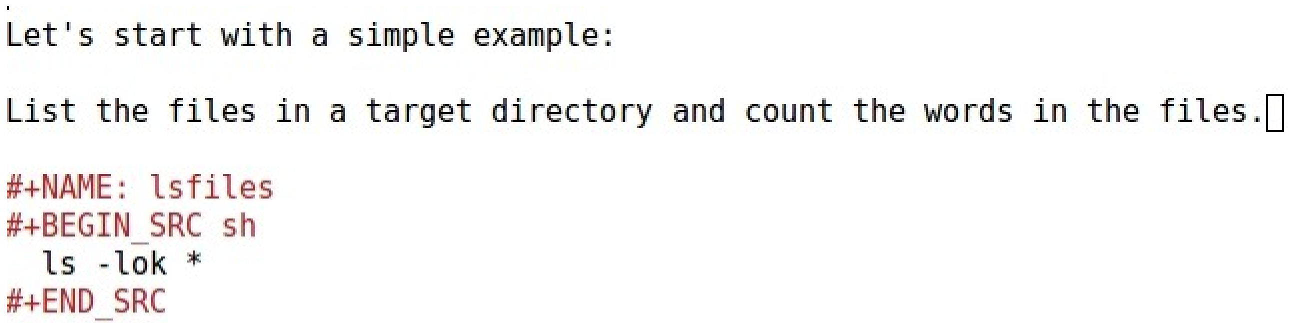
```
Documentation with code:
#+BEGIN_SRC
my comments
/* var my_code = "abc"; */
my next comment
#+END_SRC
```

Literate DevOps

- Literate programming for DevOps: scripts/manifests/playbooks
- Term coined by Howard Abrams
- Provides structure and clarity for code
- Allows to communicate systems to others



Example Document

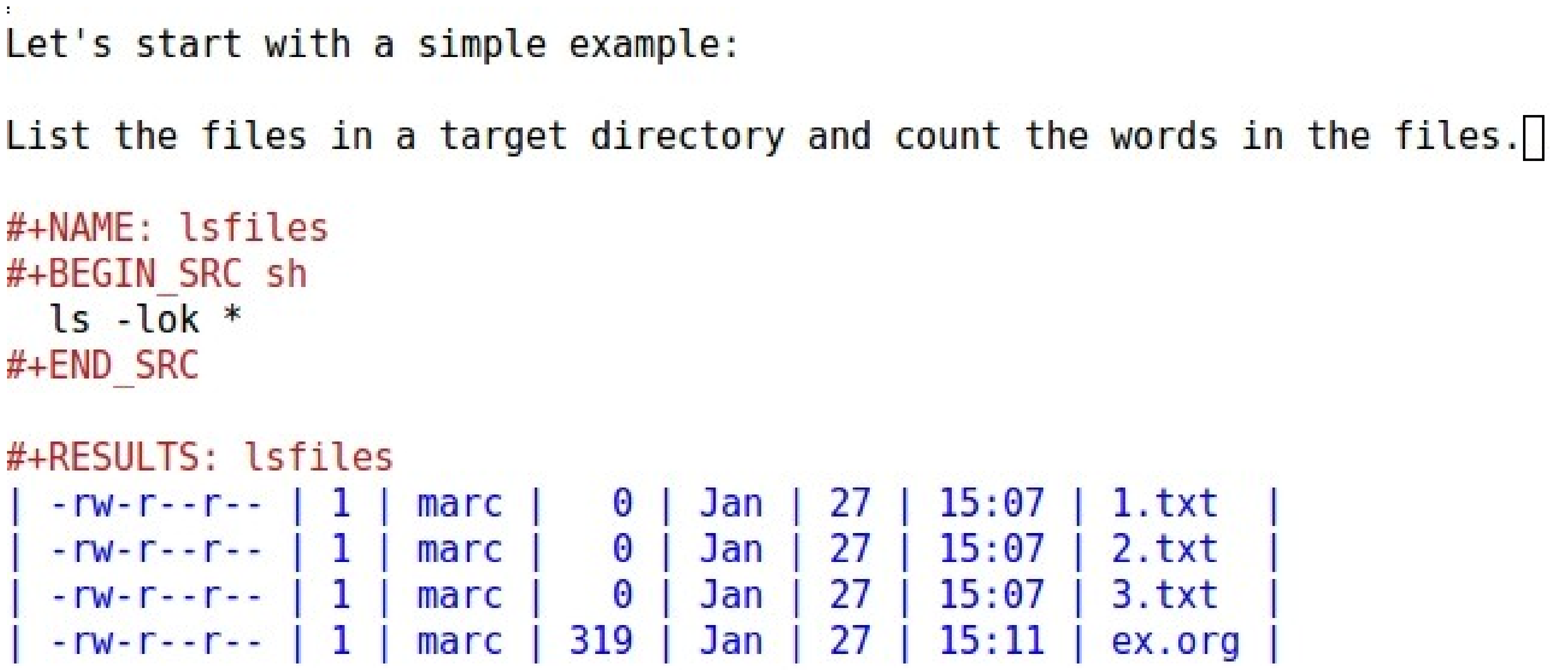


Let's start with a simple example:

List the files in a target directory and count the words in the files.

```
#+NAME: lsfiles
#+BEGIN_SRC sh
  ls -lok *
#+END_SRC
```

Example Document



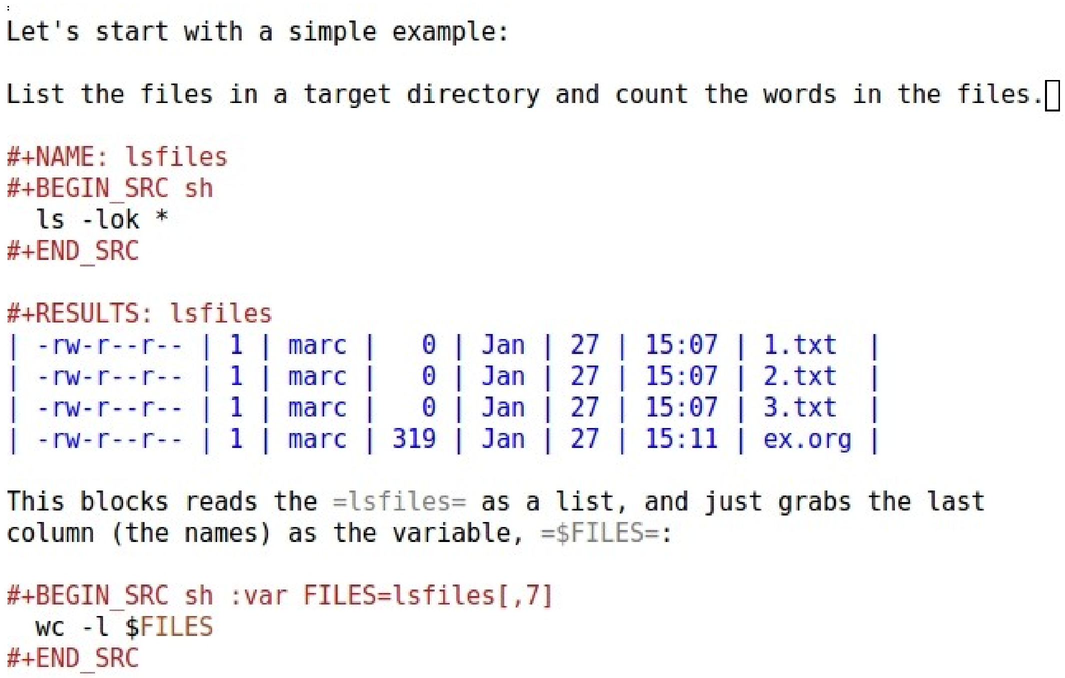
```
:
Let's start with a simple example:

List the files in a target directory and count the words in the files.

#+NAME: lsfiles
#+BEGIN_SRC sh
  ls -lok *
#+END_SRC

#+RESULTS: lsfiles
| -rw-r--r-- | 1 | marc |   0 | Jan | 27 | 15:07 | 1.txt  |
| -rw-r--r-- | 1 | marc |   0 | Jan | 27 | 15:07 | 2.txt  |
| -rw-r--r-- | 1 | marc |   0 | Jan | 27 | 15:07 | 3.txt  |
| -rw-r--r-- | 1 | marc | 319 | Jan | 27 | 15:11 | ex.org |
```

Example Document



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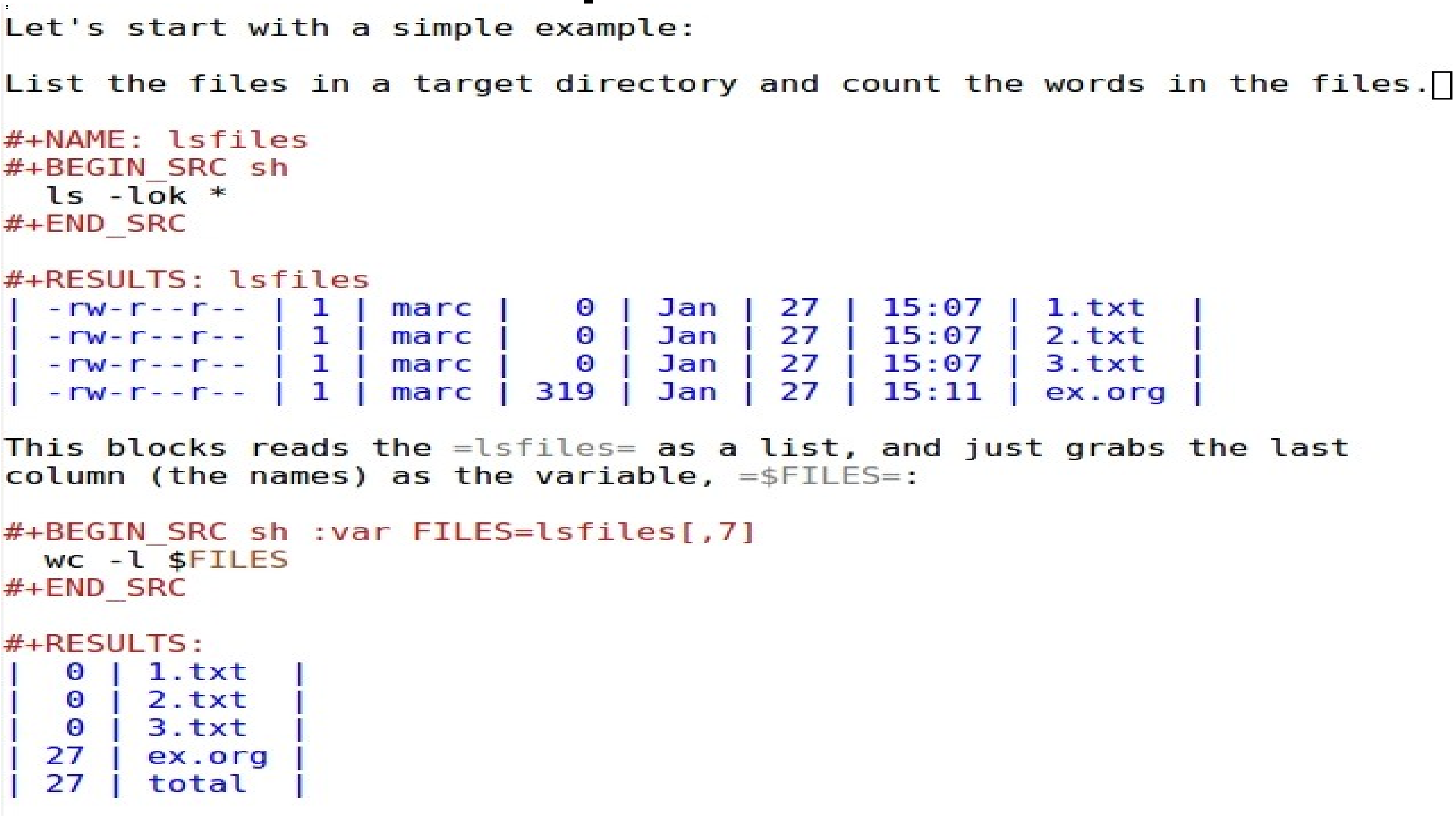
| -rw-r--r-- | 1 | marc |   0 | Jan | 27 | 15:07 | 3.txt  |
| -rw-r--r-- | 1 | marc | 319 | Jan | 27 | 15:11 | ex.org |

This blocks reads the =lsfiles= as a list, and just grabs the last
column (the names) as the variable, =$FILES=:

#+BEGIN_SRC sh :var FILES=lsfiles[,7]
  wc -l $FILES
#+END_SRC
```

Example Document



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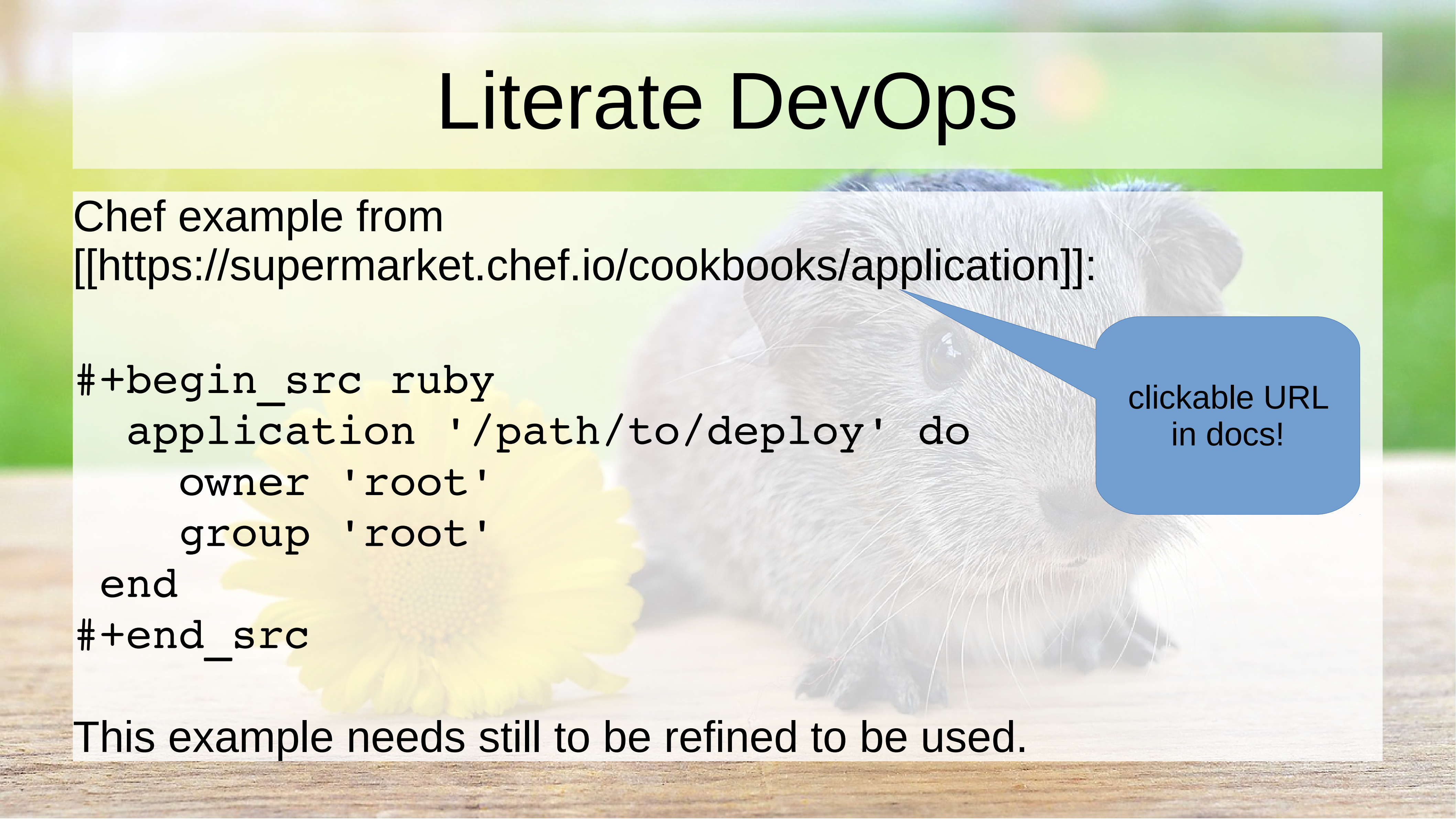
#+BEGIN_SRC sh :var FILES=lsfiles[,7]
  wc -l $FILES
#+END_SRC

#+RESULTS:
|  0 | 1.txt  |
|  0 | 2.txt  |
|  0 | 3.txt  |
| 27 | ex.org |
| 27 | total  |
```



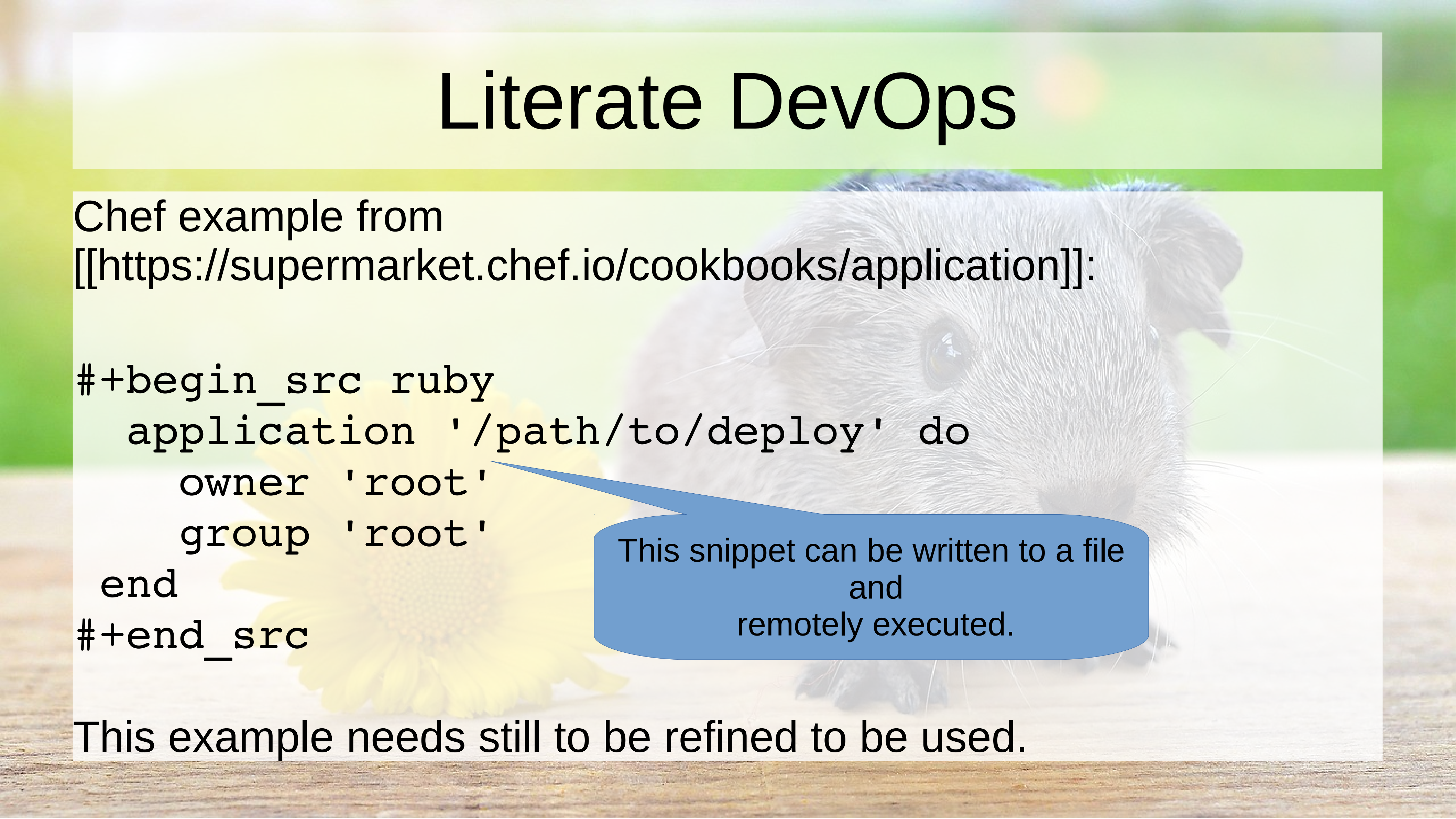
Literate DevOps

Chef example from
[[https://supermarket.chef.io/cookbooks/application]]:

```
#+begin_src ruby
  application '/path/to/deploy' do
    owner 'root'
    group 'root'
 end
#+end_src
```

clickable URL
in docs!

This example needs still to be refined to be used.



Literate DevOps

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  application '/path/to/deploy' do
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    group 'root'
 end
#+end_src
```

This snippet can be written to a file and
remotely executed.

This example needs still to be refined to be used.

Literate DevOps

Chef example from [[https://supermarket.chef.io/cookbooks/application]]:

declare source language here, ruby or puppet,...

```
#+begin_src ruby
  application '/path/to/deploy' do
    owner 'root'
    group 'root'
 end
#+end_src
```

This example needs still to be refined to be used.

Mix Chef with Terraform and apex

Org allows you to mix and match multiple languages and stacks:

- Terraform (manages DNS, network, VM's)
- Chef/Puppet/Ansible
- apex (Go, “capistrano” for AWS Lambda)

Use Case: Terraform / Vagrant

- set up Vagrant
- put Terraform into Vagrant
- set up cloud / AWS
- provision with Puppet / Chef

complicated, mix of tools

use Literate DevOps

Use Case: apex / Vagrant

- set up Vagrant
- put apex into Vagrant
- set up AWS Lambda
- set up storage

complicated, mix of tools

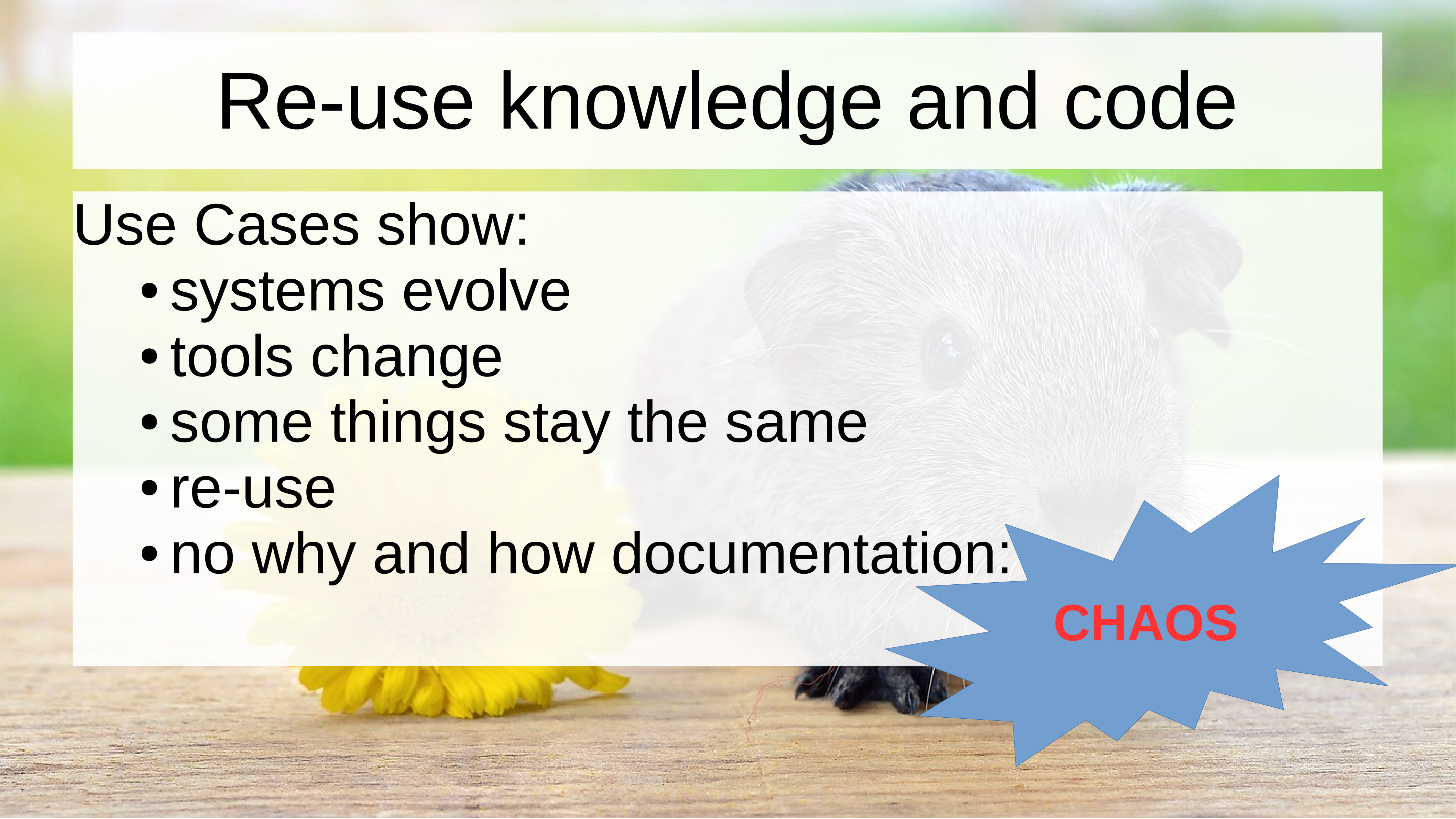
use Literate DevOps

Use Cases

- both use cases have commonalities (Vagrant)
- both install something into Vagrant (Terraform, apex)
- both do some setup (puppet, AWS Lambda)
- with LitDevOps smooth transition between use cases

switch of tooling

use Literate DevOps

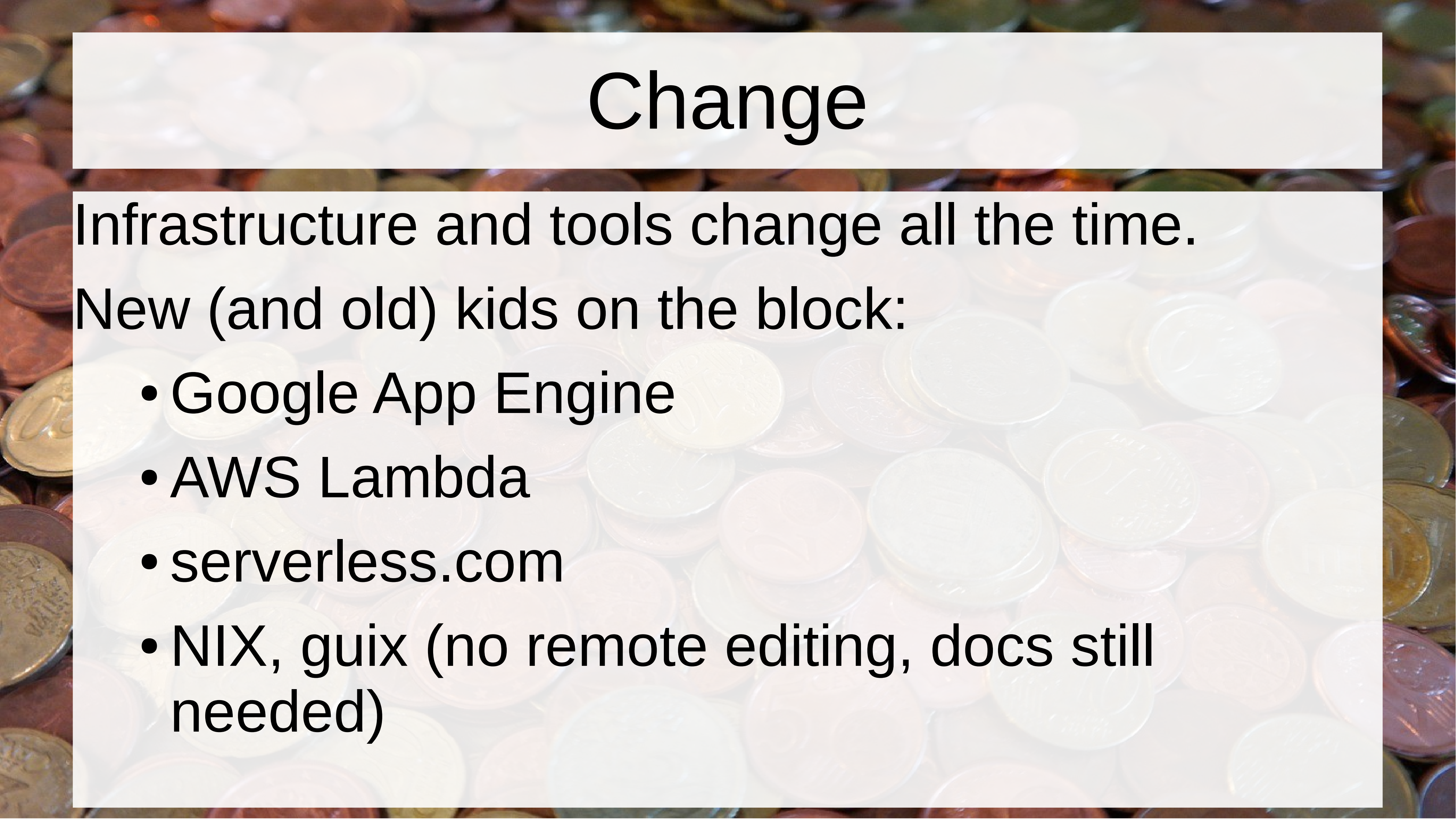


Re-use knowledge and code

Use Cases show:

- systems evolve
- tools change
- some things stay the same
- re-use
- no why and how documentation:

CHAOS



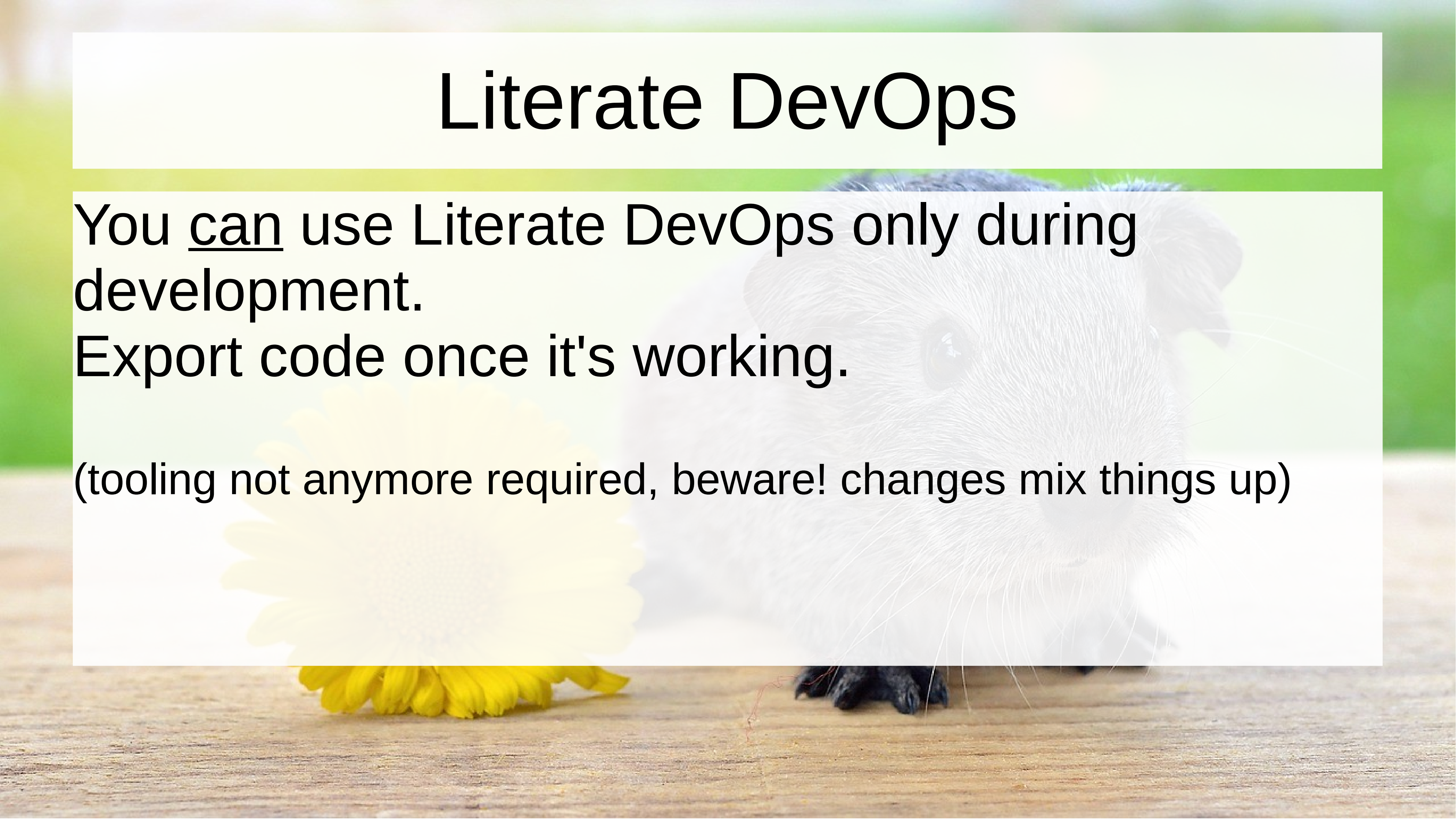
Change

Infrastructure and tools change all the time.

New (and old) kids on the block:

- Google App Engine
- AWS Lambda
- serverless.com
- NIX, guix (no remote editing, docs still needed)

Literate DevOps



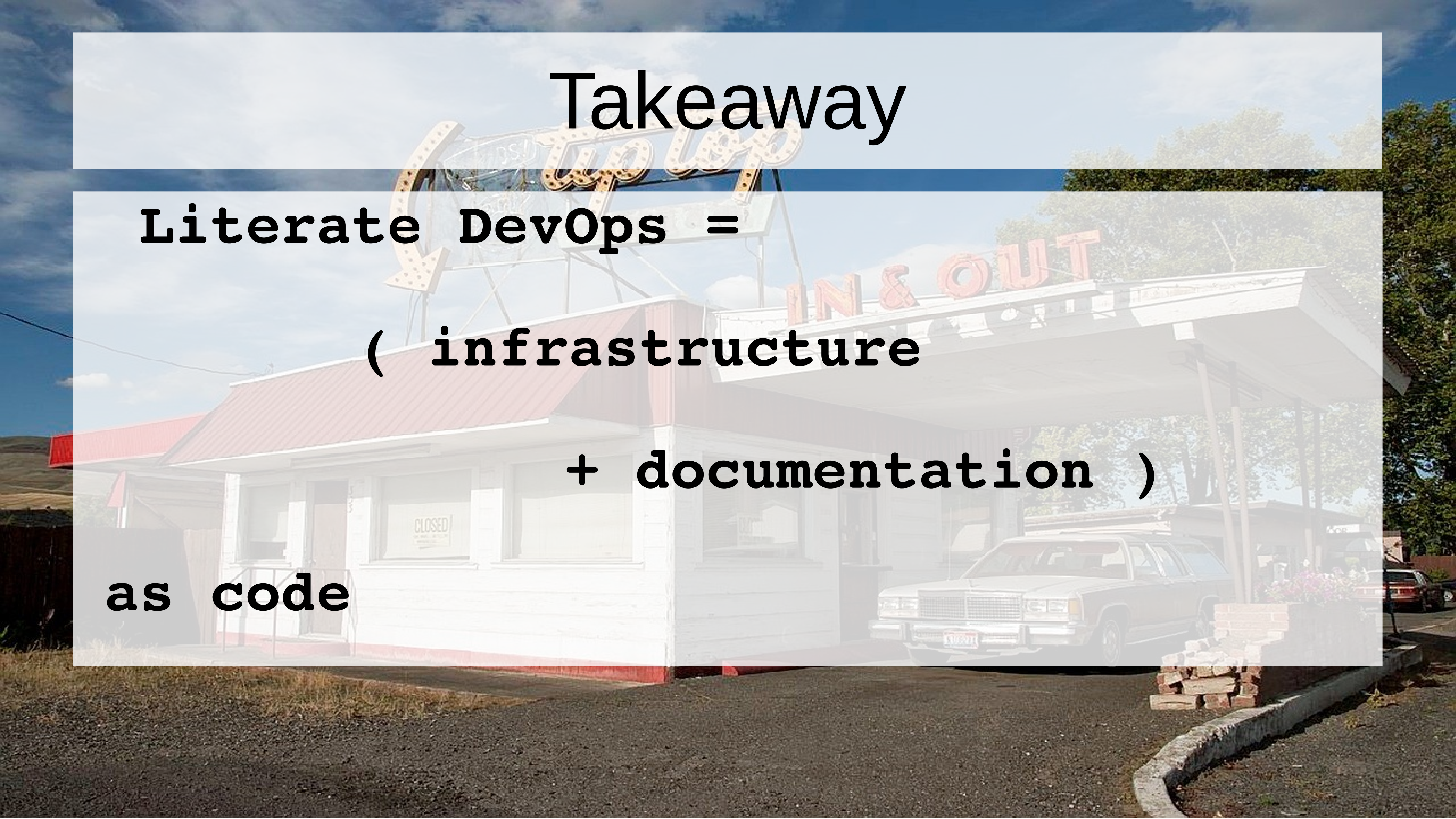
You can use Literate DevOps only during development.
Export code once it's working.

(tooling not anymore required, beware! changes mix things up)

Literate DevOps

maybe: DocOps

Takeaway



```
 Literate DevOps =

        ( infrastructure

              + documentation )

as code
```

Links

- https://en.wikipedia.org/wiki/Literate_programming
- http://howardism.org/Technical/Emacs/literate-devops.html
- http://h-rd.org/literate-devops
- http://orgmode.org

Literate DevOps

Slides at:

http://h-rd.org/literate-devops

Questions? I like to help, just ask the guy on the photo!

fosdem2016@h-rd.org