Developer's Toolkit - or things I wish someone had told me earlier...

LinuxDays Spotlight Course Fall 2016

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TheAlternative.ch
for a sustainable digital world

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Time Frame

- Block 1 (40 min)
  - Why CLI tools
  - Vim
  - Git
- Pause (5 min)
- Block 2 (40 min)
  - Build Tools (Java)
  - Misc
- Questions and Answers

Overview

Broad Topic

- Too much to talk about everything

Managing Expectations

- What this course is
  - An Overview
- What this course won't be
  - In depth...

Take Home Message

What we want you to take home from this course:

- It pays off to learn to use tools
- Automation is worth it

If You're Bored

- Handout
- Slides and Demo Examples:
  `https://github.com/hellerbarde/linuxdays-spotlight-fall2016`

IDEs

"Integrated Development Environments"

- Java: Eclipse, IntelliJ
- C/C++: Visual Studio, CLion
- C#: Visual Studio, MonoDevelop
- Aside: IDEs are good!

Features

- Refactoring Tools
- Autocompletion
- **Build Tools**

Build Tools

- From source code to releasable build
- Should be
  - Reproducible
  - Stable
  - Easy
  - Automated
- Why? (no, really, why? It's so much work...)

- Be in control
- Eliminate doubt

No IDE Available

- Languages without dedicated IDE
  - Haskell
  - Erlang
  - Elixir

Why?

- **Full** control
- Transparency
- Reproducibility
- Efficiency
- Consistency
- Wide application range

Full Control

- Reduces the magic
- You're not dependent on an IDE

Transparency

- Again, no magic.
- Greater learn effect

Reproducibility

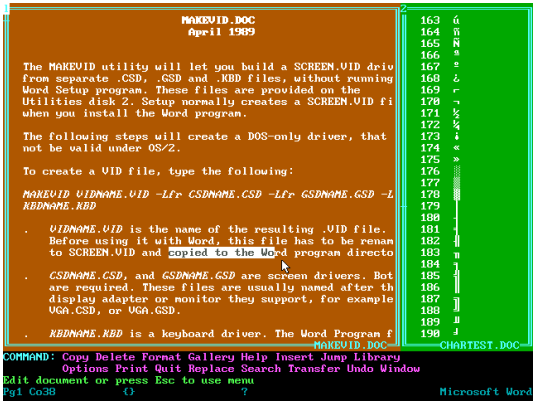
- Will your code work on **other** PCs?

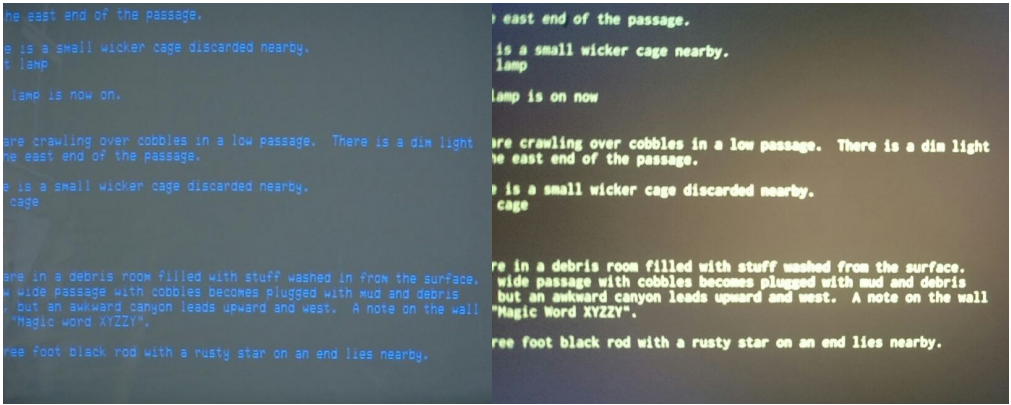
Efficiency

- Custom bash scripts
- Other shells (`zsh`, `fish`, ...)
- Great array of commands at your disposal

Consistency

- Bash is tried and true




he east end of the passage.
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lamp is now on.
are crawling over cobbles in a low passage. There is a dim light
he east end of the passage.
e is a small wicker cage discarded nearby.
cage
are in a debris room filled with stuff washed in from the surface.
w wide passage with cobbles becomes plugged with mud and debris
but an awkward canyon leads upward and west. A note on the wall
"Magic word XYZZY".
ree foot black rod with a rusty star on an end lies nearby.
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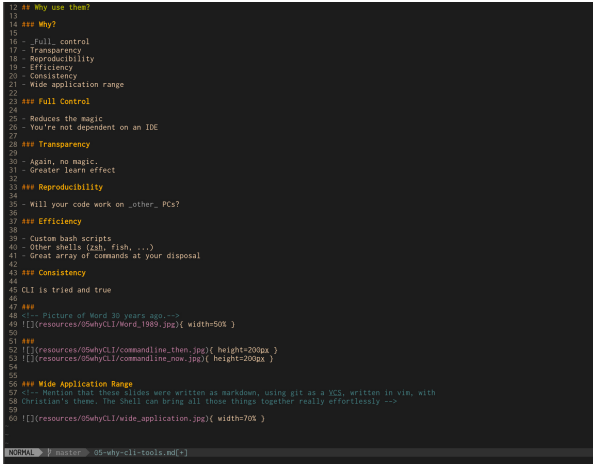
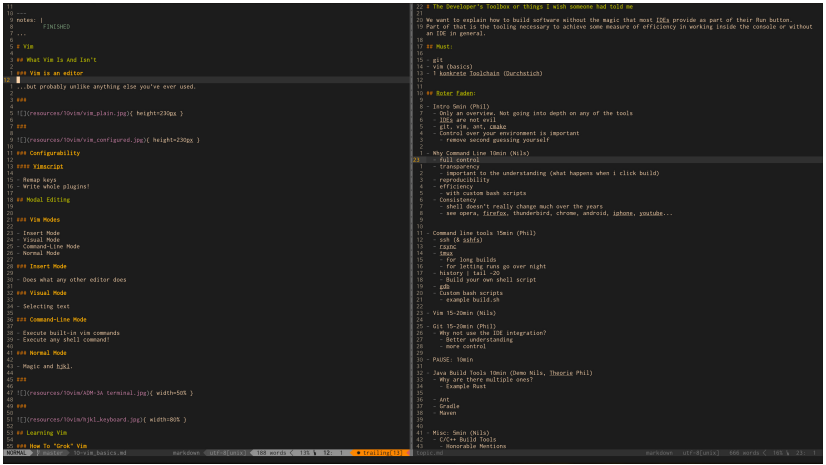
Wide Application Range




VIM - Vi IMproved
version 8.0.13
by Bram Moolenaar et al.
Vim is open source and freely distributable
Sponsor Vim development!
type :help sponsor<Enter> for information
type :q<Enter> to exit
type :help<Enter> or <F1> for on-line help
type :help version8<Enter> for version info
Running in Vi compatible mode
type :set nocp<Enter> for Vim defaults
type :help cp-default<Enter> for info on this

What Vim Is And Isn't



Vim is an editor

- Extremely powerful
- Unlike anything you've ever used

Configurability

Themes

- Gruvbox, Molokai, Jellybeans, Badwolf, Solarized, Dracula, ...
- `http://vimcolors.com/`

Vimscript

- Remap keys
- Write whole plugins!

Vim Modes

- Insert Mode
- Visual Mode
- Command-Line Mode
- Normal Mode

Insert Mode

- Does what any other editor does

Visual Mode

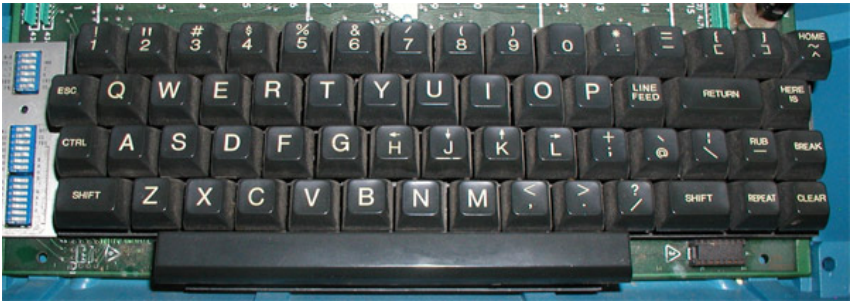
- Selecting text

Command-Line Mode

- Execute built-in vim commands
- Execute any shell command!

Normal Mode

- Wizardry and hjkl


ESC
CTRL
SHIFT
LINE FEED
RETURN
HERE IS
HOME
RUB
BREAK
SHIFT
REPEAT
CLEAR

How To "Grok" Vim

Some basic vim terminology

- Verbs
- Motions
- Objects

Vimtutor

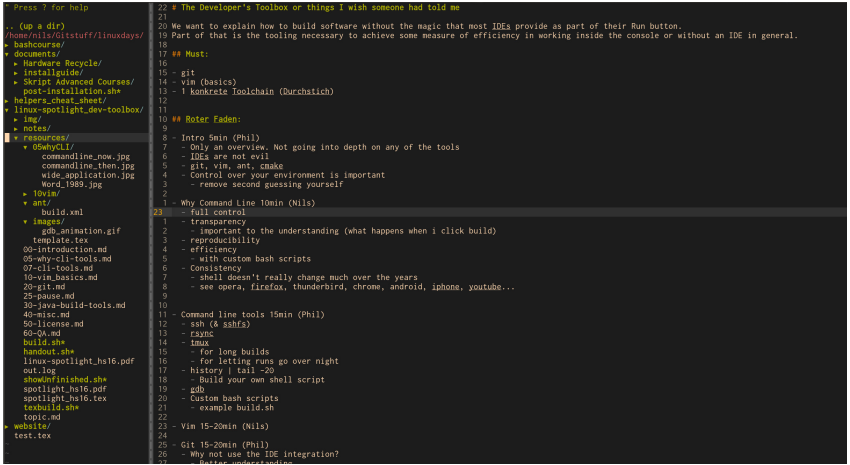
Productivity Tips

- Unmap the arrow keys.
- Learn something new from time to time.
- Actively try to improve your editing.
- Watch some talks online: "Write Code Faster: Expert-Level Vim"
- Book: Practical Vim
- Youtube: Thoughtbot
- http://vimcasts.org

Vim Is not an IDE

- But it can be. (Almost)

NERDTree



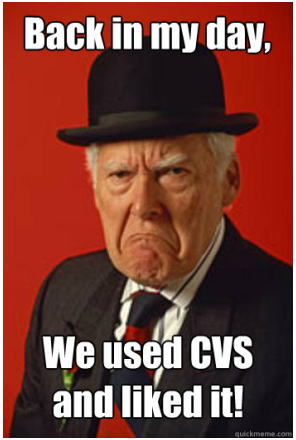
Some more:

- Commenter
- Surround
- Easymotion
- http://vimawesome.com/

Version Control Systems

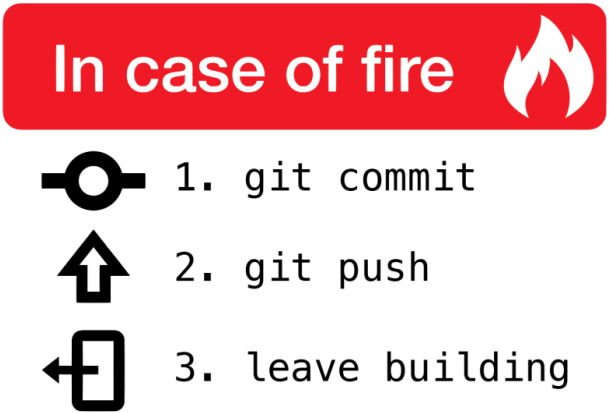
- Version Control System (VCS)
  - Keeps old versions
  - Centralized “Master” copy
  - Ability to record a reason for a change
- Why?
  - See above!

CVS



SVN

Git



History

- First release 11 years ago
- Built for large codebases
  - Linux Kernel (Millions of lines)
- Works well for small projects too
  - Your programming exercises ;)
- **Stigma of complexity**

Questions

- Who has heard of Git? (before today)
- Who used Git before?
- Who was forced to use Git?
- Who feels comfortable with it?
- Why not? 😄
- Who thinks it's black magic?

While we're on the topic...

Complexity

- Single-user version control is hard...
  - Manage Versions
  - Record Changes

- Multi-user version control is really hard!
  - Conflict resolution
  - Branching
  - Sharing

Stop! Story Time

- Demo our repository with
  - Command line
  - git cola

Recommendations

- `tig`
- `git cola`

- Quick Break. Back in 5 minutes.
- Find the slides and the demo examples here:
  `https://github.com/hellerbarde/linuxdays-spotlight-fall2016`

Overview of Build Tools

Compile, Test and Run

- ant
- make
- Custom Shell Scripts

Also find libraries

- cmake (C/C++)

Also download missing libraries

- maven
- gradle

Common Ground

- Help **you** with building software

Why Do You Need Automation

- Time
- Consistency
- Reliability

Story Time

Misc General Tools

- ssh (see Sandro's courses)
- rsync
- tmux
- "Terminal Multiplexer"
- For long builds
- pandoc with custom bash scripts!

```
# nils@Velociraptor: ~/Gitstuff/linuxdays/linux-spotlight_dev-toolbox <master ✘ [*]>
ζ cat build.sh
#!/bin/bash

if [[ -n $1 ]]; then
        pandoc --template="resources/template.tex" -t beamer "$1" -o "${1%.md}.pdf"
else
        pandoc --template="resources/template.tex" -f markdown -t beamer [0-9][0-9]-*.md -o "linux-spotlight_hs16.pdf"
fi
```

Misc Build tools

- C/C++ build tools:
  - autoconf
  - cmake
  - makefiles
  - unit test runner
- Debuggers:
  - gdb
  - Valgrind

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- Emoji provided free by http://emojione.com

Questions?

- Is anything still unclear?
- Additional information needed?
- **Ask now!**

Where to find these Slides

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