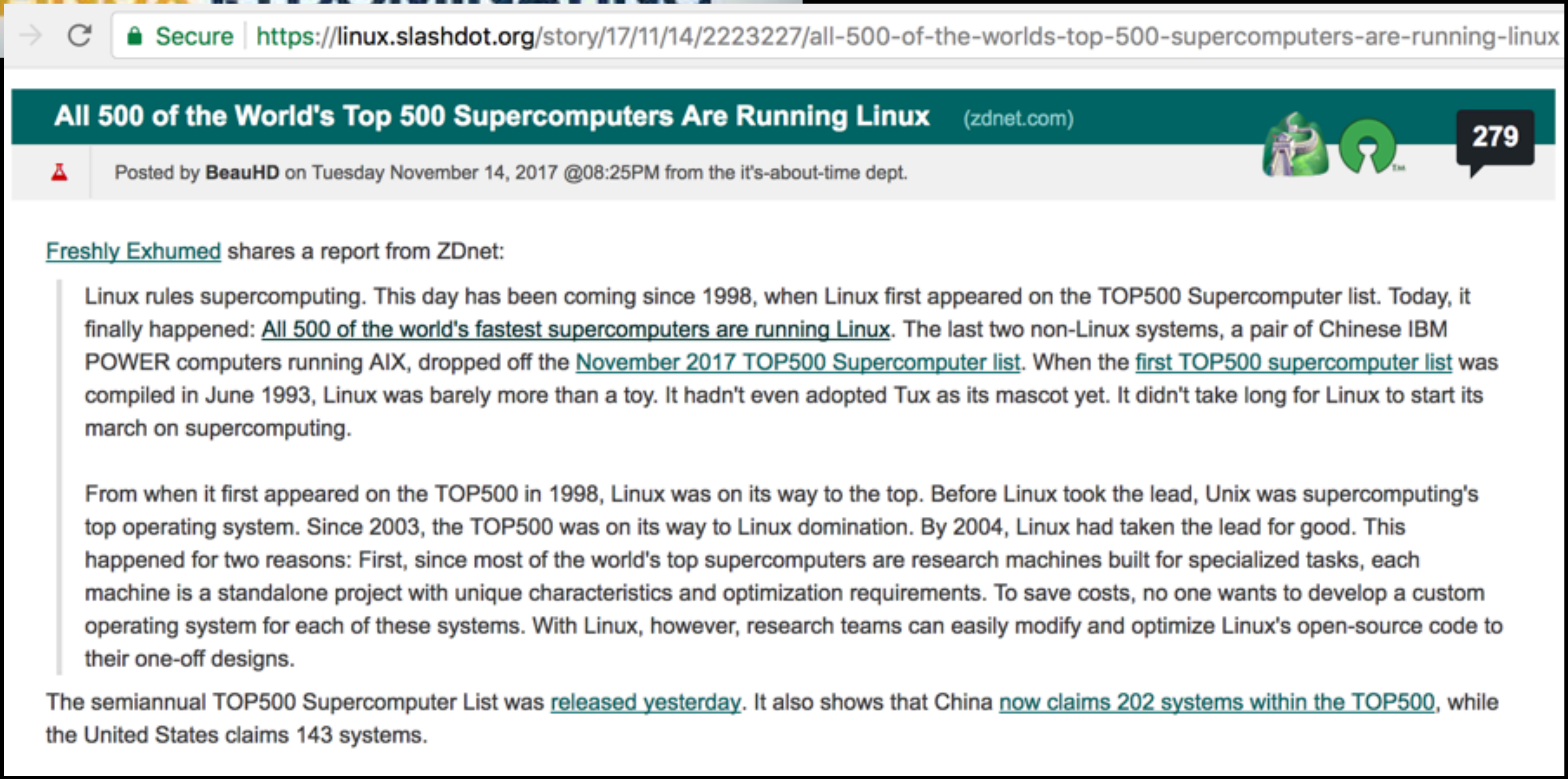
Exploring "Complex" World of Software Development

Workshop TI Unila - 18 Nov 2017

Agenda

- Operating System: **Linux**
- Text Editor: **Emacs**
- Programming Language: **Clojure & ClojureScript**
- Front End Framework: **React & React Native**

Linux


Secure
https://linux.slashdot.org/story/17/11/14/2223227/all-500-of-the-worlds-top-500-supercomputers-are-running-linux
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All 500 of the World's Top 500 Supercomputers Are Running Linux (zdnet.com)

Posted by **BeauHD** on Tuesday November 14, 2017 @08:25PM from the it's-about-time dept.

Freshly Exhumed shares a report from ZDnet:

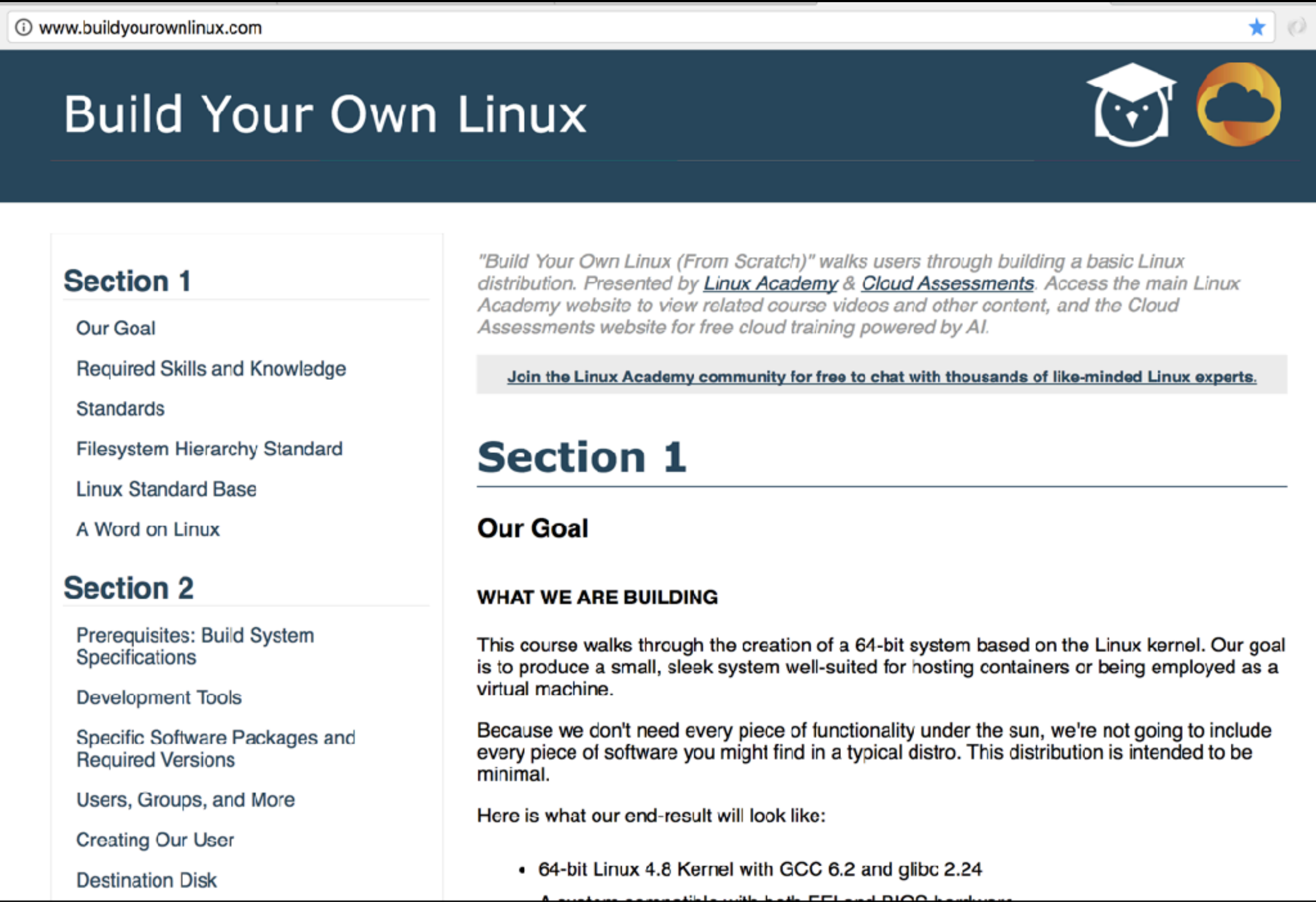
> Linux rules supercomputing. This day has been coming since 1998, when Linux first appeared on the TOP500 Supercomputer list. Today, it finally happened: All 500 of the world's fastest supercomputers are running Linux. The last two non-Linux systems, a pair of Chinese IBM POWER computers running AIX, dropped off the November 2017 TOP500 Supercomputer list. When the first TOP500 supercomputer list was compiled in June 1993, Linux was barely more than a toy. It hadn't even adopted Tux as its mascot yet. It didn't take long for Linux to start its march on supercomputing.
>
> From when it first appeared on the TOP500 in 1998, Linux was on its way to the top. Before Linux took the lead, Unix was supercomputing's top operating system. Since 2003, the TOP500 was on its way to Linux domination. By 2004, Linux had taken the lead for good. This happened for two reasons: First, since most of the world's top supercomputers are research machines built for specialized tasks, each machine is a standalone project with unique characteristics and optimization requirements. To save costs, no one wants to develop a custom operating system for each of these systems. With Linux, however, research teams can easily modify and optimize Linux's open-source code to their one-off designs.

The semiannual TOP500 Supercomputer List was released yesterday. It also shows that China now claims 202 systems within the TOP500, while the United States claims 143 systems.

```
git clone https://github.com/torvalds/linux
cd linux
git log --pretty=oneline
```

```
yum groupinstall "Development Tools"
yum install ncurses-devel
yum install qt-devel
yum install unifdef

cd /usr/src/kernels/*
make modules install
make install
```



Build Your Own Linux

"Build Your Own Linux (From Scratch)" walks users through building a basic Linux distribution. Presented by Linux Academy & Cloud Assessments. Access the main Linux Academy website to view related course videos and other content, and the Cloud Assessments website for free cloud training powered by AI.

Join the Linux Academy community for free to chat with thousands of like-minded Linux experts.

Section 1

Our Goal

WHAT WE ARE BUILDING

This course walks through the creation of a 64-bit system based on the Linux kernel. Our goal is to produce a small, sleek system well-suited for hosting containers or being employed as a virtual machine.

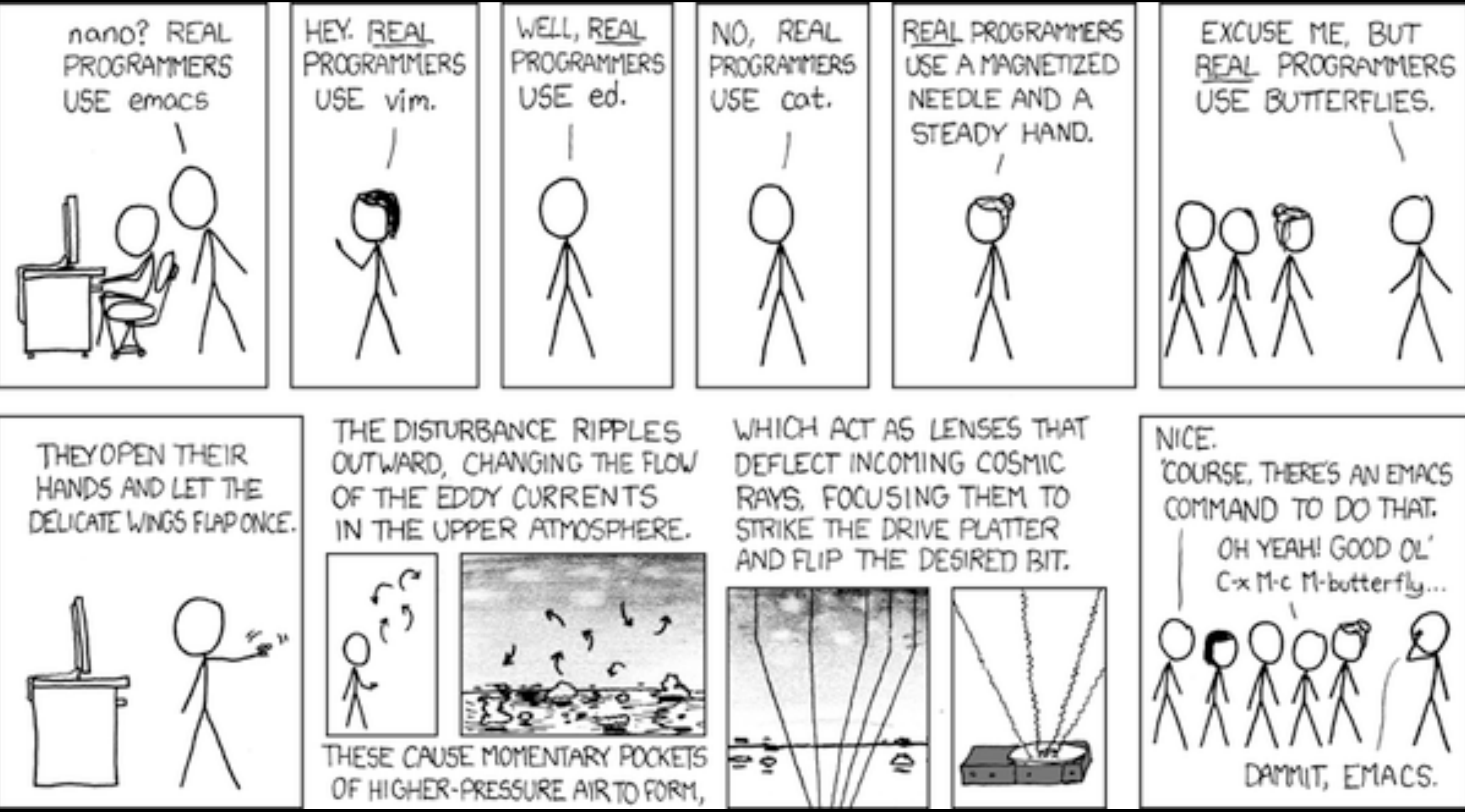
Because we don't need every piece of functionality under the sun, we're not going to include every piece of software you might find in a typical distro. This distribution is intended to be minimal.

Here is what our end-result will look like:

- 64-bit Linux 4.8 Kernel with GCC 6.2 and glibc 2.24
- A system compatible with both EFI and BIOS hardware

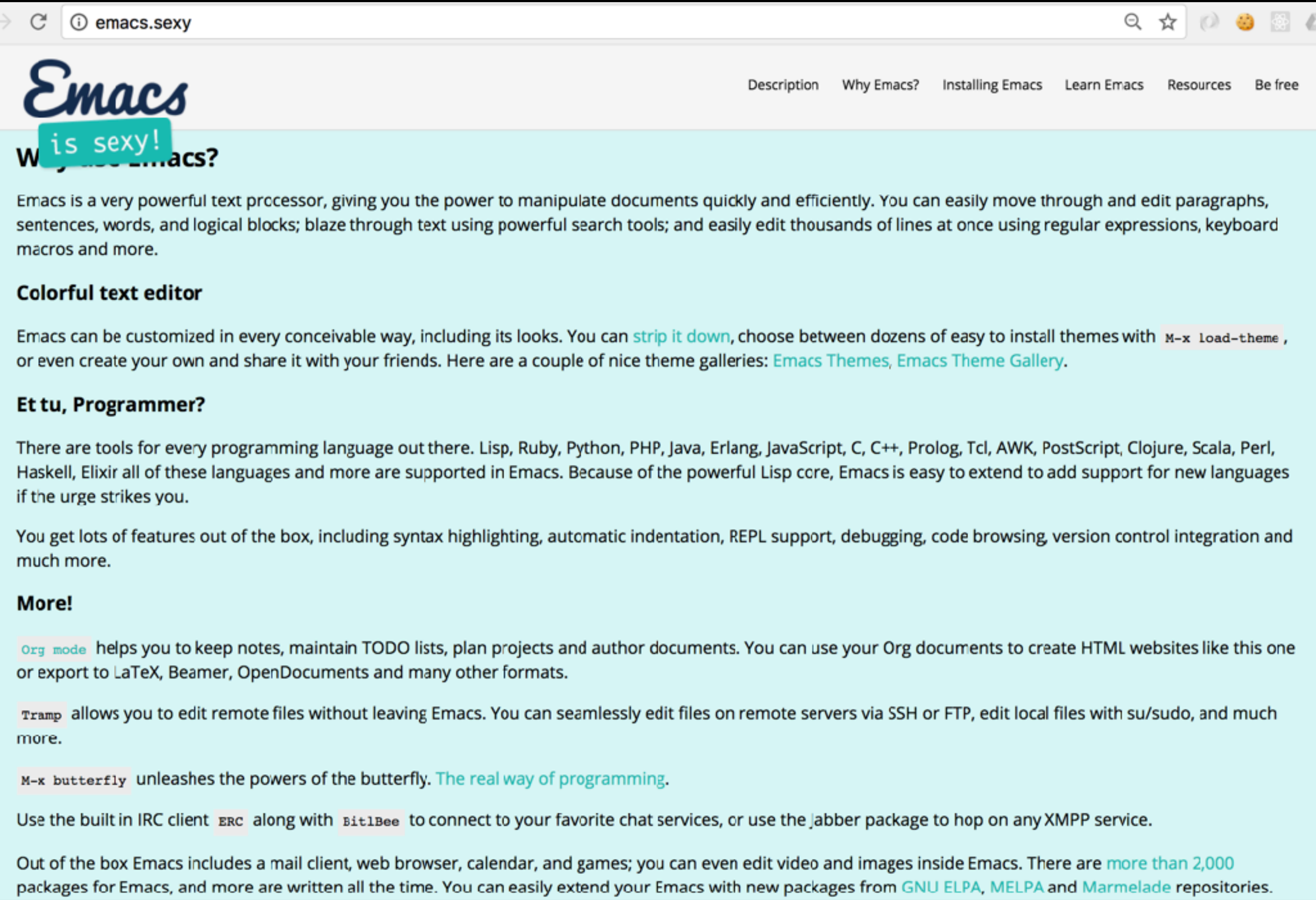
Demo: Linux Install with VirtualBox

The highly extensible text editor: **Emacs**


nano? REAL PROGRAMMERS USE emacs
HEY. REAL PROGRAMMERS USE vim.
WELL, REAL PROGRAMMERS USE ed.
NO, REAL PROGRAMMERS USE cat.
REAL PROGRAMMERS USE A MAGNETIZED NEEDLE AND A STEADY HAND.
EXCUSE ME, BUT REAL PROGRAMMERS USE BUTTERFLIES.
THEY OPEN THEIR HANDS AND LET THE DELICATE WINGS FLAP ONCE.
THE DISTURBANCE RIPPLES OUTWARD, CHANGING THE FLOW OF THE EDDY CURRENTS IN THE UPPER ATMOSPHERE.
THESE CAUSE MOMENTARY POCKETS OF HIGHER-PRESSURE AIR TO FORM,
WHICH ACT AS LENSES THAT DEFLECT INCOMING COSMIC RAYS, FOCUSING THEM TO STRIKE THE DRIVE PLATTER AND FLIP THE DESIRED BIT.
NICE.
'COURSE, THERE'S AN EMACS COMMAND TO DO THAT.
OH YEAH! GOOD OL' C-x M-c M-butterfly...
DAMMIT, EMACS.

5 Minute Emacs Basic Demo

- Creating your first ever file with Emacs
- Open file: C-x C-f
- Buffer
- Its all about eLisp function all the way down



Why use Emacs?

Emacs is a very powerful text processor, giving you the power to manipulate documents quickly and efficiently. You can easily move through and edit paragraphs, sentences, words, and logical blocks; blaze through text using powerful search tools; and easily edit thousands of lines at once using regular expressions, keyboard macros and more.

Colorful text editor

Emacs can be customized in every conceivable way, including its looks. You can strip it down, choose between dozens of easy to install themes with `M-x load-theme`, or even create your own and share it with your friends. Here are a couple of nice theme galleries: Emacs Themes, Emacs Theme Gallery.

Et tu, Programmer?

There are tools for every programming language out there. Lisp, Ruby, Python, PHP, Java, Erlang, JavaScript, C, C++, Prolog, Tcl, AWK, PostScript, Clojure, Scala, Perl, Haskell, Elixir all of these languages and more are supported in Emacs. Because of the powerful Lisp core, Emacs is easy to extend to add support for new languages if the urge strikes you.

You get lots of features out of the box, including syntax highlighting, automatic indentation, REPL support, debugging, code browsing, version control integration and much more.

More!

`Org mode` helps you to keep notes, maintain TODO lists, plan projects and author documents. You can use your Org documents to create HTML websites like this one or export to LaTeX, Beamer, OpenDocuments and many other formats.

`Tramp` allows you to edit remote files without leaving Emacs. You can seamlessly edit files on remote servers via SSH or FTP, edit local files with su/sudo, and much more.

`M-x butterfly` unleashes the powers of the butterfly. The real way of programming.

Use the built in IRC client `ERC` along with `BitlBee` to connect to your favorite chat services, or use the Jabber package to hop on any XMPP service.

Out of the box Emacs includes a mail client, web browser, calendar, and games; you can even edit video and images inside Emacs. There are more than 2,000 packages for Emacs, and more are written all the time. You can easily extend your Emacs with new packages from GNU ELPA, MELPA and Marmelade repositories.

HOW TO LEARN EMACS

a beginner's guide to Emacs 24 or later · http://j.mp/beginemacs
Sacha Chua (@sachac) LivingAnAwesomeLife.com

? Questions? I'd love to hear from you!

May 17 2013

If you're a developer or sysad...

Learn Vim

→ the other text editor

Seriously. Learn the basics so that you can easily work on other people's computers. If you know your way around Vim, people won't give you as much grief over Emacs.

Here's what you need to know:
i insert mode ↔ <Esc> command mode
:vimtutor
:w write/save file
:q quit
:q! really quit

★ are you a long-time vi user trying out Emacs? Check out Evil (www.search for "Evil Emacs")?

Emacs? I'm never installing that on my server.

vi

★ You can actually edit remote files in Emacs without installing Emacs on the other computer but that's an intermediate topic. (see TRAMP)

server ✓ ssh/ftp x emacs
✓ emacs

Okay. Once you know the basics of vim, you can get on with learning Emacs. ☺

Why learn Emacs?
→ customizable
→ endless room for growth

Learn the terms

Why are Emacs terms so weird? It's because Emacs has been around for a very long time, and it's hard to change the way things are called. Don't worry, you'll get used to it.

This will help you read documentation.

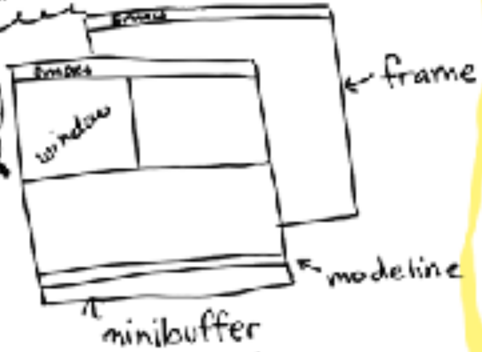
Reading Keyboard shortcuts:

C-x C-s → press Ctrl+x, then Ctrl+s

C = Control Key, C = Control key

↳ you can keep Ctrl pressed, then press X and then S

I use a mix of beginner-friendly and Emacs-standard terms in this guide.



You'll also see keyboard shortcuts like:

M-x → Press Alt+x (or ⌘x)
M = Meta key (alt/⌘)

★ This lets you execute commands by name. (even better with M-x icomplete-mode)

★ alternatively, you can replace M-... with <Esc>... (ex: press Esc, then press x)

★ Press <Tab> at a prompt to see options.

RET → Return/Enter key

Windows show buffers, which could be:
- a file
- a process
- info not associated with a file

Learn how to learn more

Inside Emacs:

C-h t Tutorial
C-h i Info manual
C-h k <Keyboard shortcut> (works with menus too) Describes a shortcut
C-h a Searches commands
C-h w <command> Shows shortcut
C-h m Describe current modes
C-h C-h Help on help
C-h f Describe a function (by name)

Check out the menus

On the web:
EmacsWiki.org
planet.emacsen.org
stackoverflow.com
reddit.com/r/emacs
& more!

Like IRC? Check out #emacs on irc.freenode.net
↳ folks are wonderful and helped me put this together!

Learn Emacs basics

C-x C-f open/visit a file
C-x C-s save/write a file
C-x C-c quit ★ Note: You don't need to quit Emacs after each file. Just use C-x C-f to open the next one.

How to select text:
← Go to the start and press C-SPC (Ctrl+space) to set the mark (the beginning)
← Go to the end and run your command. (Ex: C-w is "kill", which actually cuts the text.)

Text editing
C-/ undo (need to redo? just do something unrelated, then undo the undo) ↳ even better with undo tree
C-w kill/cut
C-y yank/paste → learn about the kill ring
M-x replace-string RET

★ Learn how to use Keyboard macros. They're awesome.
C-x (start macro
C-x) end macro
C-x e execute macro
e... ...again

... and more!

Buffer & window management
C-x b switch buffer → even better with M-x ido-mode
C-x 2 split ☰
C-x 3 split ◫
C-x o other window
C-x 0 get rid of current window
C-x 1 get rid of other windows

Navigation & search
M-g M-g go to line (hold Alt/⌘ and then press g twice)
C-s Interactive search
C-r Interactive search backward
M-> End of buffer
M-< Beginning of buffer
M-x occur RET Find lines

Extend & customize

M-x load-theme RET
Try out color themes → use tab to see the list and list-packages to add more
M-x customize-group RET
set common options
M-x customize-face RET
change background, foreground, etc.

M-x list-packages RET
install lots of modules... → want a prettier Emacs? Check out color themes. (lots of people use color themes)

and then...

editing your ~/.emacs file!

initializes your Emacs, adds new functionality, and so on.

see emacswiki.org for lots of examples

Use M-x eval-buffer or restart Emacs to see the changes.

Broke your Emacs config? emacs -q skips ~/.emacs

Other good things to learn

Org-mode.org
organize your life in plain text

Narrowing/Widening
focus

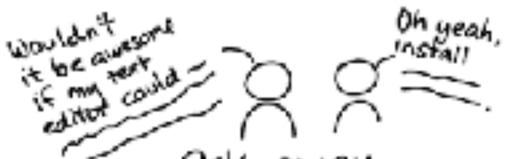
Calc
powerful calculator and converter

Eshell / Term
command-line in Emacs

TRAMP
remote access

Writing & debugging → edebug
Emacs Lisp
(it sounds scary, but it's powerful ☺)

There's so much more!



ask away, and discover more by exploring!

Sacha Chua

Clojure

JDK & Leiningen

- xdg-open http://www.oracle.com/technetwork/java/javase/downloads/index.html
- xdg-open https://leiningen.org/#install

Simple Made Easy.

A modern Lisp for **functional programming** + symbiotic with the established Java Platform + designed for concurrency

Imperative
(Procedural, OOP)
vs
Functional

Imperative:

- Encapsulation
- Inheritance
- Polymorphism

Functional:

- Lambda Calculus
- Higher Order Function
- Immutability
- No side-effects

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Demo: Clojure REPL

ClojureScript

Demo: `Cljs REPL`

React & React Native

Demo: Cljs RUM