Vim Internals

A Gentle Introduction

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Slides: https://bit.ly/340on6i
Files: https://bit.ly/2VvzD7k

The Roadmap

- Why Vim?
- Going to the source.
- Fixing a “high-level” bug! (VimL)
- Fixing a “low-level” bug! (C)
- Where to?

Part I: Why Vim?

Greetings…


```c
#include <stdio.h>


int main(void) {

  printf("Hello, World!\n");
}
```

Greetings…


```
public class Hello {

   public static void main(String[] args) {

      System.out.println("Hello, World!");
   }
}
```

Greetings…

```
#include <stdio.h>


int main(void) {

  printf("Hello, World!\n");
}
```

Greetings…


```
ssize_t write(int fd, const void *buf, size_t count);
```

It’s turtles all the way down.

Why Vim?

- Vim is forever. Well, at least ***since 1976***.

  https://www.youtube.com/watch?v=VADudzQGvU8 (1:08:44)

- Vim allows you to ***achieve mastery***.

  https://www.youtube.com/watch?v=1qLstQV2j8w (6:40)

- Vim demands that you ***grok the toolchain***.
- Vim is ***free!***

Part II: Going to the source.

You will need:

QUOIN

- The ***repository***.

```
$ git clone https://github.com/vim/vim.git
```

- Some ***packages***.

```
$ sudo apt install gcc libncurses-dev \
    python3-dev xorg-dev
```

- Or… some packages the ***easy way***!

```
$ sudo apt build-dep vim
```

You will need to run:


```
$ cd vim/src/

$ make

$ ./vim --clean;  # We did it!

$ make test
```

Part III: A high-level bug.

The process.

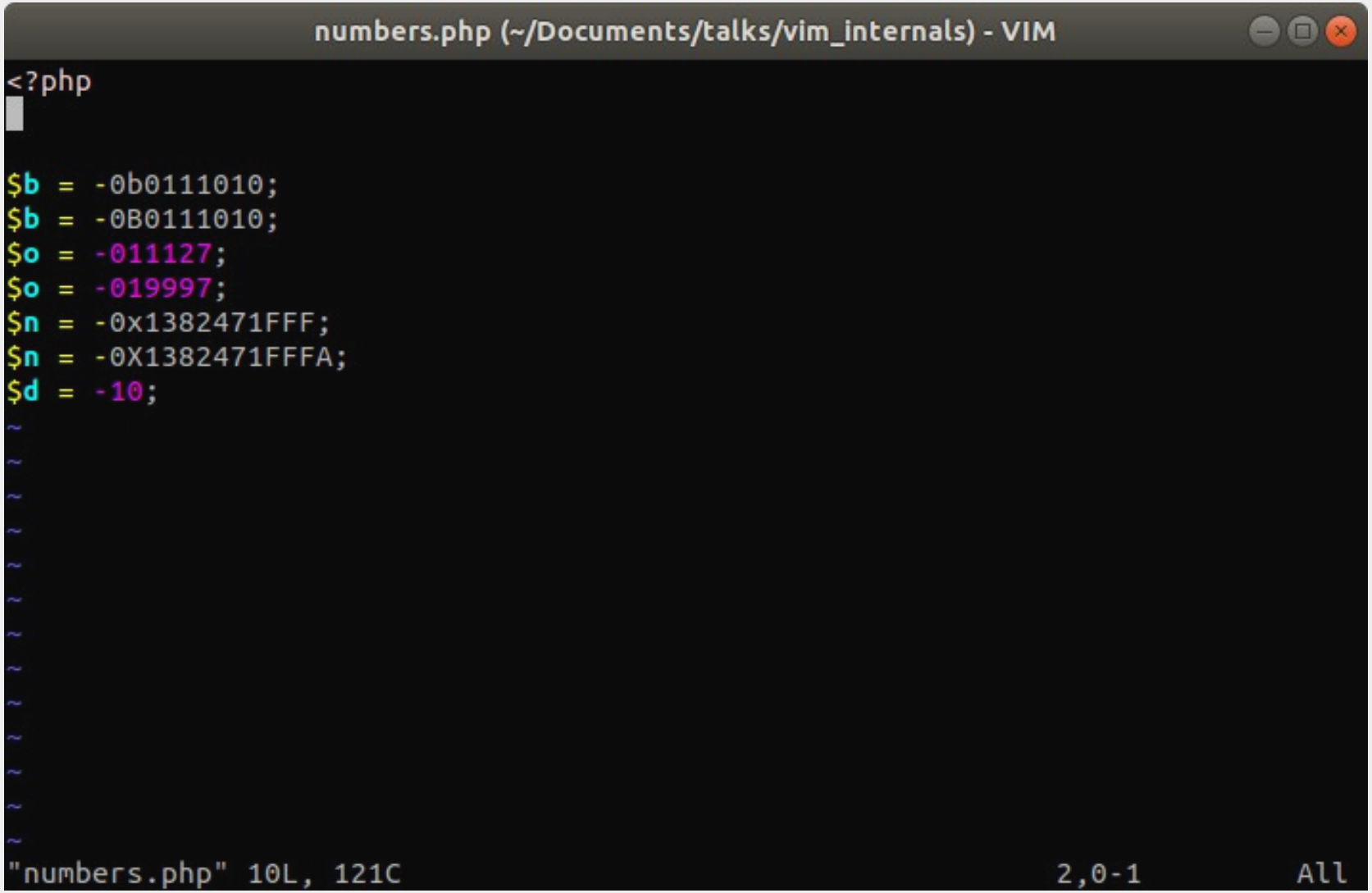
1)Identify the bug with a precise reproduction.

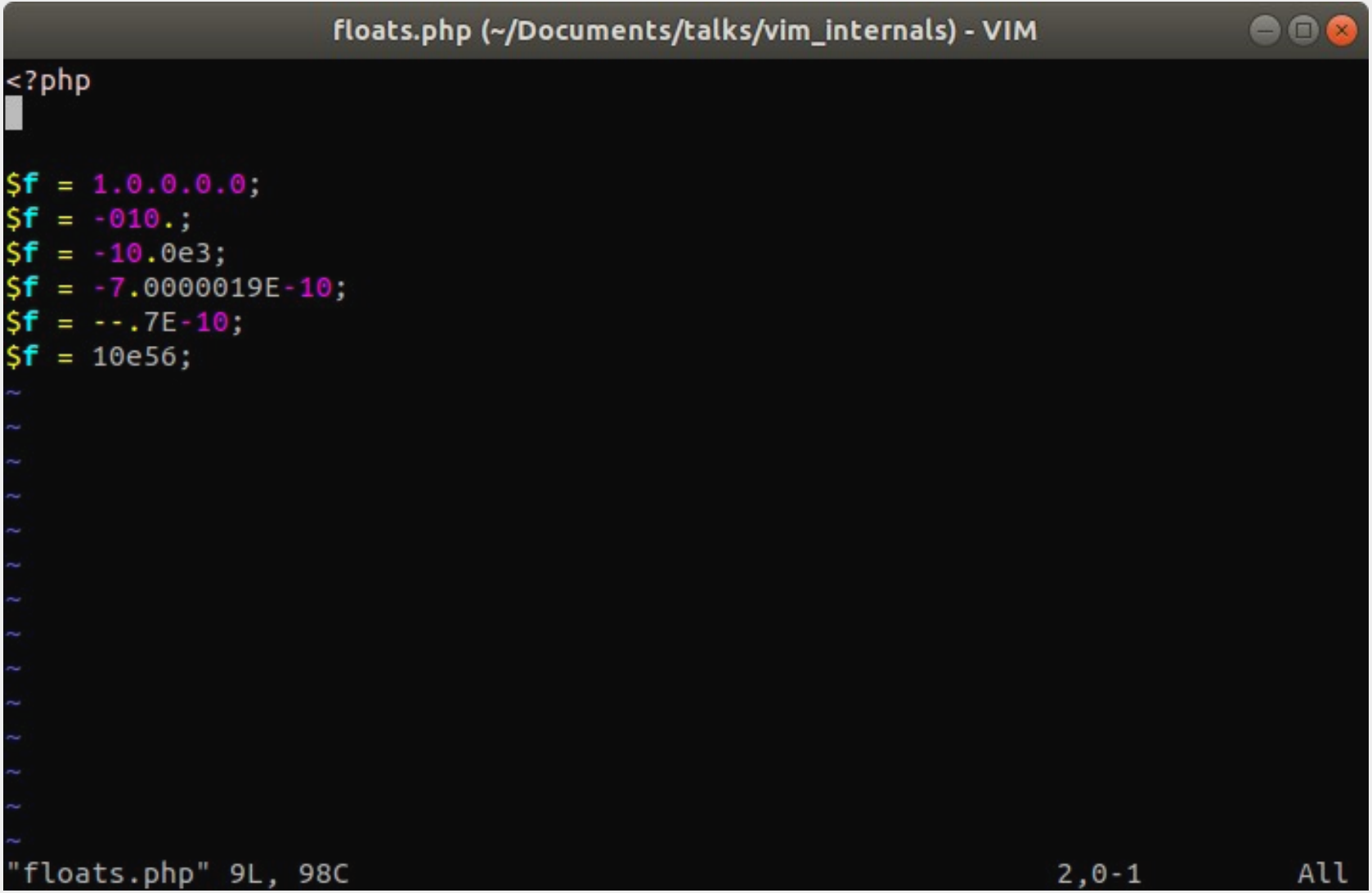
2)Confirm the bug still exists.

3)Research: Is someone else working on it?

4)Fix the bug if you can!

5)Report the bug *with the solution*. (fastest!)


numbers.php (~/Documents/talks/vim_internals) - VIM
<?php
$b = -0b0111010;
$b = -0B0111010;
$o = -011127;
$o = -019997;
$n = -0x1382471FFF;
$n = -0X1382471FFFA;
$d = -10;
"numbers.php" 10L, 121C
2,0-1
All

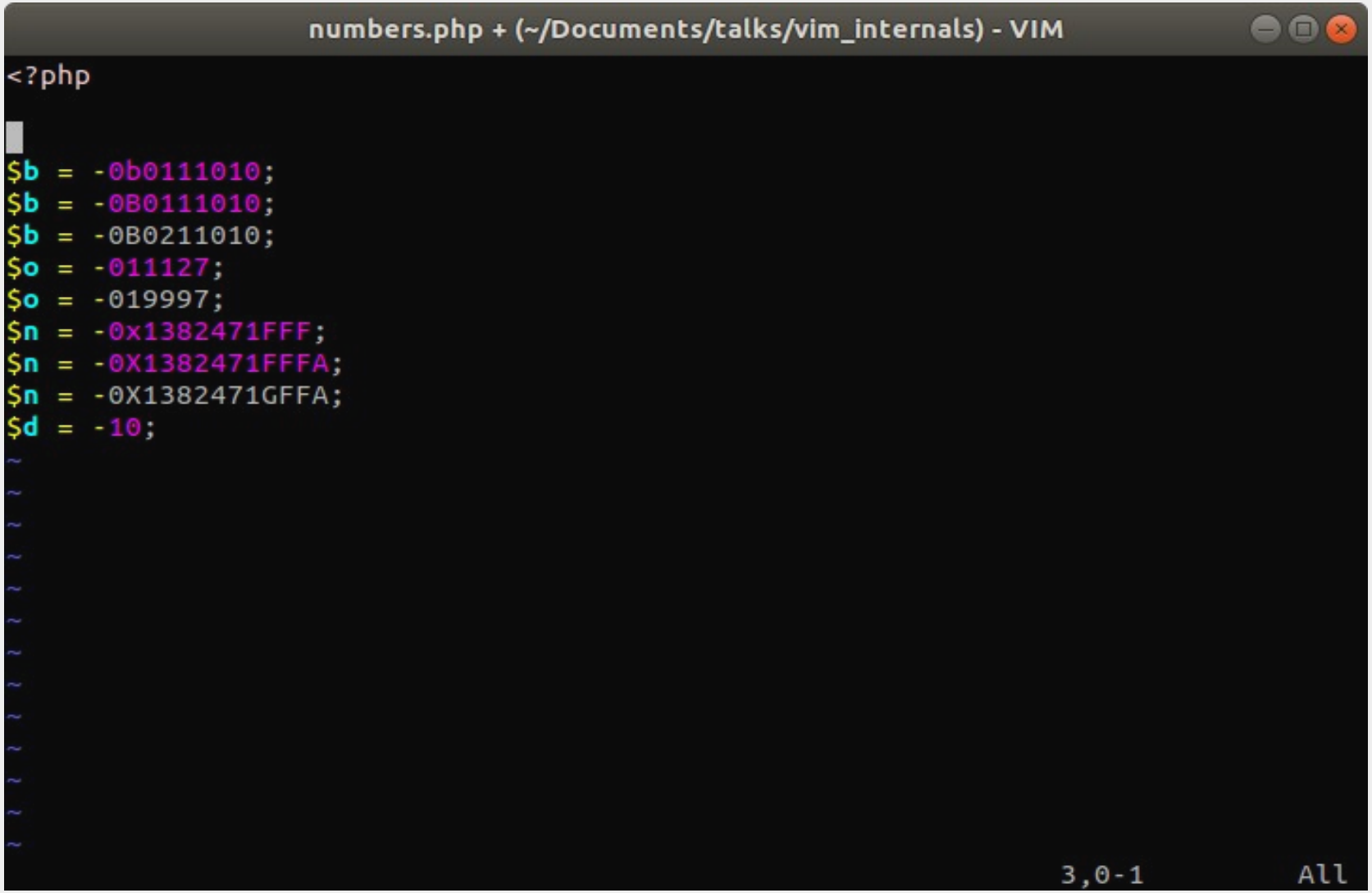

floats.php (~/Documents/talks/vim_internals) - VIM
<?php
$f = 1.0.0.0.0;
$f = -010.;
$f = -10.0e3;
$f = -7.0000019E-10;
$f = --.7E-10;
$f = 10e56;
"floats.php" 9L, 98C
2,0-1
All

From the PHP website:

```
decimal     : [1-9][0-9]*
            | 0

hexadecimal : 0[xX][0-9a-fA-F]+

octal       : 0[0-7]+

binary      : 0[bB][01]+

integer     : decimal
            | hexadecimal
            | octal
            | binary
```

The new rules for Numbers:

```
" In the file "vim/runtime/syntax/php.vim" ...
syn match phpNumber "\<\%([1-9]\d*\|0\)\>" contained display
syn match phpNumber "\<0[xX]\x\+\>"        contained display
syn match phpNumber "\<0\o\+\>"            contained display
syn match phpNumber "\<0[bB][01]\+\>"      contained display
```


numbers.php + (~/Documents/talks/vim_internals) - VIM
<?php
$b = -0b0111010;
$b = -0B0111010;
$b = -0B0211010;
$o = -011127;
$o = -019997;
$n = -0x1382471FFF;
$n = -0X1382471FFFA;
$n = -0X1382471GFFA;
$d = -10;
3,0-1
All

Summary for bug #1

- How did I know what to do?
- What did I do next?
- How did my discussion with the maintainer proceed?
- See the patch: **php.diff**

Demo.

Part IV: A low-level bug.

The details…

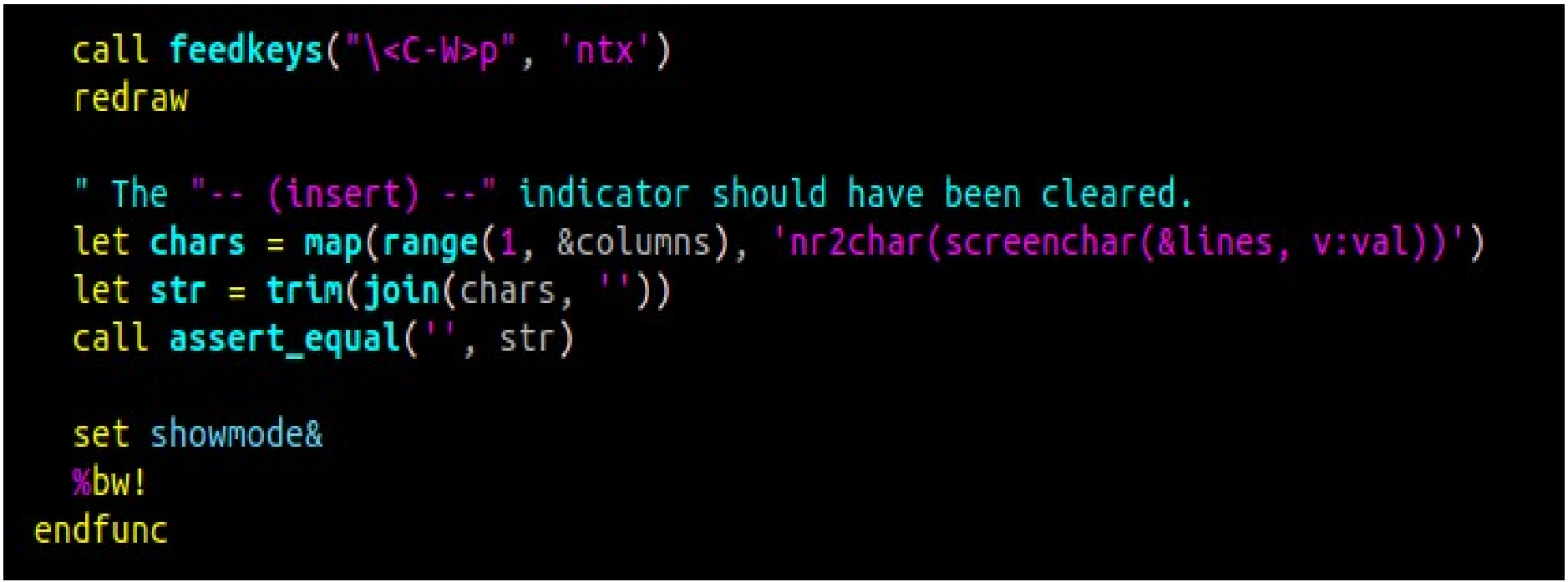
- The patch: https://bit.ly/2MyrOeg
- The email: https://bit.ly/2o1KERA
- Now for a demo and some analysis!

Demo.

The test (part I)

```
func Test_insert_cleared_on_switch_to_term()
  CheckFeature terminal

  set showmode
  terminal
  wincmd p

  call feedkeys("i\<C-O>", 'ntx')
  redraw

  " The "-- (insert) --" indicator should be visible.
  let chars = map(range(1, &columns), 'nr2char(screenchar(&lines, v:val))')
  let str = trim(join(chars, ''))
  call assert_equal('-- (insert) --', str)
```

The test (part II)



```
  call feedkeys("\<C-W>p", 'ntx')
  redraw

  " The "-- (insert) --" indicator should have been cleared.
  let chars = map(range(1, &columns), 'nr2char(screenchar(&lines, v:val))')
  let str = trim(join(chars, ''))
  call assert_equal('', str)

  set showmode&
  %bw!
endfunc
```

The fix!

```
#ifdef FEAT_TERMINAL
    if (bt_terminal(curwin->w_buffer))
    // terminal is likely in another mode
    redraw_mode = TRUE;
#endif
```

The perfect patch…

1) … fixes a bug.
2) … adds a test case.
3) … reduces complexity.

This is the “hat trick” in software development.

Part V: Where to?

The future of Vim...

1) The Matrix
2) Star Trek
3) Blade Runner
4) Mad Max
5) The Road

A Quote.

The end.

Questions?