What is NetDevOps? Why?

...

Leslie Carr

SREConl6

Who Is Leslie?

Operations Engineer

- @lesliegeek
- Google
- Craigslist
- Twitter
- Wikimedia Foundation (Wikipedia)
- Cumulus Networks



Who Are You?

Are you a network engineer?

- Are you automation curious?
- Is your network running in the traditional model?

Are you a systems engineer?

- Do you love your network engineers?
- Do you want to help them automate?

What Will You Learn? Why Should You Listen?

Legacy Networks -> Modern Techniques

http://www.trefor.net/2015/06/29/network-automation/

What Is DevOps?



https://www.safaribooksonline.com/library/view/effective-devops/9781491926291/

What Is DevOps?

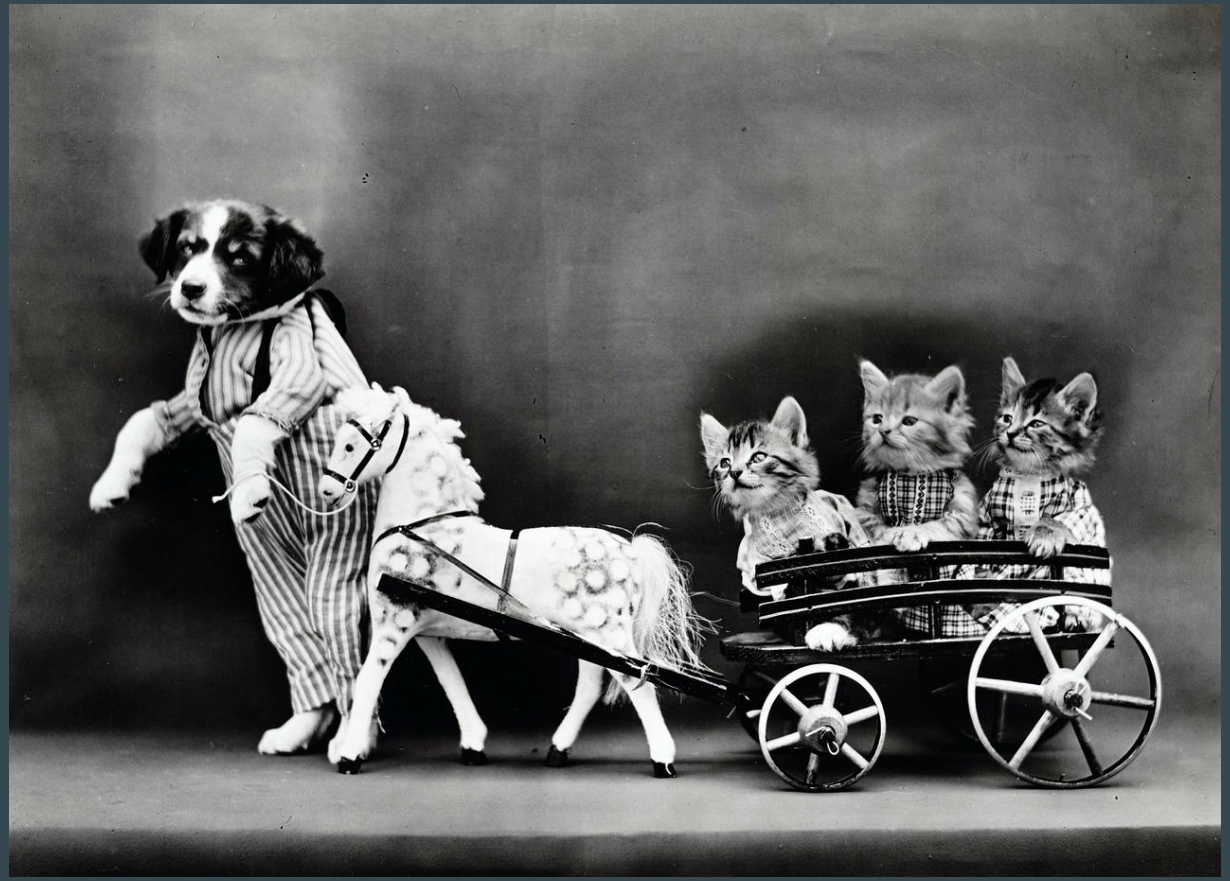


DevOps!

Infrastructure == Code

https://www.thoughtworks.com/insights/blog/infrastructure-code-reason-smile

What Do We Look Like Now?



Traditional Networking Methodology

- Logging in manually with a password
- Typing in commands
- Cutting and pasting over console
- Some vendors have rollback
- RANCID is the only decent tool to save configurations or state
- Typos can bring down your whole network

Why is Traditional Networking like this?



Automation is for you!



https://www.youtube.com/watch?v=ArqvSGRzUBw

Working Together



Common Complaints about Automation

- It’s a fad
- It’s hard
- This will steal my job
- One wrong move will take everything down
- My gear doesn’t support it
- I don’t know where to start

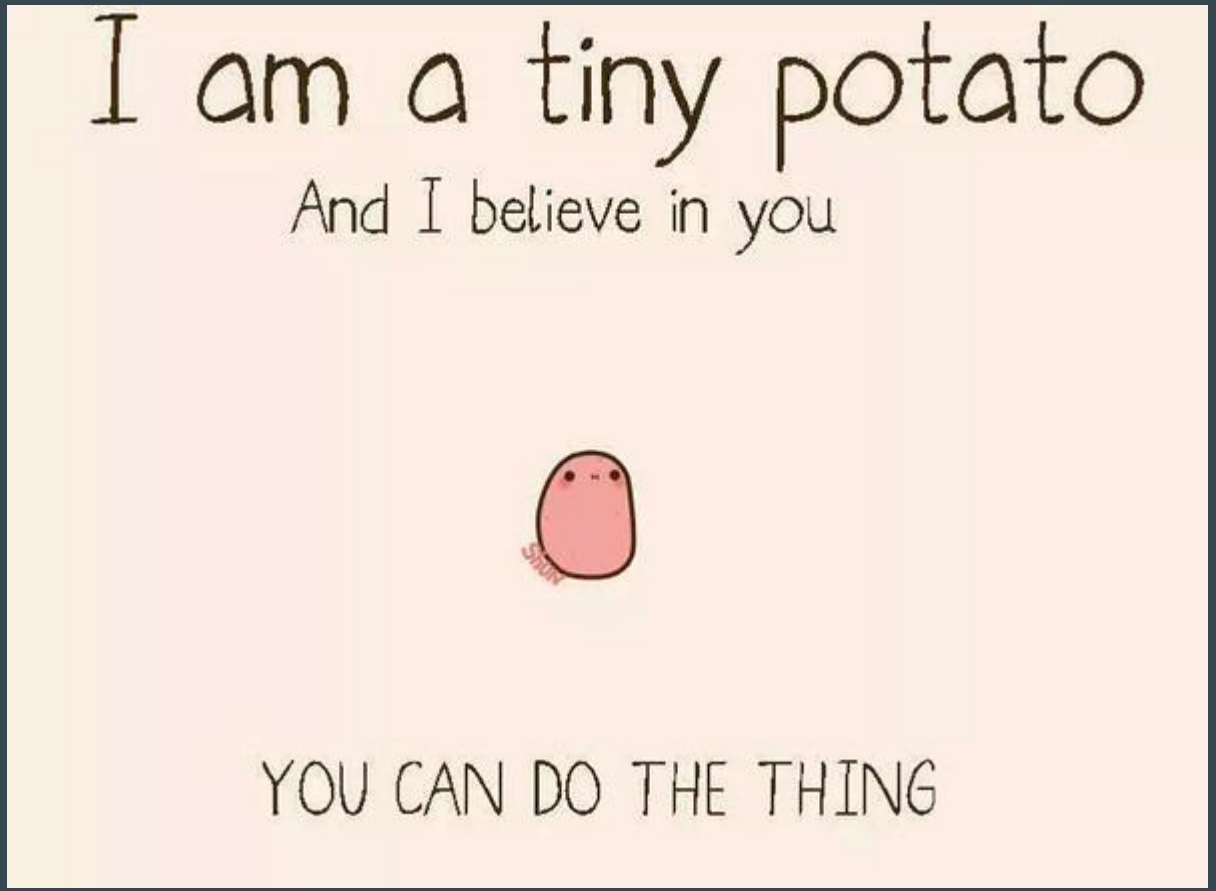
Trust the Computers



Vendors and Automation!



Here's How to Start



No Way! You can do this on any equipment!



Step 1 - Start using Git!

- ~~Source Code~~ text file repository
- Automatic file revision/change management
- Built for teams to work on the same files
- Easy to get started, lots of knobs for advanced users

https://rogerdudler.github.io/git-guide/

Step 1 - Start using Git!



https://try.github.io



http://www.xkcd.com/1597/

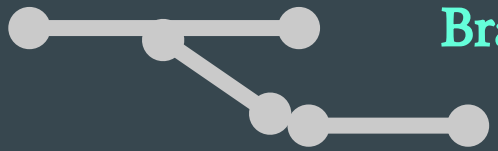
Git Glossary



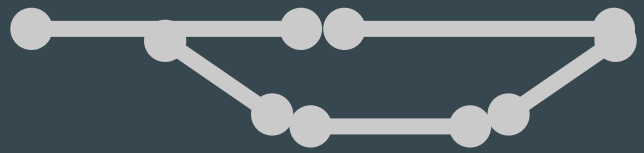
Remote Repository – Central server hosting files



Local Repository – Your local copy of the remote. Where you change things



Branch – Isolated copy for new features, risky changes



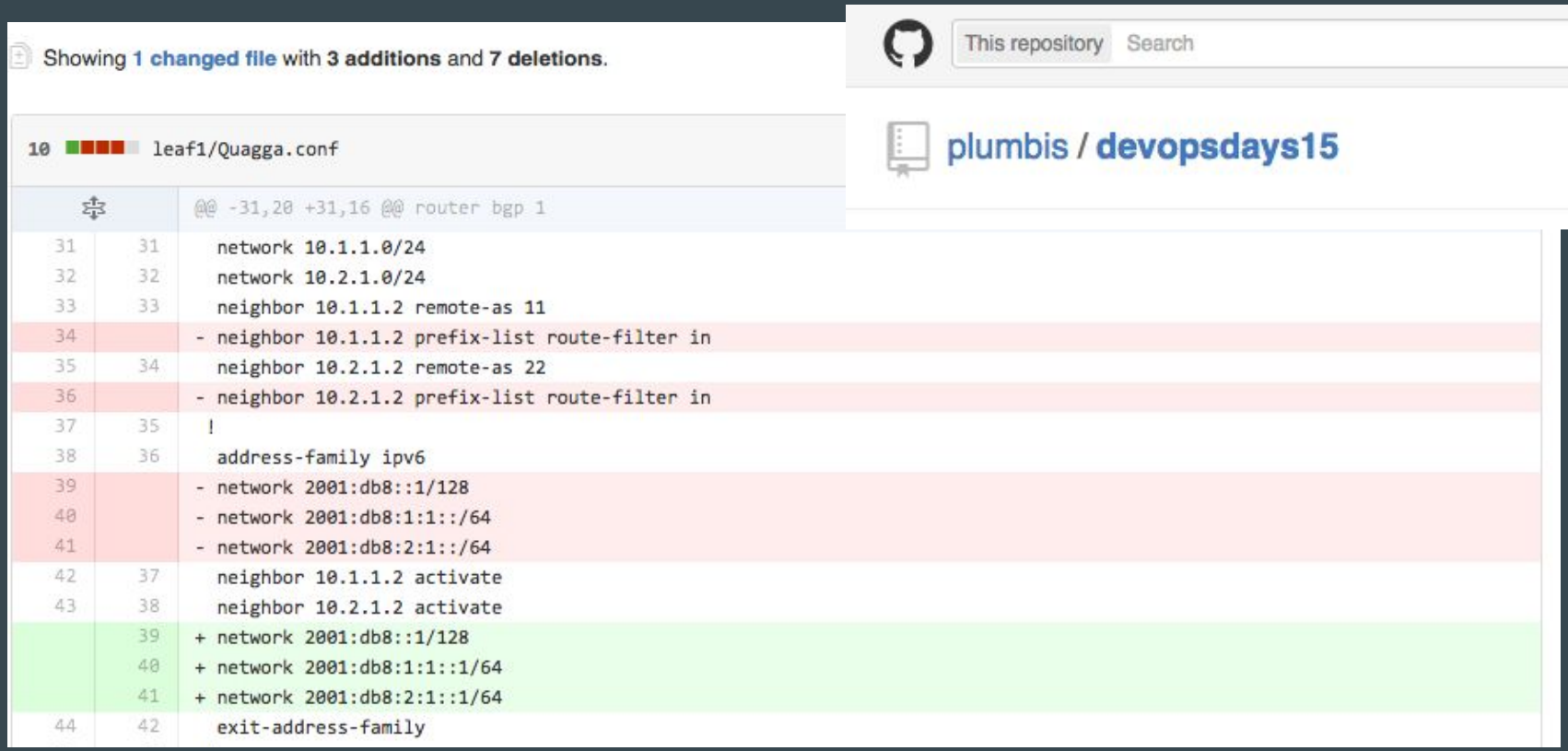
Merge – Apply branch changes to master repository copy (see also: “Pull Request”)

Step 2 - Check in Your Configuration

Check in ALL THE CONFIGS!

```
lcarr@Lappy:~/puppet-presentation (master)$ git add *
lcarr@Lappy:~/puppet-presentation (master)$ git commit -a -m "New router
configs"
[master 3dd394a] New router configs
 3 files changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 router1.conf
 create mode 100644 router2.conf
 create mode 100644 router3.conf
lcarr@Lappy:~/puppet-presentation (master)$ git push
Counting objects: 3, done.
Delta compression using up to 4 threads.
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 377 bytes | 0 bytes/s, done.
Total 3 (delta 0), reused 1 (delta 0)
To git@github.com:LeslieCarr/puppet-presentation.git
   546f0fa..3dd394a  master -> master
lcarr@Lappy:~/puppet-presentation (master)$
```

Github Changes In Action



Showing 1 changed file with 3 additions and 7 deletions.

10 leaf1/Quagga.conf

@@ -31,20 +31,16 @@ router bgp 1

```
31  31    network 10.1.1.0/24
32  32    network 10.2.1.0/24
33  33    neighbor 10.1.1.2 remote-as 11
34      - neighbor 10.1.1.2 prefix-list route-filter in
35  34    neighbor 10.2.1.2 remote-as 22
36      - neighbor 10.2.1.2 prefix-list route-filter in
37  35    !
38  36    address-family ipv6
39      - network 2001:db8::1/128
40      - network 2001:db8:1:1::/64
41      - network 2001:db8:2:1::/64
42  37    neighbor 10.1.1.2 activate
43  38    neighbor 10.2.1.2 activate
    39  + network 2001:db8::1/128
    40  + network 2001:db8:1:1::1/64
    41  + network 2001:db8:2:1::1/64
44  42    exit-address-family
```

This repository Search

plumbis / devopsdays15

Step 3

Templatize configuration files

- Templates let you reuse code snippets
- Computers never forget... or make typos

https://docs.puppetlabs.com/puppet/latest/reference/lang_template_erb.html

Template Example

site.pp:

```
node 'network.server' {
  switch::config { 'leaf1':
    loopback   => '10.0.0.1/32',
    webservers =>
      { interfaces => 'swp1 swp2 swp5',
        vlan       => '3' },
    storage    =>
     { interfaces => 'swp6',
       vlan       => '10'},
  }
}
```

config.pp

```
define switch::config
( $switch = $title, $loopback, $webservers,
$storage )
{
file { "/home/switch_configs/${switch}.conf":
   ensure  => present,
   content => template('switch/interfaces.erb')
   owner   => 'cumulus',
   group   => 'cumulus',
   mode    => '0644',
  }
}
```

Template Example

interfaces.erb:

```
auto eth0
iface eth0 inet dhcp

auto lo
iface lo inet loopback
 address <%= @loopback %>

# webserver vlan
auto br_webserver_<%= webservers['vlan'] %>
iface br_webserver_<%= webservers['vlan'] %>
  bridge-ports <%= webservers['interfaces'] %>
  bridge-stp on
```

```
#storage vlan
auto br_storage_<%= storage['vlan'] %>
iface br_storage_<%= storage['vlan'] %>
  bridge-ports <%= storage['interfaces'] %>
  bridge-stp on
```

Completed Configuration File!

```
auto eth0
iface eth0 inet dhcp

auto lo
iface lo inet loopback
   address 10.0.0.1/32

# webserver vlan
auto br_webserver_3
iface br_webserver_3
    bridge-ports swp1 swp2 swp5
    bridge-stp on
```

```
#storage vlan
auto br_storage_10
iface br_storage_10
    bridge-ports swp6
    bridge-stp on
```

Your Infrastructure has transformed into Code



Team Separation is a Problem



Git Branches to the Rescue!

- Create changes in branches

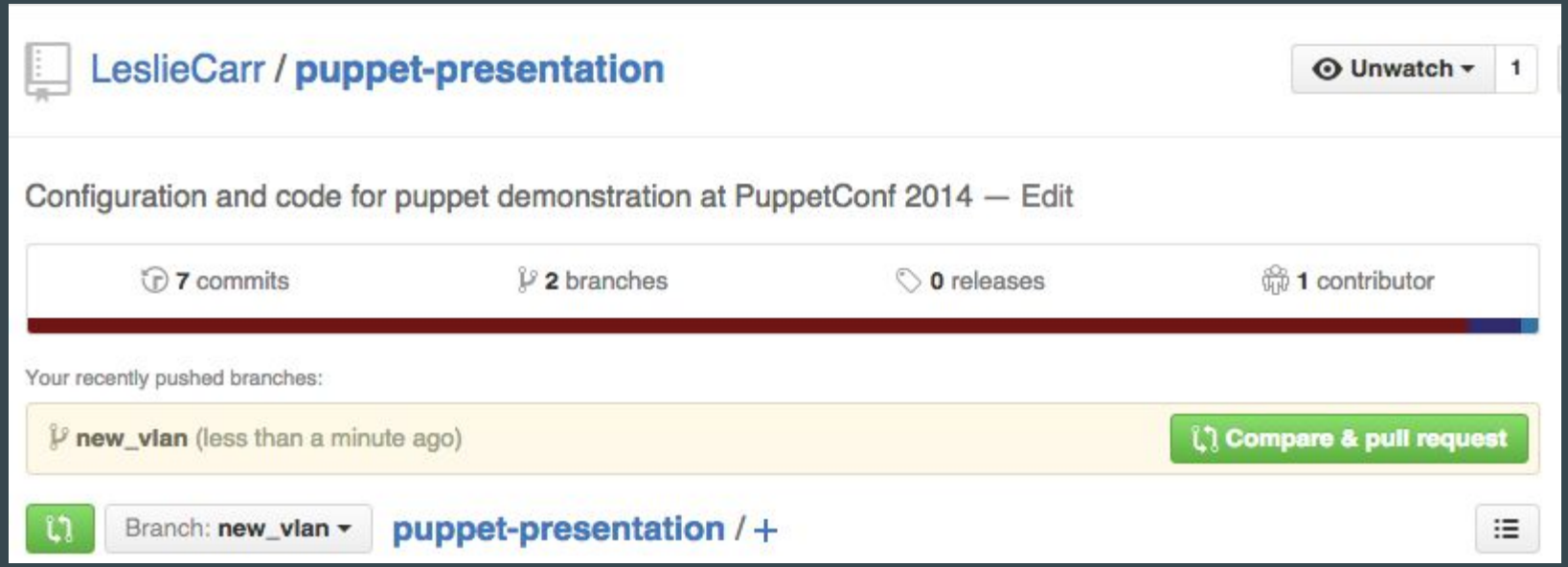


- Merge and review

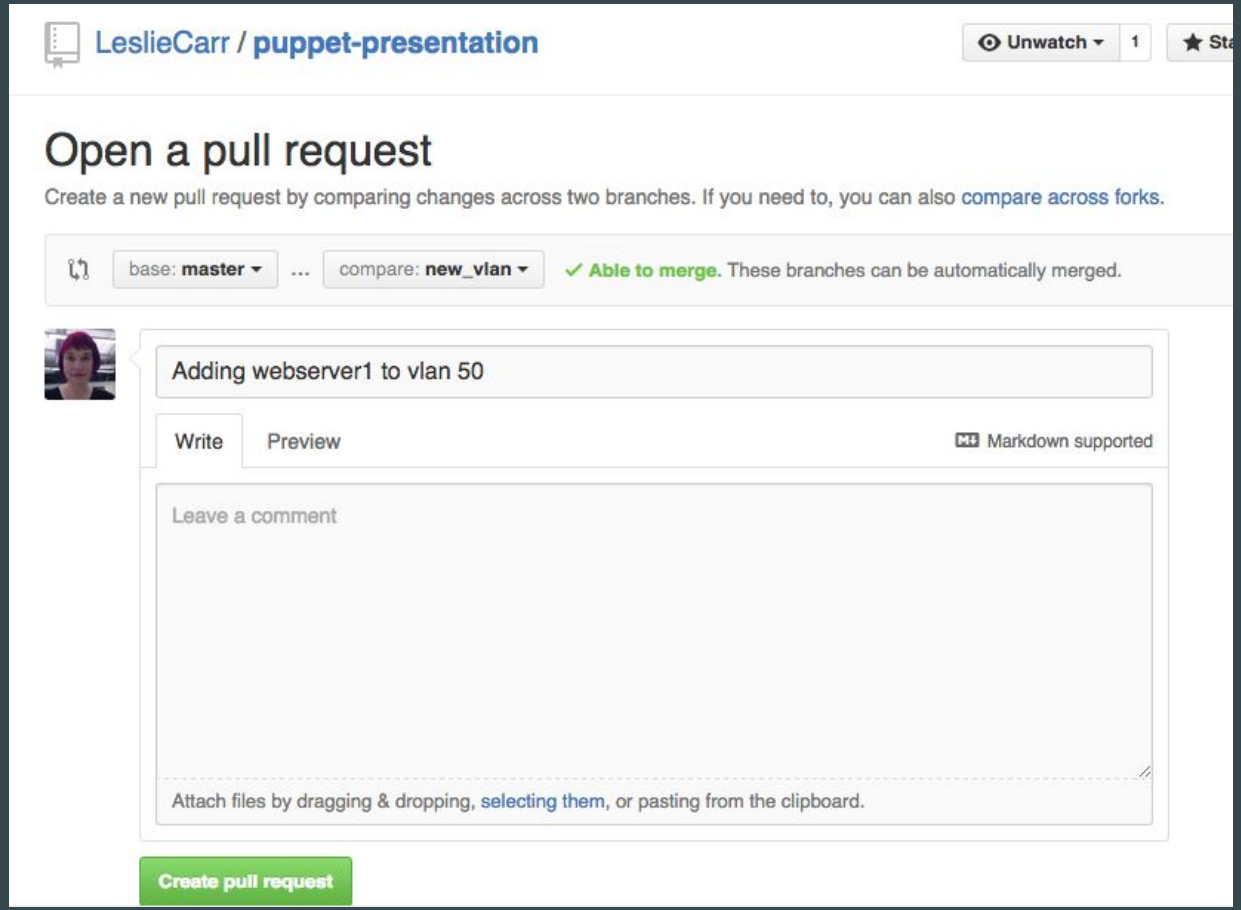


Use merge/pull request as an opportunity to review impact of changes

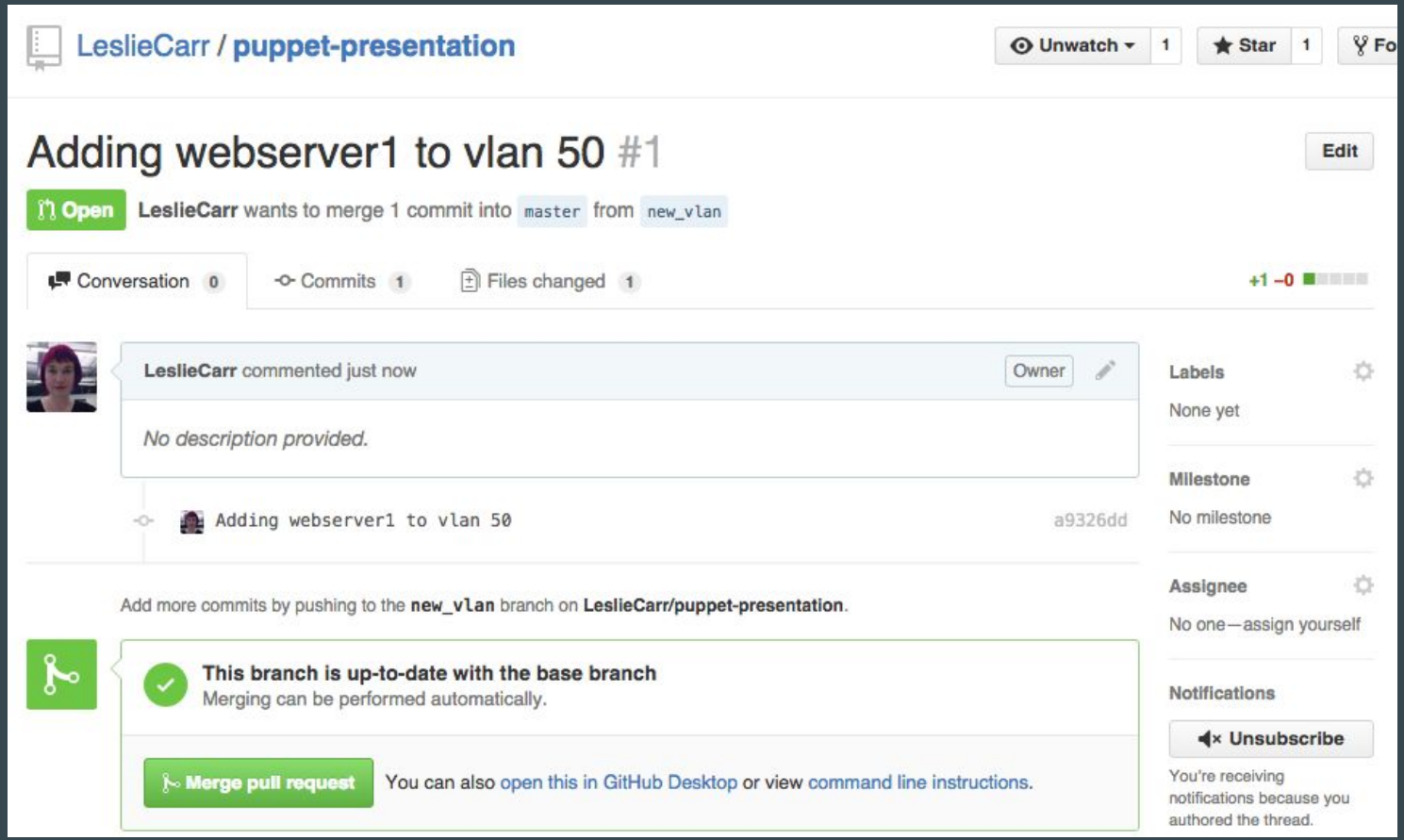
Git Branches to the Rescue!



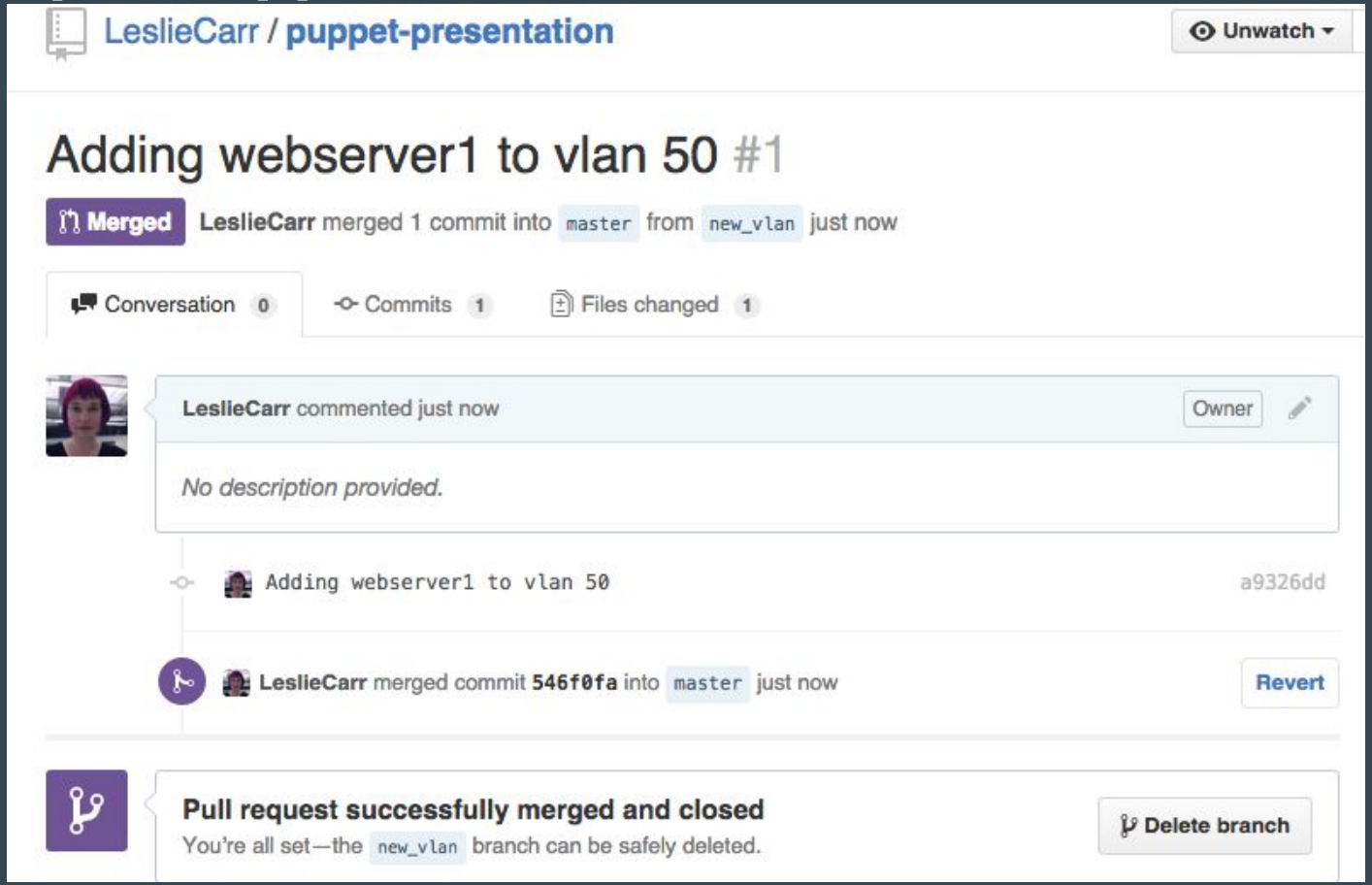
Start a Pull Request on Github



Approve or Deny the Request!



Pull Request Approved!



Pull Requests Allow Security + Teamwork



All of the Teams are Working Together



Advanced Topics for Extra Credit



Continuous Integration Systems

- Catch tpyos!
- Use spell checking
- Probably already have one





Virtualize a Copy of Your Network





Add in an Agent or Pushes



So Happy!



Oops! I mistyped my loopback!

site.pp:

```
node 'network.server' {
  switch::config { 'leaf1':
    loopback   => '10.0.0.1/3',
    webservers =>
      { interfaces => 'swp1 swp2 swp5',
        vlan       => '3' },
    storage    =>
     { interfaces => 'swp6',
       vlan       => '10'},
  }
}
```

Pushing a Broken Change

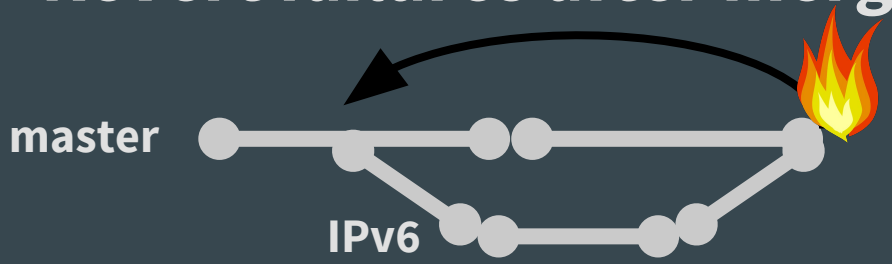


Where was that change?



git revert!

- Revert failures after merge



git revert Workflow

```
leslie@mogwai:~$ git revert -m 1 HEAD~0
[master 4df89bb] Revert "Merge pull request #1 from LeslieCarr/new_vlan"
 1 file changed, 1 deletion(-)
leslie@MacBook-Pro:~/github/puppet-presentation (master)$ git push
To git@github.com:LeslieCarr/puppet-presentation.git
   546f0fa..4df89bb  master -> master
```

All Better



No Post Mortem == Wishing For Success



Post Mortems are Your Friend!

- Opportunity, not a chore!
- Blameless
- Ruthlessly accurate
- Fix!

Failure is Okay



Before Automation



After Automation



Step 1 - Git!



https://try.github.io

Infrastructure as Code



Team Separation



Advanced Topics



Teamwork



Questions?

Questions?

@lesliegeek

