

What is NetDevOps? Why?

...

Leslie Carr

RIPE71

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?

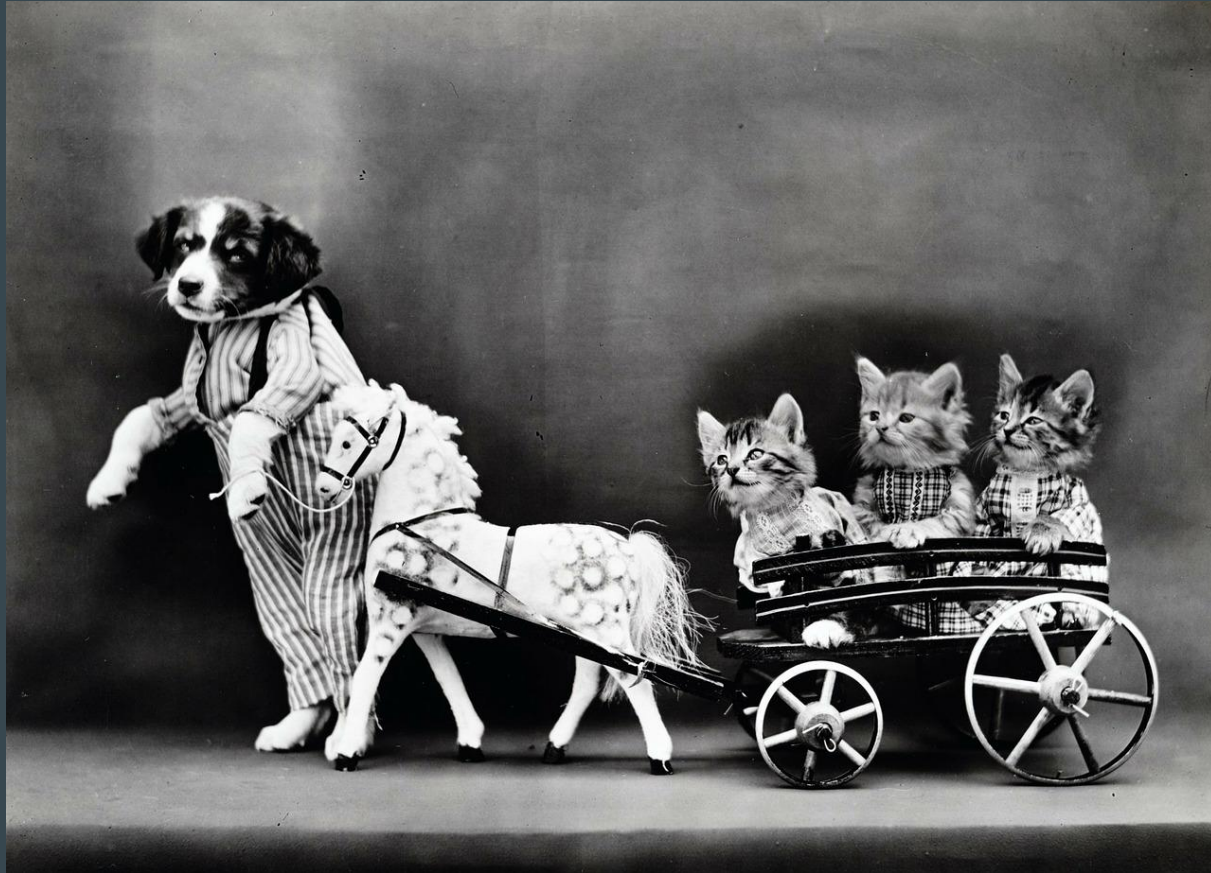


DevOps!

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!

ARISTA



CISCO™



JUNIPER
NETWORKS



SALTSTACK



CHEF™
CHEF.IO



ANSIBLE

Here's How to Start

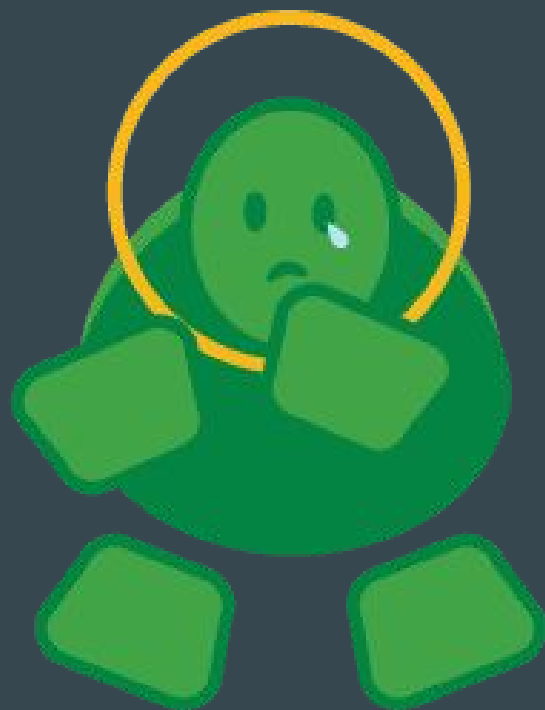
I am a tiny potato

And I believe in you



YOU CAN DO THE THING

Not Yet....



No Way!



Step 1 - 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

Step 1 - Git!



<https://try.github.io>



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

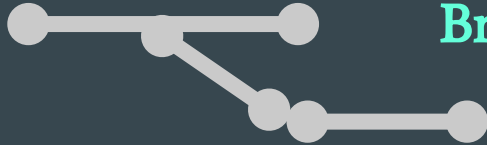
Git Glossary



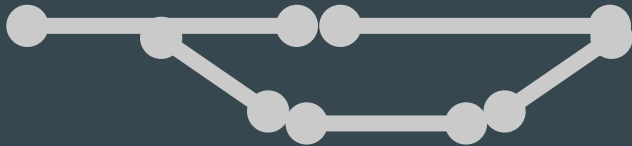
Remote Repository – Central server hosting files



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.



This repository Search

10 leaf1/Quagga.conf



plumbis / devopsdays15

| | + | - | |
|----|----|--------|---|
| | @@ | -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 |

Step 3

Templatize configuration files

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

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_<%= webserver['vlan'] %>
iface br_webserver_<%= webserver['vlan'] %>
  bridge-ports <%= webserver['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
```

Infrastructure as 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!


 **LeslieCarr / puppet-presentation** Unwatch ▾ 1

Configuration and code for puppet demonstration at PuppetConf 2014 — Edit

 **7** commits  **2** branches  **0** releases  **1** contributor

Your recently pushed branches:

 **new_vlan** (less than a minute ago) Compare & pull request

 Branch: **new_vlan** ▾ **puppet-presentation** / + ☰


Start a Pull Request on Github

LeslieCarr / puppet-presentation Unwatch 1 ★ Star

Open a pull request

Create a new pull request by comparing changes across two branches. If you need to, you can also [compare across forks](#).

base: **master** ... compare: **new_vlan** ✓ Able to merge. These branches can be automatically merged.

 Adding webserver1 to vlan 50

Write Preview Markdown supported

Leave a comment

Attach files by dragging & dropping, [selecting them](#), or pasting from the clipboard.

[Create pull request](#)


Approve or Deny the Request!

LeslieCarr / puppet-presentation Unwatch 1 Star 1 Fo



Adding webserver1 to vlan 50 #1 Edit

Open LeslieCarr wants to merge 1 commit into `master` from `new_vlan`


Conversation 0 Commits 1 Files changed 1 +1 -0


 **LeslieCarr** commented just now Owner

No description provided.

  Adding webserver1 to vlan 50 a9326dd

Add more commits by pushing to the `new_vlan` branch on `LeslieCarr/puppet-presentation`.

 **This branch is up-to-date with the base branch**
Merging can be performed automatically.

 **Merge pull request** You can also [open this in GitHub Desktop](#) or view [command line instructions](#).

Labels ⚙️
None yet

Milestone ⚙️
No milestone

Assignee ⚙️
No one—assign yourself

Notifications
🔊 Unsubscribe
You're receiving notifications because you authored the thread.


Pull Request Approved!

LeslieCarr / puppet-presentation Unwatch



Adding webserver1 to vlan 50 #1


Merged LeslieCarr merged 1 commit into `master` from `new_vlan` just now


Conversation 0 Commits 1 Files changed 1

 LeslieCarr commented just now Owner

No description provided.

  Adding webserver1 to vlan 50 a9326dd

 LeslieCarr merged commit `546f0fa` into `master` just now Revert

 **Pull request successfully merged and closed** Delete branch

You're all set—the `new_vlan` branch can be safely deleted.

Pull Requests Allow Security + Teamwork



Working Together



Advanced Topics



Continuous Integration Systems

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



Travis CI



Virtualization



Add in an Agent or Pushes



CHEF[™]
CHEF.IO



ANSIBLE



SALTSTACK

So Happy!



Oops!

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

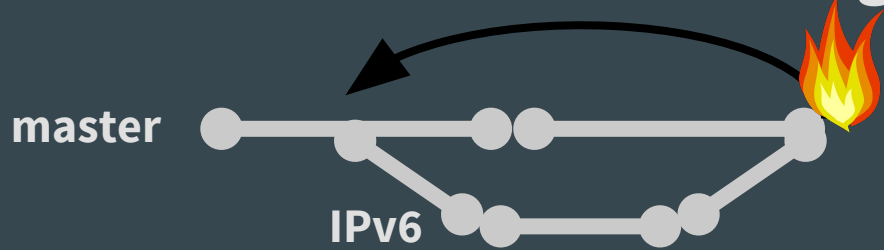


Where was that change?



git revert!

- Revert failures after merge

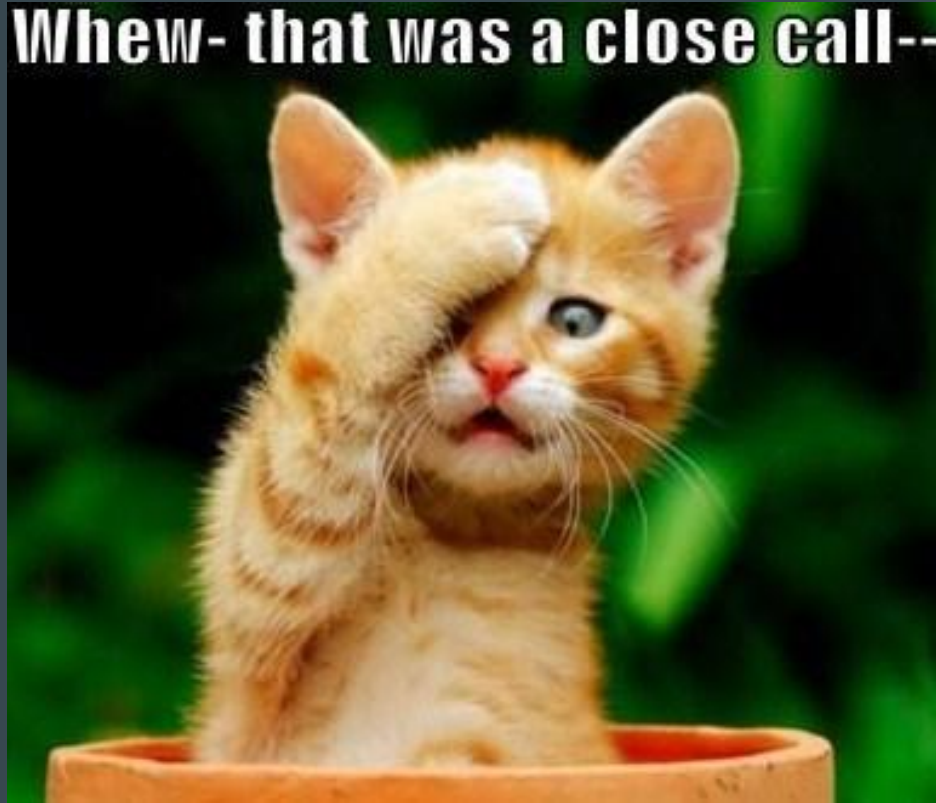


git revert Workflow

```
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

Whew- that was a close call--



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

