

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?

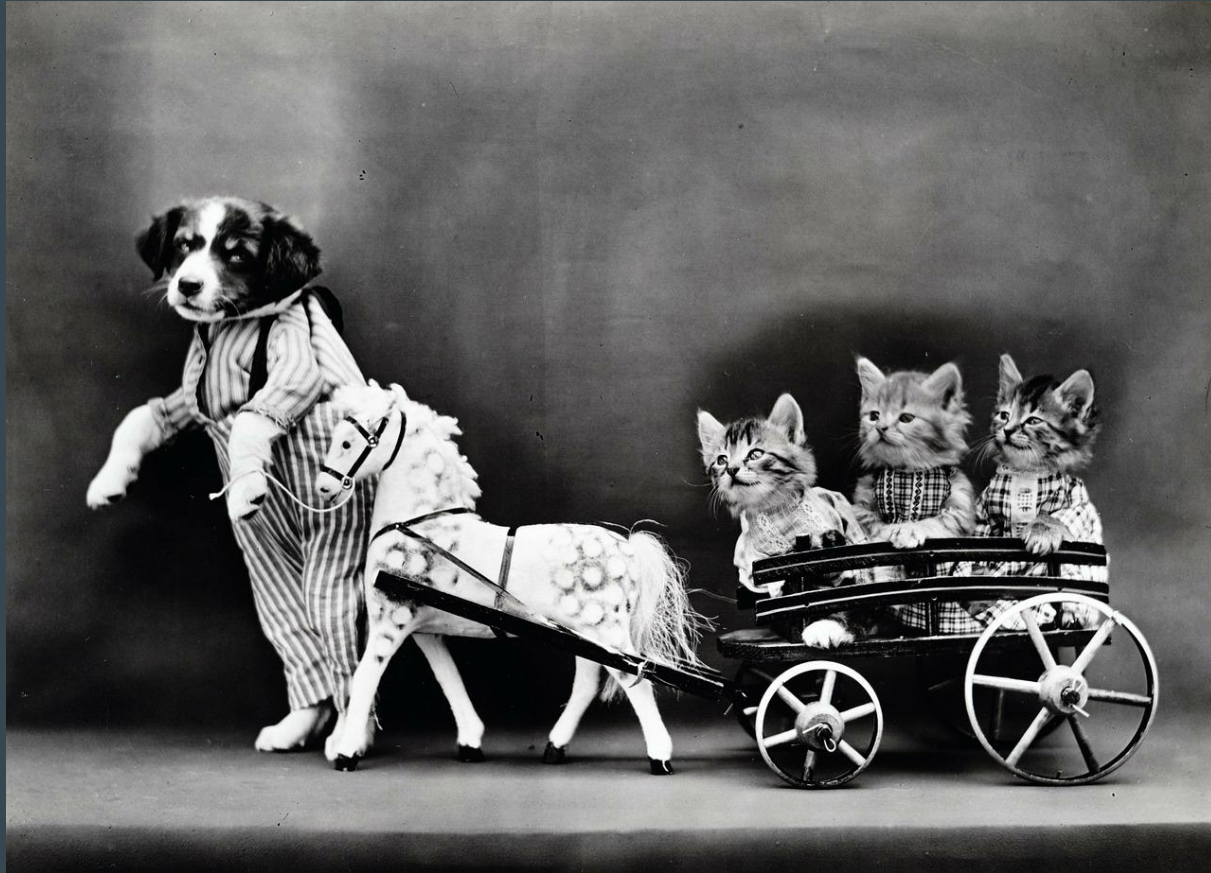


DevOps!

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™



puppet
labs®



SALTSTACK



CHEF™

CHEF.IO



cumulus®

JUNIPER®
NETWORKS



ANSIBLE

Here's How to Start

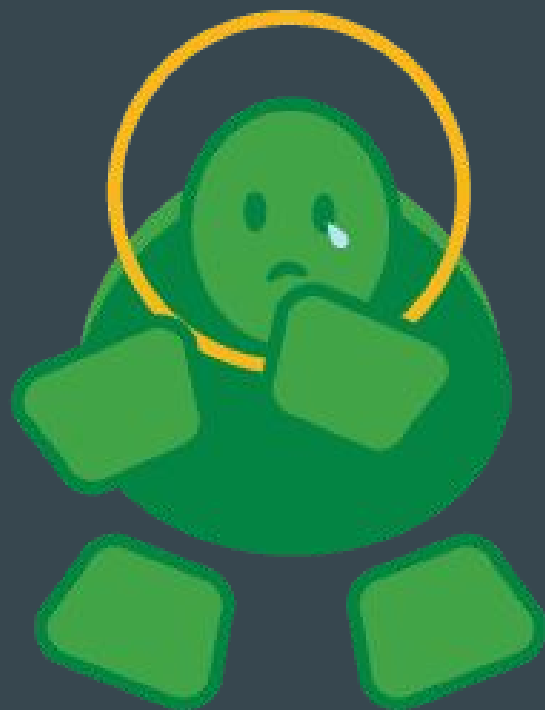
I am a tiny potato

And I believe in you



YOU CAN DO THE THING

Not Yet....



No Way! You can do this on any equipment!



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>

THIS IS GIT. IT TRACKS COLLABORATIVE WORK ON PROJECTS THROUGH A BEAUTIFUL DISTRIBUTED GRAPH THEORY TREE MODEL.

COOL. HOW DO WE USE IT?

NO IDEA. JUST MEMORIZE THESE SHELL COMMANDS AND TYPE THEM TO SYNC UP. IF YOU GET ERRORS, SAVE YOUR WORK ELSEWHERE, DELETE THE PROJECT, AND DOWNLOAD A FRESH COPY.



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

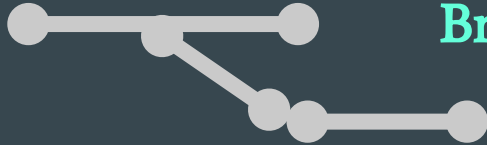
Git Glossary



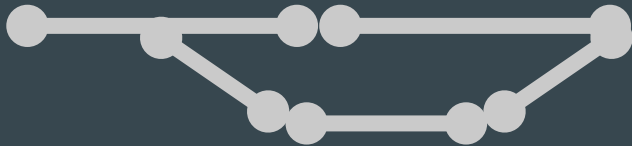
Remote Repository – Central server hosting files



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
```

Your Infrastructure is Now 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 `tpyos`!
- Use spell checking
- Probably already have one



Travis CI



Virtualize a Copy of Your Network



Add in an Agent or Pushes



CHEF[™]
CHEF.IO



ANSIBLE



SALTSTACK

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

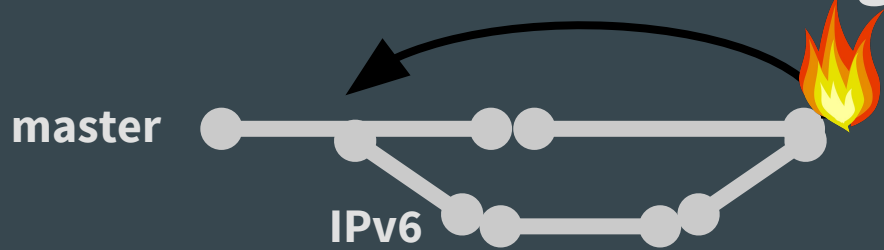


Where was that change?



git revert!

- Revert failures after merge

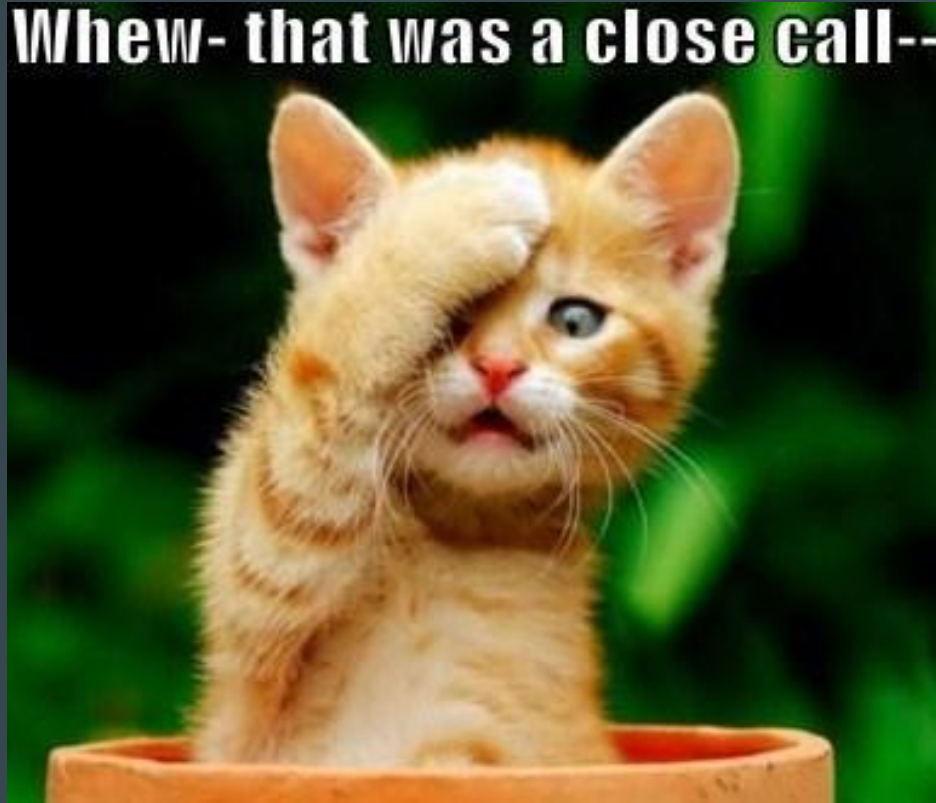


git revert Workflow

```
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

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

