What is NetDevOps? Why?

...

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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
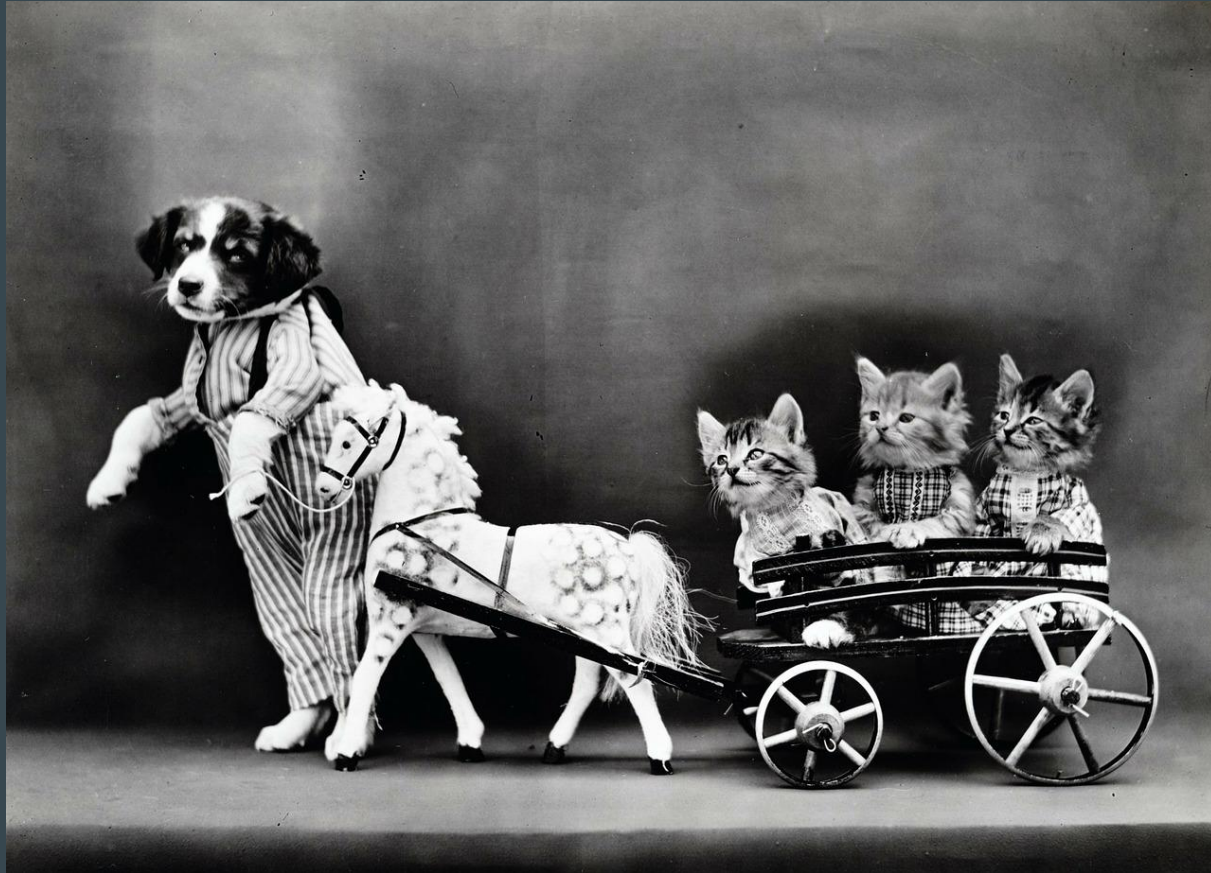
What Is DevOps?

What Is DevOps?

DevOps!

Infrastructure == Code

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!

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

Not Yet….
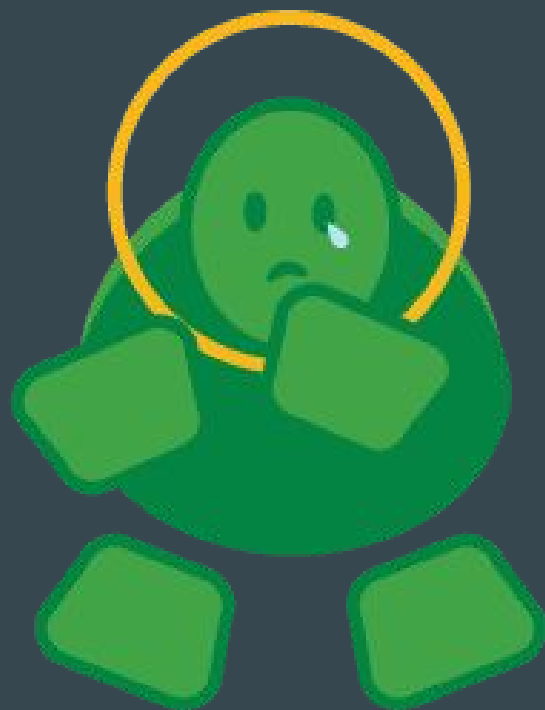
No Way!

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
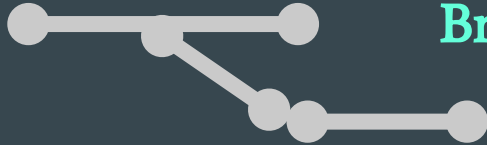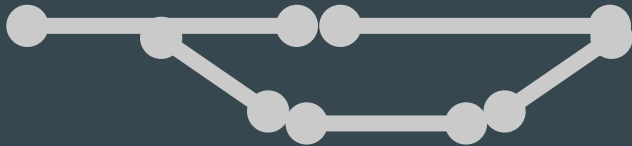
Step 1 - Git!

https://try.github.io

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

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
```

Infrastructure as Code

Team Separation is a Problem

Git Branches to the Rescue!

- Create changes in branches

master

vlan

- Merge and review

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

master

vlan

Git Branches to the Rescue!

Start a Pull Request on Github

Approve or Deny the Request!

Pull Request Approved!

Pull Requests Allow Security + Teamwork

Working Together

Advanced Topics

Continuous Integration Systems

- Catch tpyos!

- Use spell checking

- Probably already have one

Travis CI

Virtualization

Add in an Agent or Pushes

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'},
  }
}
```
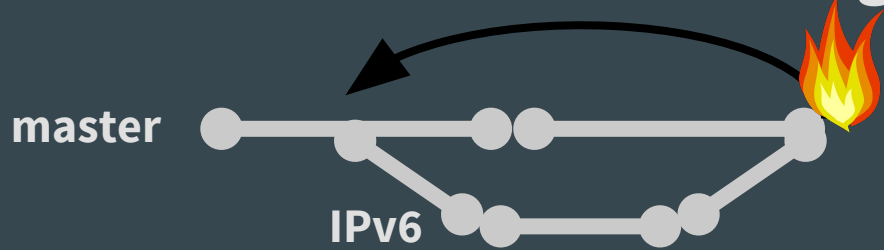
Pushing a Broken Change

Where was that change?

git revert!

- **Revert failures after merge**
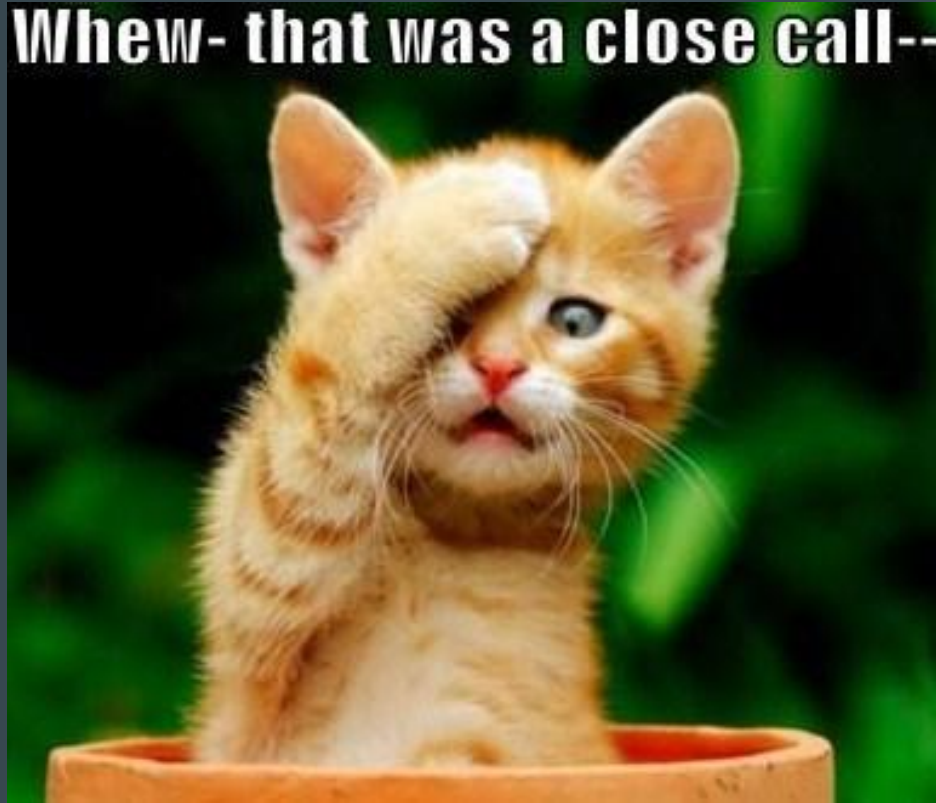
master

IPv6

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