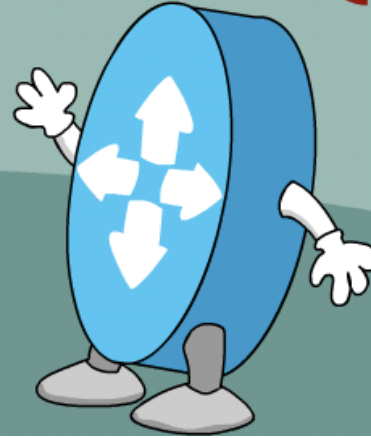




# NETDEVOPS {LIVE!}



DEVNET

# Picking your First Network Automation Project

Eric Thiel, CCIE 11956 DC/Security  
Developer Advocacy, Cisco DevNet  
Twitter: @securenetwrk

Season 2, Talk 2

<https://developer.cisco.com/netdevops/live>

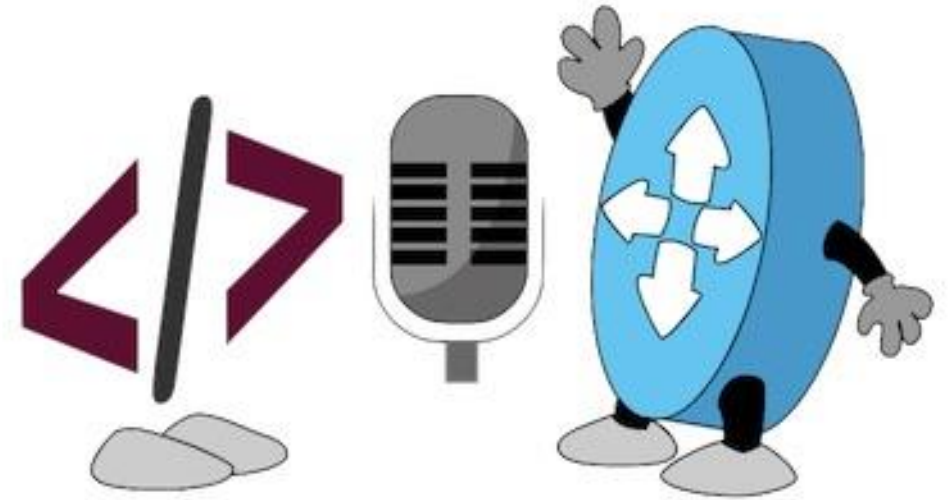


<http://cs.co/ndl>

Help us track NetDevOps Live Interest!

# What are we going to talk about?

- Brainstorming ideas
  - Whiteboard 101
- Selecting your top candidates
  - Everyone gets a say
  - Weight results based on ease and risk
- Map out the workflow
- Choose your tools
- Demo



# Before we start...

- ✓ “Perfect is the enemy of good”
- ✓ Choose the best tool for the job... and your skills

Brainstorming ideas

# Whiteboard 101

- Gather multiple people for first brainstorm
- Don't filter suggestions at first
- To encourage ideas, ask questions:
  - What tasks do you spend the most time on weekly?
  - What have been causes of recent issues?
  - What tasks do you most dislike about your job?
- If you are still stuck, browse DevNet Code Exchange for inspiration  
<https://developer.cisco.com/codeexchange>

# Whiteboard ideas

- Managing ACLs on firewalls
- We have too many different software versions in use
- Making a change across 100 devices is slow
- Testing after a maintenance takes much longer than the maintenance itself
- We need to audit and enforce compliance against a baseline “gold” config

Selecting your top  
candidates



# Whiteboard ideas

- Managing ACLs on firewalls ||
- We have too many different software versions in use ~~||||~~ | This is a great project, but advanced
- Making a change across 100 devices is slow ||
- Testing after a maintenance takes much longer than the maintenance itself ~~||||~~ Read Only
- We need to audit and enforce compliance against a baseline “gold” config ||| Audit is RO

Map out the workflow

# Ask “How would I do this manually”

- Testing after a maintenance takes much longer than the maintenance itself:
- SSH to each router at the site, look at OSPF/BGP and make sure it “looks about right”
- Ping from a handful of devices to a handful of other devices
- “Show log” and look for any recent unexpected entries

# Ask “How would I do this manually”

- We need to audit and enforce compliance against a baseline “gold” config
- Build list of baseline config commands in notepad
- Build list of devices to connect to, and connect to each one at a time
- Show running config, and manually compare each line in notepad against existing config
- Look for any additional configs that should not be allowed (such as extra users or logging servers)
- Build list of changes needed in a text file and open a ticket to make changes during next change window

Choose your tools

# Which vehicle would win in a race?



# So what tools are in your toolbox?

- Network controllers (DNAC/APIC) – Network automation out of the box
- Genie CLI – Run as a free-standing app with no code required.
- Ansible – A relatively easy to use configuration management tool with no Python experience needed
- NAPALM – A convenient Python library that abstracts different devices into a common set of functions
- NSO – Cisco Network Services Orchestrator CLI based device templates are a great way to get started automating across diverse platforms
- Python + requests – Using the requests module within Python allows easy interaction with REST based APIs

# Now, what protocol would you like to use?

- As with tools, there are multiple protocols available for automation.
- RESTCONF – Newer platforms tend to offer a RESTCONF API. When a tool supports RESTCONF, that option will often outperform the other options, and could be a great choice
- NETCONF – Even more common than RESTCONF, NETCONF sends payloads via SSH, but in XML format, making it a reliable and robust option.
- CLI – The tools above generally offer at a minimum CLI-based automation. In that case, the tool must parse the text based CLI responses and present them to the script for processing



# Let's choose a tool

- Testing after a maintenance takes much longer than the maintenance itself:
- This use case turns out to be the easiest by far. It is also low risk since it is only reading information. To solve it, you could leverage a tool like Genie command line tool.
- Genie leverages pyATS behind the scenes, but you can use it to gather operational state of the network without writing any code
- If you do know Python and wish to extend this use case further, you could use the Genie Python library to handle data gathering as part of a broader script

# Netmiko vs. Genie CLI

Netmiko:

```
#!/usr/bin/env python
from netmiko import ConnectHandler
from getpass import getpass

ip_addr = raw_input("Enter IP Address: ")

device = {
    'device_type': 'cisco_ios',
    'ip': ip_addr,
    'username': 'admin',
    'password': getpass(),
    'port': 22,
}

net_connect = ConnectHandler(**device)
output = net_connect.send_command_expect("show version")

print
print '#' * 50
print output
print '#' * 50
print
```

Genie CLI:

```
genie learn config routing --testbed-file lab1.yaml --output
myout/output1
```

Let's try it out

# Let's choose a tool

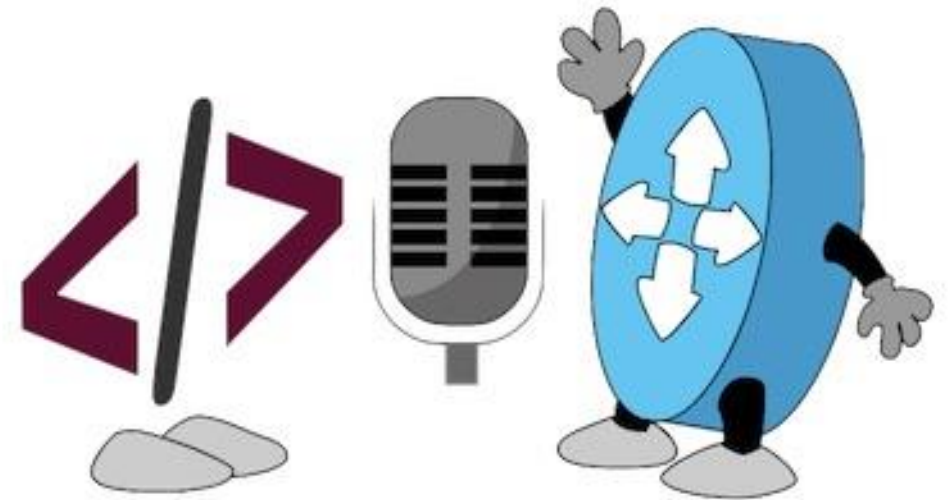
- We need to audit and enforce compliance against a baseline “gold” config
- Start with read-only (audit), and worry about enforcement later
- If you know Python, there are several options such as NAPALM
- If you don't know Python, or if you do but want a simple solution, there are a number of configuration management tools that do this very well. We will use Ansible for our example
- In Ansible, you can define all of the config information you wish to enforce, but run it in “check mode” to audit compliance

Let's try it out

Summing up

# What did we talk about?

- Brainstorming ideas
  - Whiteboard 101
- Selecting your top candidates
  - Everyone gets a say
  - Weight results based on ease and risk
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# Webinar Resource List



- Docs and Links
  - <https://developer.cisco.com/python>
- Learning Labs
  - Laptop Setup <http://cs.co/lab-dev-setup>
  - Ansible for IOS XE <https://developer.cisco.com/learning/modules/intro-ansible-iosxe>
  - pyATS and Genie <https://developer.cisco.com/learning/modules/pyats-genie>
- DevNet Sandboxes
  - Cisco DNA Center Always On <http://cs.co/sbx-dnac-ao>
  - IOS Always On <http://cs.co/sbx-iosxe>
- Code Samples
  - <http://cs.co/etcode>

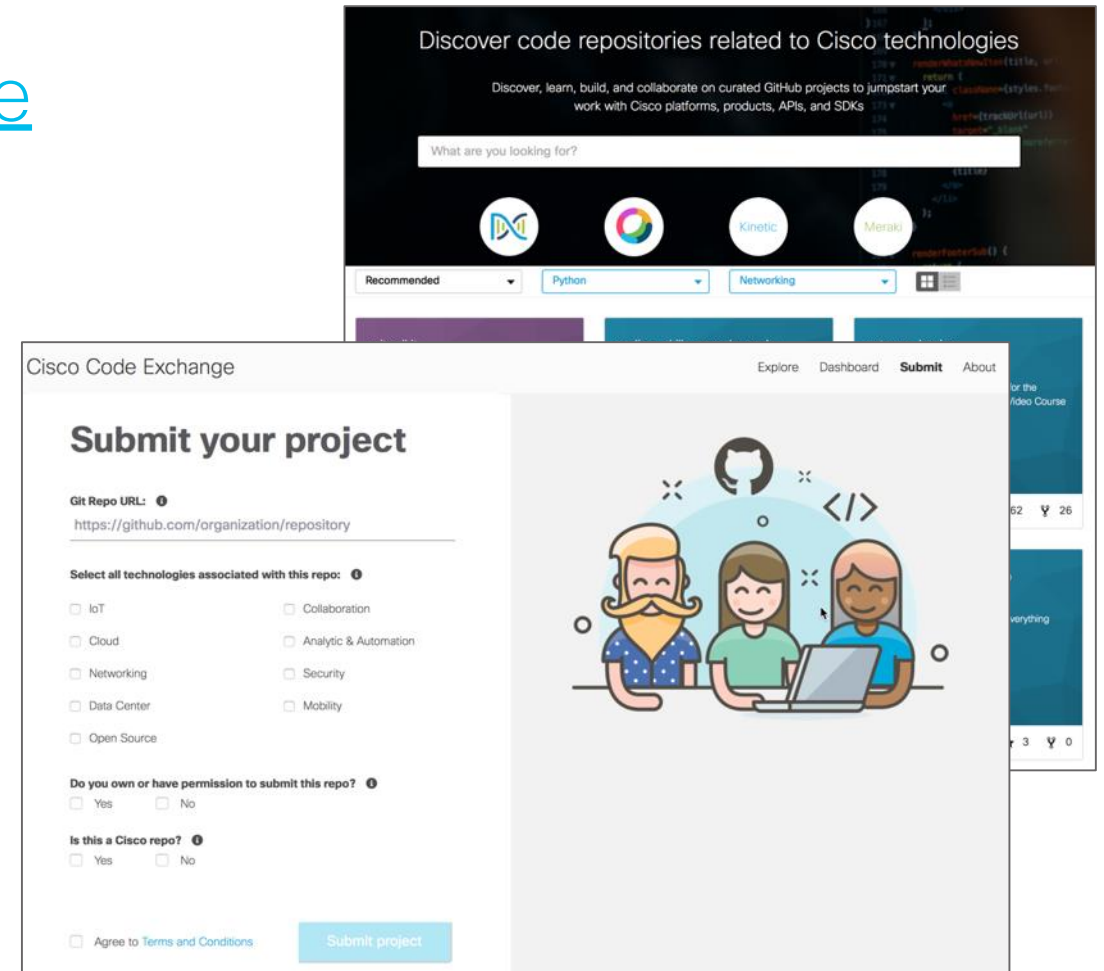


# NetDevOps Live! Code Exchange Challenge

[developer.cisco.com/codeexchange](https://developer.cisco.com/codeexchange)

***Hold a whiteboard session for your team. Pick one task that involves only reading information, and test it using Genie CLI, Ansible, or the tool of your choice***

*Example: Back up configs from your IOS XE devices to a local file using Ansible.*



The image shows two overlapping screenshots of the Cisco Code Exchange website. The top screenshot is a search interface with the heading "Discover code repositories related to Cisco technologies". It includes a search bar with the placeholder text "What are you looking for?", a filter menu with "Recommended", "Python", and "Networking" selected, and several circular icons representing different technologies. The bottom screenshot is the "Submit your project" form. It contains the following fields and options:

- Git Repo URL:** A text input field with the placeholder "https://github.com/organization/repository".
- Select all technologies associated with this repo:** A list of checkboxes for various categories: IoT, Cloud, Networking, Data Center, Open Source, Collaboration, Analytic & Automation, Security, and Mobility.
- Do you own or have permission to submit this repo?:** Radio buttons for "Yes" and "No".
- Is this a Cisco repo?:** Radio buttons for "Yes" and "No".
- Agree to Terms and Conditions:** A checkbox.
- Submit project:** A blue button.

On the right side of the bottom screenshot, there is an illustration of three people (two men and one woman) sitting around a laptop, with a GitHub logo and code symbols above them.

# Looking for more about NetDevOps?

- NetDevOps on DevNet [developer.cisco.com/netdevops](https://developer.cisco.com/netdevops)
- NetDevOps Live! [developer.cisco.com/netdevops/live](https://developer.cisco.com/netdevops/live)
- NetDevOps Blogs [blogs.cisco.com/tag/netdevops](https://blogs.cisco.com/tag/netdevops)
- Network Programmability Basics Video Course [developer.cisco.com/video/net-prog-basics/](https://developer.cisco.com/video/net-prog-basics/)



Got more questions? Stay in touch!



**Eric D. Thiel**



[erthiel@cisco.com](mailto:erthiel@cisco.com)



[@securenetwrk](https://twitter.com/securenetwrk)



<http://github.com/securenetwrk>



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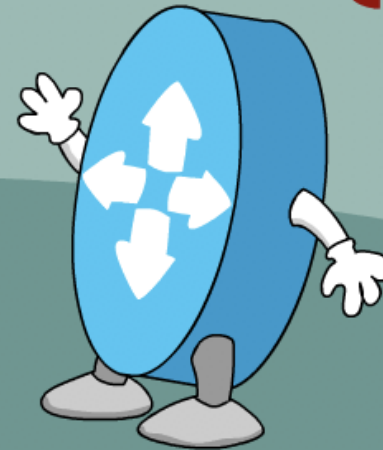
[facebook.com/ciscocodevnet/](https://facebook.com/ciscocodevnet/)



<http://github.com/CiscoDevNet>



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