

Best Practices and Lessons Learned using GitHub for Corporate Open Source

Charles Eckel / Cisco DevNet





Agenda

- Goal and reality
- GitHub guidance
 - Orgs
 - Membership and permissions
 - Contributions
 - Licensing and copyrights
 - Navigation
- Conclusion



 Collaborate on code and content with the extended and growing DevNet community inside and outside of Cisco



What we have - Wild West

- GitHub is easy, free, way to share code
- Anyone can create a GitHub org
 - Dozens of "Cisco" GitHub orgs
 - Some have no description
 - Several host healthy projects
 - Others are dormant
- Many repos have no license
- Hard to determine who to contact



Cisco Systems · GitHub

https://github.com/CiscoSystems + GitHub is where people build software. More than 28 million people use GitHub to discover, fork, and contribute to over 79 million projects.

Cisco DevNet · GitHub

In this repository, various basic examples, samples apps and explanations to start using the REF API in order to develop your own cloud client using digital TV services. Once you're connected to Cisco sandbox, the client application has access to Live channel list, vod catalogue, booking and recording features. You've visited this page many times. Last visit: 227/18

Cisco Data Center · GitHub

https://github.com/datacenter * Ansible modules for managing Clsco ACI fabrics. clsco aci apic sdn ansible clsco-aci-fabrics. ... Fire up your network with built-in poap on your Clsco Nexus switches and ignite.

GitHub - cisco/libest

https://github.com/cisco/libest

Contribute to libest development by creating an account on GltHub.

GitHub - cisco/openh264: Open Source H.264 Codec https://github.com/cisco/openh264 + Open Source H.264 Codec. Contribute to openh264 development by creating an account on GitHub

Cisco Spark · GitHub

https://github.com/ciscospark
GitHub is where people build software. More than 28 million people use GitHub to discover, fork, and contribute to over 79 million projects.

GitHub - cisco/joy: A package for capturing and analyzing network flow ... https://github.com/cisco/joy -

joy - A package for capturing and analyzing network flow data and intraflow data, for network research, forensics, and security monitoring.

APIC: Introducing the ACI Toolkit on GitHub | Cisco Communities

https://communities.cisco.com/community/.../introducing-the-aci-loolkit-on-github Oct 27, 2014 - The Ciseo Application-Centric Infrastructure (ACI) team is excited to announce the release of the ACI Toolkit, a new open source project designed to help.

Orgs and repos

GitHub Organization (a.k.a. Org)

- Shared accounts where businesses and opensource projects can collaborate across many projects
- Owners and administrators manage member access to data and repos
- Free for unlimited collaborators on unlimited public repos
 - Pay for private repos, additional features
- Variety of roles that grant different levels of access



One Org vs. Multiple Orgs

- GitHub does not support nested organizations
- Single org simplifies navigation, search, metrics
- Governance is the key factor
 - All repos in an org should have common governance



Cisco DevNet GitHub Org

- Description
 - Place for DevNet community to access sample code and collaborate on open source projects that are used in some way in DevNet
- Email
 - devnet-githubowners@cisco.com

Search or jump to	Pull requests Issues Marketplace Explo	ore 🌲 + - 👰 -
Cisco DevNet Place for DevNet community to http://developer.cisco.com	access sample code and collaborate on open sourc devnet-github-owners@cisco.com	ce projects that are used in some way in DevNet
Pinned repositories		Customize pinned repositories
 ⇒ yang-explorer An open-source Yang Browser and RPC Builder Application ● Python ★ 176 ♀ 68 	awesome-webex A curated list of Cisco Webex resources for developers ★ 98 ♀ 30	 ≡ coding-skills-sample-code Sample code for the Cisco DevNet Coding Skills Learning Labs Python ★ 83 ¥ 87
 = apic-em-samples-aradford This is a collection of sample scripts and tools for APIC-EM ● Python ★ 48 ♀ 35 	■ opendaylight-sample-apps Sample applications for use with OpenDaylight (https://www.opendaylight.org/) ● HTML ★ 24 ∛ 30	 ■ ydk-py Python SDK generated from YANG data models. ● Python ★ 101 ¥ 31
ios	Туре:	All - Language: All -
19 results for repositories matching ios pyats-ios-sample	🔀 Clear filter	Top languages Python • HTML • JavaScript • Makefile • Java
pyATS Example script for Cisco IOS Testbed cisco test-automation routers ccnp cc Python ★ 10	na ccie pyats	Most used topics Manage learning-labs cisco

Public vs. Private

- Non members cannot see private repos or private people
- All repos should be public, eventually
- May be private until ready to be made public
 - E.g. until content is solid, product has released, licensing is determined
 - Best to make public asap
- All people should be public
 - Include name by which you are known in your GitHub profile

Search or jump to	7 Pull requests Issues Marketplace Expl	lore 🧳 + - 👰 -
Cisco DevNet Place for DevNet community to http://developer.cisco.com	access sample code and collaborate on open sour devnet-github-owners@cisco.com Teams 59 III Projects 1 🔅 Settings	ce projects that are used in some way in DevNet
Pinned repositories		Customize pinned repositories
 ≡ yang-explorer An open-source Yang Browser and RPC Builder Application ● Python ★ 176 ♀ 68 	 ≡ awesome-webex A curated list of Cisco Webex resources for developers ★ 98 ♀ 30 	 ≡ coding-skills-sample-code Sample code for the Cisco DevNet Coding Skills Learning Labs ● Python ★ 83 ♀ 87
💭 Features Business Explore M	larketplace Pricing Search	Sign in or Sign up
DEVNET DEVNET Place for DevNet community to http://developer.cisco.com	o access sample code and collaborate on open sour I devnet-github-owners@cisco.com	rce projects that are used in some way in DevNet
Repositories 318 Repople 10	Projects 0	

Pinned repositories

ania am complet prode

yang-explorer	awesome-webex	coding-skills-sample-code
An open-source Yang Browser and RPC Builder Application	A curated list of Cisco Webex resources for developers	Sample code for the Cisco DevNet Coding Skill Learning Labs
● Python 🔺 176 🛛 😵 68	★ 98 ¥ 30	● Python ★ 83

velle m

opendeulight comple op

What is appropriate?

- Sample code related to a given Cisco product, API, and/or technology space
- Sample applications illustrating use of Cisco and non-Cisco APIs
- Integrations with Cisco and non-Cisco products and platforms
- Open source projects that are incorporated into or are used with Cisco products and solutions
- DevNet Learning Labs
- DevNet Sandboxes



What is NOT appropriate?

- Repo without any clear ties to DevNet
- DevNet cloud platform
- Sandbox back end
- Learning Lab back end
 - Exception exists as a private repo in CiscoDevNet, needs to be external to make use of AWS build servers, could move to enterprise GitHub if switched to use internal build servers



Archives

- Archive repos that are inactive or inappropriate
 - GitHub provides option to archive a repo
 - Mark as archived and read-only
- Delete useless/empty repos



Membership and permissions

Membership/Roles

- Owners
- Members
- Outside Collaborators





- Administrative access to everything in GitHub org
- Limit to few people in your company/organization
- Currently
 - 28 owners, all are Cisco employees
 - MUST enable two factor authentication
- Proposed
 - 10 or less, Cisco DevNet stakeholders
 - Current members of DevNet team only



Members

- GitHub default role
- Currently
 - 250, mostly Cisco employees, some non-Cisco
- Proposed
 - Limit to those who need to see private repos
 - Restrict repo creation to owners only
 - By default, all members can create repos
 - Request to become a member or have a repo created
 - Email owners (e.g. <u>devnet-github-owners@cisco.com</u>)



Outside Collaborator

- Not a "member", but has Read, Write, or Admin permissions to one or more repositories
- Had 100+, mostly non-Cisco
- Converted to members, if appropriate
- Do not use going forward KISS



Teams

- Group of members, reflect org's structure, cascading access permissions
- Currently
 - 59 teams, some with 50+ users
 - Most associated with a specific repo or set of repos
- Proposed
 - Not needed? Repo level permissions/notifications seems sufficient
 - Teams based on function or task, not Cisco/DevNet structure
 - Only owners create teams, may appoint non-owners as team maintainers
 - Team maintainers have complete control of team
- One model used elsewhere in Cisco is one team per repo
 - Team maintainer adds members to team
 - All team members are committers to that repo



Permissions

- Repos are main guardrail, but also main source of freedom
- Only owners can create repos
- Within a repo, anyone can have Admin/Write/Read permissions
- Owners can assign non-member as an Admin of a repo
- Admin has complete control of repo for which they are Admin
 - By default, Admin can change repo visibility between public and private
 - Restrict this ability to owners only



Contributions

Contributing to DevNet

- Welcome and encourage contributions
- Do NOT need to be "member" of GitHub org
- Each repo MUST have clear policy for how to contribute and what is required to become a committer

- CONTRIBUTING.md file, or equivalent in README

- Contributions take many forms, from simply "starring" a repo to creating a pull request with a proposed code change
- Preferred means of contributing can vary from each repo
- Important to read the CONTRIBUTING file and contribute accordingly



Contribute a new repo

- Create a new repo, or transfer ownership of an existing repo to CiscoDevNet
- Review templates provided, make sure your repo meets requirements and is aligned with conventions highlighted in template
- Contact owners of the CiscoDevNet org (email <u>devnet-github-owners@cisco.com</u>) for guidance regarding repo you would like to contribute



Template and guidelines for various types of repos

- Sample code
- Sample application
- Learning Lab
- API or SDK for existing Cisco product
- Upstream contribution to open source project
- New open source project



Repo Templates

- Illustrate appropriate use of README, LICENSE, CONTRIBUTING files
- Automated process that asks questions and generates repo based on answers
- Work in progress for how Learning Labs, Modules, Tracks should use CiscoDevNet repos
 - <u>https://github.com/CiscoDevNet/devnet-guidelines</u>
- Easy to copy/clone template and use as basis for new repo
- Make easy to do "right" thing



DevNet Writing Guidelines (Public)

Welcome to the DevNet Writing Guidelines. This repo contains DevNet's guidelines on creating learning labs, code samples, slides and setting up sandboxes for labs.

The topics below are some of the topics of most interest to newbies. For more the complete set of writing guidelines see this repo's wiki page.

On this page

Learning Labs How do I author a learning lab? Templates Code Conventions Author Scripts Recommended Tools

Learning Labs

The source markdown for all of DevNet's learning labs are stored in the repos of the CiscoDevNet organization.

If you want to create and publish a lab on the DevNet site, you must commit the lab and its associated files to a repo within the CiscoDevNet organization. The lab's markdown, images, JSON metadata, etc must exist in a certain directory



Transfer existing repo

- Contact owners of CiscoDevNet
 - email devnet-github-owners@cisco.com
- Add a CiscoDevNet owner as contributor to your repo with admin privileges
 - Your repo needs to exist within an org for this to work
 - Free to create new org for public repos and transfer repo to it
- CiscoDevNet owner
 - Transfers ownership of your repo to CiscoDevNet
 - Gives you admin privileges to your repo



Long lived forks

Sometimes helpful to have long-lived fork of existing repo with intent to eventually commit changes upstream

- Add note to README.md articulating why fork exists
- Deemed "least bad" way to transparently identify why CiscoDevNet has forks of open source repos

README.md

ild failing coverage 70% docs passing

DO NOT COMMIT THIS TEXT BLOCK UPSTREAM

This is a **temporary fork**, maintained by @einarnn, of the main ncclient repository that has initial support for pre-RFC IETF YANG Push functionality as implemented in IOS XE 16.6.1 onwards. This functionality will be upstreamed sometime after the the IETF YANG Push drafts achieve RFC status.

Recommended installation process is to first install vanilla ncclient via pip, and then install this fork over the top:

pip install --upgrade git+https://github.com/CiscoDevNet/ncclient.git

Please feel free to submit PRs or get in touch with @einarnn with any problems, queries or suggestions.

ncclient: Python library for NETCONF clients

ncclient is a Python library that facilitates client-side scripting and application development around the NETCONF protocol. ncclient was developed by Shikar Bhushan. It is now maintained by Leonidas Poulopoulos (@leopoul)

Docs: http://ncclient.readthedocs.org

PyPI: https://pypi.python.org/pypi/ncclient

Requirements:

version >= Python 2.6 or Python3



Licensing and copyrights

Corporate Licensing Challenges

- As a large commercial company, some code we want to share cannot be fully open sourced due to current business strategy
- Not every useful bit of code we have to release has any general community value - some is beneficial only if you are a paying Cisco customer
- Want to enable lightweight, engineer-friendly, open source-like experience for customer code where true open source isn't the right fit, without discouraging open source or confusing the ecosystem



Cisco Sample Code License

- <u>Cisco Sample Code License</u> is NOT an open source license
 - Similar to open source but is restricted to uses "with" a Cisco product or service
 - NOT intended to substitute or replace open source
 - Open door to sharing code previously available only to partners under negotiated license
- When appropriate to use:
 - Want to limit some use cases; for example, want to expose product code to allow start-ups to build feature enhancement but not permit competitors to copy feature or make derivative features
 - Code can effectively be used only by paying customers, e.g., tools or SDKs for a subscription-based enterprise product



Rationale

- No downside to community since no real utility to noncustomers
 - Better to not overuse or abuse open source where not truly open source in character
 - Enables sharing of more code that product team would not have otherwise shared
- Otherwise lean towards open source, generally better for everyone
 - Clearly delineating and separating Cisco product sample code under this license and real open source is key to avoiding confusion and negative optics



Open Source Licenses

- BSD 3-clause and Apache 2.0 preferred
 - Both grant sufficient permissions with few requirements
 - Copyleft limits sample code use cases for many customers and partners
- Alignment with any applicable licenses has value
 - Multiple licenses on the same code can unnecessarily complicate things
- BSD 3-clause for smaller efforts, sample code
 - Low likelihood of forming significant external community or future use in products
 - Shorter, simpler, no express patent license
- Apache for larger/more important efforts
 - Intend to form a broad external community or use in products
 - Longer, more "legalistic," express patent rights grant
 - Requires more due diligence around potential patents, overkill for sample code



Beyond Licensing

- Determining the "right" license is often just the beginning
- Clear, lightweight framework for contributing back
 - Overhead of using CLA and even DCO outweigh any benefits for sample code
 - Prefer simple CONTRIBUTING file describing process
- Goal make licensing as self service as possible

- Help devs know, want, and be able to do the right thing



Navigation

Quick and dirty

- Use GitHub APIs to auto generate pages
 - <u>http://ciscodevnet.github.io/#/sample-code</u>
- Scan all repos in list of known Cisco GitHub orgs
- Check for presence of README, LICENSE, activity
- Add "How do I get my project listed?" to make contacts and rules known



Code Exchange





Filters and search to find repos





Repo in Code Exchange and in GitHub

disco DEVNET	CE Me
Cisco Code Exchange	Explore Dashboard Submit About
arrosid/netconf-ip-address	⊙ 1 ★ 1 ℃ 1 View on Github
netconf-ip-address Configure IP Address Automatically on IOS XE devices using Python & NETCONF This repository contains scripts to configure IP Address on Cisco IOS XE	OWNER arrosid CONTRIBUTOR arrosid Categories
devices automatically using Python and NETCONF. We use the ncclient python library in this script.	Networking Open Source LANGUAGES

- ncclient 0.6.3+
- Python 2.7 or Python 3.4+
- setuptools 0.6+
- Paramiko 1.7+
- lxml 3.3.0+
- libxml2
- libxslt

Supported Devices

This script tested with Cisco IOS XE devices

⊙ 1 ★ 1 β² 1
View on Github
OWNER
CONTRIBUTOR arrosid cckelcu
CATEGORIES Networking Open Source
LANGUAGES Python
LICENSE MIT License

arrosid / netconf-ip-addr	ress		Watch ▼ 1	★Unstar 1 [%] Fork 1
<> Code ① Issues 0 11	Pull requests 0	Projects 0 📰 Wiki	III Insights	
onfigure IP Address Automati	cally on IOS XE usi	ng Python & Netconf		
T 19 commits	រ៉ូ / 1 branch	\bigcirc 0 releases	2 contributors	a <u>t</u> a MIT
Branch: master - New pull reque	est		Create new file Upload files Fin	nd file Clone or download 🔻
arrosid Update README.md			Late	est commit 58a791e 9 days ago
	Create LICEN	SE		10 days ago
README.md	Update READ	ME.md		9 days ago
Topology.png	add topology	and modify the READMI.md		15 days ago
configure_ip_address.py	Correct the in	dentation		15 days ago
inventory.yml	return the invo	entory.yml file		15 days ago
ip_address_template.xml	remove <conf< td=""><td>ig> and statement fro</td><td>om the template</td><td>15 days ago</td></conf<>	ig> and statement fro	om the template	15 days ago
III README.md				
Hand DEVNET published				
netconf-ip-a	ddress			

Requirements

Add your repo to Code Exchange

CE Me

Cisco Code Exchange

Explore Dashboard Submit About

Submit your project

Git Repo URL: ()

ps://github.com/CiscoDevNet/opendaylight-sample-apps

Select all technologies associated with this repo: 0



Open Source

Do you own or have permission to submit this repo?

🗹 Yes 🗌 No

Is this a Cisco repo?

🗸 Yes 🗌 No





Conclusion

Next Steps

- Create templates
- Determine set of "Topics"
- Security vulnerability handling
- Establish and track metrics
- Make governance of CiscoDevNet GitHub org public



Questions?

- DevNet: <u>https://developer.cisco.com/</u>
- GitHub: <u>https://github.com/CiscoDevNet</u>
- Code Exchange: <u>https://developer.cisco.com/codeexchange/</u>
- Join DevNet:

https://developer.cisco.com/join/osseu18







Thank you!

THE LINUX FOUNDATION OPEN SOURCE SUMMIT EUROPE

