

Grab your favorite beverage and a stack of
your favorite desert

We will begin in a little bit



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NetBox & Ansible

Josh VanDeraa



Josh VanDeraa

- 16+ year network veteran
- Network Automation Engineer with Network to Code (NTC)
- Started automating networks with Python, moved to Ansible with 2.0 release
- Built multiple automation frameworks with NetBox as the Source of Truth (SoT)



 @vanderaaj

 <https://www.linkedin.com/in/josh-vanderaa/>

Network to Code

- Network to Code is a network automation solution provider
 - We bridge the gap between Software Development, DevOps, and Network Engineering teams
-
- Many articles posted on NTC Mag – <https://blog.networktocode.com>
 - <https://www.networktocode.com>



/company/network-to-code/



@networktocode

>>> network .toCode()

Agenda

- Introduction
- Source of Truth
- NetBox as Source of Truth -> Ansible
 - NetBox Inventory Plugin
 - NetBox Collections
- Filters to audit the source of Truth



Source of Truth

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Source of Truth

- Single source of authority about a piece of data
- Not likely to be a single source for all pieces of data
- Source of Truth aggregation

Data Domain	Source of Truth
Device Inventory	 netbox
IP Addresses	 netbox / IPAM
Tenant / Client Details - clients - addresses - contracts	Service Now / CMDB

What is NetBox

- Defines the intended state of the network
- Free and Open Source Software
- Started by Network Engineering team at DigitalOcean
 - Domain-specific SoT for NetOps
- **REST API**

Function	Component
HTTP service	nginx or Apache
WSGI service	gunicorn or uWSGI
Application	Django/Python
Database	PostgreSQL 9.4+
Task queuing	Redis/django-rq

What is NetBox

- **Devices** - Types of devices and where they are installed
- **Equipment racks** - Organized by group and site
- **Connections** - Network, console, and power connections among devices
- **Data circuits** - Long-haul communications circuits and providers
- **IP address management (IPAM)** - IP networks and addresses, VRFs, and VLANs
- **Virtualization** - Virtual machines and clusters

What NetBox is not

- Network monitoring
- DNS server
- RADIUS server
- Configuration management
- Facilities management

Additional Features

- Custom Scripts
- Reporting
- Webhooks
 - Templated
- Plugins [beta]
 - New in 2.8, released on 2020-04-13

Script Data

Location Number	<input type="text"/>	Location Number
Circuit	<input type="text"/>	-----
MDF Rack Height	<input type="text"/>	13 Height of the MDF Rack in U count
Security Appliance Model	<input type="text"/>	MX64 Model of Security Appliance
Switch Model	<input type="text"/>	MS120 Model of Switch
MDF Switch Count	<input type="text"/>	2 Number of access switches to create
Meraki Organization ID	<input type="text"/>	NTC-MN01 Meraki Org ID to add the network to

Build in Meraki Dashboard
Build the Meraki Environment

Commit changes
Commit changes to the database (uncheck for a dry-run)

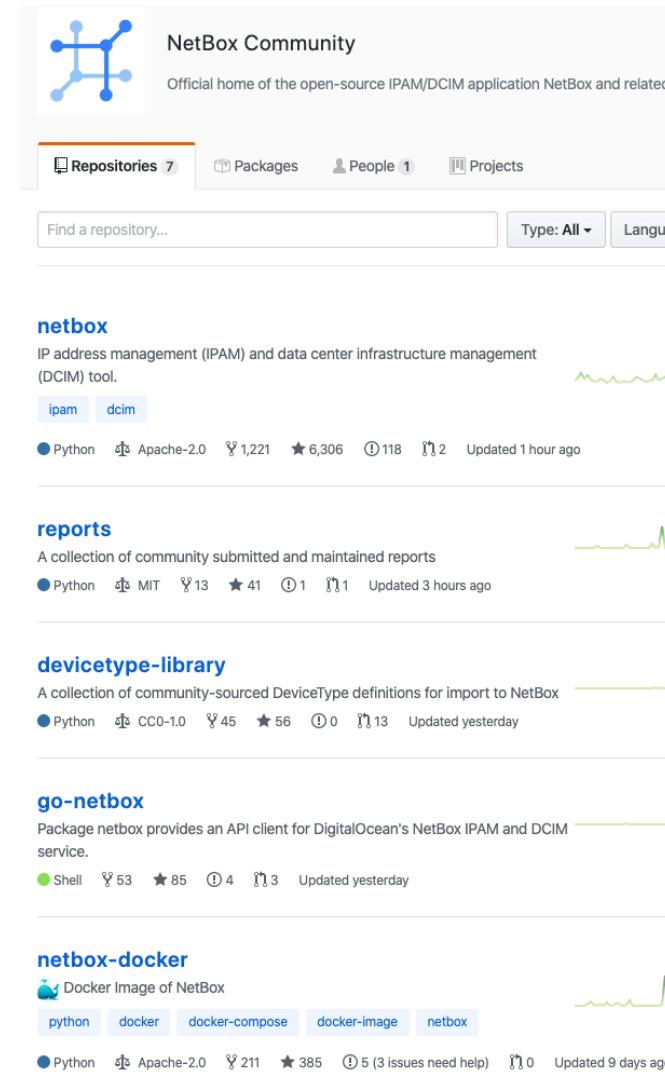
Custom Script



Webhook

NetBox Community

- Github
 - netbox-community
- Assistance:
 - Google User Group
- Documentation
 - <https://netbox.readthedocs.io>
- **Network to Code Slack**
 - slack.networktocode.com
 - Community around Network Automation
 - #NetBox
 - #Ansible
 - #Python



The screenshot shows the GitHub organization page for "NetBox Community". The header features the organization's logo, which is a blue network graph icon, and the name "NetBox Community". Below the header, it says "Official home of the open-source IPAM/DCIM application NetBox and related". There are tabs for "Repositories" (7), "Packages", "People" (1), and "Projects". A search bar is present with the placeholder "Find a repository...", and filters for "Type: All" and "Language".

netbox
IP address management (IPAM) and data center infrastructure management (DCIM) tool.
[View profile](#) · [Code](#) · [Issues](#) · [Pull requests](#) · [Commits](#) · [Patches](#) · [Topics](#)
Python Apache-2.0 1,221 stars 6,306 forks 118 issues 2 updated 1 hour ago
ipam dcim

reports
A collection of community submitted and maintained reports
[View profile](#) · [Code](#) · [Issues](#) · [Pull requests](#) · [Commits](#) · [Patches](#) · [Topics](#)
Python MIT 13 stars 41 forks 1 updated 3 hours ago

devicetype-library
A collection of community-sourced DeviceType definitions for import to NetBox
[View profile](#) · [Code](#) · [Issues](#) · [Pull requests](#) · [Commits](#) · [Patches](#) · [Topics](#)
Python CC0-1.0 45 stars 56 forks 13 updated yesterday

go-netbox
Package netbox provides an API client for DigitalOcean's NetBox IPAM and DCIM service.
[View profile](#) · [Code](#) · [Issues](#) · [Pull requests](#) · [Commits](#) · [Patches](#) · [Topics](#)
Shell 53 stars 85 forks 3 updated yesterday

netbox-docker
Docker Image of NetBox
[View profile](#) · [Code](#) · [Issues](#) · [Pull requests](#) · [Commits](#) · [Patches](#) · [Topics](#)
Python Apache-2.0 211 stars 385 forks 5 (3 issues need help) issues 0 updated 9 days ago

Demo

- Look at NetBox
- Populating NetBox with **Ansible Collections**
- Looking into NetBox Inventory

	Task	Inventory Source
Playbook 01	Add devices to NetBox with temporary IP address	Static Inventory
Playbook 02	Add full interface information from dynamic inventory	Dynamic Inventory – Ansible Inventory Plugin (NetBox)
Playbook 03	Audit NetBox / Device Information	Dynamic Inventory – Ansible Inventory Plugin (NetBox)

Ansible NetBox Collections

```
- name: "Test NetBox modules"
connection: local
hosts: localhost
tasks:
  - name: Task 1 - Create with NameSpace
    netbox.netbox.netbox_device:
      netbox_url: http://netbox03
      netbox_token: {{ netbox_token }}
      data:
        name: Test66
        device_type: Cisco Test
        device_role: Core Switch
        site: Test Site
        status: Staged
        state: present
```

Ansible NetBox Collections

```
# INSTALLATION:  
ansible-galaxy collection install netbox.netbox  
  
- name: "Test NetBox modules"  
  connection: local  
  hosts: localhost  
  collections:  
    - netbox.netbox  
  tasks:  
    - name: Task 1 - Create with collections key  
      netbox_device:  
        netbox_url: http://netbox03  
        netbox_token: {{ netbox_token }}  
        data:  
          name: Test66  
          device_type: Cisco Test  
          device_role: Core Switch  
          site: Test Site  
          status: Staged  
          state: present
```

Five Minute
Break

Sign up for the NTC Public Slack

www.ntcslack.com

NetBox Day
Virtual Event
2020-05-19

<https://www.papercall.io/netbox-day>

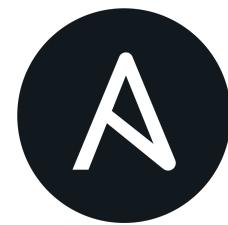
Extending Ansible through Filters

Josh VanDeraa



Filter Agenda

- Filter Plugins
 - What are filters?
 - Where do I define filters?
 - How do I create a custom filter?
 - When to use a filter?



What are Filters?

- Manipulate data in some fashion
- Filters are written in Python
- Occurs on the Control Node



Where to put filters?

- Defined in your ansible.cfg
`filter_plugins = plugins/filter`
- In the root project directory, directory called
`filter_plugins`

```
└── main.yml
└── README.md
└── ansible.cfg
└── filter_plugins/
└── group_vars/
└── host_vars/
└── netbox_inventory.yml
└── start_inventory
└── tests/
```

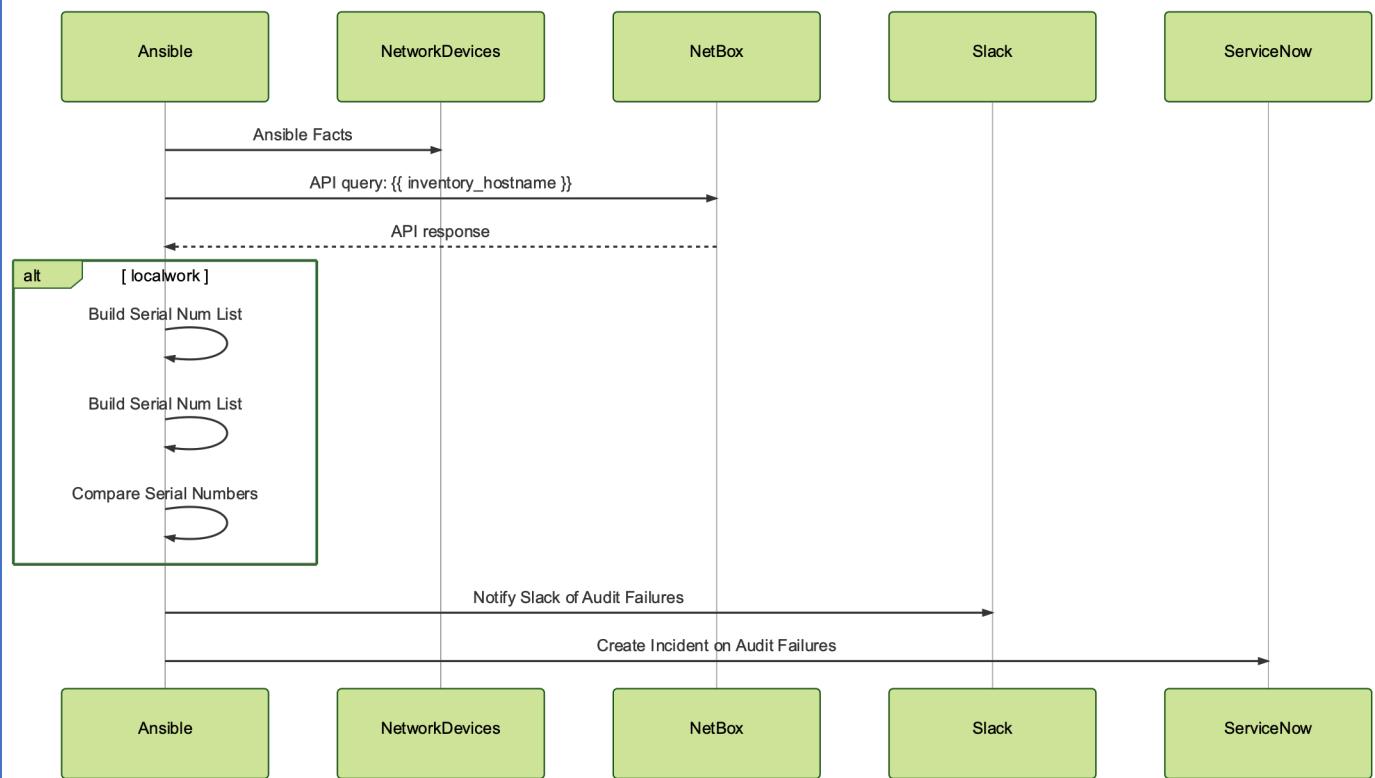
```
└── main.yml
└── README.md
└── ansible.cfg
└── group_vars/
└── host_vars/
└── netbox_inventory.yml
└── plugins/
    └── filter
└── start_inventory
└── tests/
```

Filters

- Build out Filters
 - MAC Address Conversion
 - Get Device Role from Hostname
 - Build IPv4 address from Ansible Facts
 - Get Interface ID
- Auditing Filters
 - Comparing serial numbers
 - Get Serial Numbers from Ansible Facts

Audit of Devices

- NetBox is a Source of Truth for devices



NetBox

sw-1

- sw-1 has an additional unit in a stack
- Lab version of sw-1 does not have a second unit, so only one serial number

netbox03

Organization Devices IPAM Virtualization Circuits Power Secrets Other

Search admin

netbox03

sw-1 All Objects Search

Devices

Name	Status	Tenant	Site	Rack	Role	Type	IP Address
sw-1	Active	—	MINNESOTA01	MN_01	Switch	Cisco IOSv	10.50.50.254
sw-1:2	Active	—	MINNESOTA01	MN_01	Switch	Cisco IOSv	

Refine search

Search Results

Devices 2

netbox03 (v2.7.11) 2020-04-16 17:55:14 UTC Docs API Code Help

Connect with us

- On the Web
 - <https://blog.networktocode.com>
 - <https://www.networktocode.com>
 - <https://www.josh-v.com>
 - https://github.com/jvanderaa/ansible_netbox_demo
- Network to Code Slack
 - www.ntslack.com
- LinkedIn
 - <https://www.linkedin.com/company/network-to-code/>
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