ABSTRACT

A lightning talk on one engineer's perspective on how to pick network automation and SoT platforms. Topics include "NautoBox", Nornir, Ansible, Netmiko, and unnamed vendors' "One True Answer" for your automation needs. Disclaimer: There isn't only one answer.

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Selecting a Network "Source of Truth"

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Quick Review: Why do we want a Source of Truth?

- The first step to structured network automation and infrastructure as code.

- Your intent is retrievable via one application.

- API-friendly and can be queried or populated by scripts and software.

- Data is normalized.

- What we strive for is a "Single Source of Truth", or "Source of Intent"

Contenders for Single Source of Truth

- NetBox

- Nautobot

- Vendor-provided software, like Cisco DNAC, NSO, or Arista CloudVision.
  - Only a "source of truth" for the specific things it orchestrates.
  - Part of a larger picture.

Disclaimer

- Shannon is not a super expert in NetBox nor Nautobot.

- Shannon has spent the vast majority of her time in NetBox.

- The following information should be considered the "Fallible Perspectives, Observations, and Opinions of Shannon"

- Not all-inclusive.

- Let's share notes!

NetBox vs Nautobot

Moreso a datasheet than a slideshow.

(* Shannon's perspective, observations, and opinions!)

Similarities

- Open-source, Django-based web application that includes a database backend.
  - Nautobot was forked from NetBox v2.10.4 by NtC.
- Provides many built-in "models" with which you can depict real-world networking and infrastructure.
  - They still share original core models.
- API-driven. You can CRUD physical and logical network components.
- GraphQL support.
  - Nautobot as of v1.0. NetBox later as of v3.0
- Social authentication support.
- Plugins (or Apps) are implemented as Django apps or assets.
- Maintained Python libraries, pynetbox and pynautobot.
- Maintained Docker implementations.
- Both iterate quickly and have bustling communities.
- *…and so much more!*

Nautobot Divergence

- Difference in Philosophy

  - NetBox: Do one thing and do it well. Reduce scope.

  - Nautobot: Increase scope for customers to help power automation out-of-the-box.

- Backed and maintained by NetworkToCode.

- Nautobot App Ecosystem

- Via Apps, many out-of-the-box plugins maintained by NtC.

  - Examples: ChatOps, Golden Configuration, SSoT plugins (syncing), etc.

- NetworkToCode provides many commercial support options for Nautobot and its apps.

(* Shannon's observations!)

Key Technical Differences as of November 2022

Model Additions Since Fork

Netbox
- ASNs
- IP Ranges
- FHRP Groups
- L2VPN and L2VPN Termination models
- Contacts
- Custom Fields now may reference objects, similar to Nautobot's Relationships

Nautobot
- Location Type (room, building, etc.)
- Dynamic Groups (group of objects based on conditions)
- Popular Nautobot Apps/plugins introduce collections of models
  - Firewalling
  - Device Lifecycle
  - BGP (incl. ASNs)

Note: Many concepts also available in community NetBox plugins

(* Shannon's observations!)

Key Technical Differences as of November 2022

- Statuses
  - Nautobot made Statuses first-class citizens by creating its own model type in Nautobot v1.0, allowing users to customize their statuses.
  - NetBox made statuses customizable via configuration options later in NetBox v3.1.

- Secrets
  - Nautobot has a Secrets app that is used to enable Nautobot to access external secrets, such as device credentials for NAPALM.
    - Supports Hashicorp Vault, AWS Secrets Manager, and others.
  - NetBox has deprecated its Secrets app as part of core and recommends users to seek alternatives. Original functionality has been moved to a plugin.

(* Shannon's observations!)

Key Technical Differences as of November 2022

- Native Git Integration
  - Nautobot advertises native Git integration for some of its features, such as repository access for jobs, config contexts, and export templates.
  - NetBox does not have native Git integration. Similar behavior would require a custom script.

- Nautobot Jobs vs NetBox Scripts/Reports
  - Nautobot introduced "Jobs" to replace NetBox's scripts and reports. Jobs are schedulable and have additional access control options.
  - NetBox scripts/reports will be schedulable following v3.4's beta.

(* Shannon's observations!)

Key Technical Differences as of November 2022

Custom Fields

- Both support many field types; text, objects, selection, etc
  - NetBox added object and multi-object field types in v3.2. This can emulate behavior similar to Nautobot Relationships.

- May be attached to almost any model type.
  - Nautobot supported additional model types on fork from NetBox v2.10.4.
  - NetBox later added support for these additional models post-fork, v2.11.0.

- NetBox has exclusively asymmetrical relationships to objects via custom fields.
  - Nautobot now supports Many-to-Many and One-to-One symmetrical relationships via their Relationships model.

(* Shannon's observations!)

Key Technical Differences as of November 2022

- Vendor Support
  - NetBox has a cloud-hosted NetBox SaaS option provided by NS1.
  - NetBox Enterprise is advertised by separate entities.
  - Nautobot has cloud-hosted Nautobot (and more) SaaS slated for 2023 by NtC.
  - Nautobot Enterprise is advertised by NtC.

- Vendor Support for Plugins
  - Community-shared NetBox plugins do not have vendor support.
  - NtC-provided Nautobot apps have commercial support available.

(* Shannon's observations!)

Key Technical Differences as of November 2022

- Plugin Interaction with Core
  - NetBox plugins are heavily restricted when interacting with NetBox core components.
  - Nautobot allows more integration with the core.
    - Application Registry
    - Modify pre-existing pages, like the home page.

- Database Backend Support
  - Both support PostgresQL
  - Nautobot supports MySQL as of v1.1

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Key Technical Differences as of November 2022

- Computed Fields
    - Nautobot has a built-in "Computed Fields" functionality that uses Jinja2 templates.
    - Additional programming is required to replicate this behavior using NetBox.

- Webhooks
    - NetBox supports conditional webhooks. Nautobot webhooks do not have input for conditions.
    - Nautobot supports "job hooks".
        - If an object is changed, a job is called rather than a webhook being sent.

(* Shannon's observations!)

Key Technical Differences as of November 2022

Many small nuances

- NetBox
  - VRF models show the number of IP Addresses associated, not only prefixes.
  - User permission constraints can use other users as a variable.
  - Cable traces can be downloaded as SVGs.

- Nautobot
  - Object record IDs are hashes as opposed to integers.
  - Added Location Type model, allowing designation of Room, Building, etc to a Location object.

And so many more not listed here. We all need to get together and share notes!

Look at the Roadmap!

Both NetBox and Nautobot have roadmaps available.

Opinion Time

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Summary of Shannon's Opinions™

- Differing philosophies.

- Nautobot sought to iterate quickly on multiple brand-new, customer-requested features that it was previously blocked on.

- NetBox kept its scope very strict. Do one thing and do it well.

- Both are currently incredibly extensible.

- Product choice is partially contingent on resources willing to be spent on network automation.
  - Features to be leveraged?
  - In-house plugins required by the organization?

What Resources Do You Have?

- People Resources
  - Network Engineers
  - Python Programmers
  - Systems Support
- Time Resources
  - Do other projects or contract renewals rely on this work?
  - Is this work parallel or contingent on other upcoming, major changes in your network?
- Money Resources
  - Enterprise Support
  - Application Infrastructure
  - Spending on People and Time resources

Implementing an SoT is a new cost.
Have clarity on exactly what processes you want to implement, and how much effort it is.

Summary of Shannon's Opinions™ Continued

- ❖ NetBox if…
  - ➢ There is interest in automation being completely decoupled from the source of intent.
  - ➢ Automation is already ingrained via other applications and an SoT is needed to compliment them.

- ❖ Nautobot if…
  - ➢ There is interest in a one-stop shop for both network automation and intent.
  - ➢ There is interest in specific features and plugins provided by Nautobot, and you can save time by implementing them as-is.
  - ➢ You have less people resources and more money resources.
  - ➢ Enterprise support is a big priority for your institution.

- ❖ Review roadmaps.
- ❖ If at all possible, make time to deploy both solutions! Your needs are as unique as your network.

Final Thoughts

❖ If using their popular plugins, Nautobot has a broader scope out of the box. The effort required by your team will also be broader should you pursue all of these features off the bat.

❖ Nautobot isn't doing anything that NetBox can't. Complexity is just shifted around, but some of that complexity is pre-written for you.
  ➢ Pre-written complexity is not necessarily One Size Fits All.

❖ Neither product can solve a lack of long-term investment by your organization's leadership in network automation.
  ➢ The resources and time required are always more than you think.
  ➢ People resources are critical to long-term success.

Thank you!

(Link to slides)

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