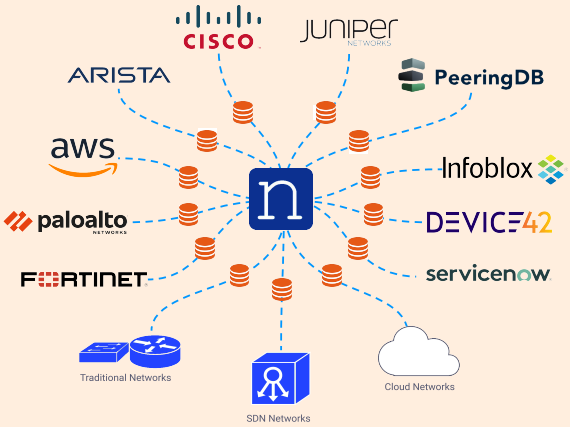
Nautobot Primer

The most open and extensible open source Network Source of Truth and Network Automation Platform

Network Source of Truth

Model your network and store data with the network's intended state in mind to power your network automation stack. Nautobot offers opinionated data models which enable quick onboarding, yet great flexibility to cater to specific use cases. Nautobot exposes intended state data in a multitude of ways to enable world-class NetDevOps workflows with REST APIs, GraphQL, Webhooks, JobHooks, native Git integration, and a defined framework to aggregate and integrate data from distributed data sources creating a Single Source of Truth.



Network Automation Platform

Leveraging the rich data already stored in Nautobot, you can perform network automation tasks directly from Nautobot or integrate with existing tools. Ramp up quickly with pre-built Nautobot Apps that address the most common network challenges. Power users can also use the robust developer API to create custom apps to address a wide range of challenges. Organizations can expect to reduce development time by 70% by leveraging Nautobot as an automation platform forging the need to solve non-functional requirements in custom apps.

Challenges networks face today:

Modern networks consist of thousands of infrastructure devices from dozens of vendors and multiple clouds. These devices provide connectivity to hundreds of thousands of endpoints which are expected to enjoy continuous connectivity at nearly all times. As time progresses, those expectations will become more demanding, putting renewed pressure on network teams to provide higher levels of service without commensurate growth in resources. This new reality puts renewed pressure on legacy processes that are already struggling to meet expectations. In response, organizations are adopting various forms of network automation making improvements within their operational models. Those organizations that are seeing the most success and change in operational models are doing it through a combination of adopting NetDevOps and leveraging data-driven network automation.

Data-Driven Network Automation is the Key to Success

Data is the foundation of network automation and is key to ensuring that organizations adopt, deploy, and realize its benefits. With a data-first approach, users focus on the intended state of the network. It is a shift from spreadsheets and ad-hoc documentation to an Enterprise-grade data platform that can enable and power network automation. Data-driven network automation aggregates network data from one or more data sources to unify and simplify network automation solutions creating a Single Source of Truth for the network. Imagine a world where your team is able to manage data and intent and let the automation happen seamlessly. That is possible with data-driven network automation powered by Nautobot.

The Industry's Leading Open Source Network Source of Truth Platform

How does Nautobot fit into data-driven network automation and Network Source of Truth? At its core, Nautobot is a Network Source of Truth that defines the intended state of the network, encompassing inventory management, IP address management, physical locations, circuit management, configuration data, and many other attributes of the network. Moreover, Nautobot is able to integrate with other data stores including data stored in git repositories serving as a Source of Truth aggregation or Single Source of Truth. This is accomplished in a highly flexible vendor-agnostic manner to permit administrators to model any use case while still enabling the enforcement of data standards. Nautobot's data is then made available in a multitude of ways, from RESTful (HTTP) and GraphQL APIs to event-driven webhooks and native Git integration to seamlessly load YAML data and scripts directly into Nautobot.

Once data is stored in Nautobot, it is possible to use this data to drive network automation. Nautobot is an automation platform, and through the use of Nautobot Jobs, users can perform network tasks using common open source Python libraries like Nornir, NAPALM, and Netmiko, or use the data from Nautobot to power other tools like Ansible and others within the network automation landscape. There are numerous free and open source Nautobot Apps that solve many common use cases such as configuration backups and config compliance. Developers can also take advantage of Nautobot's robust developer API to create custom Nautobot Apps. It is possible to inject dropdowns, menu items, create APIs and data models through the API, allowing organizations to cater to their specific network needs. Custom apps can be as lightweight or robust as necessary. Furthermore, many open source apps are already available to tackle the most common use cases. Everything from configuration management to chat operations that integrate the repository with common chat applications. The following is a graphic of the common open source Nautobot Apps.

Nautobot as a Network Source of Truth

Network Data Modeling

Nautobot's focus is to model networks as they actually exist in the real world. Below is a subset of the models that are available out of the box. The core data models in Nautobot have relationships built-in and extending relationships beyond the core model is easy. Users can also add their own models if they aren't already supported.

Inventory Management	IPAM	VLAN Management	Circuit Management	Security	Devices
- Tenants - Regions - Sites - Racks - Virtual Chassis - Devices - Device Components - *Custom Fields*	- VRFs - Aggregates - Prefixes - IP Addresses - *Custom Fields*	- VLAN IDs - VLAN Groups - *Custom Fields* **Cabling** - vCabling Connections - Tracing Paths - *Custom Fields*	- Circuits - Providers - Types - *Custom Fields* **Power** - Feeds - Panels - *Custom Fields*	- Policies - Capirca Policies - Policy Rules - NAT Policies - NAT Policy Rules - *Custom Fields*	- Role - Platform - Virtual Chassis - Console/Power - Interfaces - Front Ports - Rear Ports - Power Ports - Device Bays - *Custom Fields*

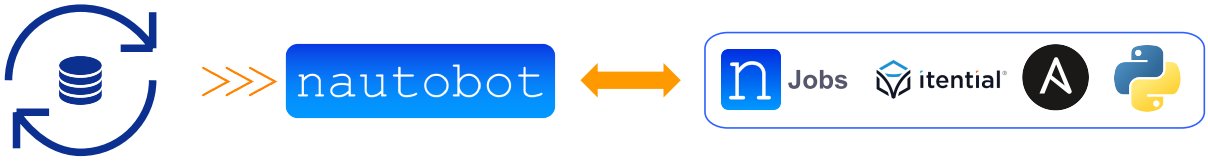
Furthermore, Nautobot's native Git integration seamlessly aggregates structured data files, e.g. YAML with the native data already supported by Nautobot. Nautobot is also able to normalize and validate data, ensuring good data hygiene. Users can create or codify business rules to ensure every Enterprise standard is adhered to within the data stored in Nautobot. Nautobot is designed to be extensible and flexible to ensure that it meets the unique requirements and use cases of any organization.

Single Source of Truth

DEVICE42 servicenow ARISTA
IP FABRIC Infoblox cisco
vmware

Any Data Source

Accepting that there will always be other tools that store network data, Nautobot provides the ability to synchronize with those platforms. Nautobots plugin systems allow organizations to leverage existing apps or create new ones that integrate data from these other data source into (or from) Nautobot, creating a Single Source of Truth.



Data Availability

The data contained in Nautobot is made available in multiple ways. First, the web portal provides a purpose-built and highly customizable front end for user interaction. Secondly, a REST API provides a means to create, read, update, and delete most objects within the database. Facilitating single object and bulk interactions. Thirdly, a GraphQL API provides an optimized means of communication with a dynamically generated database that is exposed externally. Allowing developers to define exactly what requests should return and facilitating the query of multiple types of objects simultaneously.

Nautobot as a Network Automation Platform

Nautobot's platform provides an architecture from which network automation applications can be built. Leveraging this platform, developers can expect to reduce development time by 70%. Nautobot apps are essentially self-contained Python/Django applications that integrate with Nautobot to provide custom functionality. Some of the most common use cases seen include: creating custom Nautobot UIs (forms, filters, fields, menus, links, etc), new APIs, new data models, integrations with external tools like Service Now, and completely custom automation processes.

Golden Configuration

Automate configuration backups, perform configuration compliance, and generate intended

Version Control

Allows users to have change (workflow) management with approvals when managing data

BGP Models

Allows users to model ASNs and BGP Peerings (internal and external) within Nautobot.

Capacity Metrics

Exposes key data in Nautobot as Prometheus endpoints to be later consumed and visualized in tools

Circuit Maintenance

Helps manage and view maintenances for circuits directly in Nautobot.

Data Validation

Ensure proper data hygiene and that corporate standards are enforced when adding new data

Device Lifecycle Management

Helps manage lifecycle related data such as end-of-life dates, viable software versions, and

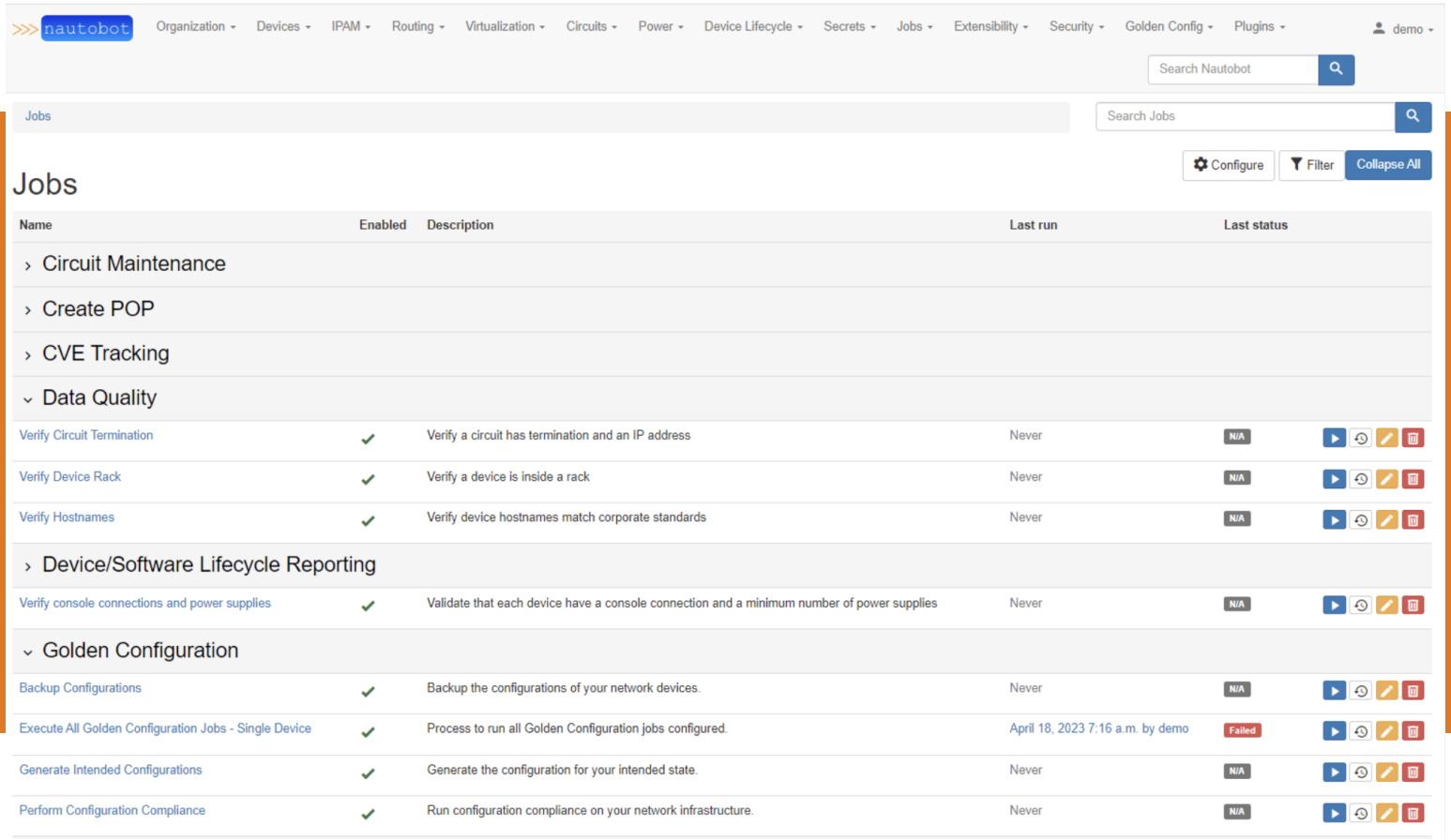
Device Onboarding

Simplifies onboarding and re-onboarding devices into Nautobot.

Using Nautobot as a platform facilitates both lightweight and complex applications. Furthermore, there are many publicly available apps to address the most common use cases. For example, maintaining configuration standards, integrating corporate chat platforms, and onboarding devices are tasks supported by applications that are freely available today.

Jobs

Nautobot Jobs are how network automation tasks are performed in Nautobot. They can be written as standalone Jobs or packaged and distributed in an App or via Git. Nautobot Jobs are written in Python and are intended for users to execute custom logic on demand from the Nautobot UI. Jobs can interact directly with Nautobot data to accomplish a wide variety of tasks including data generation & population, collection, and reporting. With the ability to interact with both Nautobot and end devices, there is practically no limit to what a job can accomplish. Jobs also have the ability to take user input at the time of execution, providing great flexibility and increasing execution accessibility to non-technical users. Additionally, jobs can also produce reports. For example, a job could be executed on a regular schedule that generates a report on console connection status, management IP connectivity, and TACACS+/RADIUS server connectivity, among other metrics.



External Automation Platform Integrations

Nautobot integrates seamlessly with other automation platforms, including commercial, other open source, and internal tools. Common integrations include Ansible, Itential, ServiceNow, Terraform, Python frameworks such as Nornir, and many tools and technologies from the large network manufactures including Cisco, Arista, and Juniper.

Want to learn more?

Use the following links for additional information:

- Join the #nautobot channel on the Network to Code Community on Slack
- View Nautobot on GitHub
- Try Nautobot Now
- Check out All Things Nautobot on YouTube
- Contact Us for a Live Demo and Overview

About Network to Code:

Network to Code is a network automation services and solutions provider that helps companies transform the way their networks are deployed, managed, and consumed. Through managed and professional services, Network to Code enables enterprises across all industries and geographies to deploy data-driven network automation based on NetDevOps principles to improve reliability, efficiency, and security while reducing costs.

NTC is the sponsor of Nautobot, an open source Network Source of Truth and Network Automation Platform with a growing ecosystem of integrations and partners. Nautobot is the leading Network Source of Truth for Enterprises looking to adopt a data-driven approach to network automation and a platform that complements any network automation journey.