

Nautobot: Truth in Network Automation

Over the last several years, network automation has moved from science project to mainstream. The latest technology stacks for network automation offer improved operational speed and cost reduction coupled with improved reliability and security. Taken together, these benefits almost make the decision to automate *automatic*. New networking solutions come with a variety of automation tools embedded from native automation integrations, DevOps integrations, to RESTful APIs (Representational State Transfer Application Programming Interfaces.)

On one end of the spectrum, basic scripting is used to perform repeated tasks. At the other end of the spectrum, DevOps practices are borrowed from developer or systems teams and integrated across the network, deploying network changes in a Continuous Integration / Continuous Delivery (CI/CD) fashion. At both ends of the spectrum lies a common data problem: a lack of accessible network data that defines the intended state and design.



At both ends of the spectrum lies a common data problem: a lack of accessible network data that defines the intended state and design

As automation increases operational speed, the gap in trusted sources of data and documentation has become a larger liability. Imagine someone walking around in the dark because a circuit breaker tripped; the person will move about in a more cautious and slower fashion to avoid risk of injury due to lack of visibility. In the case of networking, there also needs to be increased data and visibility in order to increase the rate at which an organization can adopt network automation. This makes a fully integrated centralized Source of Truth (SoT) a critical foundational element of modern network automation architectures.

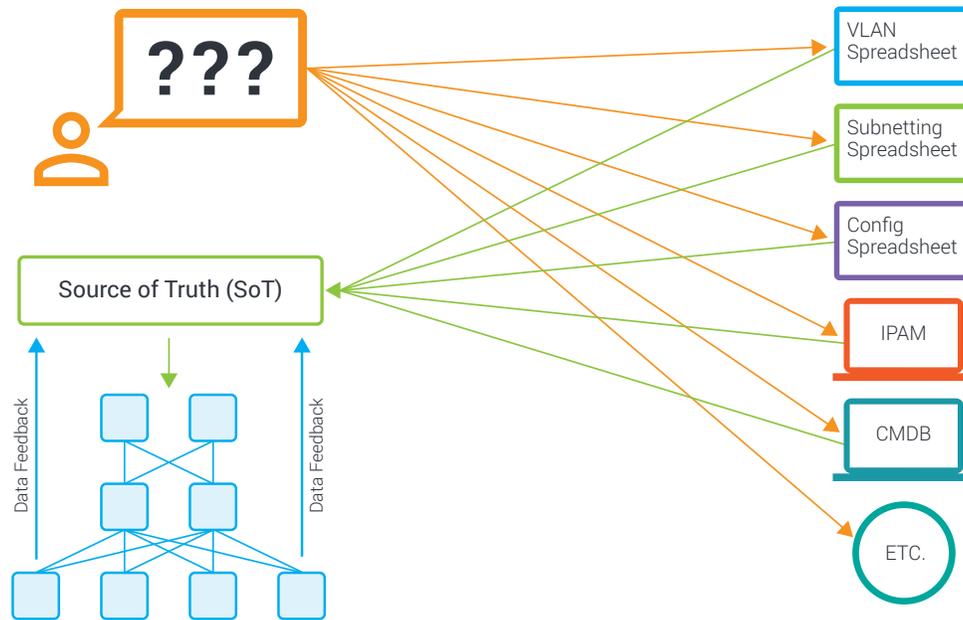
If one were to pull back the configuration curtains on some of the largest networks in the world, they would find something very unexpected. They would find spreadsheets - lots of them. While some of those spreadsheets may have been migrated to software tools such as IP Address Management (IPAM), or Data Center Infrastructure Management (DCIM) systems, many have not. Meanwhile, other important data elements such as device properties or configuration data have no natural home.

Without a centrally accessible and authoritative source of network information, operations teams work half-blind. They rely on multiple data sources that may be manually correlated with device configuration data. They have nowhere to define the intended state of the network, nor a trusted source with which to verify the current state for compliance against that intent.

That gap is the natural starting point in a network evolution, whether that evolution is automation, SDN, or anything else. To drive the transition, questions will be asked and answered. By adopting a trusted source of truth, organizations will never have to ask those questions again.

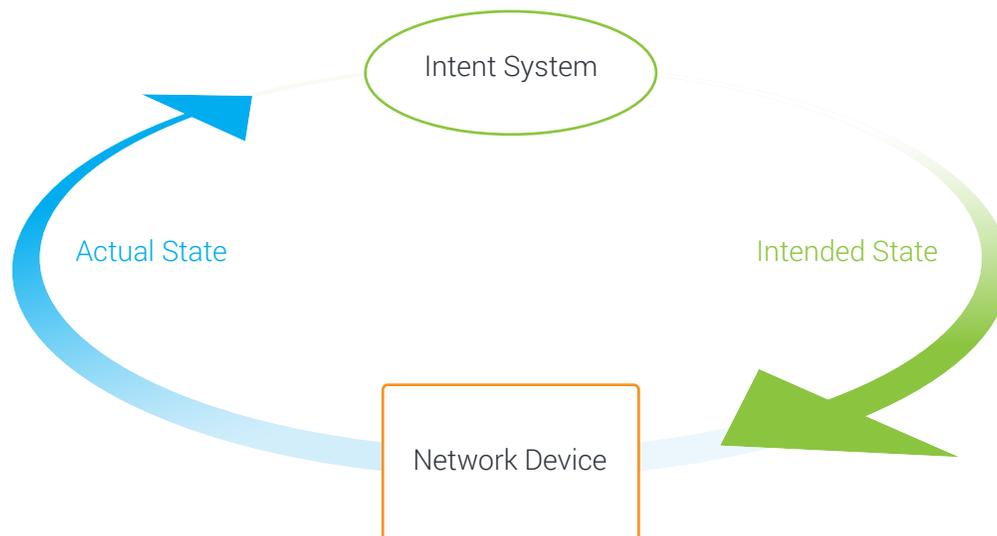
Nautobot: Truth in Network Automation

By adopting a trusted source of truth, organizations will never have to ask those questions again.



As network teams automate more functions, and as they evolve from network automation to intent-based systems and beyond, they require structured access to trusted network data. They need a central Source of Truth (SoT). That source of truth will sit at the center of a closed-loop, intent-based system. The SoT will provide the intended state. Intended state will then be implemented by the network infrastructure. This also enables other systems to verify actual state and verify that state against the SoT.

As shown in the graphic below, intent is pulled from the SoT and pushed to the devices. Actual state can then be returned and verified against the intent. This ensures network and network services devices remain compliant to approved configurations.

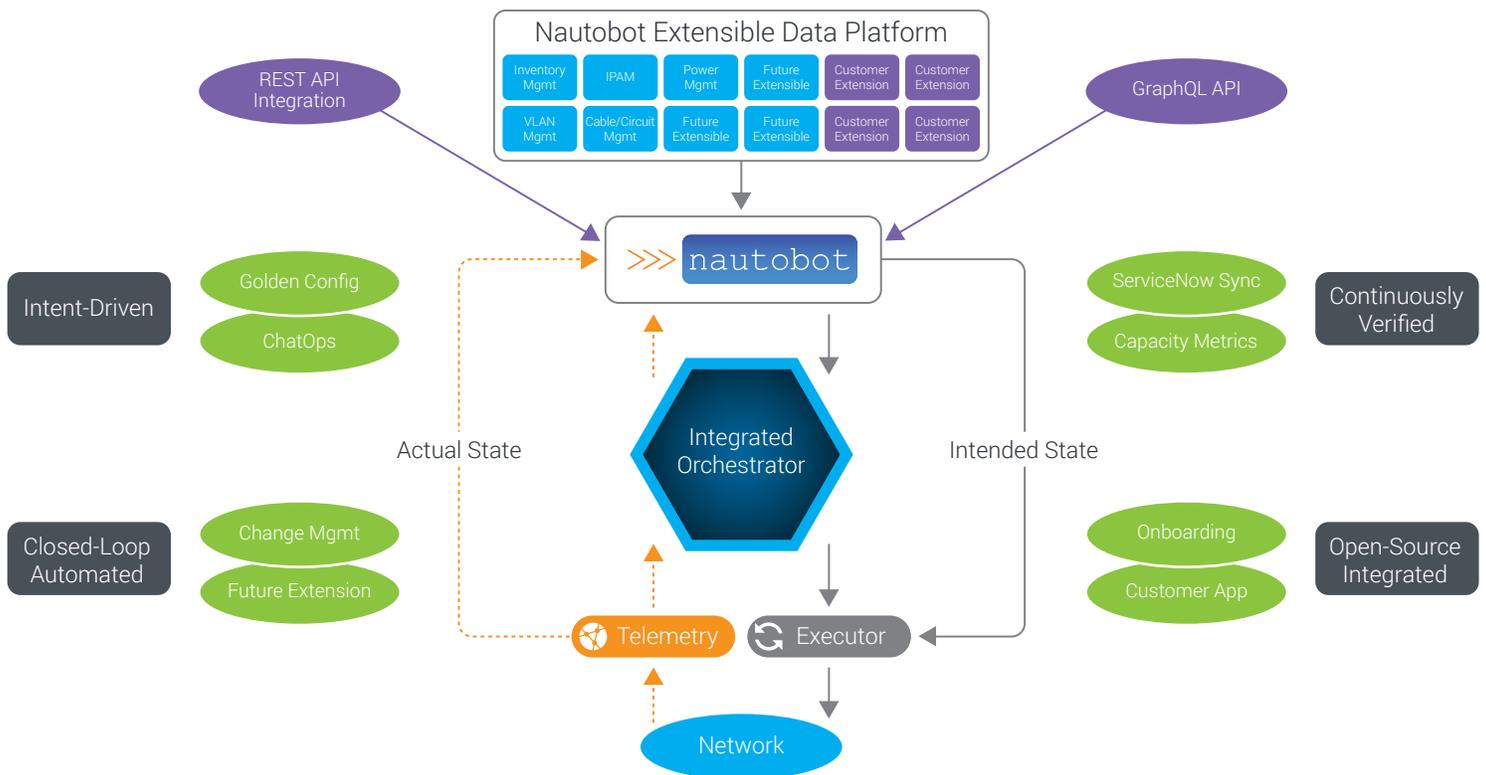


Nautobot: Truth in Network Automation

The SoT must become an extensible core to the overall network automation system. The SoT must provide extensibility and flexibility to cater to both traditional and unique network designs. It must allow users to augment data models and User Interface (UI) elements as needed. It must provide programmatic access to the data without sacrificing accessibility, thus bridging the gap between serving as data repository and serving as an automation agent.

Network to Code has reimagined what a source of truth needs to be to truly enable network automation.

Nautobot by Network to Code (NTC) is a network source of truth and network automation platform that does exactly that. Leveraging the network automation DNA of NTC, NTC has reimagined what a Source of Truth needs to be to truly enable network automation. At its heart, Nautobot is a leading network Source of Truth that can both serve to and consume from distributed data sources, e.g. external Systems of Record (SoR). Nautobot's SoT includes Git support for seamless integration into CI/CD toolchains for users that already have YAML files stored in a Git repository.



Building an automation system on a foundation of truth provides major advantages. Network truth is centralized and integrated directly into the intent loop and drives holistic network automation architectures.

With its flexibility, Nautobot also serves as a platform for network automation applications. This capability allows users to leverage the rich data in Nautobot to create lightweight or full-fledged solutions. Nautobot ships with default applications out-of-box which enable complete solutions such as Golden Configuration and ChatOps for network automation. There are also lighter weight extensions that allow users to add their own data models and use all the data from Nautobot for capacity planning (racks, ports, circuits, etc.) in tools such as Grafana.

Nautobot: Truth in Network Automation

Nautobot is extensible at every level, from data models and data sources to external integrations. Its REST and GraphQL APIs expose functionality, and Nautobot apps extend it. Integrations with configuration management, change management, and chat systems allow Nautobot to extend any workflow. This extensibility enables Nautobot to pull data from any SoR, centralize it, normalize it, and extend it back with enriched context and value. These capabilities make Nautobot the natural choice for network automation.

As Nautobot eliminates the practice of managing from spreadsheets and data across disparate systems, it eliminates risks from configuration errors and costs from additional operational time. Meanwhile it's ensuring that the questions that must be answered before embarking on the next network evolution won't have to be asked over again to set up for the following initiatives. When Nautobot is deployed as a Source of Truth, it becomes possible to document the intended network state and realized the full potential of network automation.

Resources

Explore Nautobot with the following resources.

GitHub	https://github.com/nautobot/nautobot
Nautobot Projects & Apps	https://github.com/nautobot
Slack: #nautobot	slack.networktocode.com
Docs	https://nautobot.readthedocs.io
Website	https://www.networktocode.com/nautobot
Roadmap	https://www.networktocode.com/nautobot/roadmap
Nautobot Sandbox	https://demo.nautobot.com

See project README on GitHub for more details using the sandbox environments.