

Infrastructure as Code — Open Slot

Network Configuration Automation with Infracore and Nornir

Students



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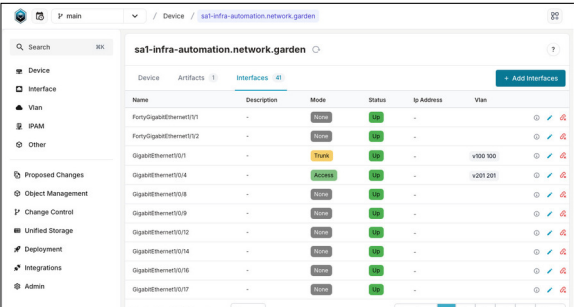
Polina Lisetska

Initial Situation: Network configuration management is a critical aspect of maintaining modern infrastructures, requiring consistent updates and validations across a wide range of devices. Traditionally, this process is time-consuming, error-prone, and often relies on manual intervention, which can lead to inconsistencies and network disruptions. Organizations often struggle to match network states with desired configurations while ensuring stability and scalability. Furthermore, auditing is tedious with configurations distributed across devices.

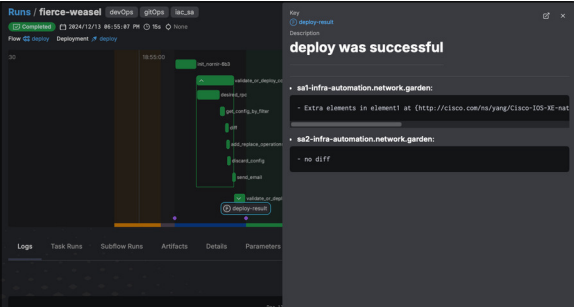
Objective: The project, Network Configuration Automation with Infracore and Nornir, aims to enhance network configuration management by automating deployment tasks and consolidating network configurations through a centralized system, Infracore. Developed by OpsMill, Infracore merges Git's version control with the flexibility of graph databases, offering a unified platform for managing infrastructure data. Our solution focuses on continuous reconciliation, ensuring that the network's state is consistently aligned with the defined configurations. By centralizing oversight through Infracore and automating deployment tasks with the Nornir framework, the project significantly improves efficiency and control. To enhance scalability and modularity, we integrated Prefect for workflow orchestration, NETCONF for communication and dry-run validation to preview configurations before applying them safely. Designed for diverse network environments, it supports various device types and YANG models for compatibility. GitLab integration adds version control and traceability, while the Conditional Runner plugin for Nornir enhances stability by managing concurrency limits during maintenance. These features collectively streamline network operations and improve overall efficiency.

Result: The project delivered an automated network configuration system for VLAN management, using Infracore as the source of truth, Nornir for automation and dry-run validation, Conditional Runner for stability, and GitLab for version control. This solution enhances scalability, reliability, and network stability while reducing manual effort.

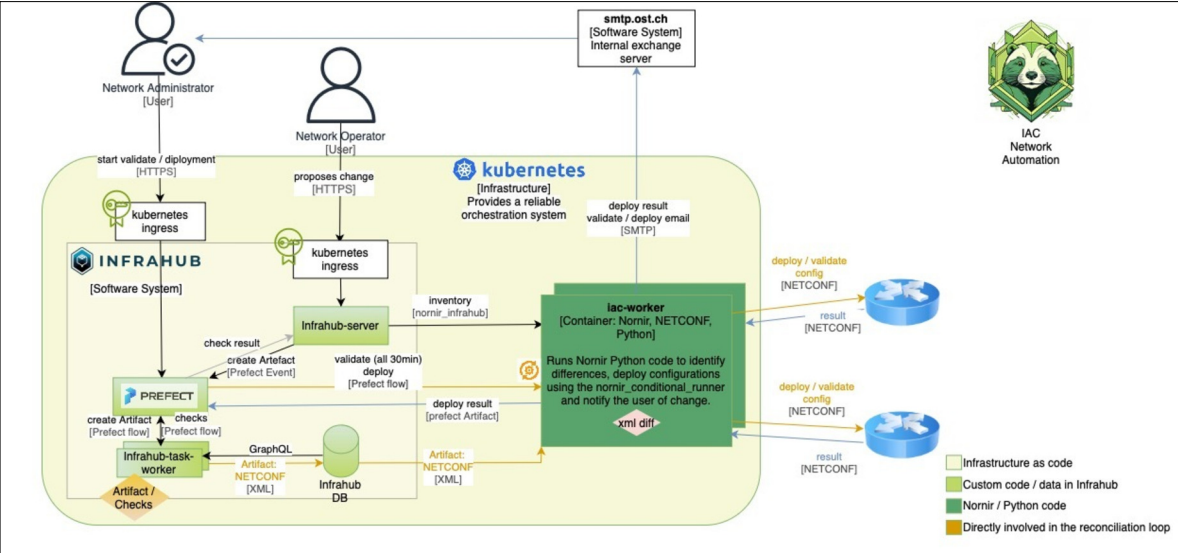
Infracore UI showing all the interfaces that are currently available on a specific device.
Own presentation



To run our Nornir NETCONF tool, we use Prefect, which allows us to define, schedule, and monitor workflows.
Own presentation



The diagram shows an automated deployment via Infracore, Prefect, and IaC Worker, integrating validation and deployment.
Own presentation



Advisor

Urs Baumann

Subject Area

Networks, Security & Cloud Infrastructure

Project Partner

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