Network Automation: The Hype vs. Reality

You aren’t behind

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- Over 20 years in IT
- Over 15 years working with Infrastructure and Operations enterprises and startups
- Security - CISSP, CISA, PCI
- Infra/Ops - Data Center, Cloud, CDN
- Head of global monitoring at Thomson Reuters
- Head of IT Operations at MFG.com (Bezos Expeditions)
- Gartner Research VP 4 years
- Product + Strategy AppDynamics/Cisco 4 years
- Kentik CTO 10 months

Ground Rules

Spoke on the phone and in person to over 500 companies a year running networks for 4 years (as all analysts do).

Most people struggle with the same fundamental problems, how to keep the lights on and improve incrementally. Technical Debt is a problem everywhere.

This talk is focused on automation which is not what Kentik does, nor what Kentik will do. However we are an input into an automation strategy and work with customers regularly on their approach.

Agenda

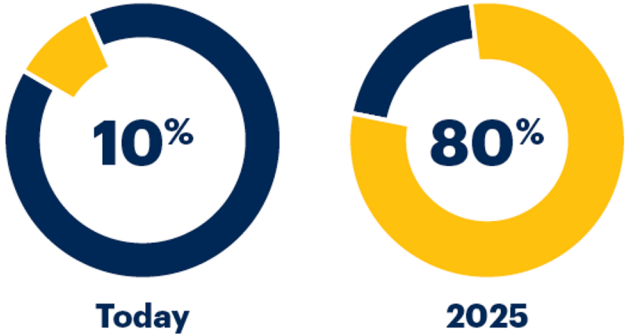
- Network complexity continues to increase
- Automation strategies fragment between custom tools, NCCM, and DevOps automation tools
- State of the union survey data on automation and telemetry and where people are going with their strategies
- Common approaches in the modern toolset for state of the network and pushing changes
- Closed loop automation and validation via CI/CD
- AIOps platforms

Infrastructure is changing, fast

In 5 years it will be fundamentally different

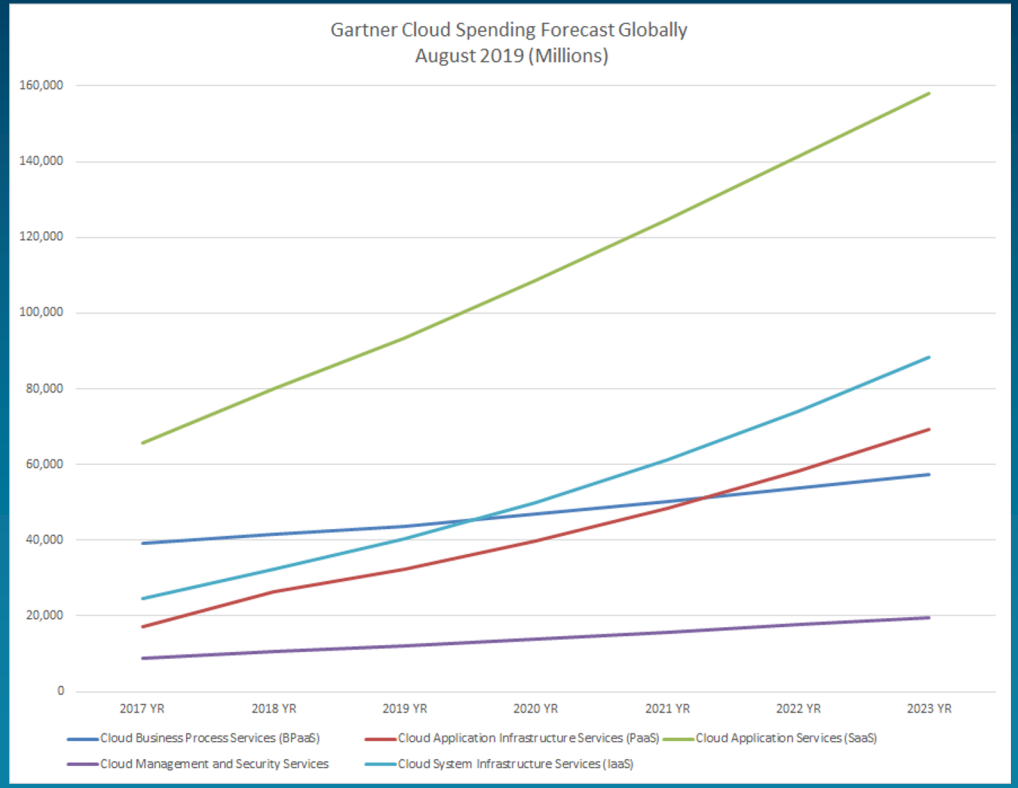
Enterprises That Will Close Their Traditional Data Centers

Percentages of Respondents

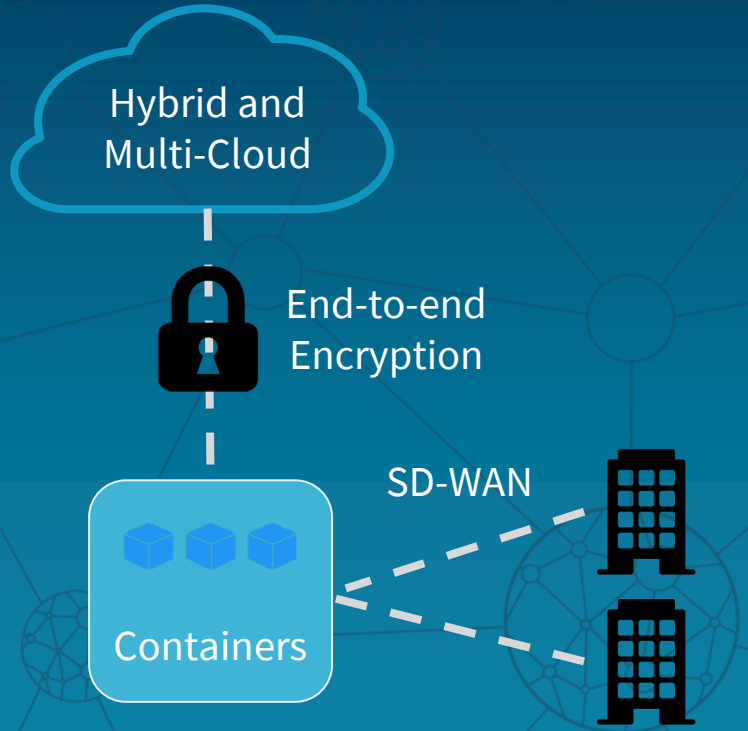


Source: Gartner (February 2019)

Gartner



Running today's networks is dramatically harder



Tasks that are impacted:

- End to end automation
- Quickly detecting problems
- Root cause determination
- Allocating network costs

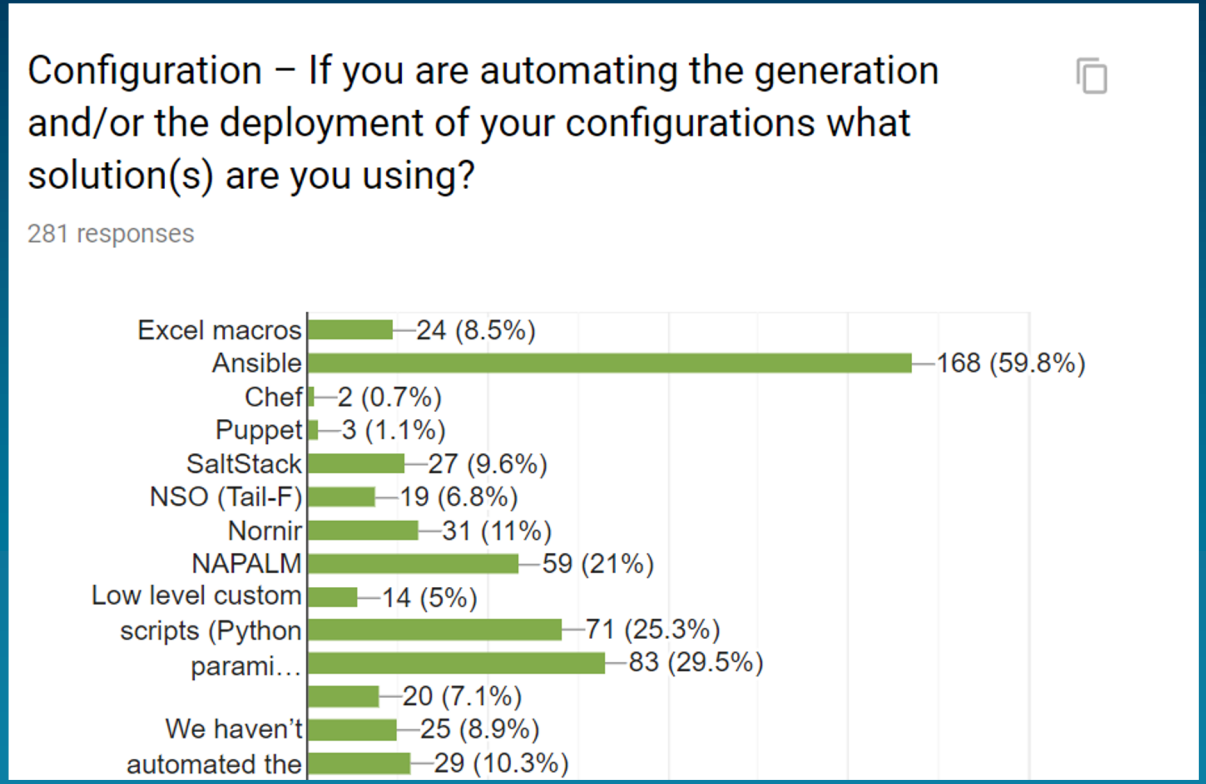
Automation is Fragmented

Gartner predicts that, through 2022, 80% of I&O organizations will use more than 10 different tools to automate their operations environments, which is an increase from an estimated 6 to 8 in 2017

4 Distinct Types of Automation Systems:

1. Network Configuration and Change Management (NCCM)
   Patching, compliance, rollout
1. Network Orchestration
   Programmatic device access (CLI/API) often DevOps
1. Policy-Based Automation
   Abstraction of devices into policy control
1. Intent-Based Networking Systems (IBNS)
   Business intent and network config are unified

NetDevOps Survey 2019: current state of automation

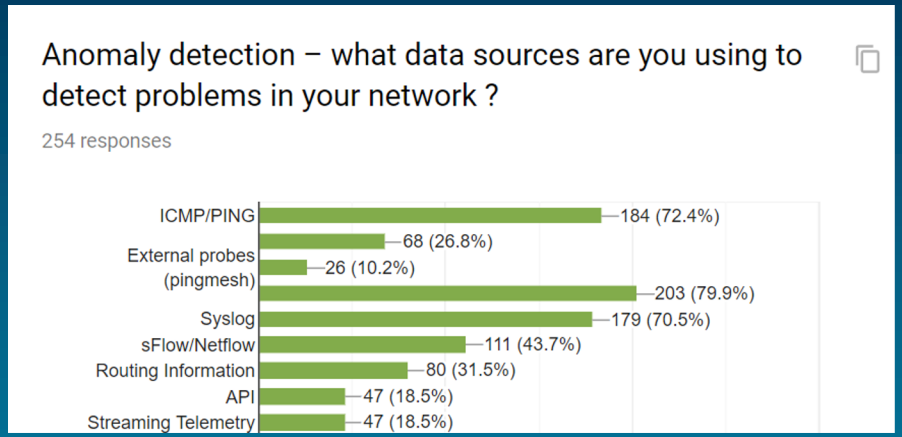


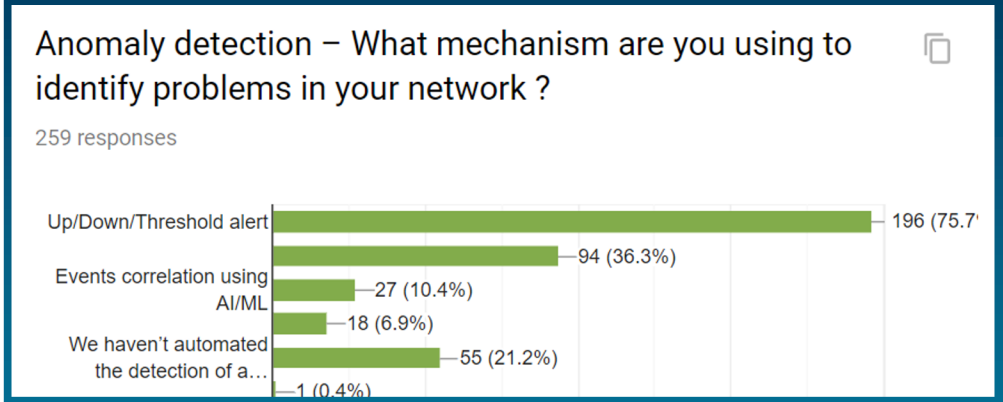
Open community driven project.

Network To Code is our partner and they kicked this initiative off.

NetDevOps Survey - 2019 Edition - https://dgarros.github.io/netdevops-survey/

NetDevOps Survey: Wow is monitoring broken





If you told me 10 yrs ago most people were using ping and thresholds to monitor their networks I would have called you crazy.

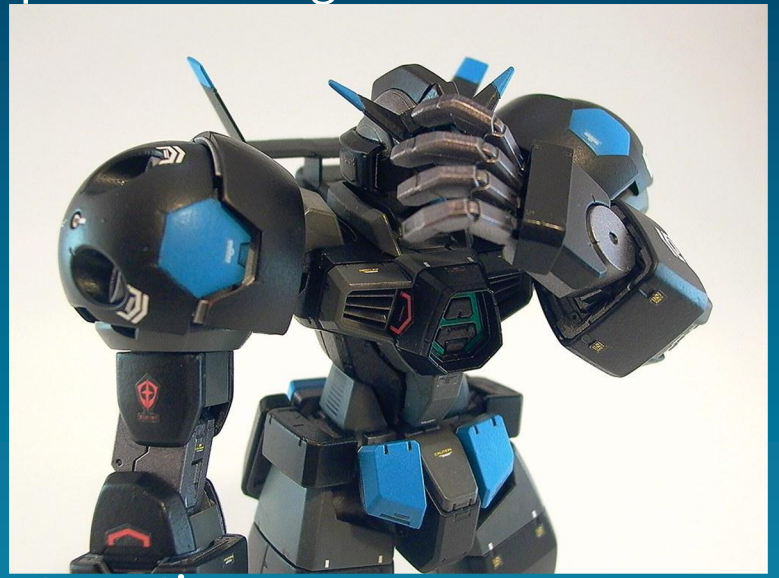
NetDevOps Survey - 2019 Edition - https://dgarros.github.io/netdevops-survey/

Ansible wins for the future

Not a single solution for the network user, requires building a toolkit of many packages typically in Python

Commonly used Python toolkits:

- Napalm
- Nornir
- Netmiko



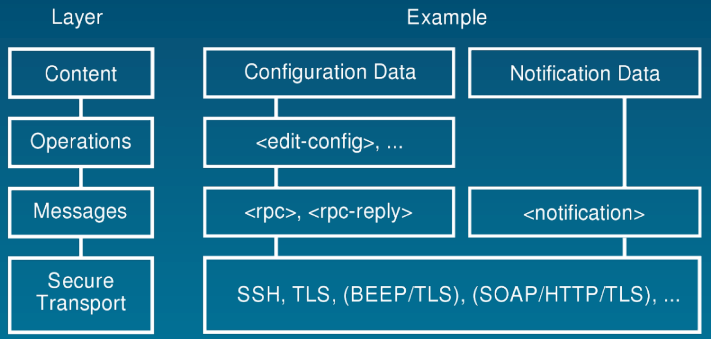
Lack of standard implementation

Doesn’t handle support / import of existing automation

Result: More complexity, but better scale

Network Modeling and State

Netconf protocol implemented on most devices, but older style XML implementation



Still need other discovery to get device status and details.

- Config download (legacy), SNMP, or proprietary APIs
- Limited usefulness of Streaming Telemetry due to lack of standards and most networks being diverse vendors/versions.

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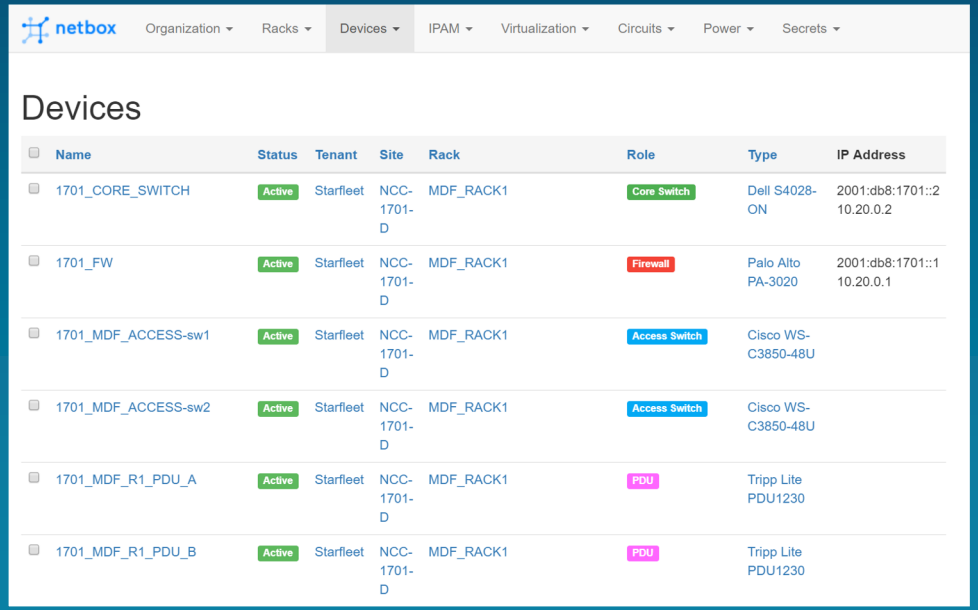
Netbox

NetBox allows for the state of the network to be managed, but not populated easily.

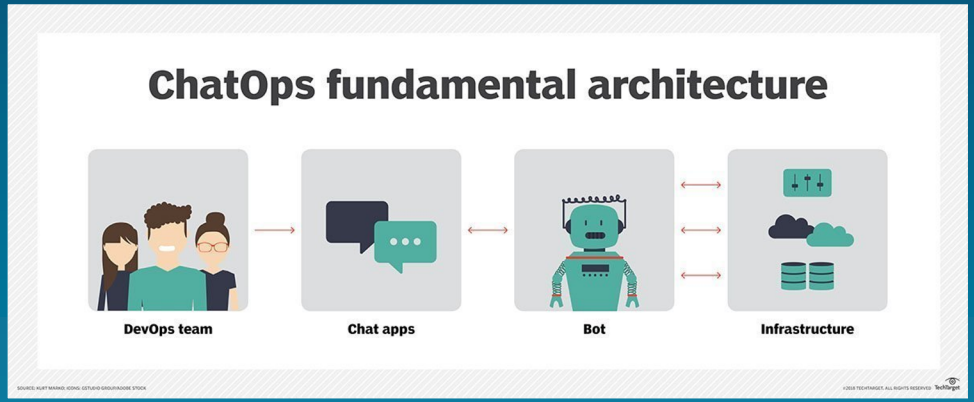


Another DIY project

ChatOps and Demo

Integrate various OSS tools as an interactive chat bots

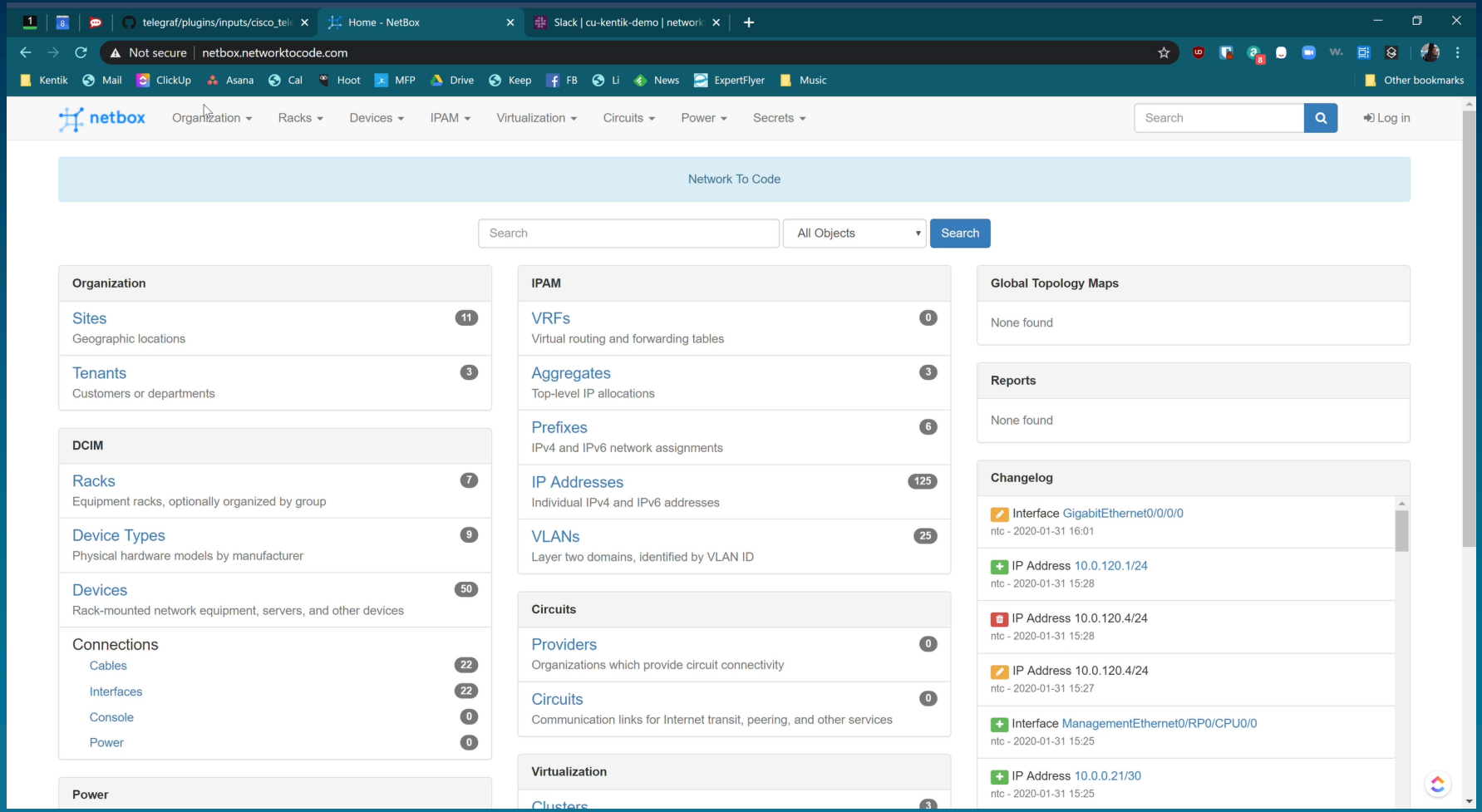
More collaborative during a change or troubleshooting event



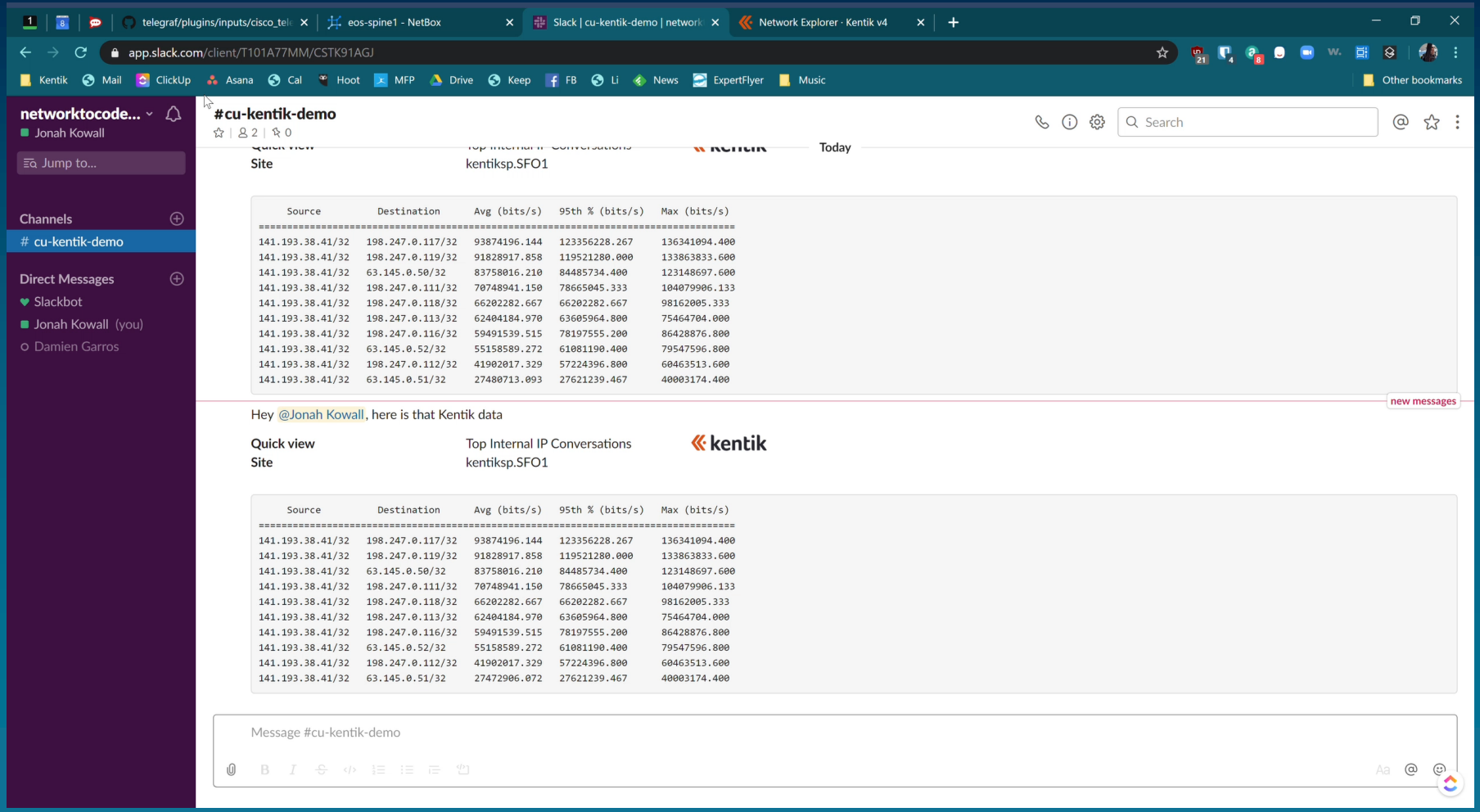
Open Source chatbot in development which includes NetBox, Ansible, and Kentik. We have more work going into this as well.

Demo Video: https://youtu.be/6wl2suubMIQ?t=691

Demo: Chatbot Netbox Site Details



Demo: Chatbot Kentik Top Sources Chart



CI for Networks

Store all configs in git

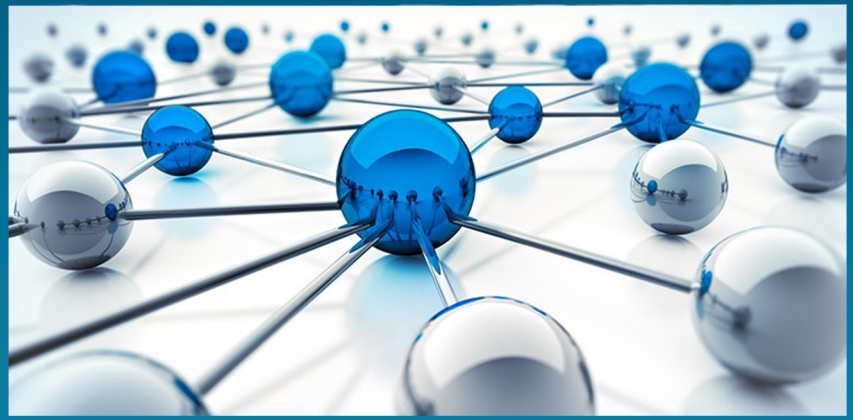
Most build custom pipeline in Python

Run through Jenkins, Gitlab

Verification using Batfish

CD For Networks

Deploy with Ansible

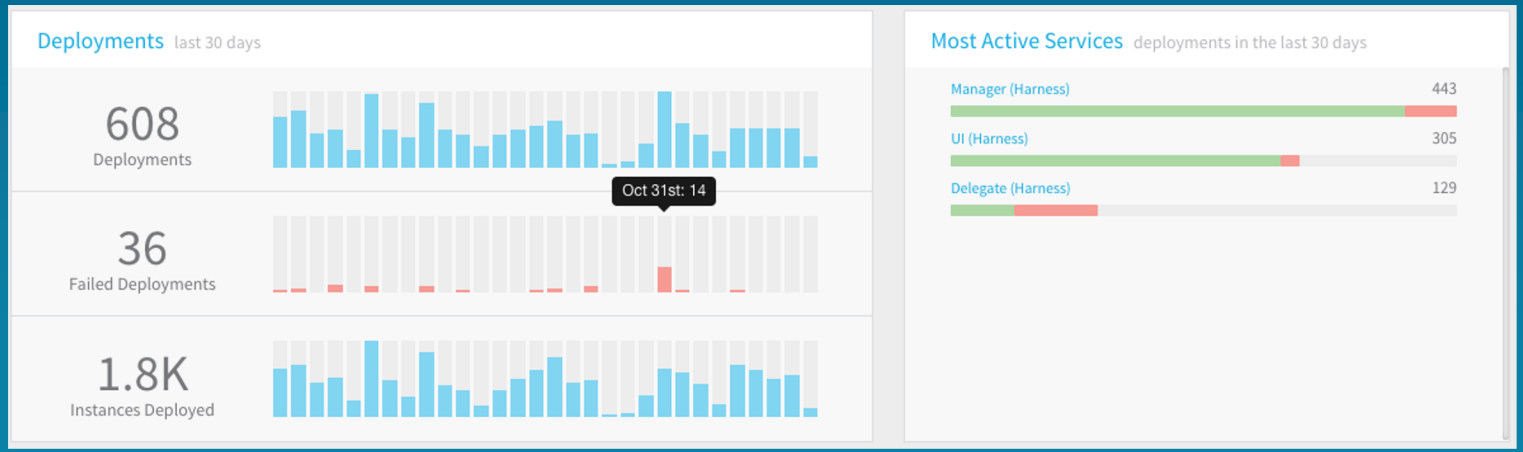


Hard if not starting from scratch many need to change operating modes

Advanced Pipelines

- Incorporate verification of device
  - Monitoring data compare pre/post + synthetic tests
- Using APIs for config replace versus modification
- Some doing this today, but only the most advanced

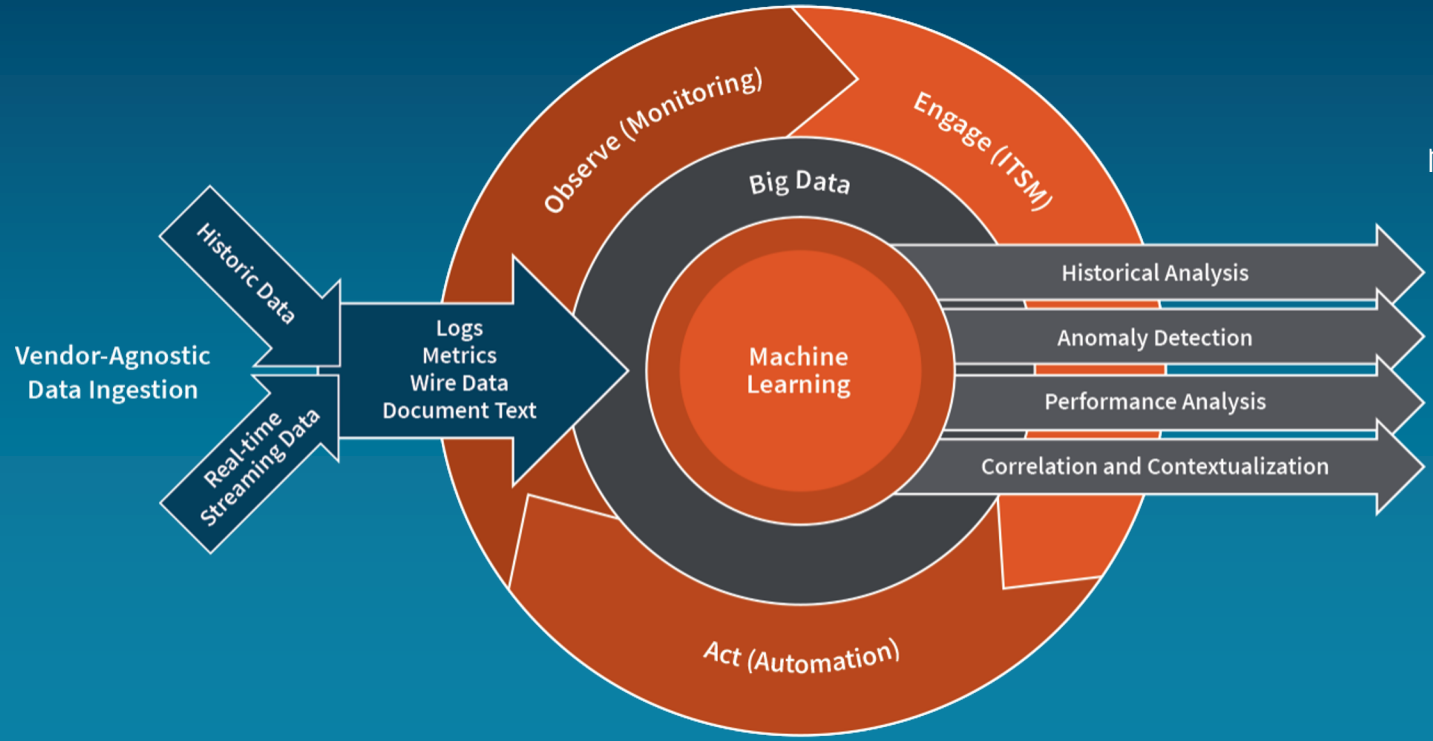
Failure is part of CD



What to buy and how to build?

Network operations have exceeded human scale

AIOps techniques can restore manageability



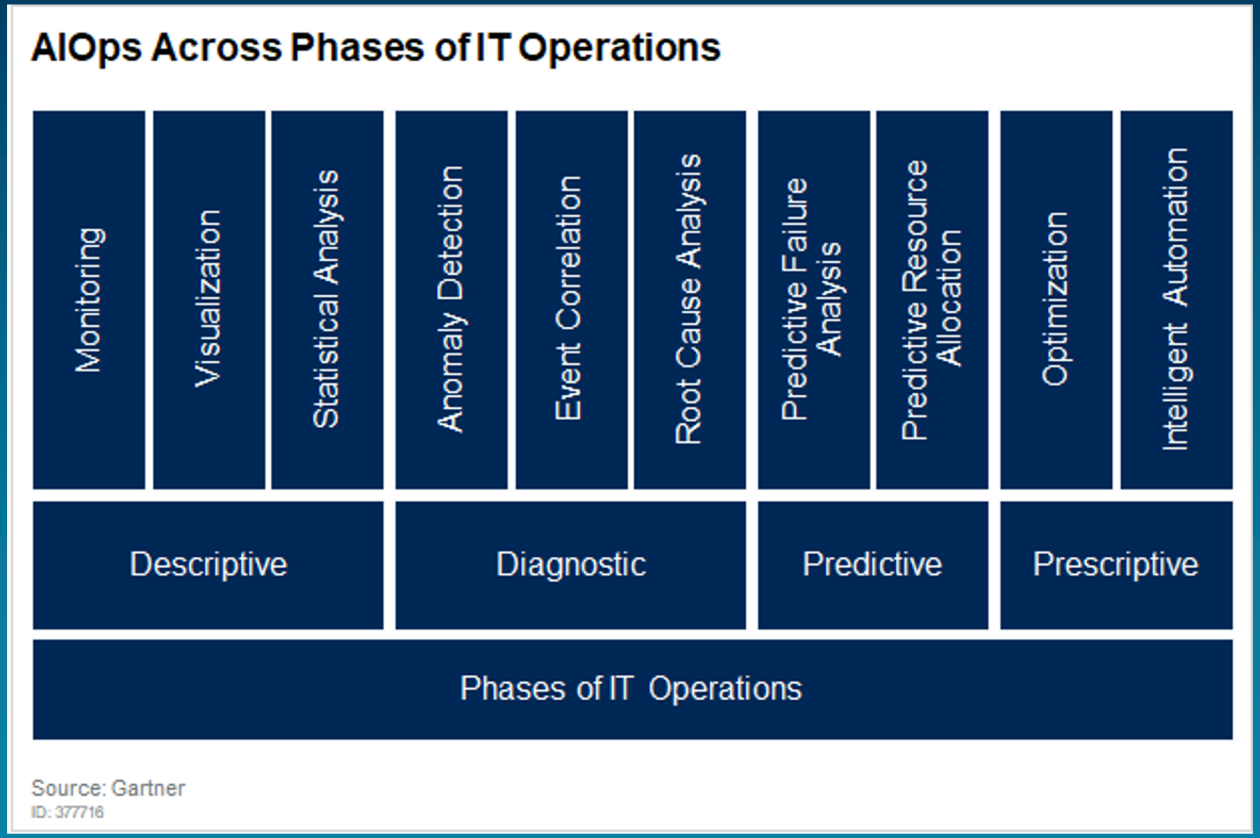
"By 2023, 40% of DevOps teams will augment application and infrastructure monitoring tools with AIOps platform capabilities.

"

"By 2024, 60% of NPMD buyers will require improved AIOps capabilities, up from 30% in 2018."

Gartner

Industry Trends: **AI for IT Operations (AIOps)**



AIOps: **AIOps for Efficient Operations**

The what

Detect and Identify Sooner

Prioritize

Scale People with Automation

The how

- Data normalization
- Data collection and aggregation
- Data enrichment

AIOps drives significant business value for increasingly complex and distributed infrastructure

Not yet reality, but coming together

Questions?