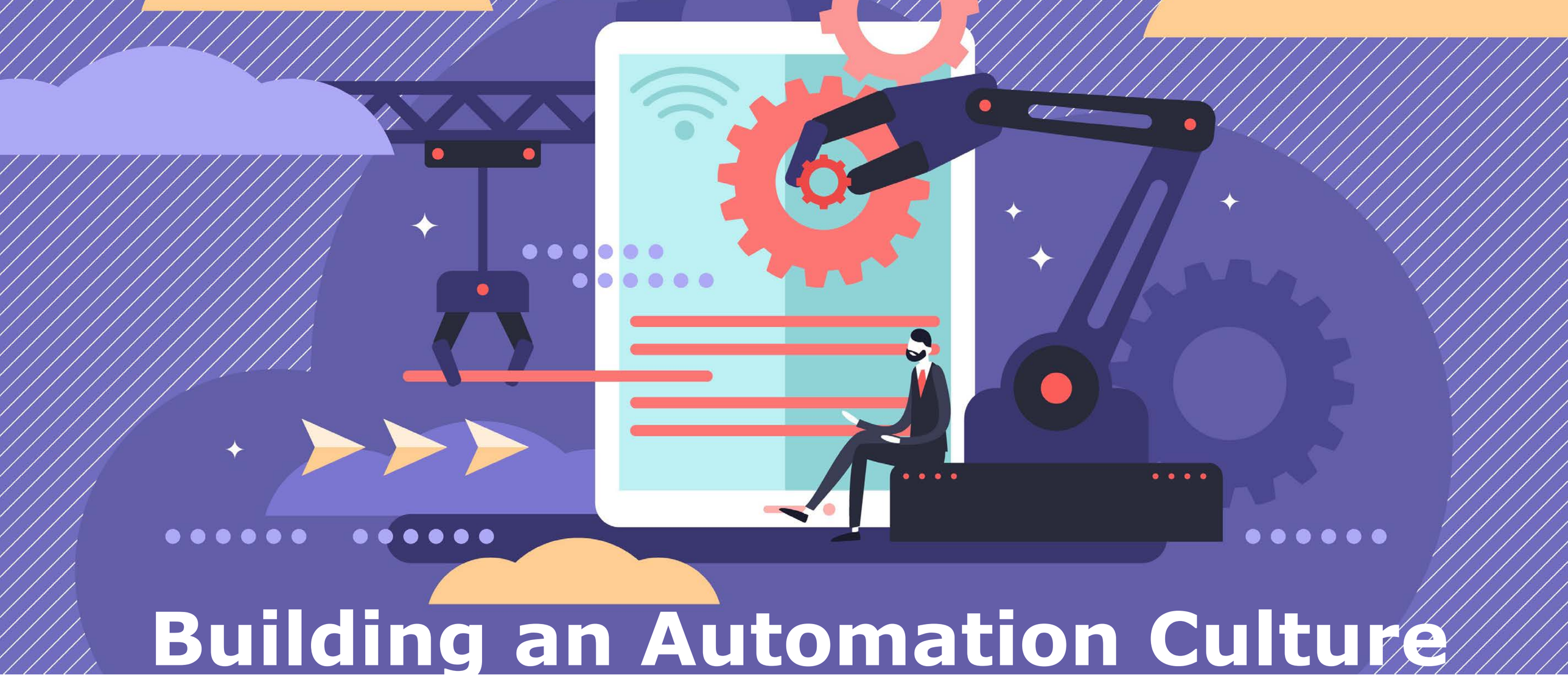

Building an Automation Culture

Luke Fowler -- Executive Director, GlobalNOC Network & Software Engineering

luke@iu.edu

Internet2 Technology Exchange 2023 – Minneapolis, Minnesota

GlobalNOC
Global Research Network Operations Center

How can we leverage our:

People
Tools
Processes

to **enable automation** across our organization

across every service delivery team

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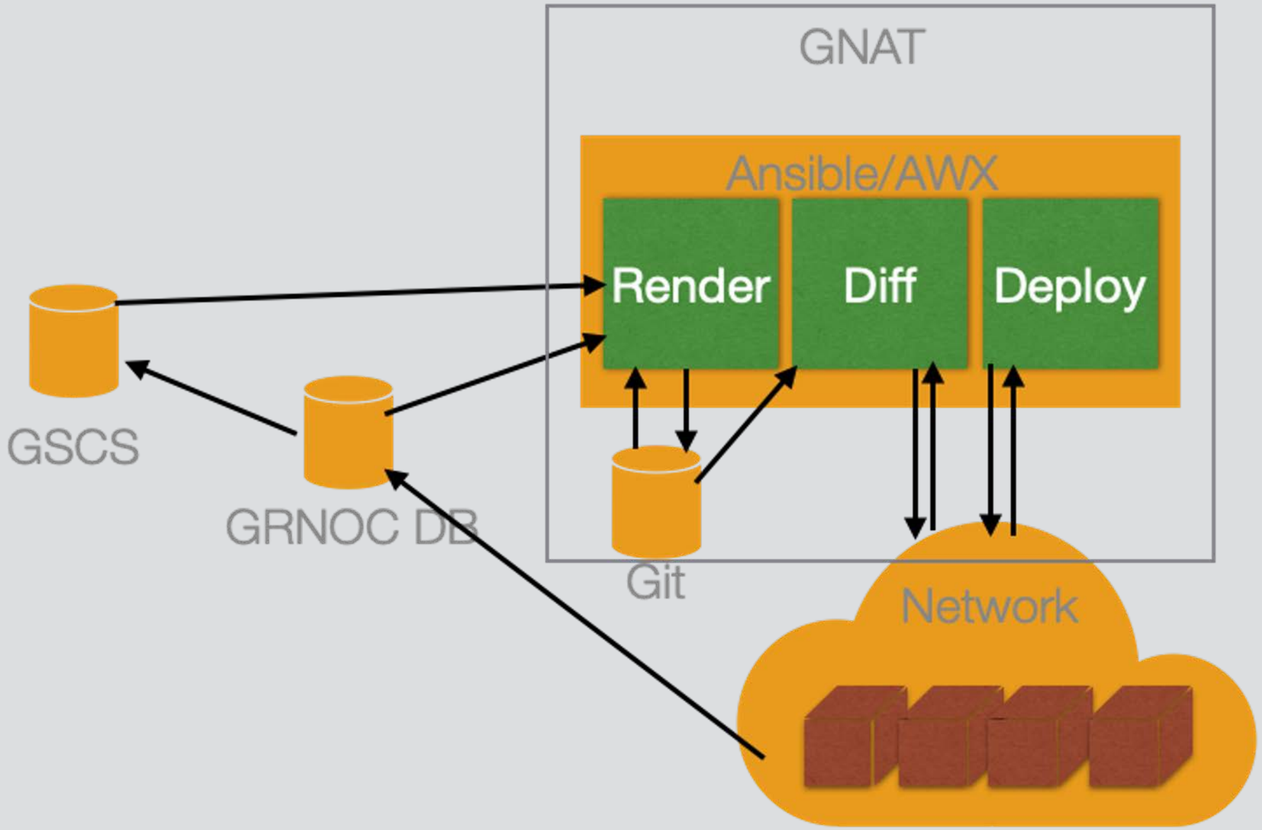
Network Config Automation

(you may have heard about this???)

- Integrated toolkit built on top of:
  - Ansible / AWX
  - Git / Github
  - GlobalNOC Database
  - UIs for baseline automation and service configuration



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Service

View History

Name

VPN-S01503

Nodes

Name

rtr3.ictc.vpn.grnoc.iu.edu

Outside Interface

GigabitEthernet0/0

Type

local

Use No Monitor Flag ☑

Use Pending Flag ☑

View config for node: rtr3.ictc.vpn.grnoc.iu.edu

Language: junos

```
groups {
  VPN-S01503 {
    security {
      zones {
        security-zone INSIDE {
          interfaces {
            st0.11;
          }
        }

      }

      ike {
        policy IKE_POLICY_PennREN_ {
          mode main;
          proposals IKE_PROPOSAL;
          pre-shared-key ascii-text 11;
        }

        gateway GATEWAY-PennREN- {
          ike-policy IKE_POLICY_
          address 1.1.1.1;
          local-identity inet 1.1.1.1;

          external-interface GigabitEthernet0/0;
```

GlobalNOC
at Indiana University

Configuration

- RANCID
- SVN
- Populators

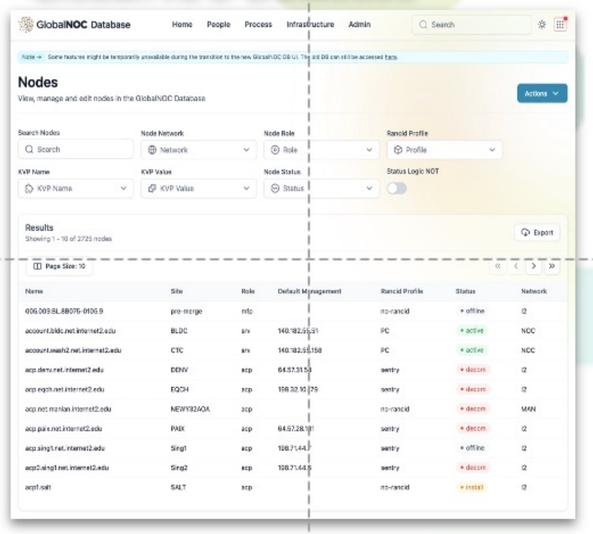
Automation

- Network Troubleshooter
- RouterProxy
- GNAT
- GSCS
- DNS AutoGen
- OESS

Telemetry & Measurement

- SNAPP
- SIMP
- TSDS
- Grafana
- Atlas
- PerfSONAR
- Netflow
- Syslog

GlobalNOC Database



Monitoring

- Nagios
- Alertmon
- Custom Agents
- Network Impact Tool

AAA

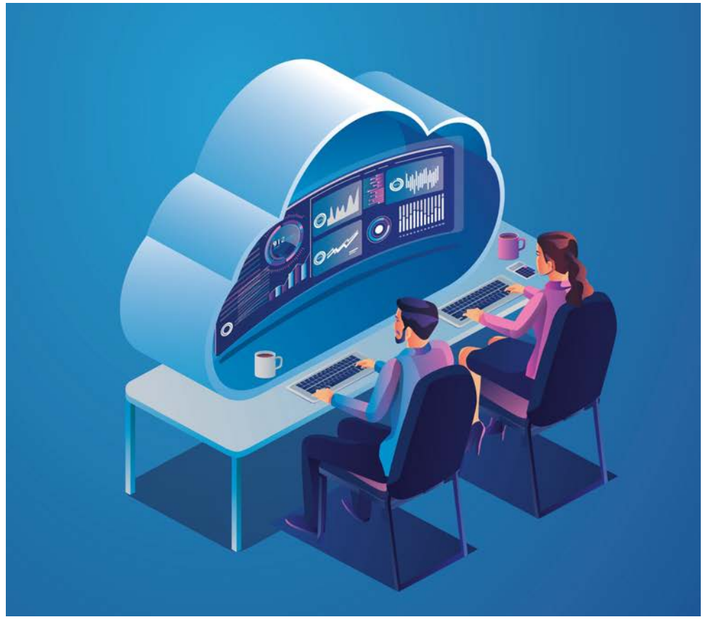
- RADIUS
- LDAP
- Kerberos
- OTP
- Shibboleth

ITSM

- ServiceNow
- Notification Tool
- Ticketing Tools
- Request Forms

Infrastructure

- Ansible/AWX
- GitHub
- Jenkins
- Puppet
- Cobbler



Service Desk

Network Engineering

Software & Systems Engineering

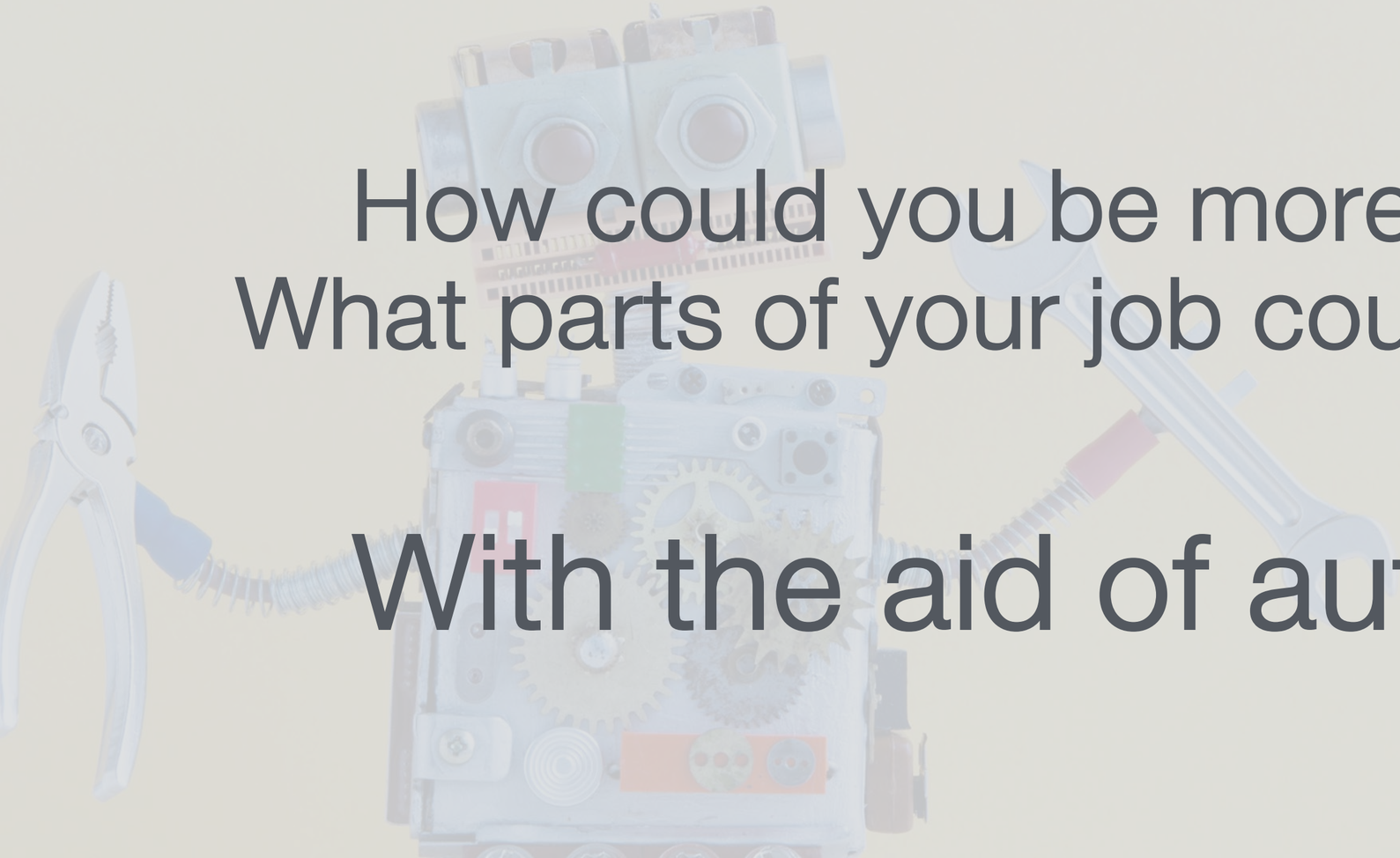
GlobalNOC
Global Research Network Operations Center

Get the whole organization involved!

We launched an “idea challenge” across GlobalNOC

How could you be more effective…
What parts of your job could be easier…

With the aid of automation



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Broadening the scope…

- Automated alert triage and routing
- Automated communication when outages are detected
- Automated tools to assist diagnose and remediate outages
- Automated tools to verify changes
- Automated systems to facilitate fine grained control of event notifications from our NOC to our users.
- Automated software testing and deployment for our network management systems
- And more…

Service Desk

- **Automated Alarm Handling**
  - Process for high-volume peer outage alarms used to have a manual “hold timer” before Service Desk engaged Network Engineering
  - These alarms now get automatic ticket creation to record the event. If peer restores before timer expires, no action is required, ticket is auto-closed.
  - If timer expires, Service Desk is notified and engages engineering.
- **Automated “Inquiry” e-mails**
  - Automate the process of sending e-mail to the remote side when we detect an outage inquiring about cause
- **Automated gathering of event up/down times**

Network Engineering

- **Automated pre/post maintenance condition comparison**
  - Tools to assist engineers during maintenance events to verify status of network after maintenance matches expectations.
- **Automate verifying light levels following fiber outage/maintenance**
  - Enable Service Desk to complete a task that used to require engineering engagement with enhanced tools and processes
- **Auto-remediation of network problem events**

Software & Systems Engineering

- **Automated Alarm Routing and Grouping**
  - Certain classes of high-volume / routine systems alarms were taking up significant time at our Service Desk to triage and route to the proper team.
  - Enabled a system to automatically classify, acknowledge, group and route these alarms to the correct systems engineering team.
- **Automated Software Release Packaging & Deployment**
  - Enhancements to our software build & deployment processes
  - Go from “code changes completed” to “tested and deployed” automatically

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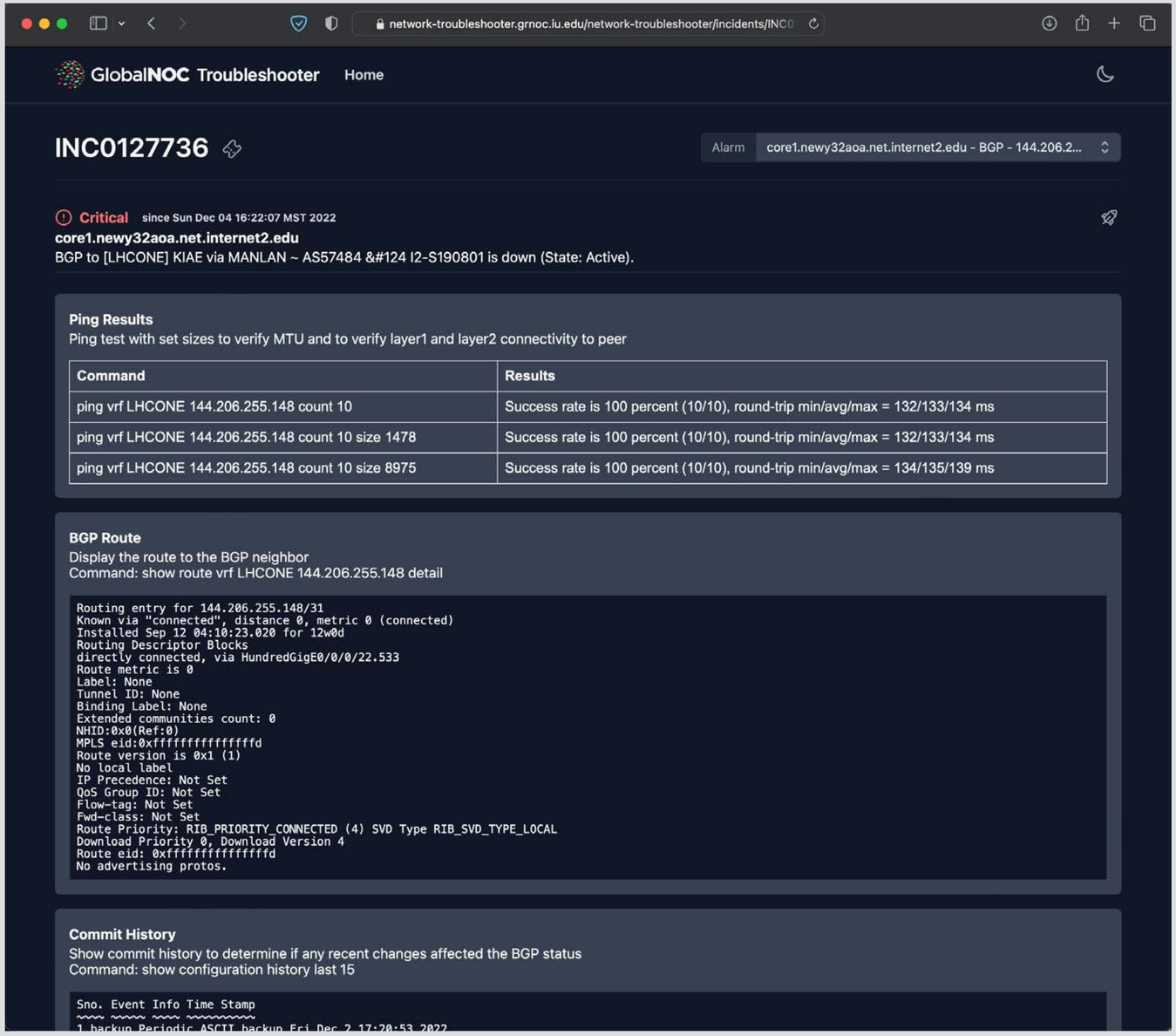
“Network Troubleshooter”

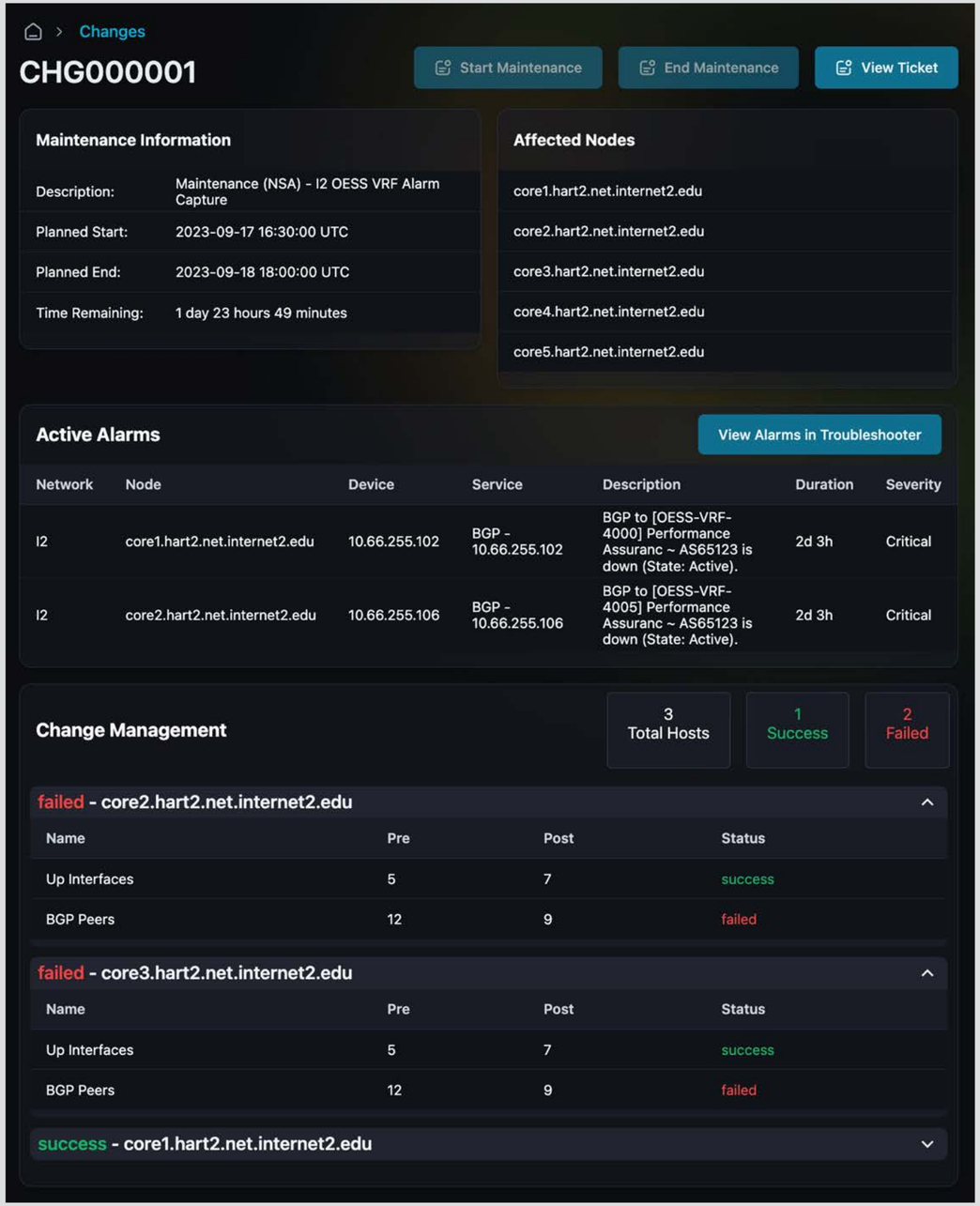
AJ Ragusa

Tomorrow – 2:40pm

Automated Incident
Troubleshooting
Dashboards
&
Automated Change Support

GlobalNOC Network Troubleshooter
(now supports both **incident** and **change** events)





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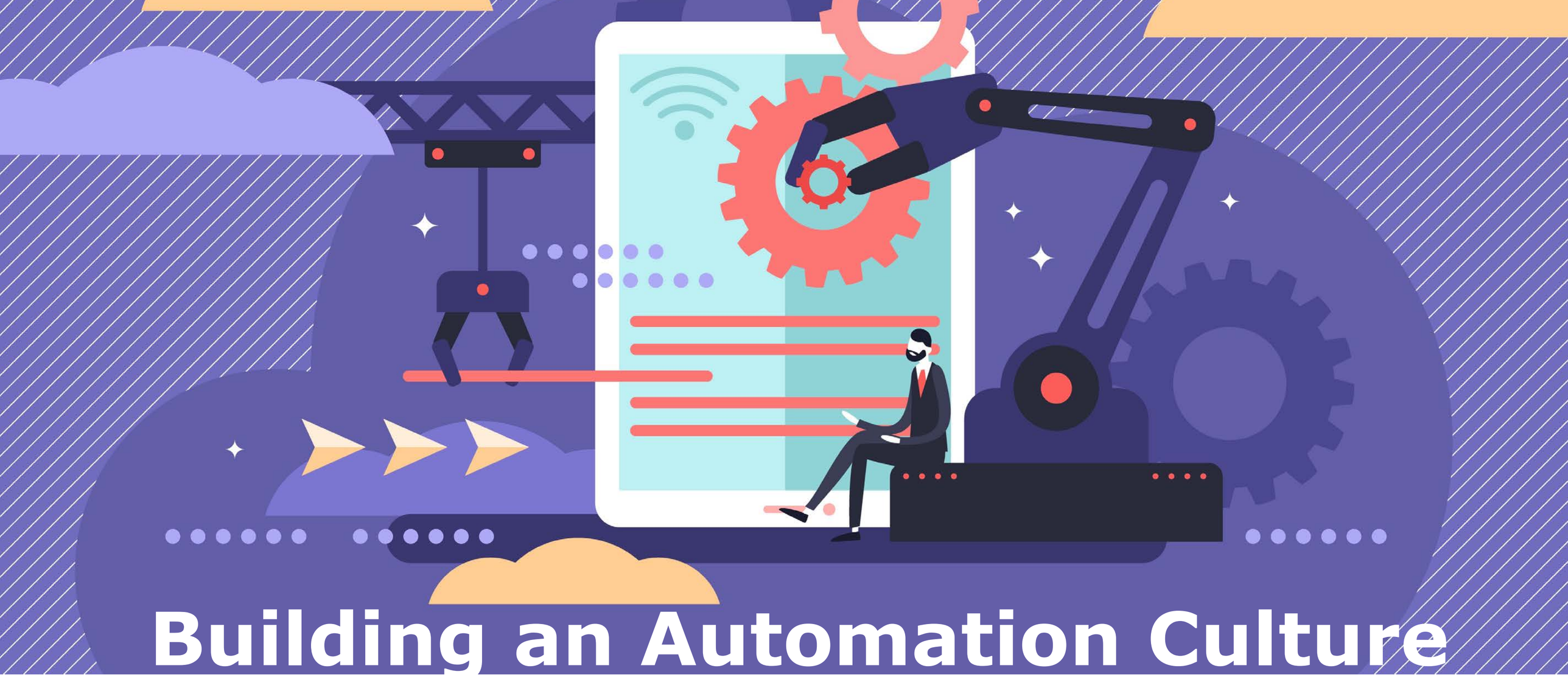
Lots of little automation projects promoting an automation culture across your organization…

Can lead to a transformative impact over time



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