AUTOMATION FOR NETWORK INFRASTRUCTURE

IMPROVING AGILITY, SPEED, & PROCESSES WITH OPEN SOURCE SOLUTIONS

Michael Ford
Senior Solutions Architect, Ansible

MANAGING NETWORKS HASN’T CHANGED IN 30 YEARS.

According to Gartner…

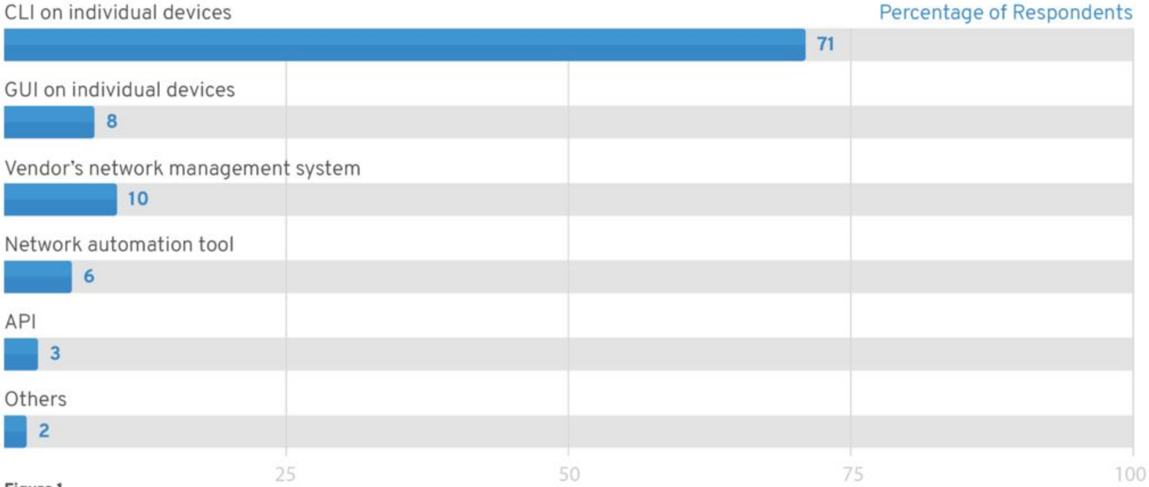


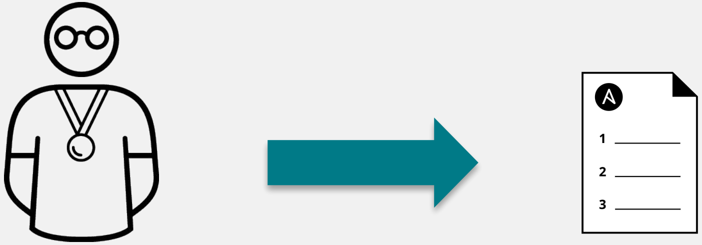
Figure 1
Primary Method for Making Network Changes

Source: Gartner, *Look Beyond Network Vendors for Network Innovation.* January 2018. Gartner ID: G00349636. (n=64)

Automation Considerations

- Compute is no longer the slowest link in the chain
- Businesses demand that networks deliver at the speed of cloud
- Automation of repeatable tasks
- Bridge silos

Automation: SME as Code



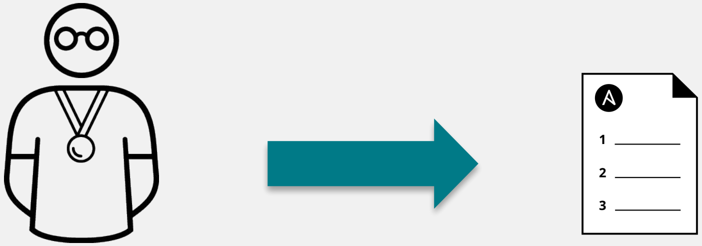
SME

Code

- Leverages Human Experience
- Reduce Repetition

- Reduce Variability
- Reduce Isolation

Automation: SME as ~~Code~~ Playbook



SME

~~Code~~ Playbook

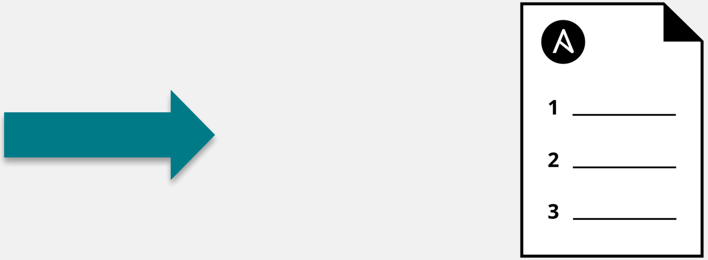
- Leverages Human Experience
- Reduce Repetition

- Reduce Variability
- Reduce Isolation

Convert Procedures to Playbooks

1. Create VLAN
2. Add port to VLAN
3. Address Interface

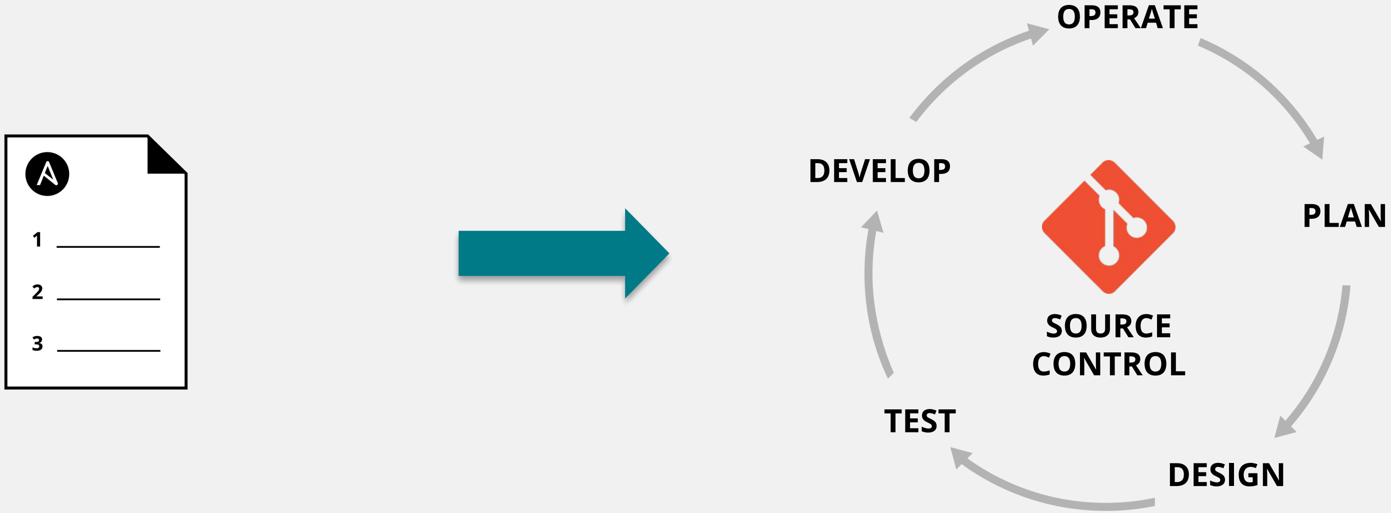
Method of Procedure



Playbook

- Define Intent, Policy, Architecture
- Apply across device type, vendor

Manage Lifecycle with Process & Playbooks



OPERATE

PLAN

DESIGN

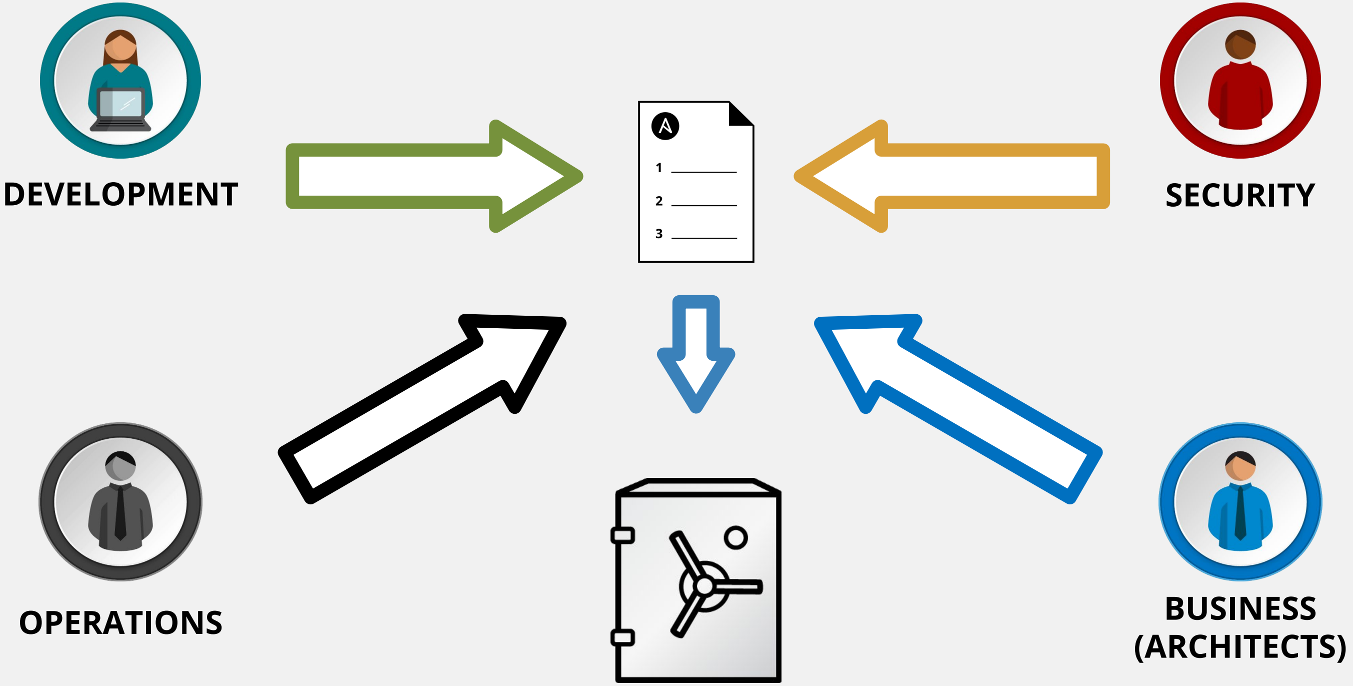
TEST

DEVELOP

SOURCE CONTROL

- Revision control, configuration management
- Ensure an ongoing steady-state
- Automated testing, reduce human error

Communicate with Playbooks



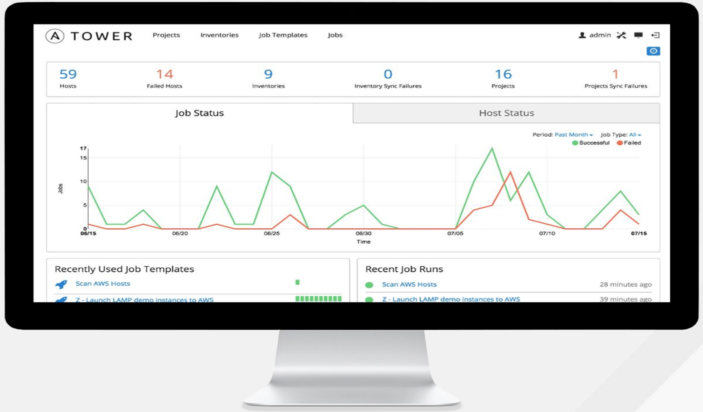
What is Ansible?

Ansible is a simple automation language that can perfectly describe an IT application infrastructure in Ansible Playbooks.

As a vendor agnostic framework Ansible can automate Arista (EOS), Cisco (IOS, IOS XR, NX-OS), Juniper (JunOS), Open vSwitch and VyOS.

Ansible Engine is an automation engine that runs Ansible Playbooks.

Ansible Tower is an enterprise framework for controlling, securing and managing your Ansible automation with a UI and RESTful API.



59	14	9	0	16	1
Hosts	Failed Hosts	Inventories	Inventory Sync Failures	Projects	Projects Sync Failures

Recently Used Job Templates

- Scan AWS Hosts
- Z - Launch LAMP demo instances to AWS

Recent Job Runs

- Scan AWS Hosts 28 minutes ago
- Z - Launch LAMP demo instances to AWS 39 minutes ago

Why Ansible?

SIMPLE

Human readable automation

No special coding skills needed

Tasks executed in order

Get productive quickly

POWERFUL

Image updates

Configuration management

Compliance

Orchestrate the network lifecycle

AGENTLESS

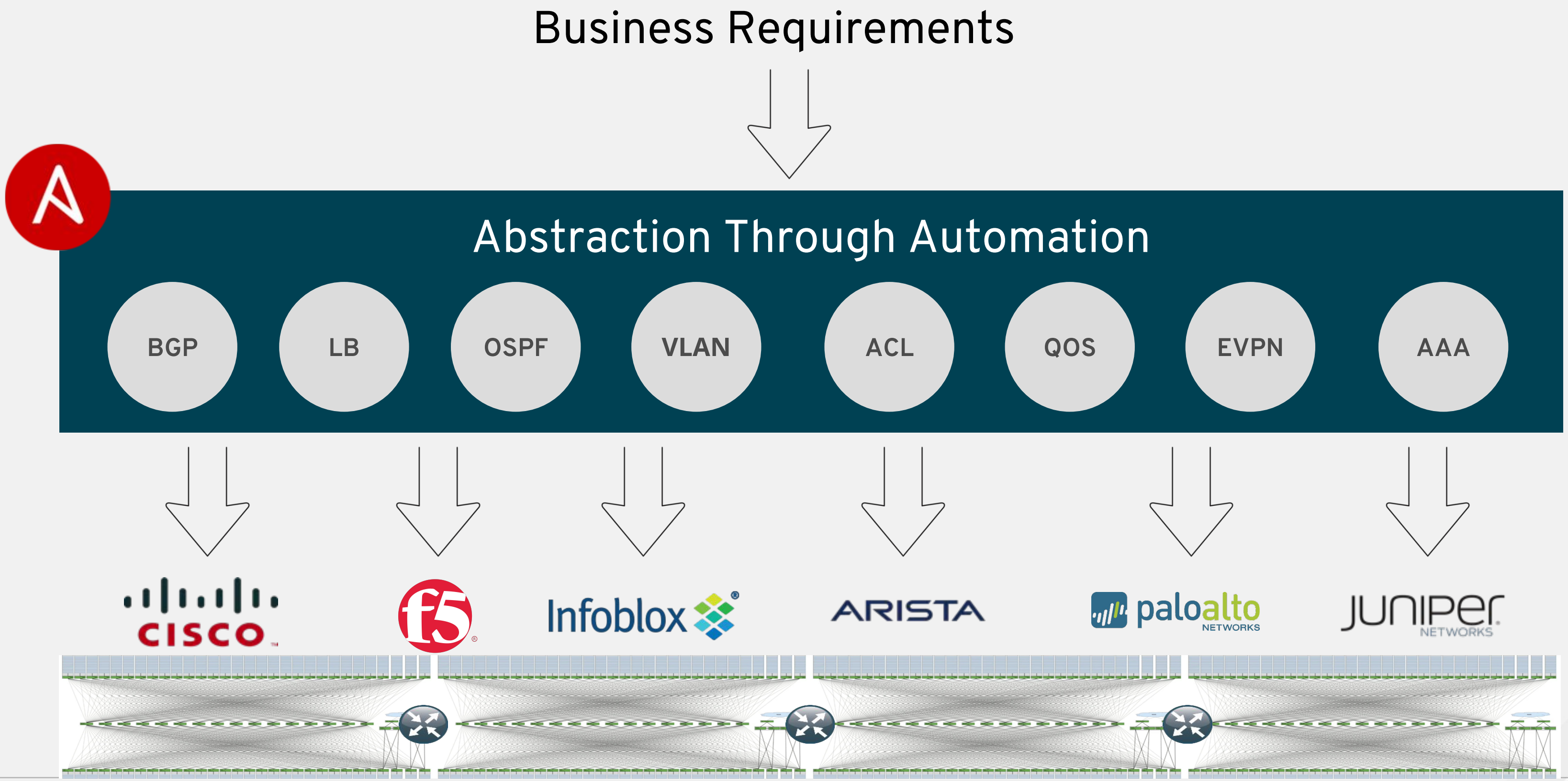
Agentless architecture

Uses OpenSSH & WinRM

No agents to exploit or update

More efficient & more secure

The Flexibility of Choice



Business Requirements

Abstraction Through Automation

BGP

LB

OSPF

VLAN

ACL

QOS

EVPN

AAA

The Road To Automation

STANDARDIZE

with Red Hat Ansible Engine

- Snapshot State
- Detect Unauthorized Change
- Standardize Existing Configs
- Standardize New Deployments

AUTOMATE

with Red Hat Ansible Engine

- Automate common tasks
- Make changes across any set of network devices
- Validate that changes were successful

SCALE

with Red Hat Ansible Tower

- Automated deployment from Services Catalogue
- Automated compliance checking & enforcement
- API-Driven Integration with Application Development

Organize the Chaos → Optimize your Infrastructure → Stop Logging Into Devices

Improved Outcomes with Automation

Time to Value
Configuration & Change Automation

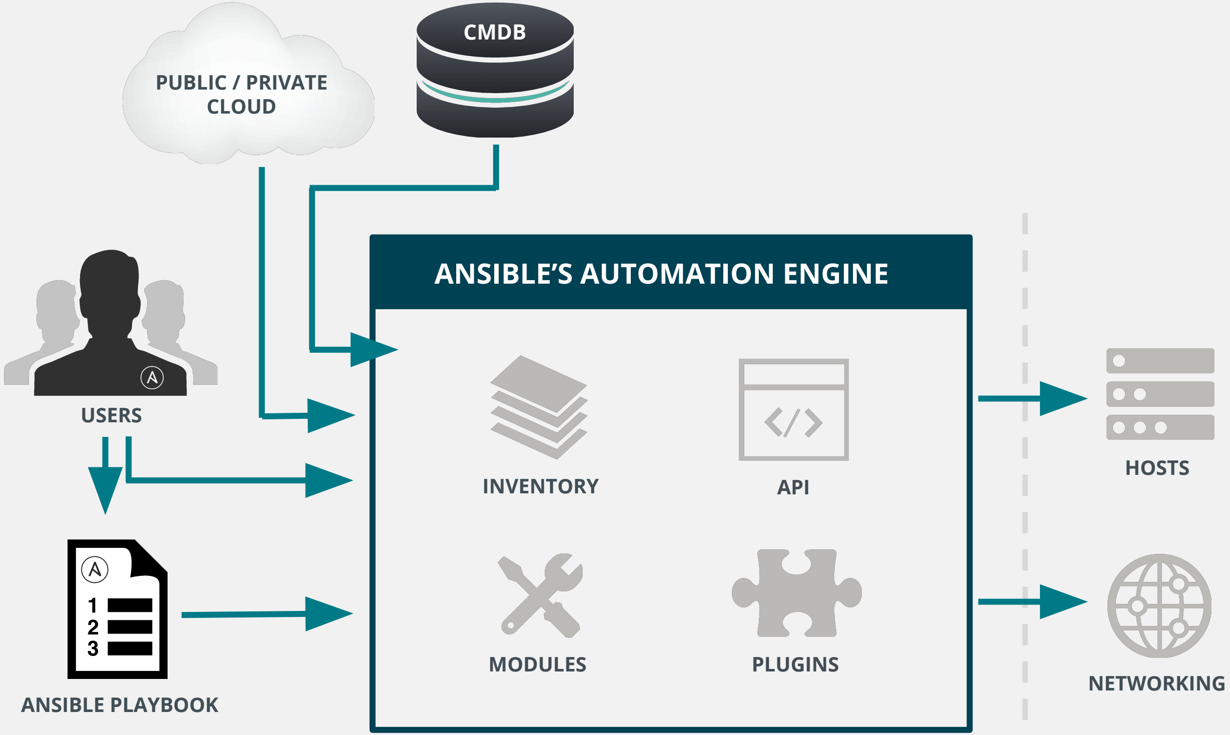
- Faster Customer Service On-boarding
- Faster Execution of Change Requests

Time to Remediation
Automated Fault Remediation

- Faster Execution of Maintenance
- Faster Troubleshooting and Remediation

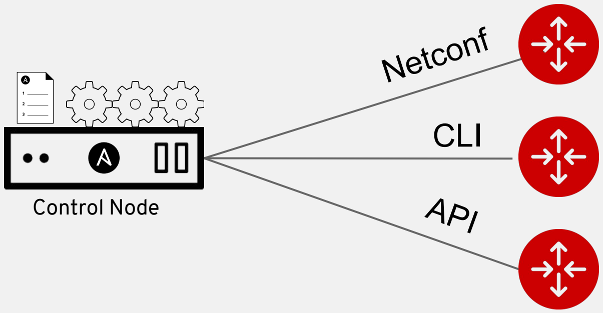
Playbooks & Network Modules

Under the Hood



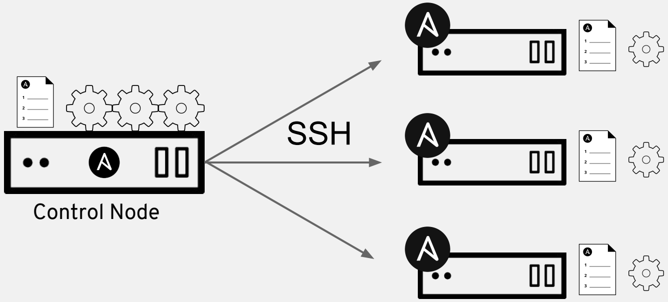
Connection Plugins

Python code is executed locally on the control node



NETWORKING DEVICES

Python code is copied to the managed node, executed, then removed



LINUX HOSTS

Anatomy of a Playbook

```
- hosts: network
```

Inventory: The devices to configure

```
  vars:
    site_domain_name: 'example.net'
    network_name_servers:
      - 8.8.8.8
      - 8.8.4.4
    log_host: 10.2.2.3
```

Variables: The key/value pairs that change from device to device

```
  tasks:
    - name: Configure the hostname and domain name
      net_system:
        hostname: "{{ inventory_hostname }}"
        domain_name: "{{ site_domain_name }}"
        name_servers: "{{ network_name_servers }}"

    - name: configure host logging
      net_logging:
        dest: host
        name: "{{ log_host }}"
```

Tasks: The tasks to perform on those devices

Network Functional Modules

Building Blocks

command

(e.g. ios_command)

- Executes command on device
- Provides output for further processing

config

(e.g. ios_config)

- Manipulates the config of the device
- Idempotent

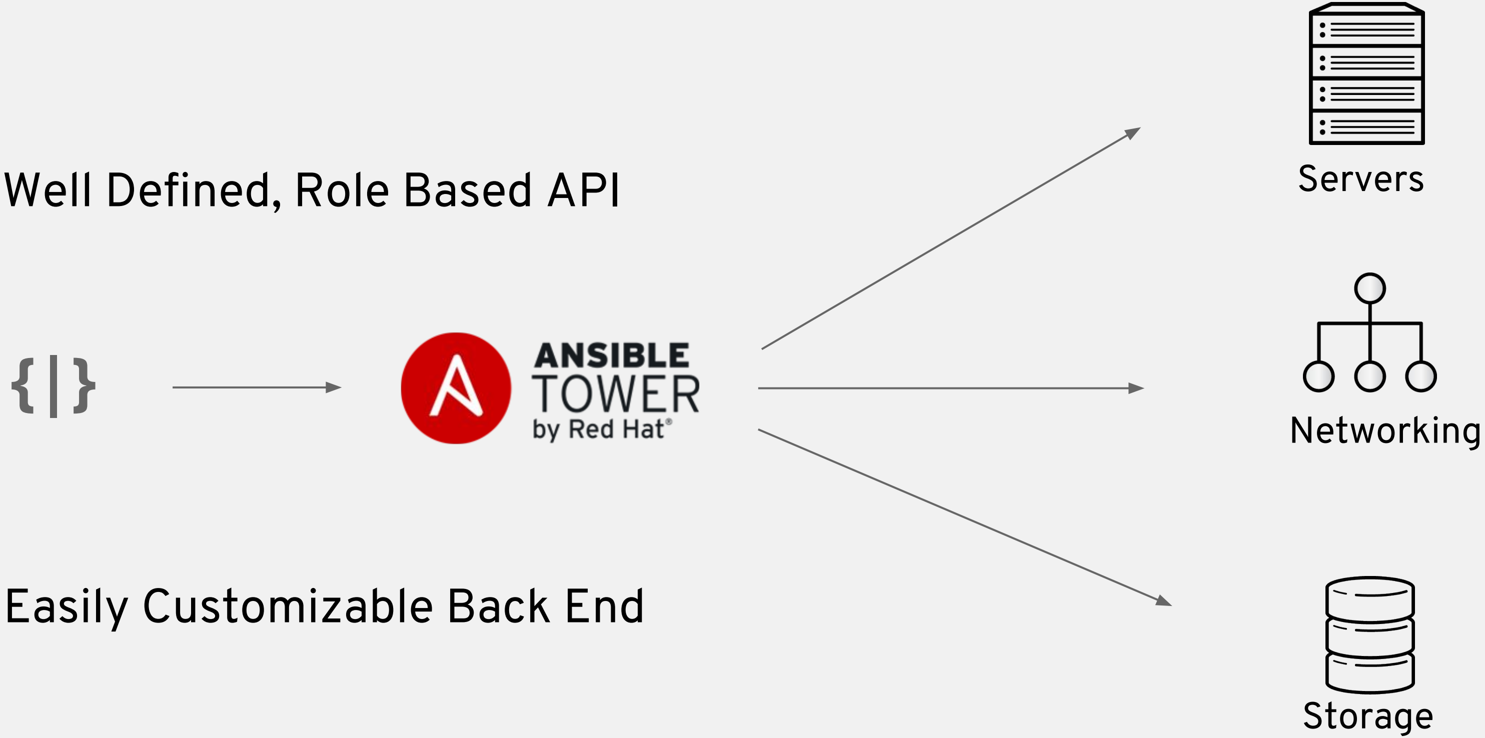
facts

(e.g. ios_facts)

- Collects facts from the device

API-Driven Infrastructure

Well Defined, Role Based API



ANSIBLE TOWER by Red Hat®

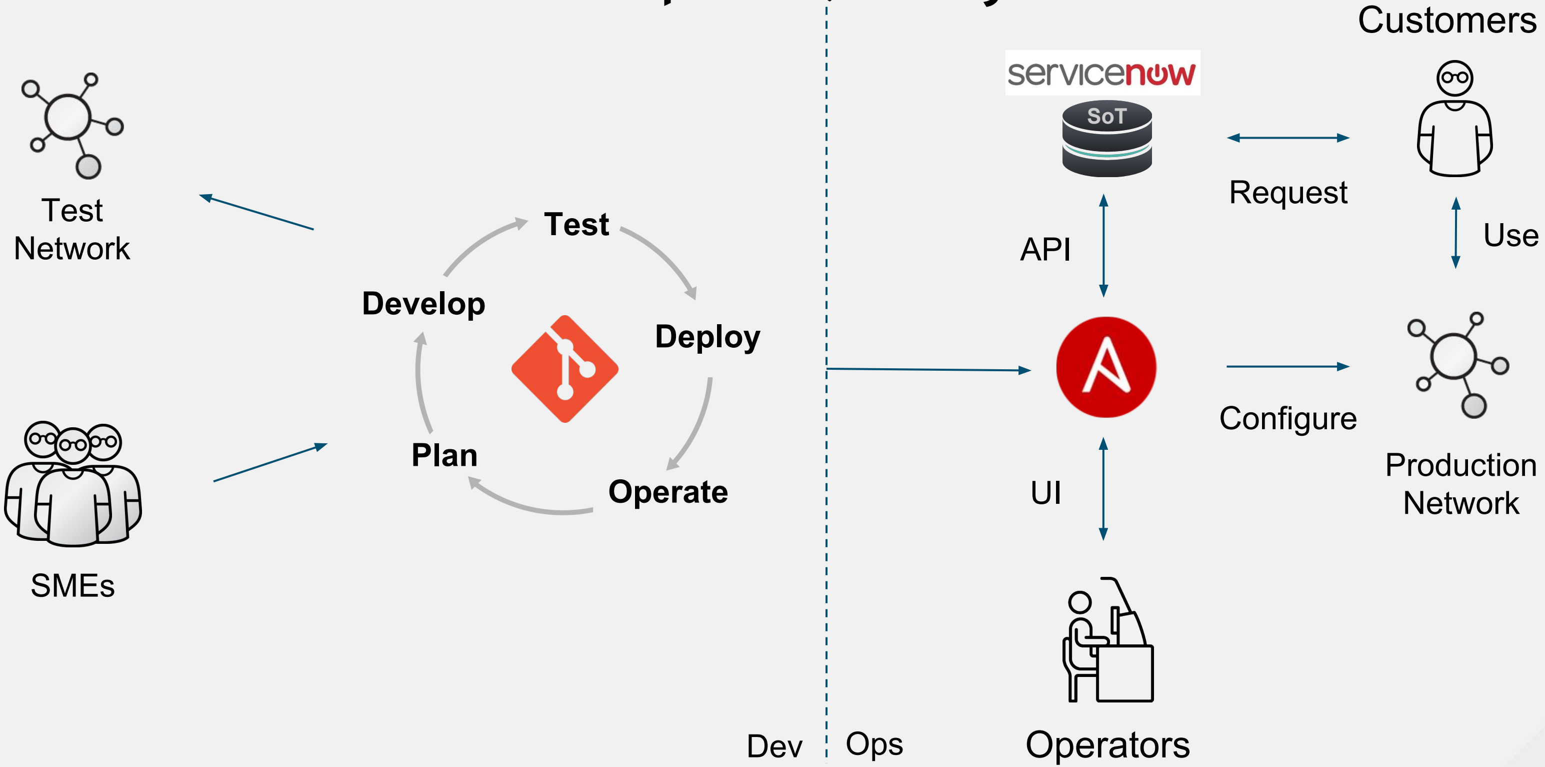
Servers

Networking

Storage

Easily Customizable Back End

Automate the Enterprise, not just Humans



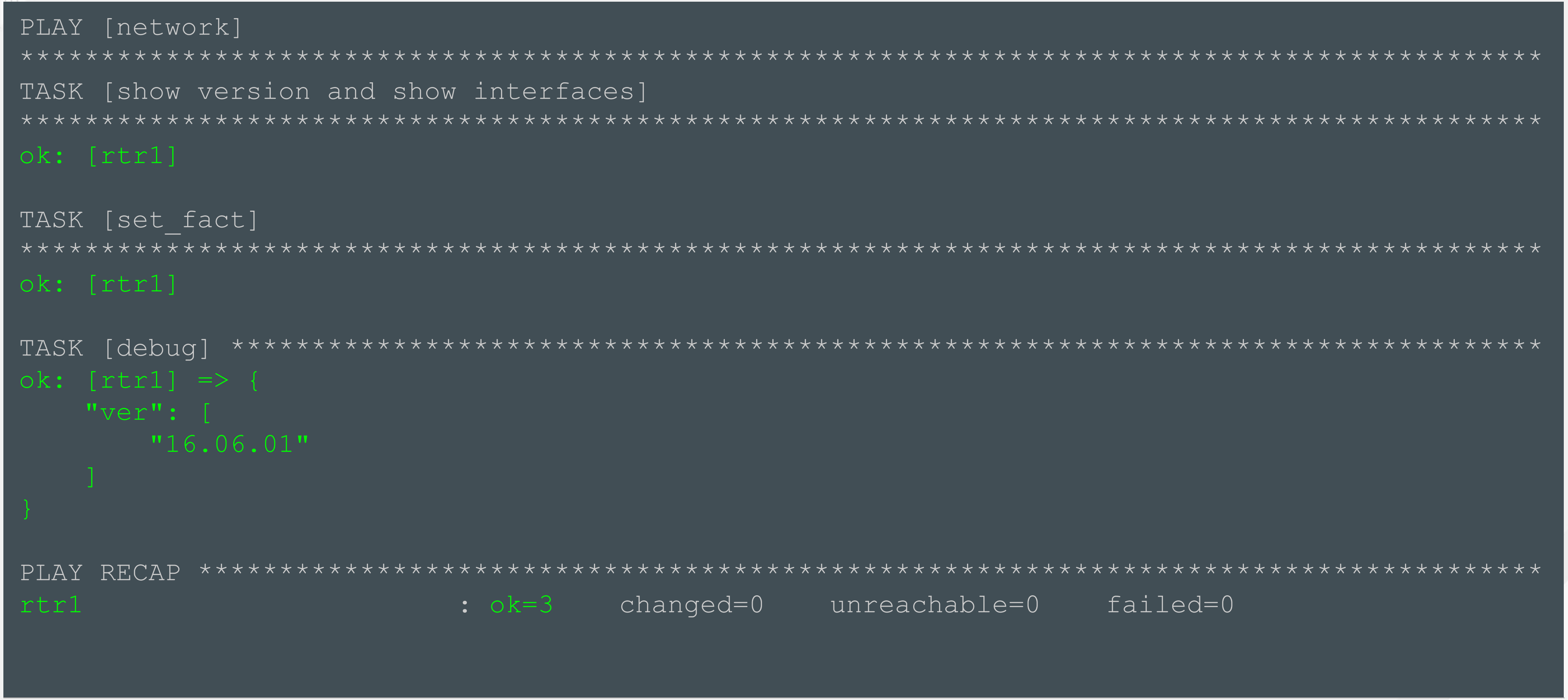
Network Functional Module: Command

```
- hosts: network
  gather_facts: no
  connection: local
  tasks:
    - name: show version
      ios_command:
        commands:
          - show version
        wait_for:
          - result[0] contains Version
        register: results

    - set_fact:
        ver: "{{ results.stdout[0]|regex_search('Version ([0-9.]+)','\\1') }}"

    - debug: var=ver
```

Network Functional Module: Command



```
PLAY [network]
**********************************************************************************************
TASK [show version and show interfaces]
**********************************************************************************************
ok: [rtr1]

TASK [set_fact]
**********************************************************************************************
ok: [rtr1]

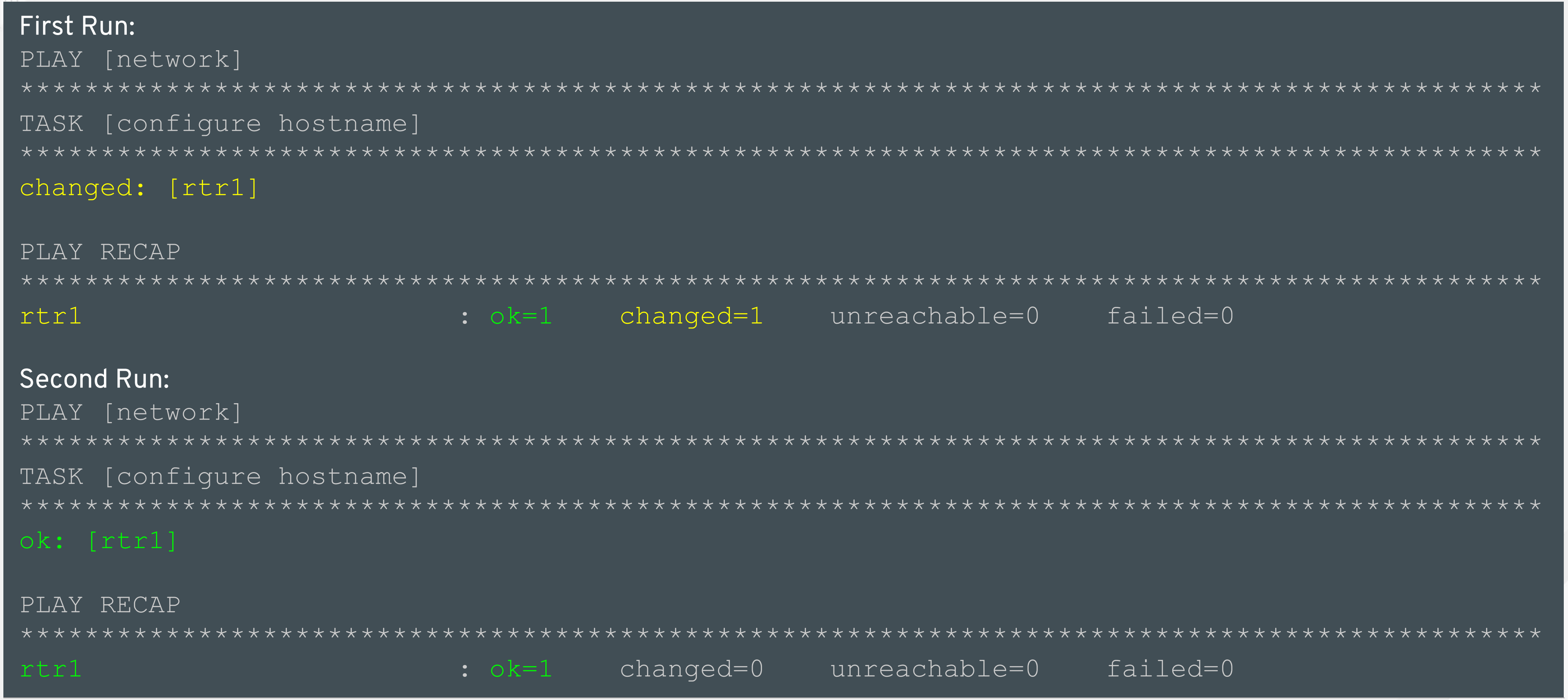
TASK [debug] *********************************************************************************
ok: [rtr1] => {
    "ver": [
        "16.06.01"
    ]
}

PLAY RECAP ***********************************************************************************
rtr1                       : ok=3    changed=0    unreachable=0    failed=0
```

Network Functional Module: Config

```
- hosts: network
  gather_facts: no
  connection: local
  tasks:
    - name: configure hostname
      ios_config:
        lines:
          - "hostname {{ inventory_hostname }}"
```

Network Functional Module: Config



First Run:

```
PLAY [network]
***********************************************************************************************
TASK [configure hostname]
***********************************************************************************************
changed: [rtr1]

PLAY RECAP
***********************************************************************************************
rtr1                        : ok=1    changed=1    unreachable=0    failed=0
```

Second Run:

```
PLAY [network]
***********************************************************************************************
TASK [configure hostname]
***********************************************************************************************
ok: [rtr1]

PLAY RECAP
***********************************************************************************************
rtr1                        : ok=1    changed=0    unreachable=0    failed=0
```

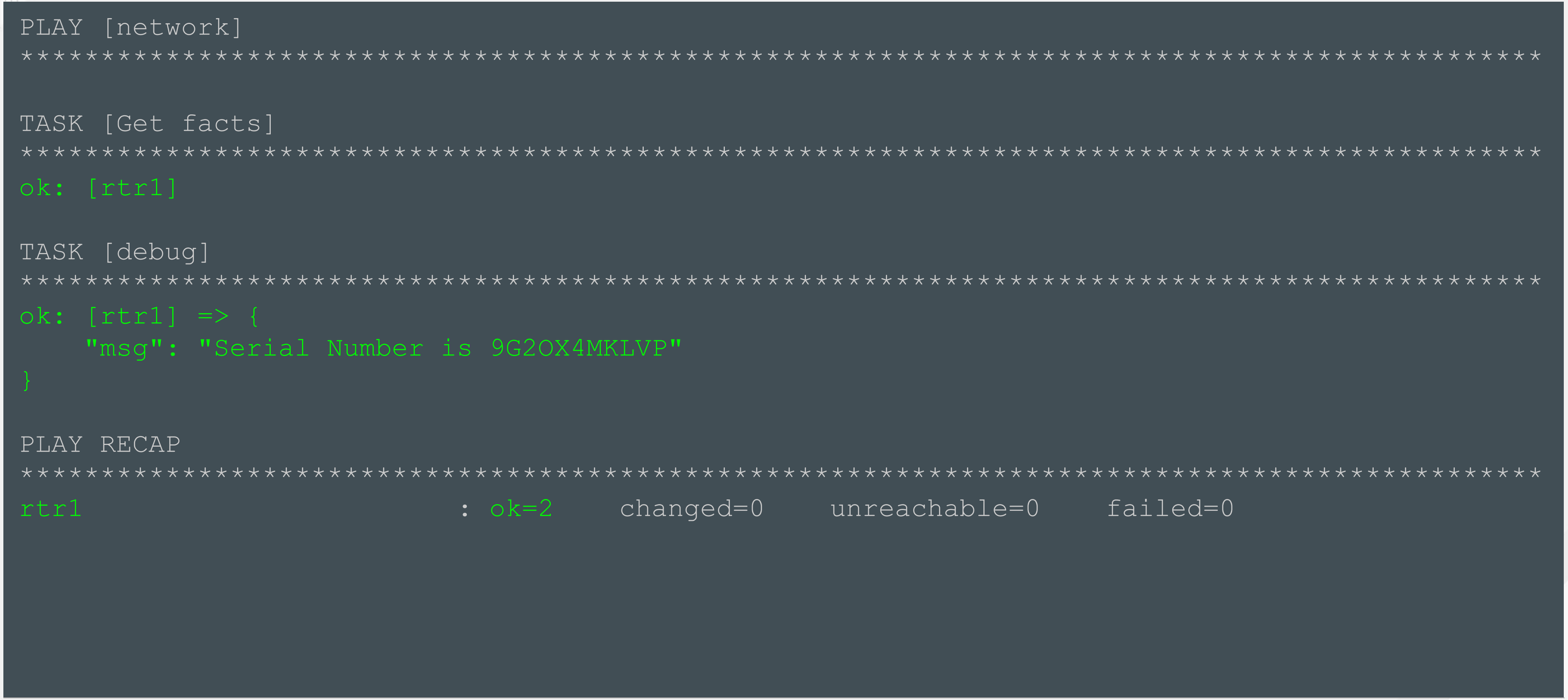
Network Functional Module: Facts

```
- hosts: network
  connection: local
  gather_facts: False
  tasks:

    - name: Get facts
      ios_facts:
        gather_subset: all

    - debug: msg="Serial Number is {{ ansible_net_serialnum }}"
```

Network Functional Module: Facts



```
PLAY [network]
************************************************************************************************

TASK [Get facts]
************************************************************************************************
ok: [rtr1]

TASK [debug]
************************************************************************************************
ok: [rtr1] => {
    "msg": "Serial Number is 9G2OX4MKLVP"
}

PLAY RECAP
************************************************************************************************
rtr1                        : ok=2    changed=0    unreachable=0    failed=0
```

Network Resource Modules

```
- name: configure the “management” vrf
  eos_vrf:
    name: management
    state: present
  when: ansible_network_os == 'eos'

- name: configure the “management” vrf
  ios_vrf:
    name: management
    description: oob mgmt vrf
    state: present
  when: ansible_network_os == 'ios'

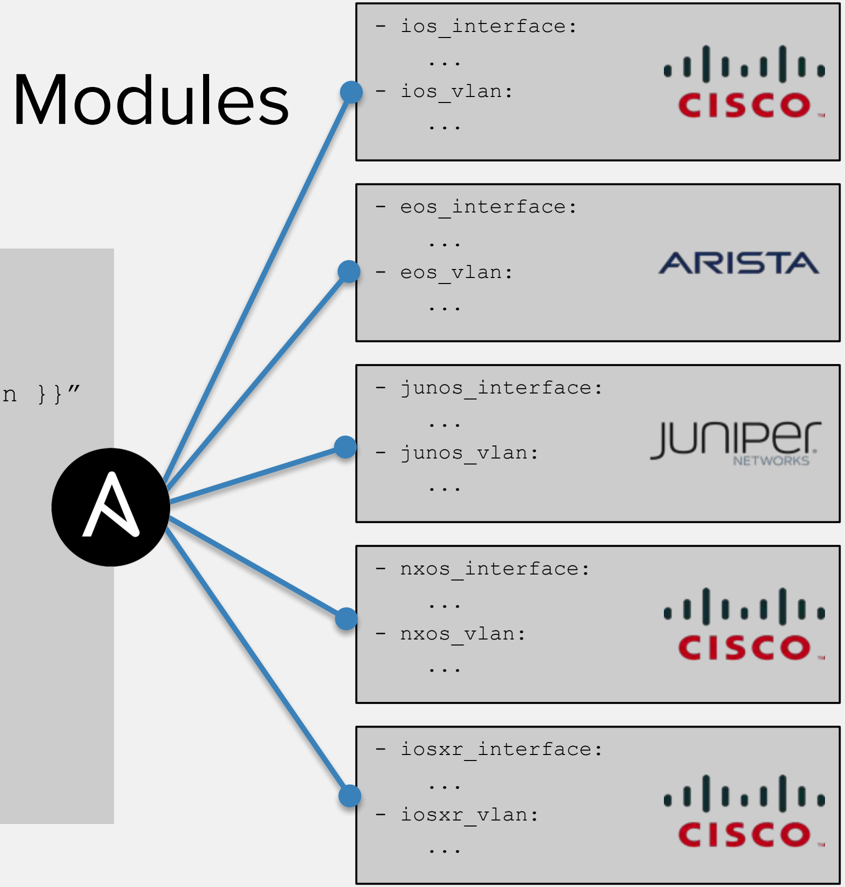
- name: configure the “management” vrf
  nxos_vrf:
    name: management
    description: oob mgmt vrf
    state: present
  when: ansible_network_os == 'nxos'
```

- Per Platform Implementation
- Focused on managing a resource
- Declarative by design
- Handles complexity

Network Resource Modules

```
- name: configure network interface
  net_interface
    name: “{{ interface_name }}”
    description: “{{ interface_description }}”
    enabled: yes
    mtu: 9000
    state: up

- name: configure VLAN ID and name
  net_vlan:
    vlan_id: 20
    name: test-vlan
```



```
- ios_interface:
    ...
- ios_vlan:
    ...
```

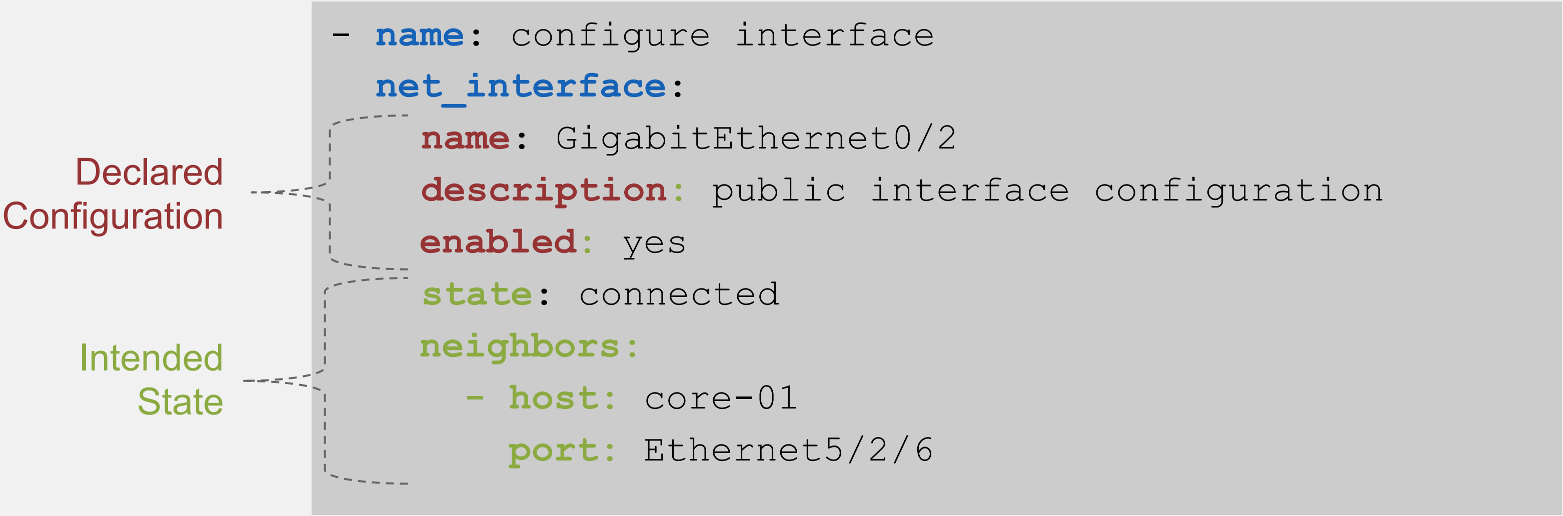
```
- eos_interface:
    ...
- eos_vlan:
    ...
```

```
- junos_interface:
    ...
- junos_vlan:
    ...
```

```
- nxos_interface:
    ...
- nxos_vlan:
    ...
```

```
- iosxr_interface:
    ...
- iosxr_vlan:
    ...
```

Declarative Intent



```
- name: configure interface
  net_interface:
    name: GigabitEthernet0/2
    description: public interface configuration
    enabled: yes
    state: connected
    neighbors:
      - host: core-01
        port: Ethernet5/2/6
```

Aggregate Resources

Loop entries

```
- name: Configure VLANs
  net_vlan:
    vlan_id: “{{ item.vlan_id }}”
    name: “{{ item.name }}”
    state: “{{ item.state | default(‘active’)
}}”
  with_items:
    - { vlan_id: 1, name: default }
    - { vlan_id: 2, name: Vl2 }
    - { vlan_id: 3, state: suspend }
```

Multiple Operations

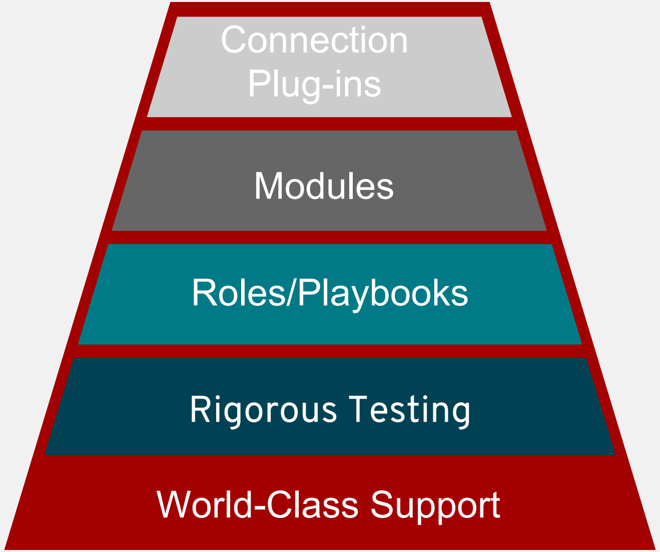
Bulk entries

```
- name: Configure VLANs and Purge
  net_vlan:
    aggregate:
      - { vlan_id: 1, name: default }
      - { vlan_id: 2, name: Vl2 }
      - { vlan_id: 3, state: suspend }
    state: active
    purge: yes
```

Single Operation

Applications Roles

- Focused on addressing operational use cases
- Approved and opinionated methods
- Developed, tested, and distributed by Ansible
- Agile development with gated release process



Connection Plug-ins

Modules

Roles/Playbooks

Rigorous Testing

World-Class Support

Software Supply Chain

Network Operators aren’t programmers, need one-stop for “approved” content

Community

Where to obtain playbooks, roles, modules?

Who wrote them?

Are they tested?

Who supports them?

Supported

Trusted Distribution:

- Development: GitHub/ansible-network
- Released: Ansible Galaxy

Distributed CI test system

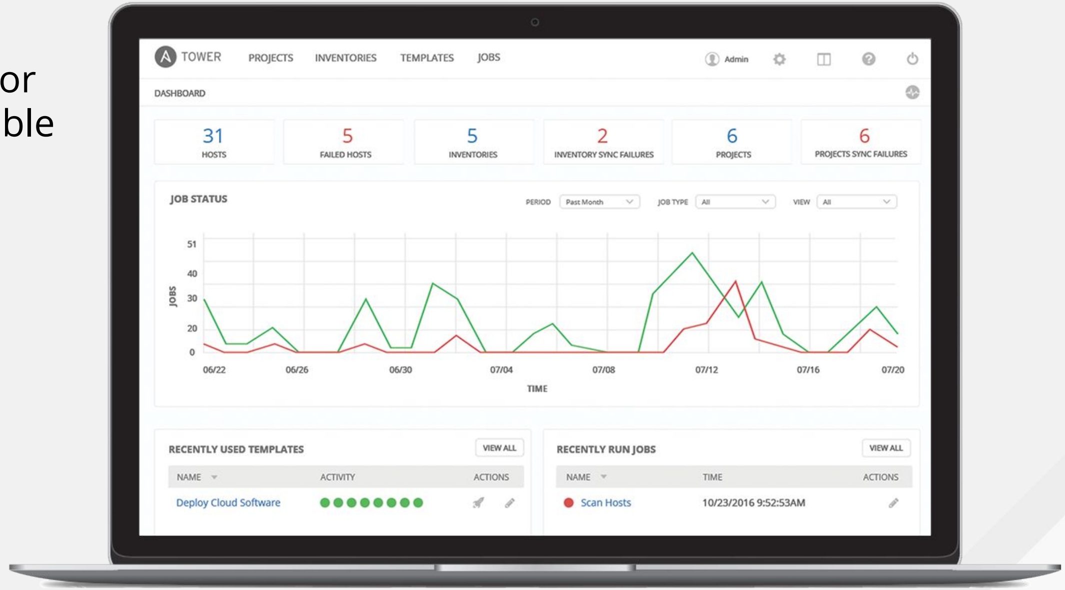
Supported by Red Hat

Automation for Teams

Ansible Tower technical introduction and overview

Ansible Tower is an **enterprise framework** for controlling, securing and managing your Ansible automation – with a **UI and RESTful API.**

- **RESTful API**
- **Role Based access control**
- **Deploy** entire applications with **push-button deployment** access
- All automations are **centrally logged**



31	5	5	2	6	6
HOSTS	FAILED HOSTS	INVENTORIES	INVENTORY SYNC FAILURES	PROJECTS	PROJECTS SYNC FAILURES

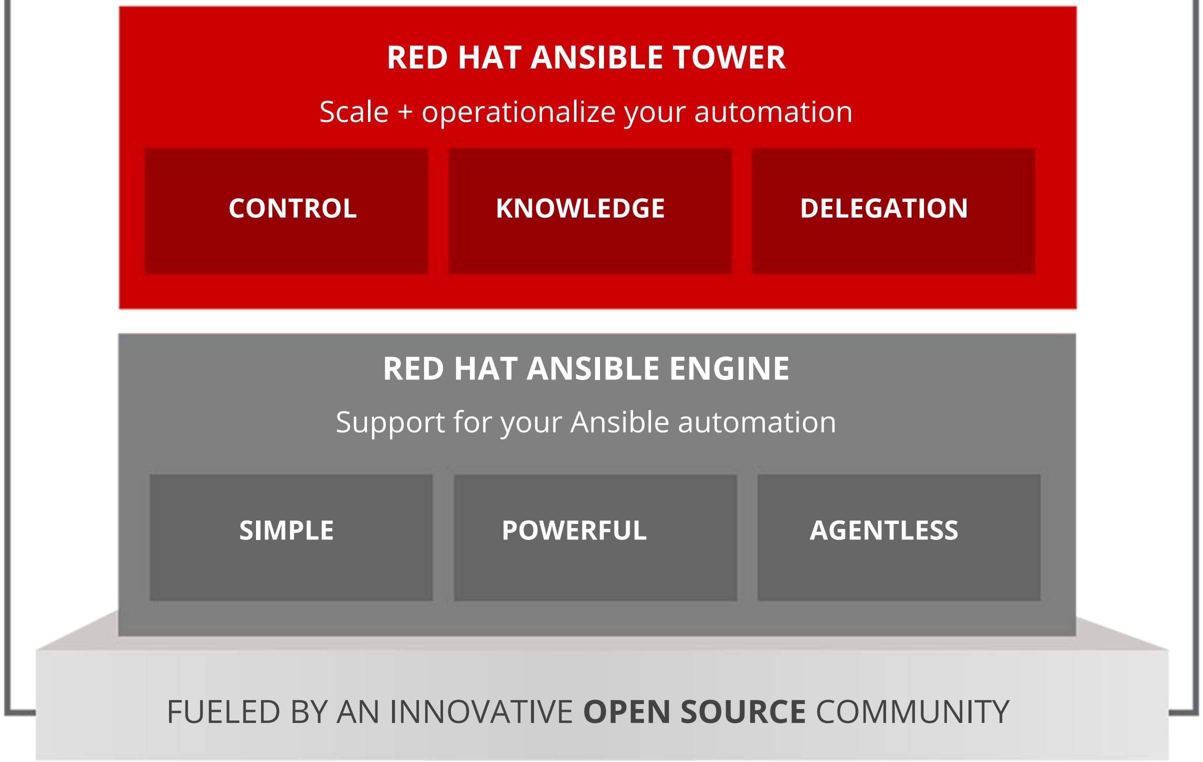
RECENTLY USED TEMPLATES

NAME	ACTIVITY	ACTIONS
Deploy Cloud Software	●●●●●●●●	

RECENTLY RUN JOBS

NAME	TIME	ACTIONS
● Scan Hosts	10/23/2016 9:52:53AM	

RED HAT® ANSIBLE® Automation



RED HAT ANSIBLE TOWER

Scale + operationalize your automation

CONTROL

KNOWLEDGE

DELEGATION

RED HAT ANSIBLE ENGINE

Support for your Ansible automation

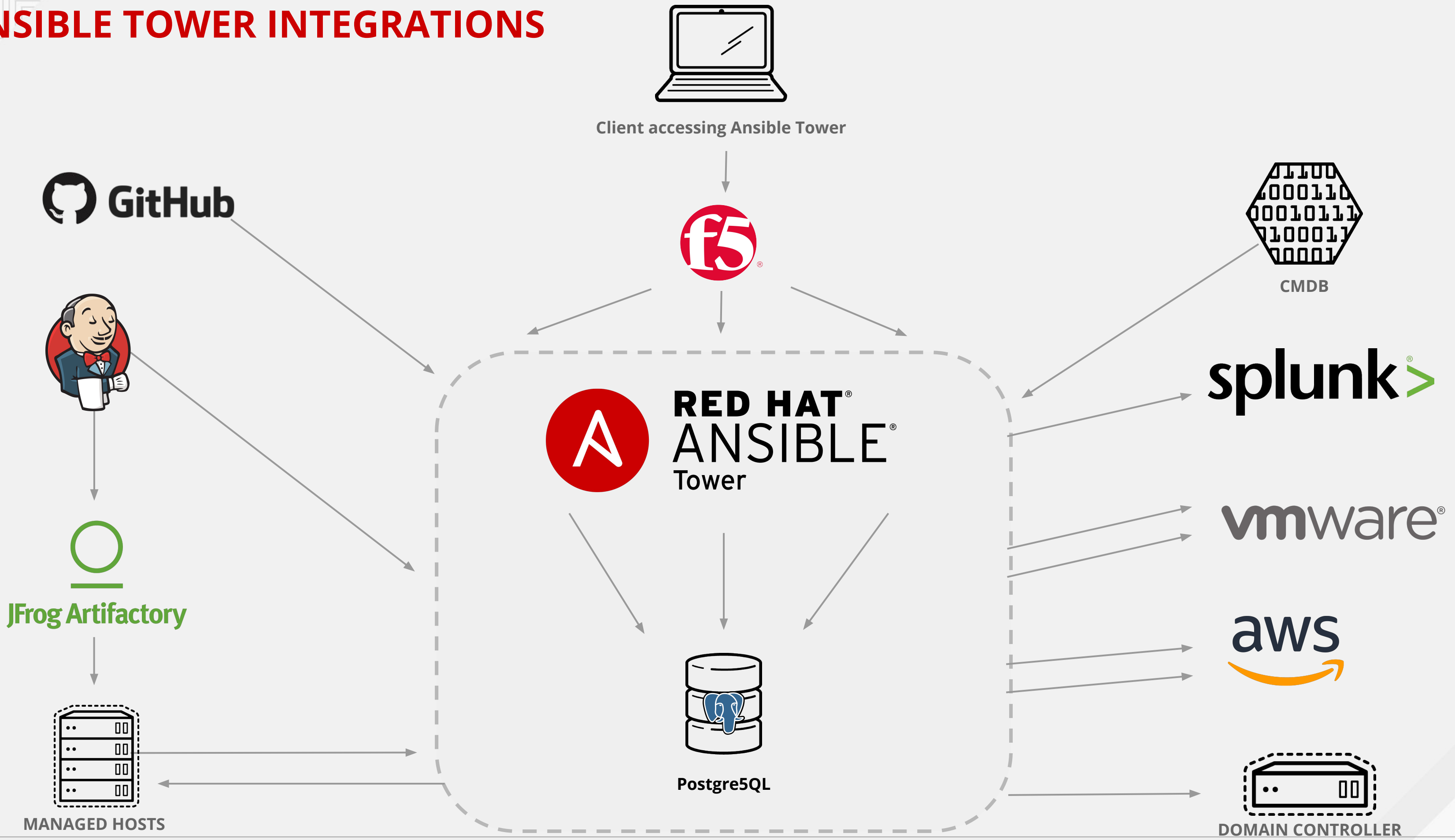
SIMPLE

POWERFUL

AGENTLESS

FUELED BY AN INNOVATIVE **OPEN SOURCE** COMMUNITY

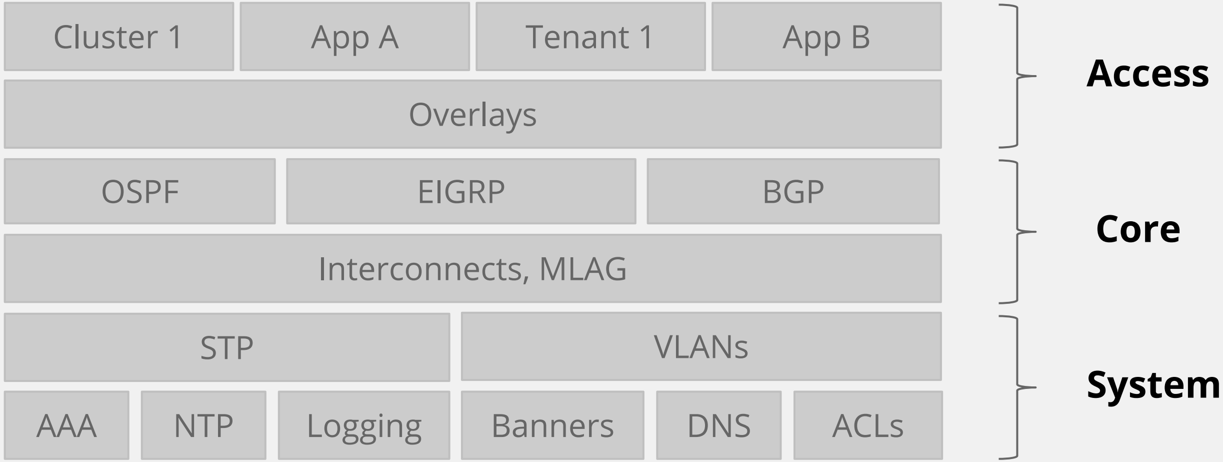
ANSIBLE TOWER INTEGRATIONS



Core Concepts & Best Practices

Layered Implementation

Simplifies playbooks, limits blast radius, and facilitates RBAC



Cluster 1 | App A | Tenant 1 | App B

Overlays

OSPF | EIGRP | BGP

Interconnects, MLAG

STP | VLANs

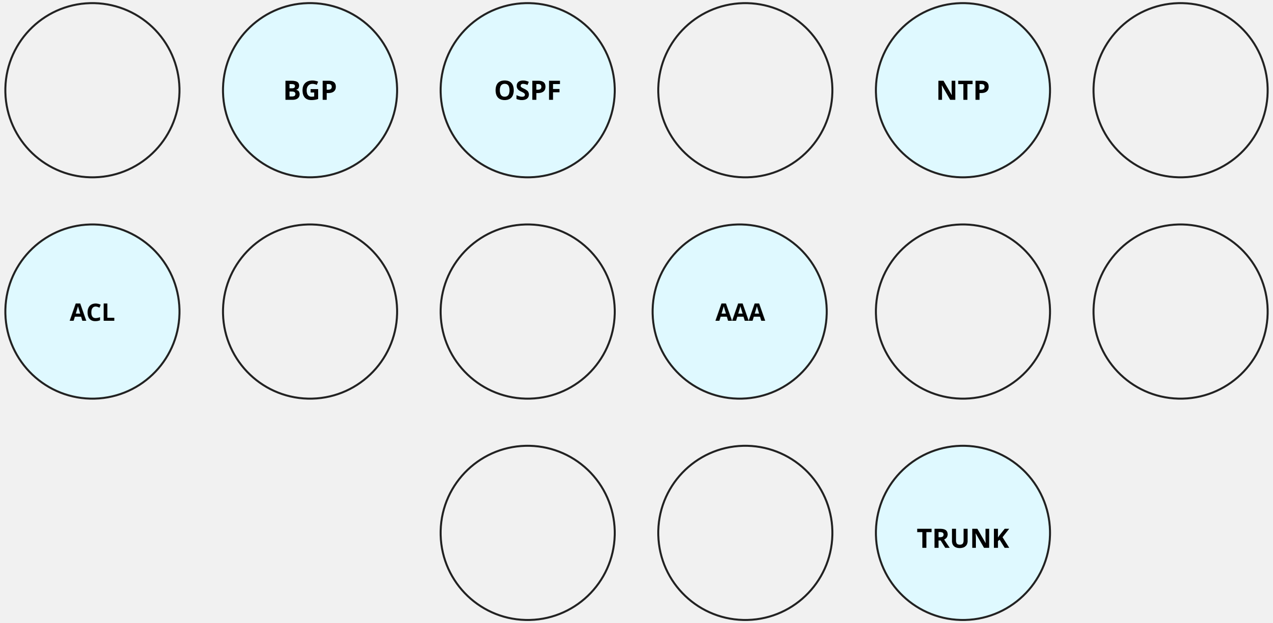
AAA | NTP | Logging | Banners | DNS | ACLs

Access

Core

System

Manage Applications, not Devices



BGP

OSPF

NTP

ACL

AAA

TRUNK

Inventory

```
[access_swicthes]
switch1
switch2

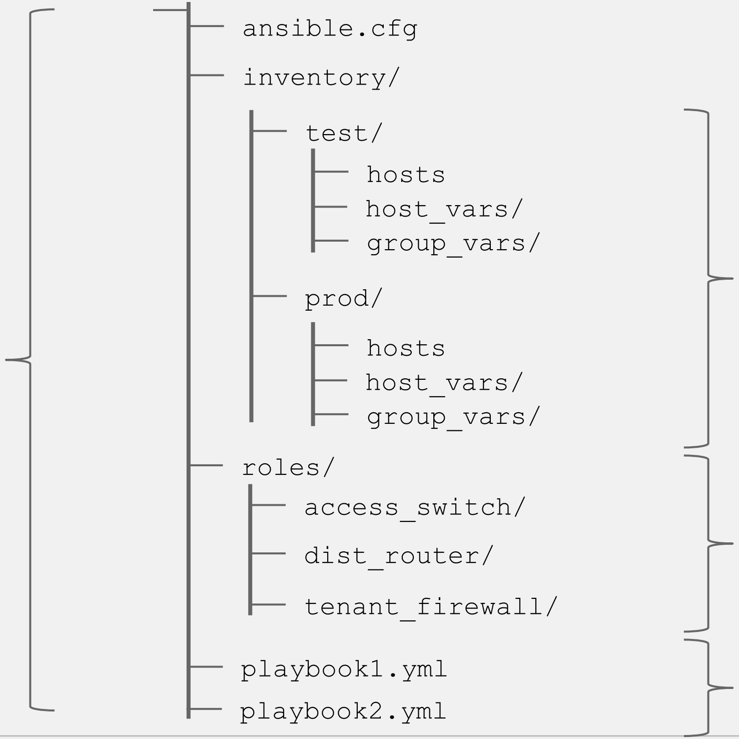
[access:vars]
ansible_network_os=ios

[routers]
juniper1 ansible_network_os=junos
cisco1 ansible_network_os=ios

[network:children]
access_switches
routers
```

- The devices being automated
- Part of SoT (Source of Truth).
- Static for ad-hoc activities and small environments.
- Dynamic for wider activities and large/enterprise/multi-site environments.
- Groups hosts by function, location, vendor, etc.

Directory Structure



```
├── ansible.cfg
├── inventory/
│   ├── test/
│   │   ├── hosts
│   │   ├── host_vars/
│   │   └── group_vars/
│   └── prod/
│       ├── hosts
│       ├── host_vars/
│       └── group_vars/
├── roles/
│   ├── access_switch/
│   ├── dist_router/
│   └── tenant_firewall/
├── playbook1.yml
└── playbook2.yml
```

Project Repository

Per-Environment Inventory and Data

Community/Organizational shared code

Repository-Specific Playbooks

Key/Value Pairs

Abstraction Through Data Models

Cisco IOS

```
router bgp 65082
no synchronization
bgp log-neighbor-changes
neighbor 10.11.12.2 remote-as 65086
no auto-summary
```

Juniper JunOS

```
bgp {
    local-as 65082;
    group TST {
        peer-as 65086;
        neighbor 10.11.12.2;
    }
}
```

Key/Value Pairs

Abstraction Through Data Models

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bgp {
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        peer-as 65086;
        neighbor 10.11.12.2;
    }
}
```

Key/Value Pairs

Abstraction Through Data Models

```
bgp:
  global:
     config:
       as: 65082
   neighbors:
     neighbor:
       - neighbor_address: 10.11.12.2
         config:
           peer_group: TST
           peer_as: 65086
```

```
router bgp 65082
no synchronization
bgp log-neighbor-changes
neighbor 10.11.12.2
remote-as 65086
no auto-summary
```

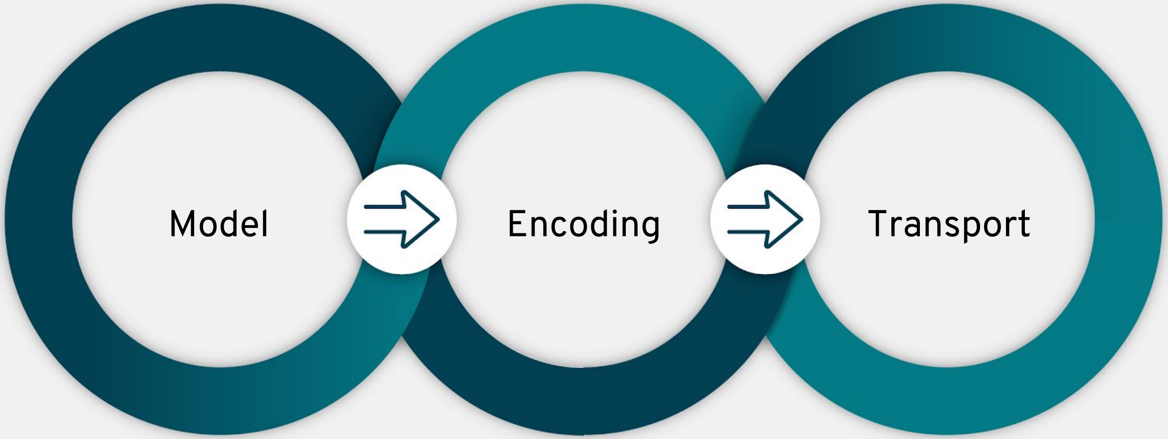
```
bgp {
    local-as 65082;
    group TST {
        peer-as 65086;
        neighbor 10.11.12.2;
    }
}
```

YANG OC Data Model

Vendor-Specific Rendering

The Flexibility of Ansible + Data Models

Any Model, Any Encoding, Any Transport

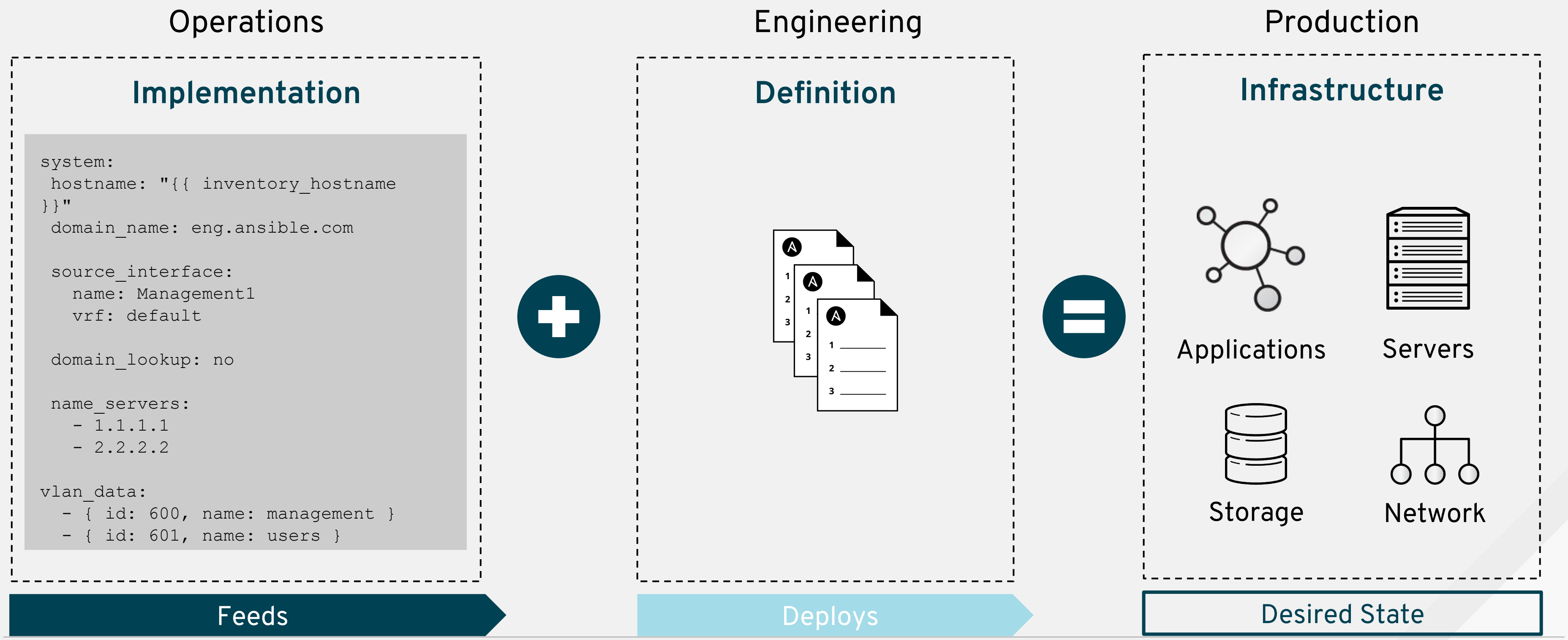


- Vendor
- OpenConfig
- Custom

- CLI
- XML
- JSON

- SSH
- Netconf
- API

Source of Truth (a.k.a. Key/Value Pairs)



```
system:
 hostname: "{{ inventory_hostname
}}"
 domain_name: eng.ansible.com

 source_interface:
   name: Management1
   vrf: default

 domain_lookup: no

 name_servers:
   - 1.1.1.1
   - 2.2.2.2

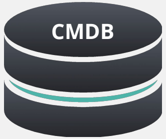
vlan_data:
  - { id: 600, name: management }
  - { id: 601, name: users }
```

Facts: Loading and Using

Load SoT from Inventory:

```
host_vars\switch1\interfaces.ym
l
```

or



or

Manually load w/Playbook:

```
- include_role:
    name: load_interface_data
```

```
hostvars[inventory_hostname]:
  interfaces:
    Gi1/0/1:
      description:
"ht3-node1:eth0"
      enabled: True
      mtu: 1500
      mode: trunk
      native_vlan: 99
    Gi1/0/2:
      description:
"ht3-node2:eth0"
      enabled: True
      mtu: 1500
      mode: access
      access_vlan: 10
    Gi1/0/3:
      description:
"ht3-node3:eth0"
      enabled: True
      mtu: 1500
      mode: access
      access_vlan: 10
```

Per-Inventory Item
Facts Cache

Available for Playbooks to reference:

```
- name: Set Interface Attributes
  net_interface
    name: “{{ item }}”
    description: “{{ item.description
}}”
    enabled: “{{ item.enabled }}”
  with_items: “{{ interfaces.keys() }}”
```

Facts: Storing

```
hostvars[inventory_hostname]:
  interfaces:
    Gi1/0/1:
      description:
"ht3-node1:eth0"
      enabled: True
      mtu: 1500
      mode: trunk
      native_vlan: 99
    Gi1/0/2:
      description:
"ht3-node2:eth0"
      enabled: True
      mtu: 1500
      mode: access
      access_vlan: 10
    Gi1/0/3:
      description:
"ht3-node3:eth0"
      enabled: True
      mtu: 1500
      mode: access
      access_vlan: 10
```

Per-Inventory Item
Facts Cache

Playbook writes out to inventory:

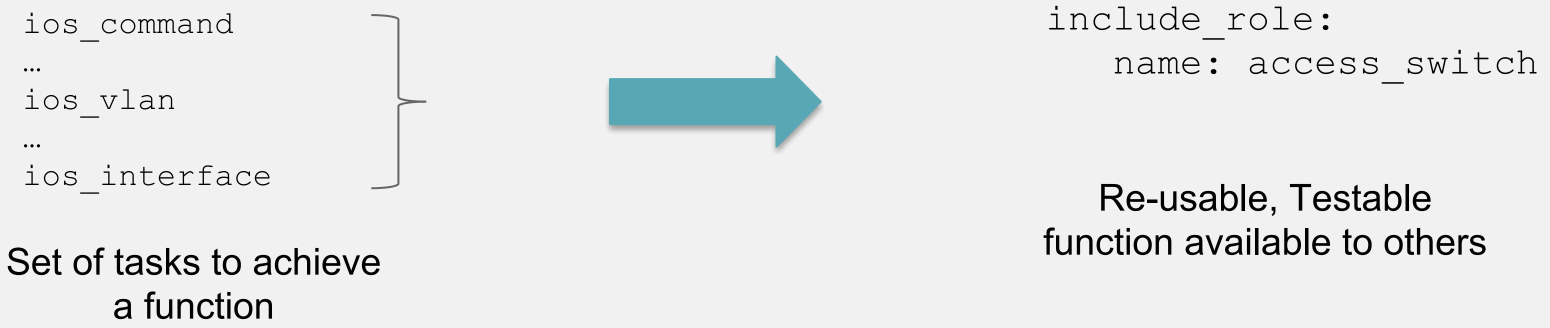
```
  - name: write out the interfaces vars
    copy:
      dest: "{{ inventory_dir }}/{{ inventory_hostname
}}/interfaces.yml"
      content: "{{ interfaces | to_nice_yaml }}"
```

or write out to CMDB

```
- include_role:
    name: save_to_cmdb
```

Roles

Roles are ways of automatically loading certain vars_files, tasks, and handlers based on a known file structure. Grouping content by roles also allows easy sharing of roles with other users.



```
ios_command
…
ios_vlan
…
ios_interface
```

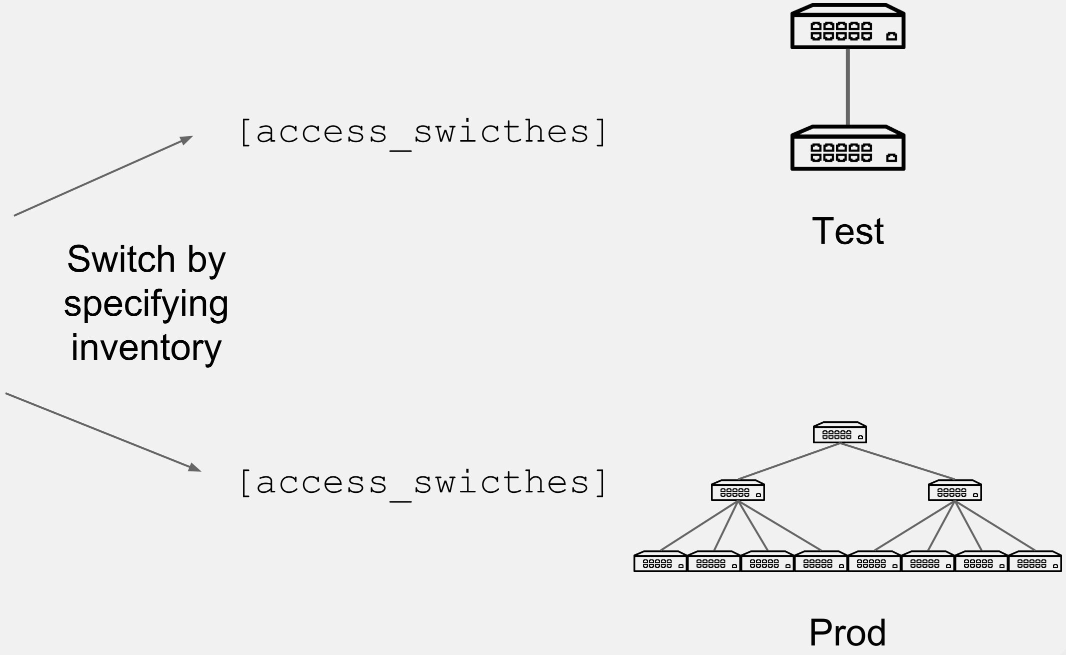
Set of tasks to achieve a function

```
include_role:
   name: access_switch
```

Re-usable, Testable function available to others

Testing Roles

```
- hosts:
access_switches
  roles:
    - access_switch
```

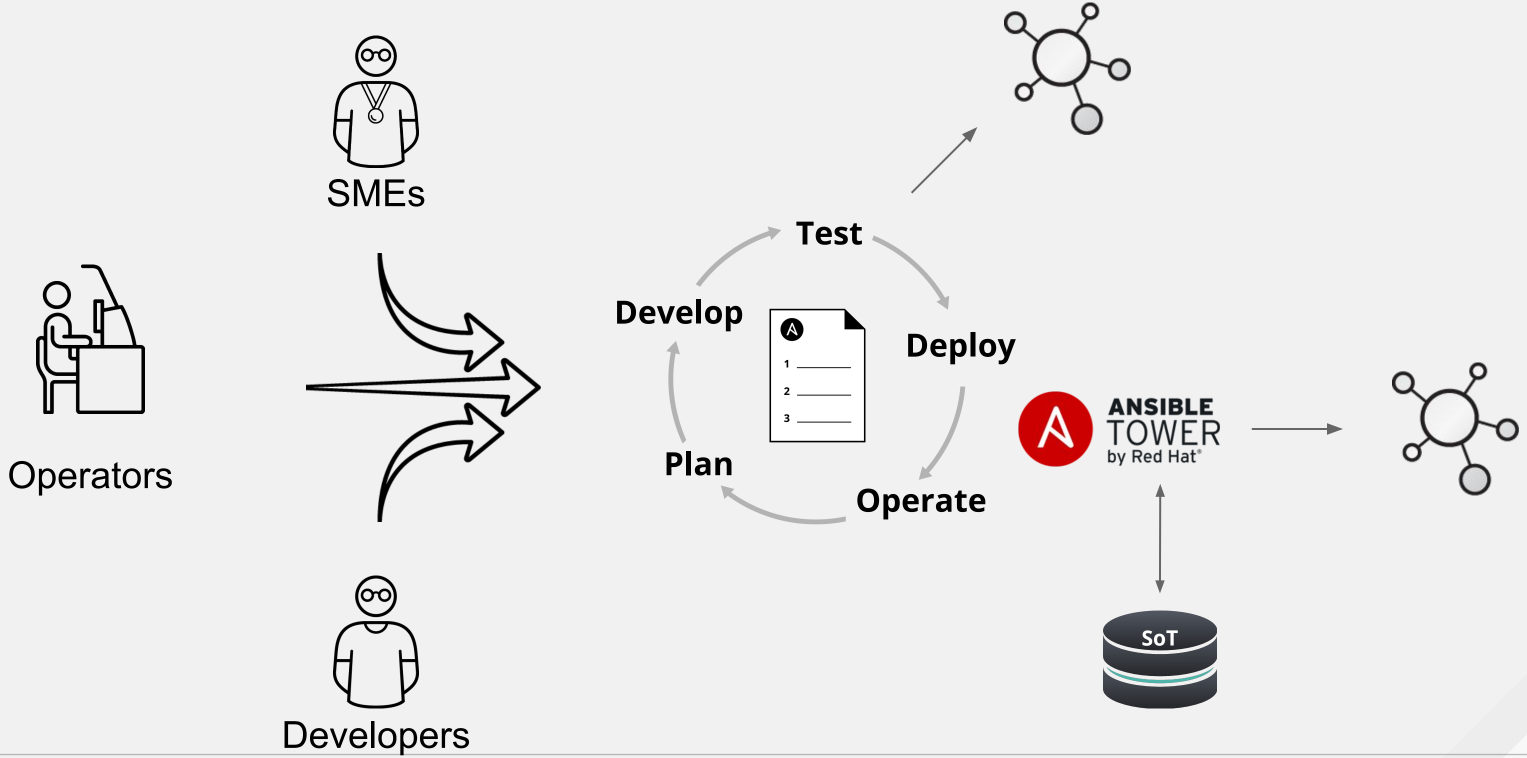


Switch by specifying inventory

```
[access_swicthes]
```

```
[access_swicthes]
```

The Automated Enterprise



SMEs

Operators

Developers

Test

Deploy

Operate

Plan

Develop

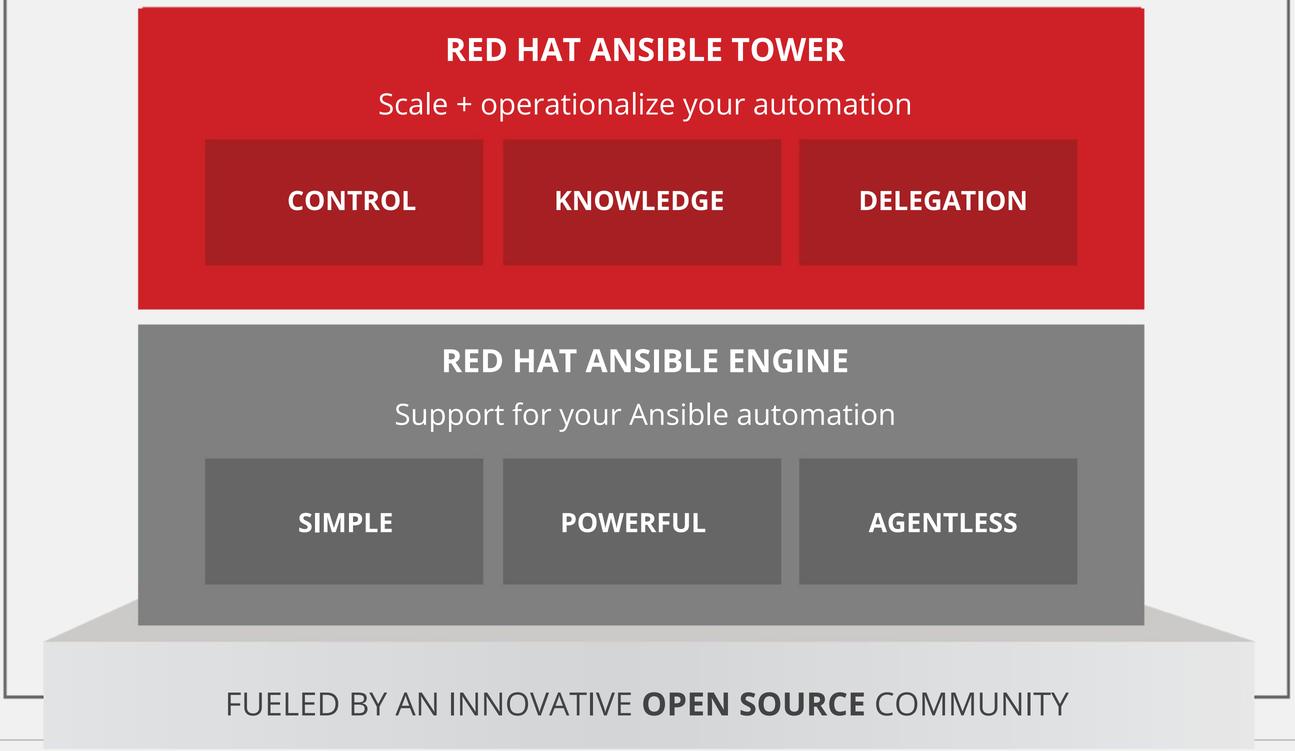
ANSIBLE TOWER by Red Hat®

SoT

Automation for Teams

Ansible Tower technical introduction and overview

RED HAT® ANSIBLE® Automation



RED HAT ANSIBLE TOWER

Scale + operationalize your automation

CONTROL

KNOWLEDGE

DELEGATION

RED HAT ANSIBLE ENGINE

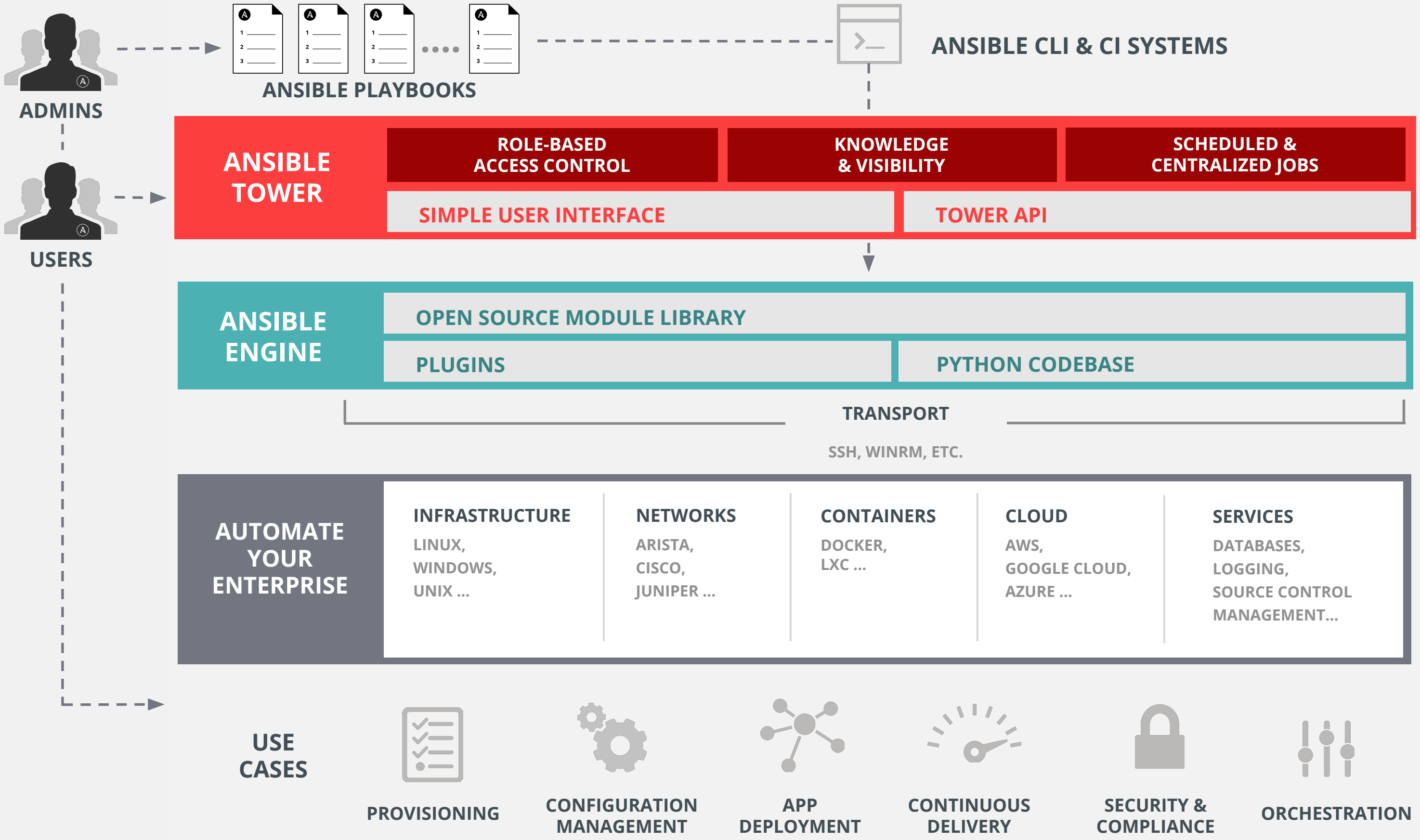
Support for your Ansible automation

SIMPLE

POWERFUL

AGENTLESS

FUELED BY AN INNOVATIVE **OPEN SOURCE** COMMUNITY



ADMINS

ANSIBLE PLAYBOOKS

ANSIBLE CLI & CI SYSTEMS

USERS

ANSIBLE TOWER

ROLE-BASED ACCESS CONTROL

KNOWLEDGE & VISIBILITY

SCHEDULED & CENTRALIZED JOBS

SIMPLE USER INTERFACE

TOWER API

ANSIBLE ENGINE

OPEN SOURCE MODULE LIBRARY

PLUGINS

PYTHON CODEBASE

TRANSPORT

SSH, WINRM, ETC.

AUTOMATE YOUR ENTERPRISE

INFRASTRUCTURE
LINUX,
WINDOWS,
UNIX ...

NETWORKS
ARISTA,
CISCO,
JUNIPER ...

CONTAINERS
DOCKER,
LXC ...

CLOUD
AWS,
GOOGLE CLOUD,
AZURE ...

SERVICES
DATABASES,
LOGGING,
SOURCE CONTROL
MANAGEMENT...

USE CASES

PROVISIONING

CONFIGURATION MANAGEMENT

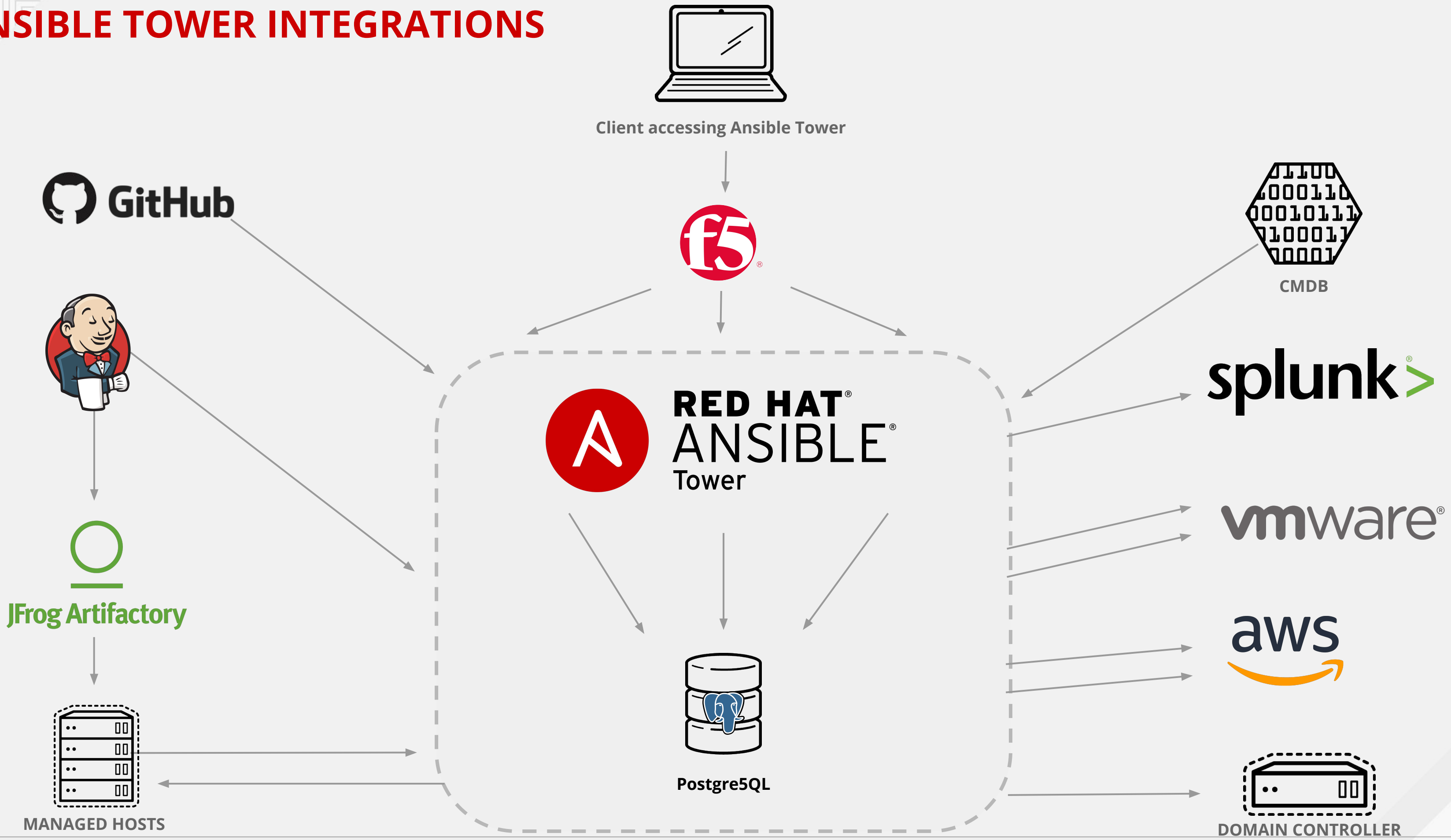
APP DEPLOYMENT

CONTINUOUS DELIVERY

SECURITY & COMPLIANCE

ORCHESTRATION

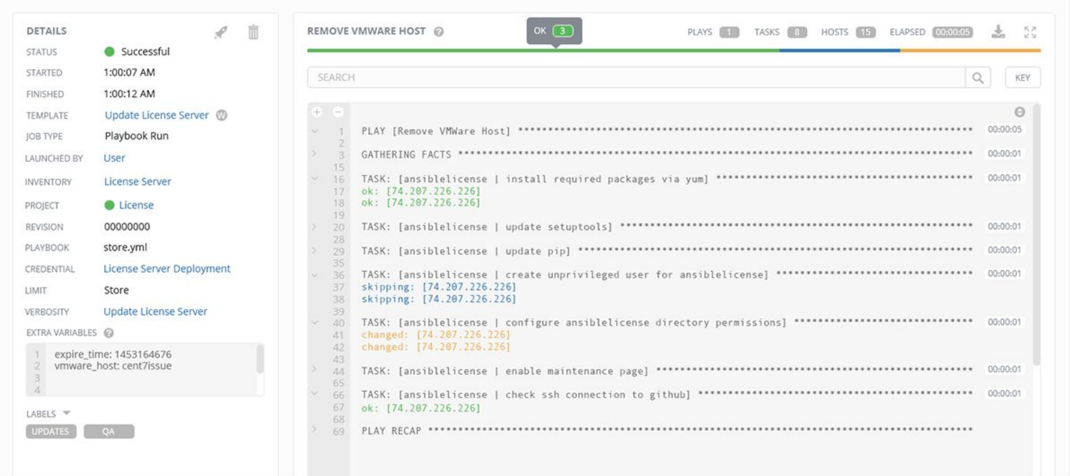
ANSIBLE TOWER INTEGRATIONS



Ansible Tower

Job Status Update

Heads-up NOC-style **automation dashboard** displays everything going on in your Ansible environment.



DETAILS

STATUS ● Successful

STARTED 1:00:07 AM

FINISHED 1:00:12 AM

TEMPLATE Update License Server

JOB TYPE Playbook Run

LAUNCHED BY User

INVENTORY License Server

PROJECT ● License

REVISION 00000000

PLAYBOOK store.yml

CREDENTIAL License Server Deployment

LIMIT Store

VERBOSITY Update License Server

EXTRA VARIABLES

```
expire_time: 1453164676
vmware_host: cent7issue
```

LABELS

UPDATES QA

REMOVE VMWARE HOST

OK 3

PLAYS 1 TASKS 8 HOSTS 15 ELAPSED 00:00:05

```
PLAY [Remove VMWare Host] ************************************************************************   00:00:05

GATHERING FACTS ***********************************************************************************   00:00:01

TASK: [ansiblelicense | install required packages via yum] ****************************************   00:00:01
ok: [74.207.226.226]
ok: [74.207.226.226]

TASK: [ansiblelicense | update setuptools] ********************************************************   00:00:01

TASK: [ansiblelicense | update pip] ***************************************************************   00:00:01

TASK: [ansiblelicense | create unprivileged user for ansiblelicense] ******************************   00:00:01
skipping: [74.207.226.226]
skipping: [74.207.226.226]

TASK: [ansiblelicense | configure ansiblelicense directory permissions] ***************************   00:00:01
changed: [74.207.226.226]
changed: [74.207.226.226]

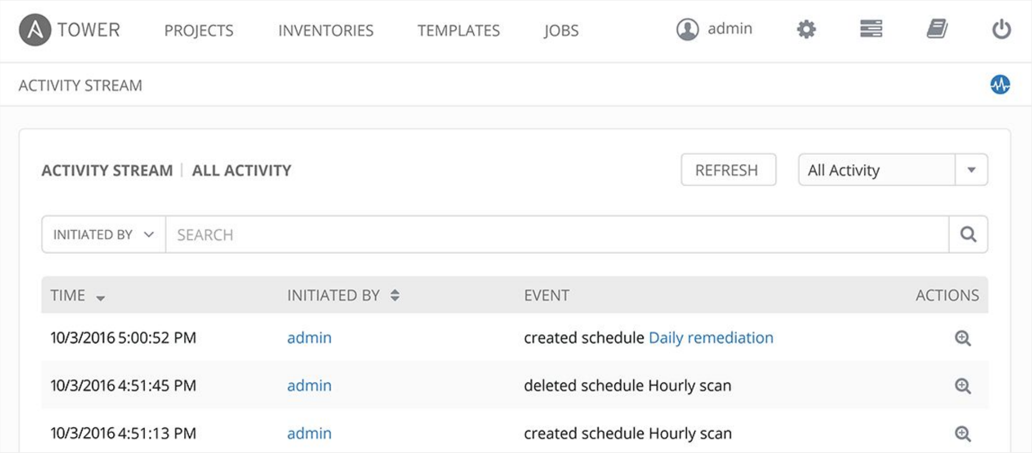
TASK: [ansiblelicense | enable maintenance page] **************************************************   00:00:01

TASK: [ansiblelicense | check ssh connection to github] *******************************************   00:00:01
ok: [74.207.226.226]

PLAY RECAP ****************************************************************************************
```

Ansible Tower

Activity Stream



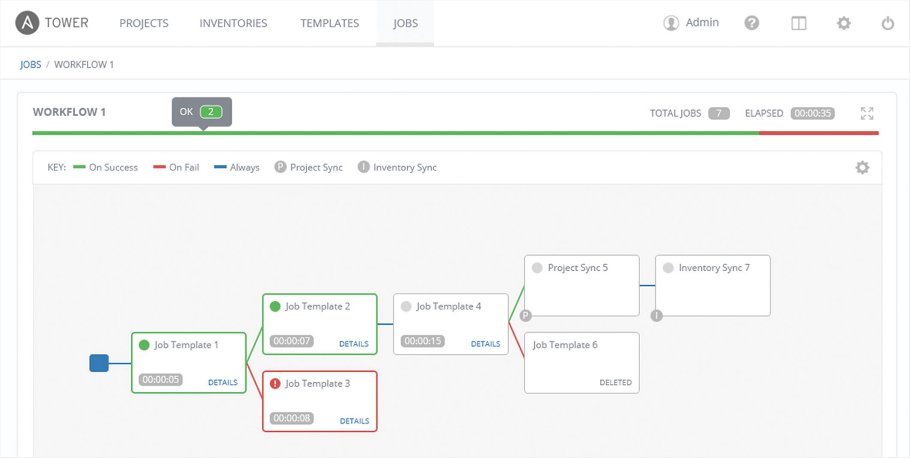
TIME	INITIATED BY	EVENT	ACTIONS
10/3/2016 5:00:52 PM	admin	created schedule Daily remediation	
10/3/2016 4:51:45 PM	admin	deleted schedule Hourly scan	
10/3/2016 4:51:13 PM	admin	created schedule Hourly scan	

Securely stores every Job that runs, and enables you to view them later, or export details through Tower's API.

Ansible Tower

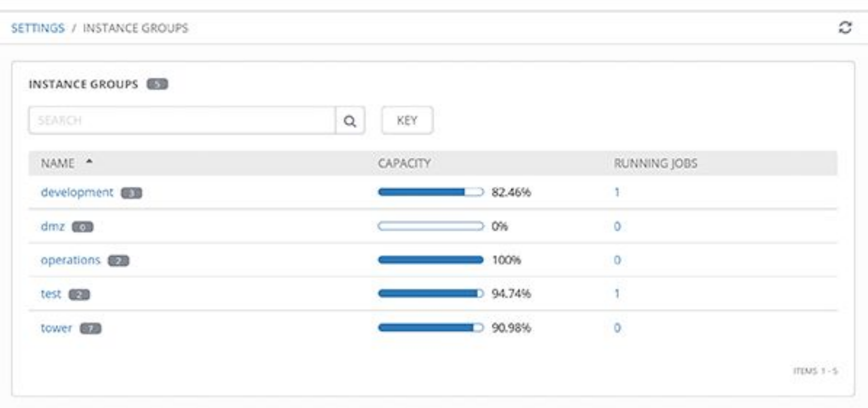
Multi-Playbook Workflows

Tower’s multi-Playbook workflows chains any number of Playbooks together to create a single workflow. Different Jobs can be run depending on success or failure of the prior Playbook.



Ansible Tower

Scale-Out Clustering



NAME	CAPACITY	RUNNING JOBS
development 3	82.46%	1
dmz 0	0%	0
operations 2	100%	0
test 2	94.74%	1
tower 7	90.98%	0

Connect multiple Tower nodes into a Tower cluster to add redundancy and capacity to your automation platform.

Add reserved capacity and capacity by organization, and deploy remote execution nodes for additional local capacity.

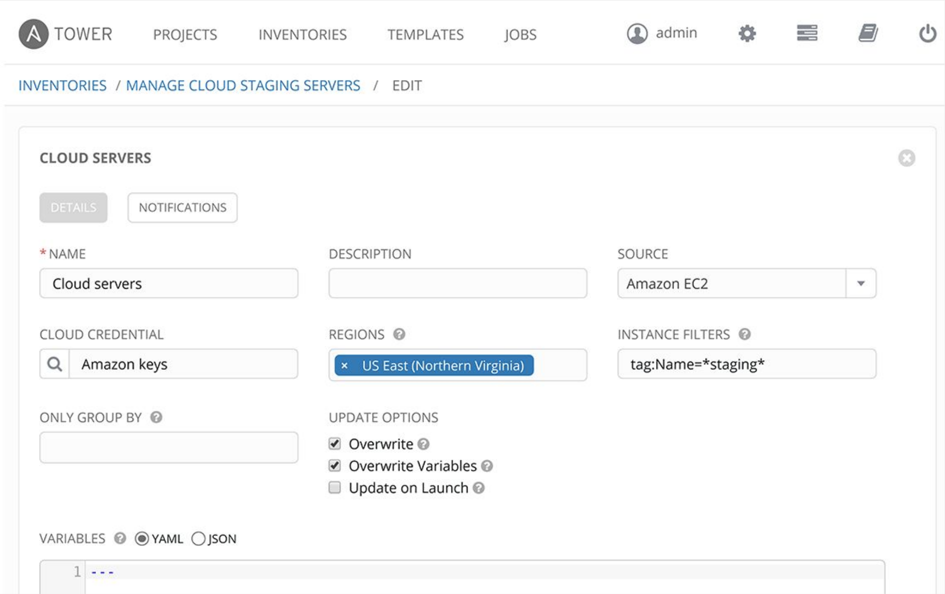
Ansible Tower

Manage and Track Your Inventory

Tower's **inventory syncing** and **provisioning callbacks** allow nodes to request configuration on demand, enabling autoscaling.

Smart Inventories allow you to organize and automate hosts across all your providers based on a powerful host fact query engine.

See alerts from Red Hat Insights directly from Tower, and use Insights-provided Playbook Remediation to fix issues in your infrastructure.



INVENTORIES / MANAGE CLOUD STAGING SERVERS / EDIT

CLOUD SERVERS

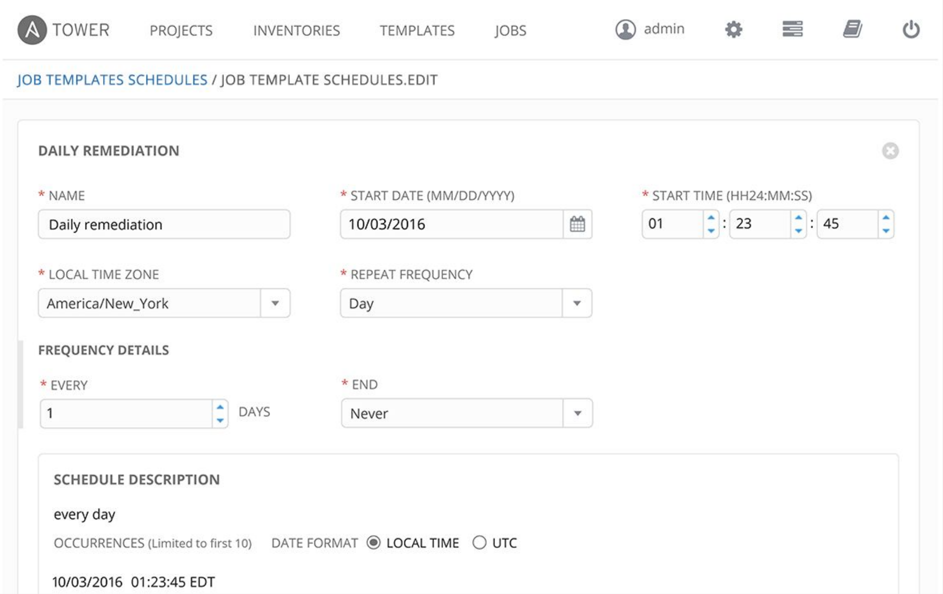
* NAME	DESCRIPTION	SOURCE
Cloud servers		Amazon EC2
CLOUD CREDENTIAL	REGIONS	INSTANCE FILTERS
Amazon keys	× US East (Northern Virginia)	tag:Name=*staging*
ONLY GROUP BY	UPDATE OPTIONS	
	☑ Overwrite ☑ Overwrite Variables ☐ Update on Launch	

VARIABLES ● YAML ○ JSON

```
---
```

Ansible Tower

Schedule Jobs



JOB TEMPLATES SCHEDULES / JOB TEMPLATE SCHEDULES.EDIT

DAILY REMEDIATION

* NAME: Daily remediation

* START DATE (MM/DD/YYYY): 10/03/2016

* START TIME (HH24:MM:SS): 01 : 23 : 45

* LOCAL TIME ZONE: America/New_York

* REPEAT FREQUENCY: Day

FREQUENCY DETAILS

* EVERY: 1 DAYS

* END: Never

SCHEDULE DESCRIPTION

every day

OCCURRENCES (Limited to first 10) DATE FORMAT ● LOCAL TIME ○ UTC

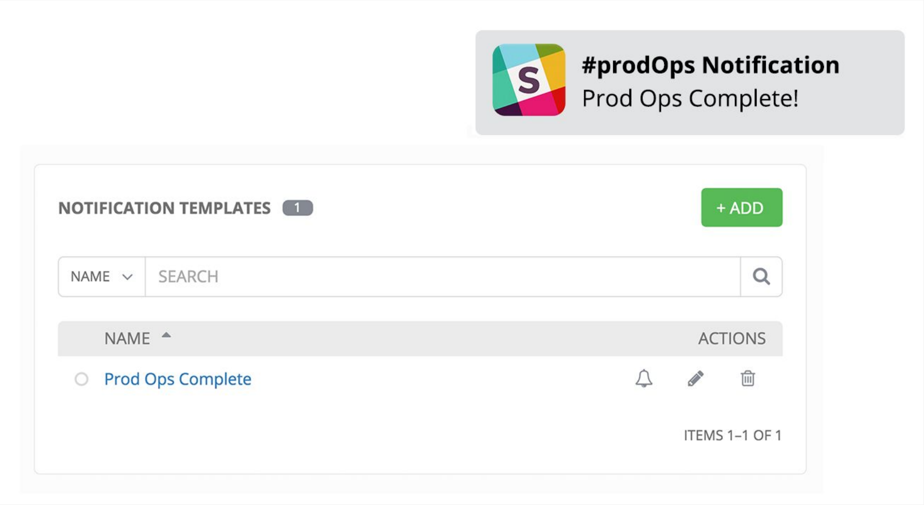
10/03/2016 01:23:45 EDT

Enables you to schedule any Job now, later, or forever.

Ansible Tower

Integrated Notifications

Stay informed of your automation status via **integrated notifications**. Connect Slack, Hipchat, SMS, email and more.



#prodOps Notification
Prod Ops Complete!

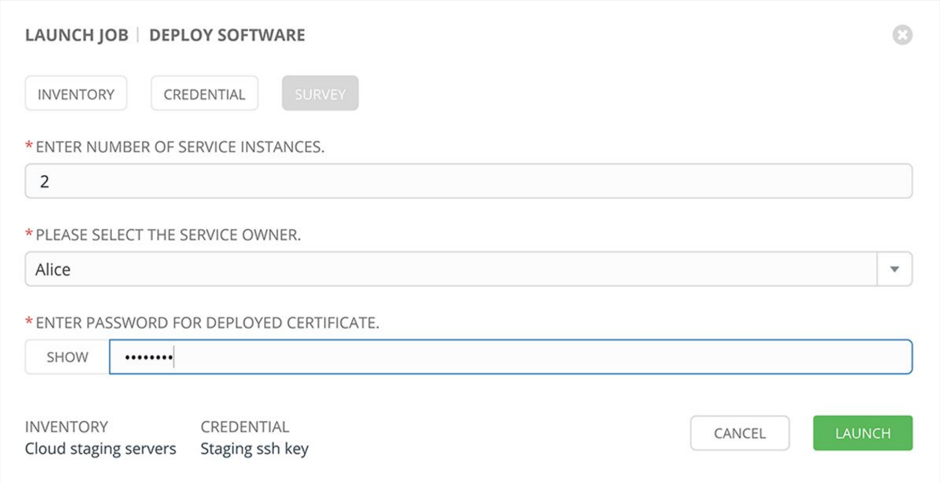
NOTIFICATION TEMPLATES 1

NAME	ACTIONS
○ Prod Ops Complete	

ITEMS 1–1 OF 1

Ansible Tower

Self-Service IT



* ENTER NUMBER OF SERVICE INSTANCES.

2

* PLEASE SELECT THE SERVICE OWNER.

Alice

* ENTER PASSWORD FOR DEPLOYED CERTIFICATE.

SHOW ••••••••

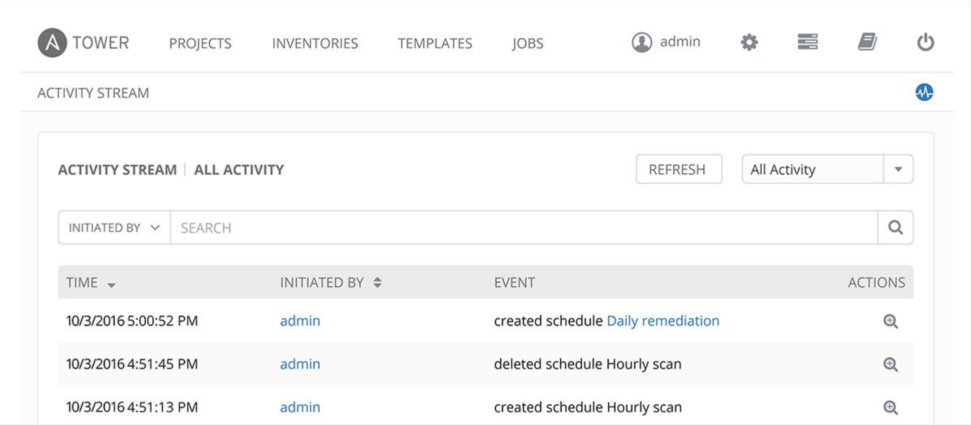
INVENTORY
Cloud staging servers

CREDENTIAL
Staging ssh key

Tower lets you launch Playbooks with just a single click. It can prompt you for variables, let you choose from available secure credentials and monitor the resulting deployments.

Ansible Tower

External Logging



TIME	INITIATED BY	EVENT	ACTIONS
10/3/2016 5:00:52 PM	admin	created schedule Daily remediation	
10/3/2016 4:51:45 PM	admin	deleted schedule Hourly scan	
10/3/2016 4:51:13 PM	admin	created schedule Hourly scan	

Connect Tower to your external logging and analytics provider to perform analysis of automation and event correlation across your entire environment.

Ansible Tower

Network Visualization

DISCOVER

Know what network devices and services are installed, represented visually

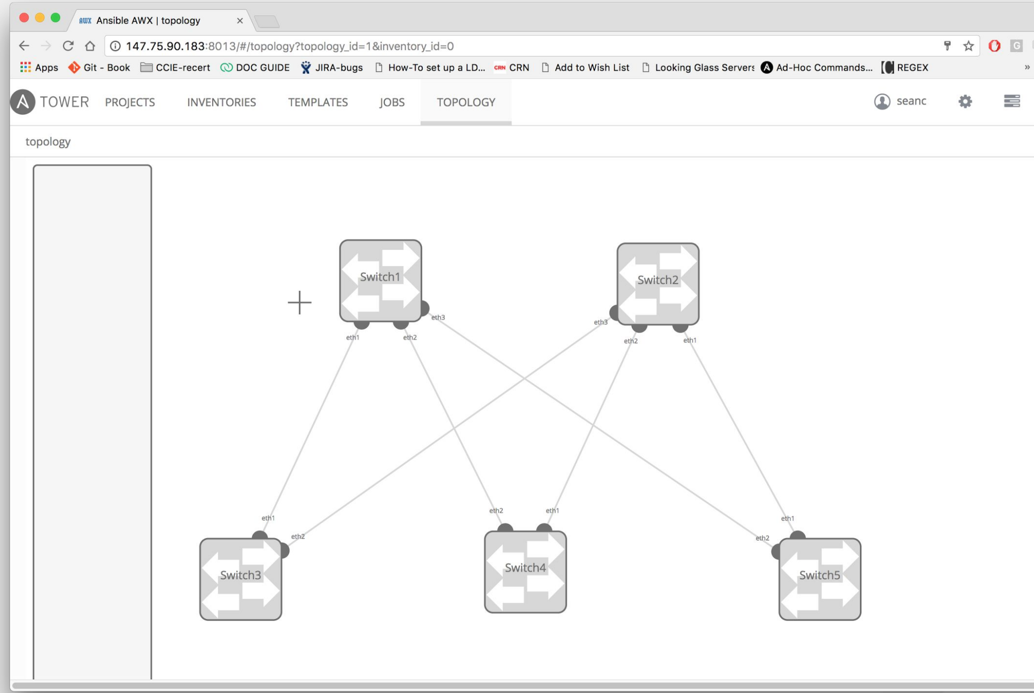
DESIGN

Create and build new topologies, adapt existing topologies from discovery, and utilize existing playbooks

DEPLOY

Convert designs to actual physical or virtual deployments using Ansible playbooks and network modules, and then automate deployment

NOTE: Currently in Alpha and not committed to a release

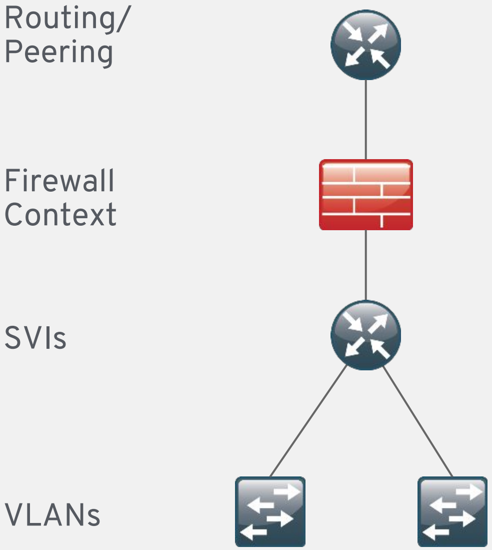


Group, Copy/Paste, Zoom

Use Cases

Automating Complex Tasks

1. Automate the deployment of the individual components as a workflow.
2. Make that workflow available to operators.
3. Force changes to workflow to maintain compliance
4. Run that workflow on a regular bases to detect any deviation from the original deployment.



Routing/ Peering

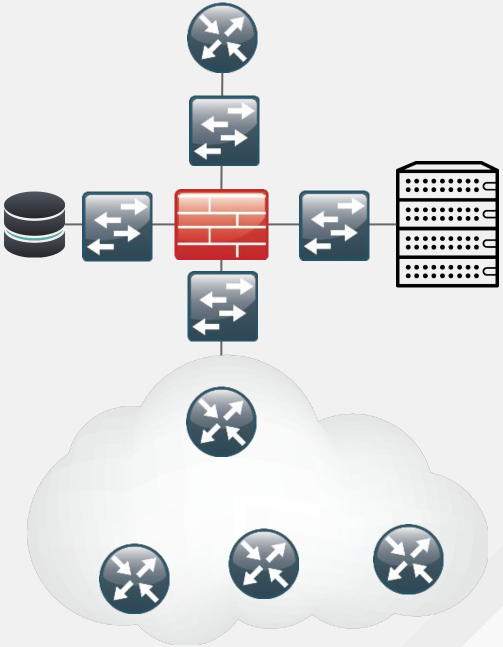
Firewall Context

SVIs

VLANs

Automating Troubleshooting

```
collect:
  ios_router:
    - show ip ospf neighbors....
    - show bgp summary....
    - show ip ospf route....
    - show ip bgp route....
  nxos_switch:
    - show ip arp....
    - show mac address-table....
  bigip:
    - ....
  junos:
    - ....
  linux:
    - ....
```

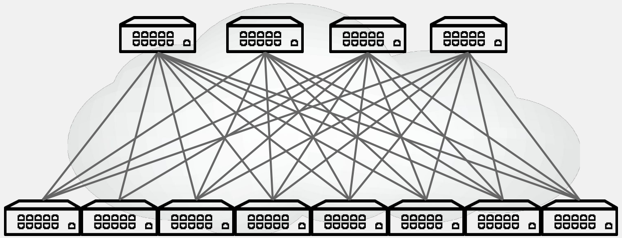


DC Fabric Deployment

```
interfaces:
  vtep:
    name: nve1
    source_interface: loopback0
    host_reachability: yes

  control:
    name: loopback0
    address: "{{ control_plane_address }}"

  fabric:
    Ethernet1/1-4:
      name: Ethernet1/1-4
```



Policy Abstraction

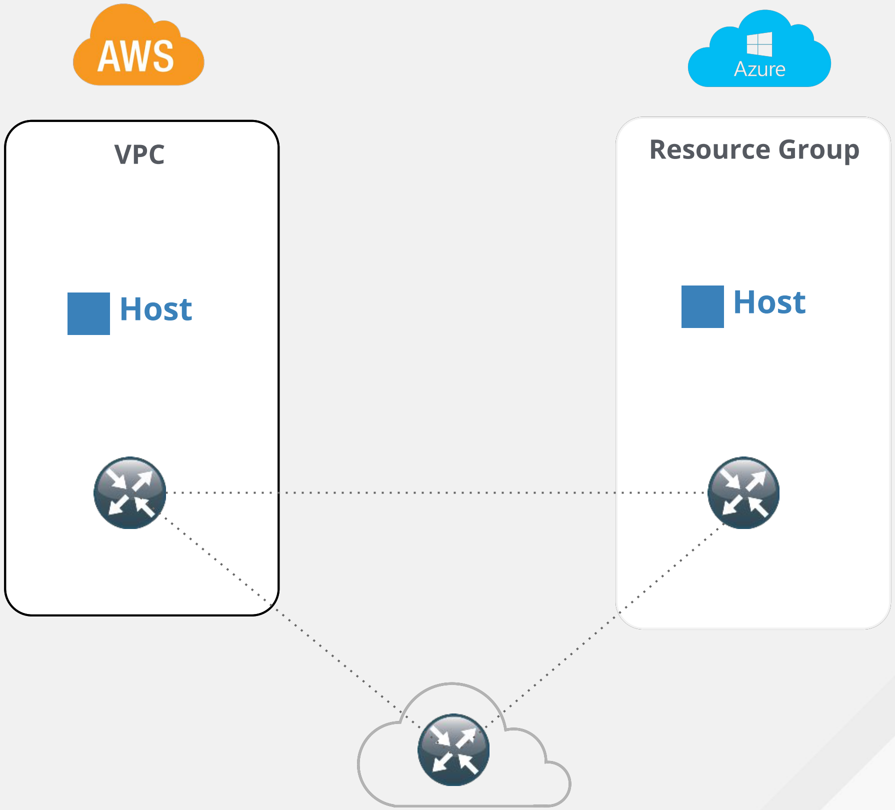
```
fw_rules:
    - { rule: "public", src_ip: 0.0.0.0/0, dst_ip: 192.133.160.23/32, dst_port: 32400, proto: tcp, action: allow, comment: app1 }
    - { rule: "public", src_ip: 0.0.0.0/0, dst_ip: 192.133.160.23/32, dst_port: 1900, proto: udp, action: allow, comment: app2  }
    - { rule: "public", src_ip: 0.0.0.0/0, dst_ip: 192.133.160.23/32, dst_port: 3005, proto: tcp, action: allow, comment: app3  }
    - { rule: "public", src_ip: 0.0.0.0/0, dst_ip: 192.133.160.23/32, dst_port: 5353, proto: udp, action: allow, comment: app4  }
```

```
- name: Insert ASA ACL
      asa_config:
        lines:
          - "access-list {{ item.rule }} extended {{ item.ac
| ipaddr('network') }}{{ item.dst_ip | ipaddr('network') }}{
        provider: "{{ cli }}"
      with_items: "{{ fw_rules }}"
```

```
- name: Create security rules
    panos_security_rule:
      operation: "{{ item.action | default (omit) }}"
      rule_name: "{{ item.comment | default (omit) }}"
      service: "{{ item.dst_port | default (omit) }}"
      description: "{{ item.description | default (omit) }}"
      source_zone: "{{ item.rule | default (omit) }}"
      destination_zone: "{{ item.destination_zone | default (omit) }}"
      action: "{{ item.action | default ('allow') }}"
      commit: "{{ item.comment | default (omit) }}"
```

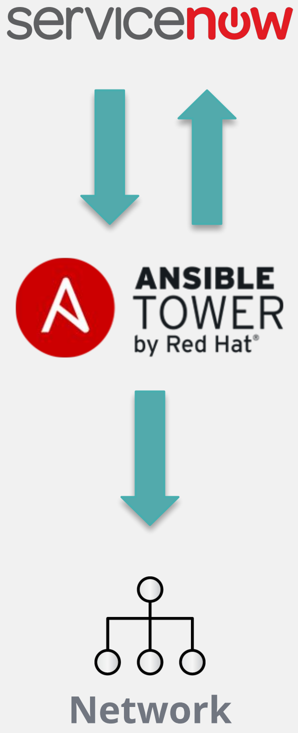
Hybrid Cloud

1. Automate the creation of the VPC and network components.
2. Deploy the same routers, load-balancers, and firewalls that you use on-site.
3. Automate the entire network in a uniform way.



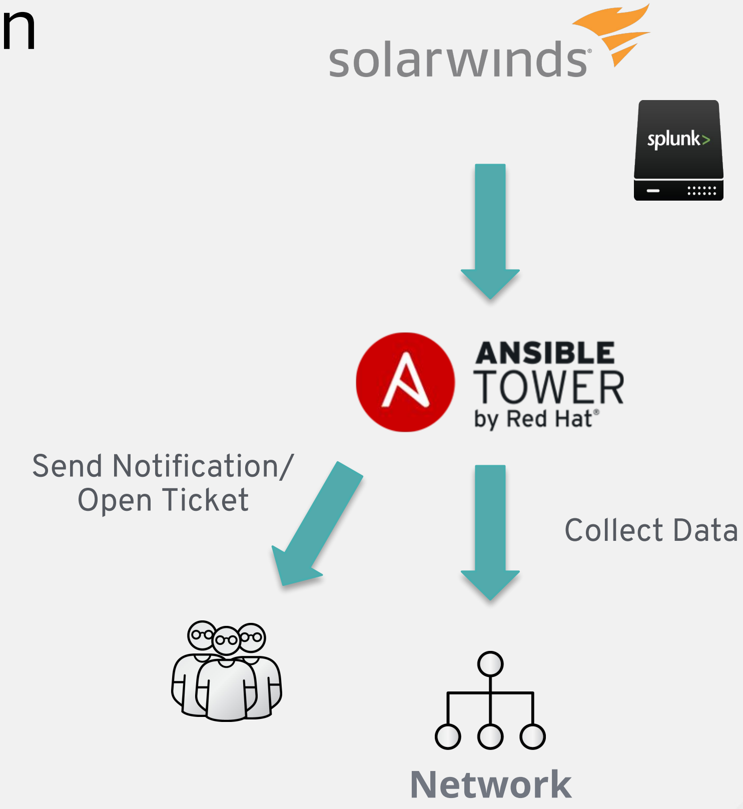
Workflow Automation

1. Customer makes request from the service catalog
2. Request goes through approval process
3. Service catalog calls Tower API to fulfill request
4. Ansible Tower updates ticket



Tier 1 Support Automation

1. Monitoring/Logging Platform detects event and calls the Ansible Tower API
2. Ansible Tower runs a playbook to collect event-specific information
3. Ansible Tower runs a playbook to open a support ticket and/or notify Tier 2 support



THANK YOU

plus.google.com/+RedHat

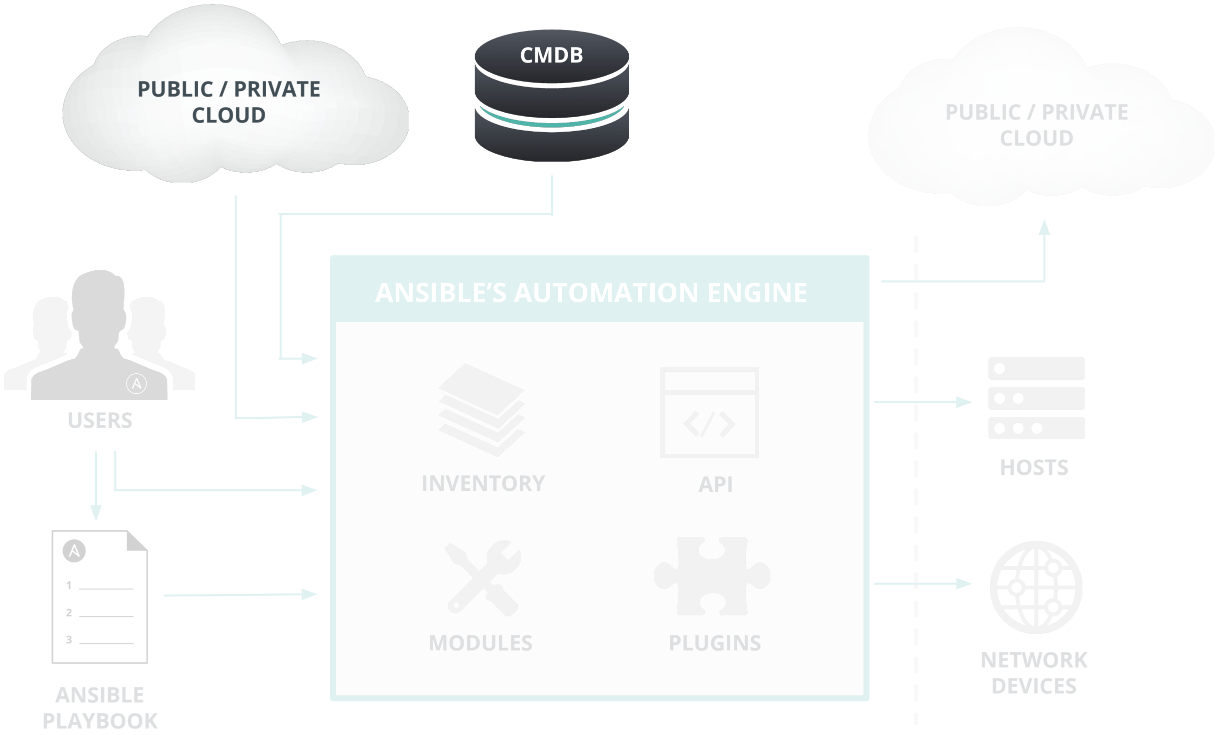
linkedin.com/company/red-hat

youtube.com/user/RedHatVideos

facebook.com/redhatinc

twitter.com/RedHatNews

How Ansible Works



CLOUD

OpenStack, VMware, EC2, Rackspace, GCE, Azure, Spacewalk, Hanlon, Cobbler

CUSTOM CMDB

RED HAT ANSIBLE Tower

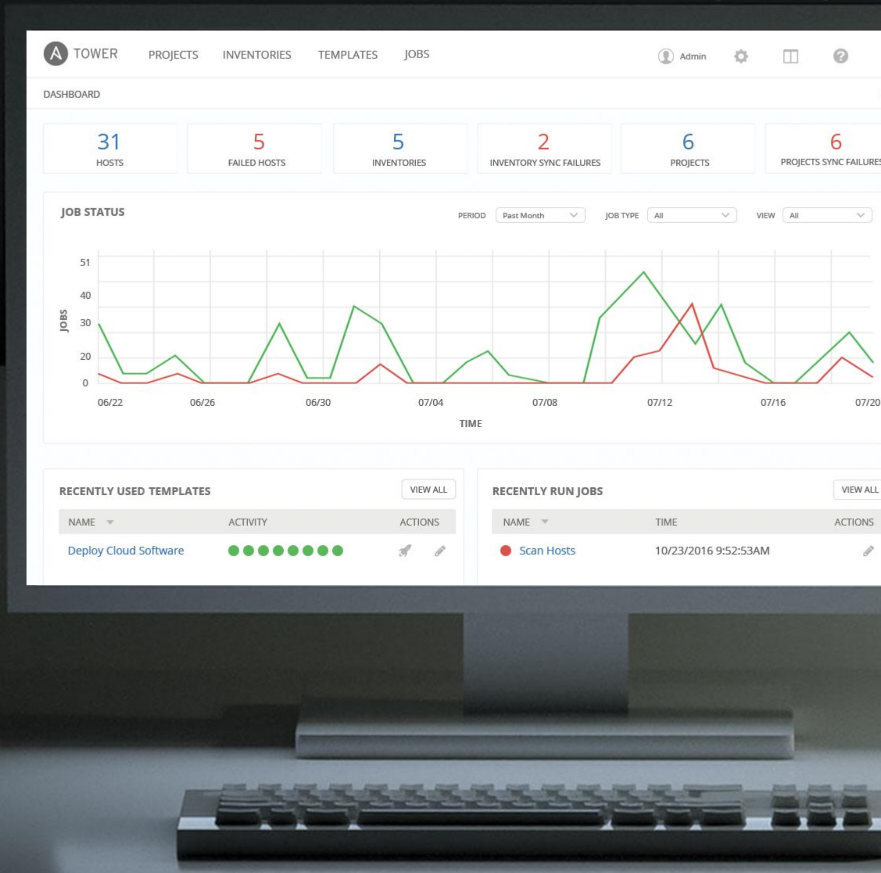
AUTOMATION FOR TEAMS

Ansible Tower technical introduction and overview

WHAT IS ANSIBLE TOWER?

Ansible Tower is an **enterprise framework** for controlling, securing and managing your Ansible automation – with a **UI and RESTful API.**

- **Role-based access control**
- **Deploy** entire applications with **push-button deployment** access
- All automations are **centrally logged**



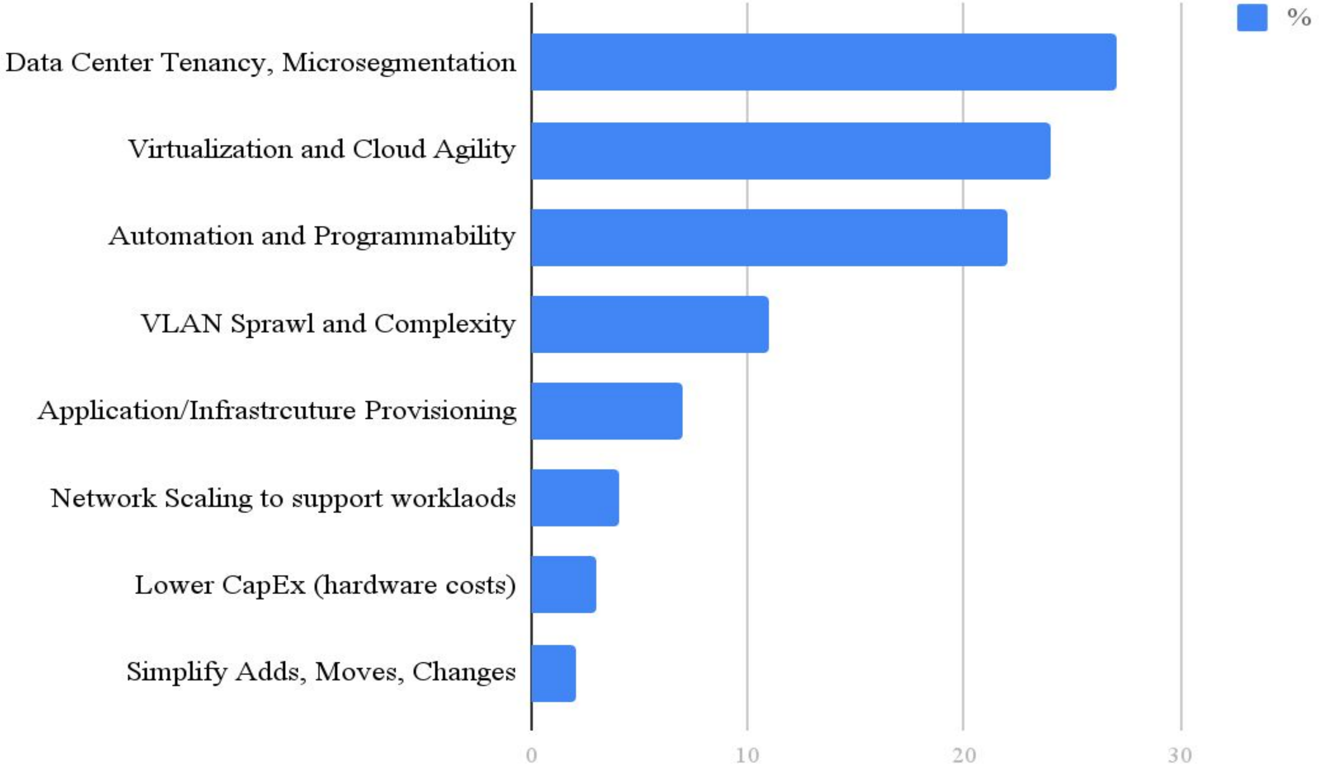
NAME	ACTIVITY	ACTIONS
Deploy Cloud Software	●●●●●●●●	

NAME	TIME	ACTIONS
● Scan Hosts	10/23/2016 9:52:53AM	

AUTOMATION and SDN

BENEFIT	SDN	AUTOMATION
Reconfigure the network from a central point	✔	✔
Reduced vendor lock in with commodity hardware	?	✔
Leverage existing infrastructure	✖	✔
Programmability	✔	✔
Reduced opex/capex costs	?	✔

PRIMARY SDN USE CASES



SOFTWARE DEFINED NETWORK (SDN)

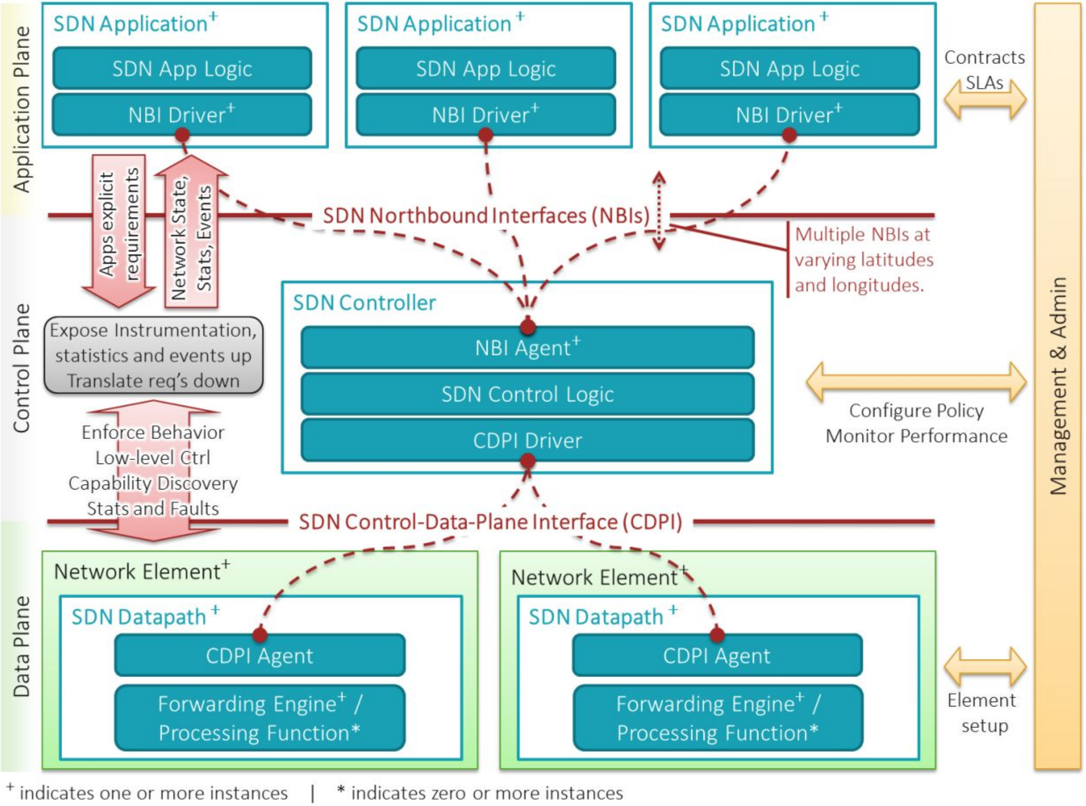


Figure 1: Overview of Software-Defined Networking Architecture

Ref: https://www.opennetworking.org/images/stories/downloads/sdn-resources/technical-reports/SDN-architecture-overview-1.0.pdf

RED HAT ANSIBLE ENGINE NETWORKING ADD-ON

NETWORK MODULES

- **Developed, maintained, tested, and supported** by Red Hat
- **140+ supported modules** and growing*
- Red Hat **reports and fixes problems**
- **Networking modules included** with Ansible Engine offering, but **the Ansible Engine Networking Add-On** SKU purchase is **required** for full support

*take special note of the specific supported platforms

NETWORKING ADD-ON INCLUDED SUPPORT:

Arista EOS

Cisco IOS

Cisco IOS XR

Cisco NX-OS

Juniper Junos

Open vSwitch

VyOS

NETWORK VISUALIZATION (USE CASES)

DISCOVER

Know what network devices and services are installed, represented visually

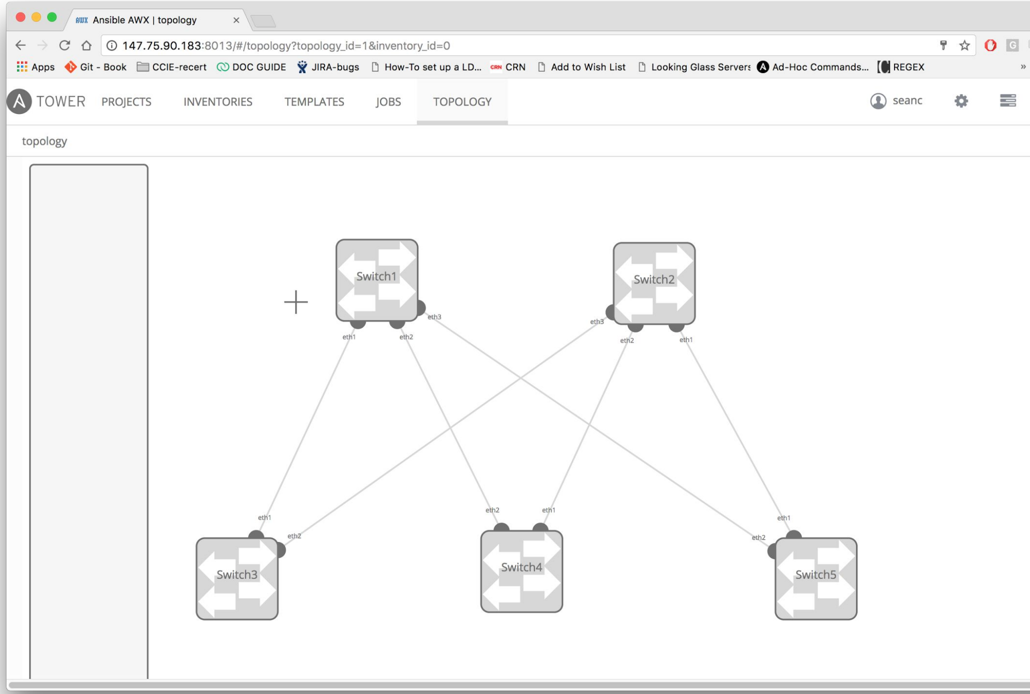
DESIGN

Create and build new topologies, adapt existing topologies from discovery, and utilize existing playbooks

DEPLOY

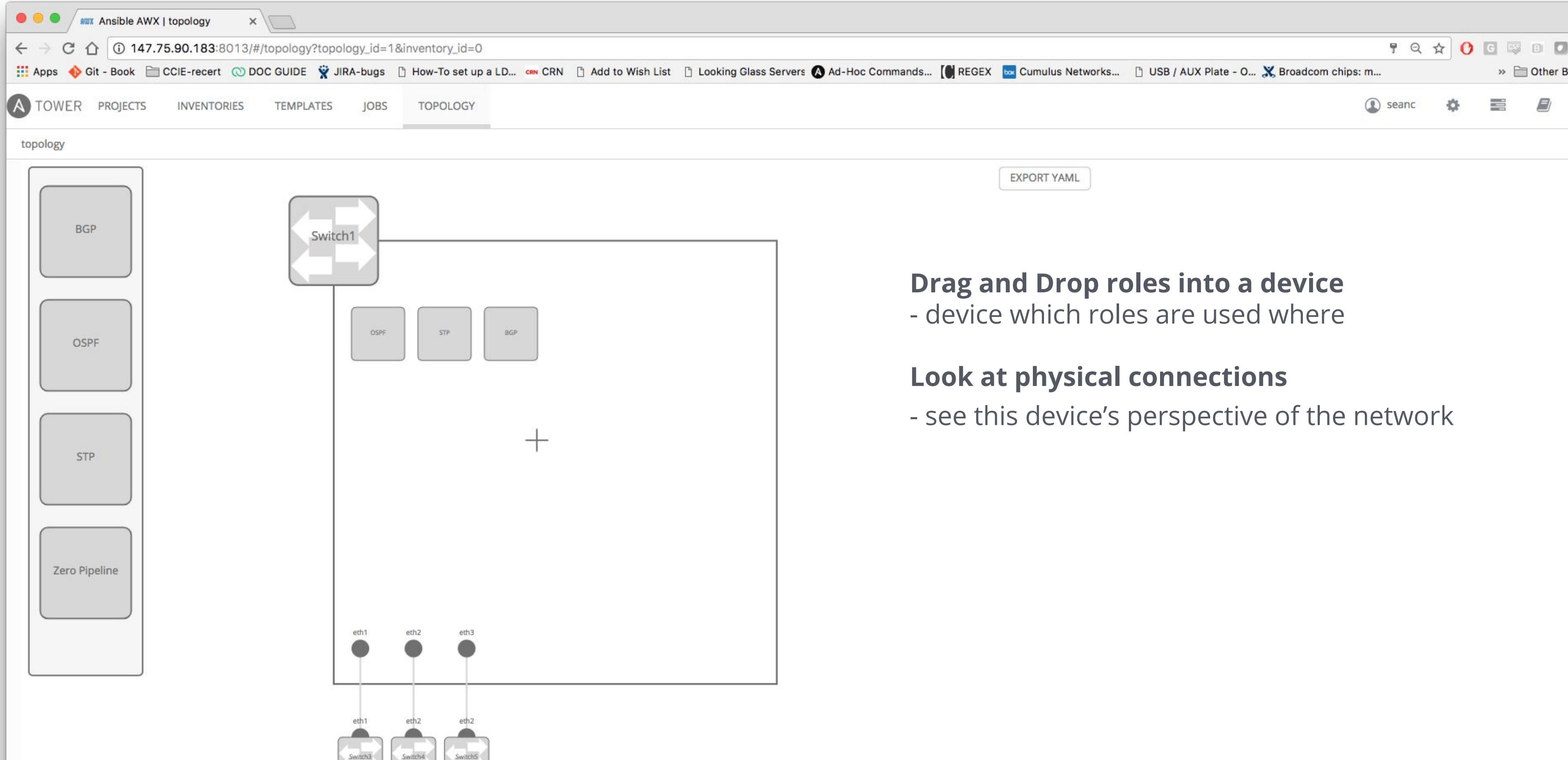
Convert designs to actual physical or virtual deployments using Ansible playbooks and network modules, and then automate deployment

NOTE: Currently in Alpha and not committed to a release



Group, Copy/Paste, Zoom

DEVICE SPECIFIC ZOOM LEVEL



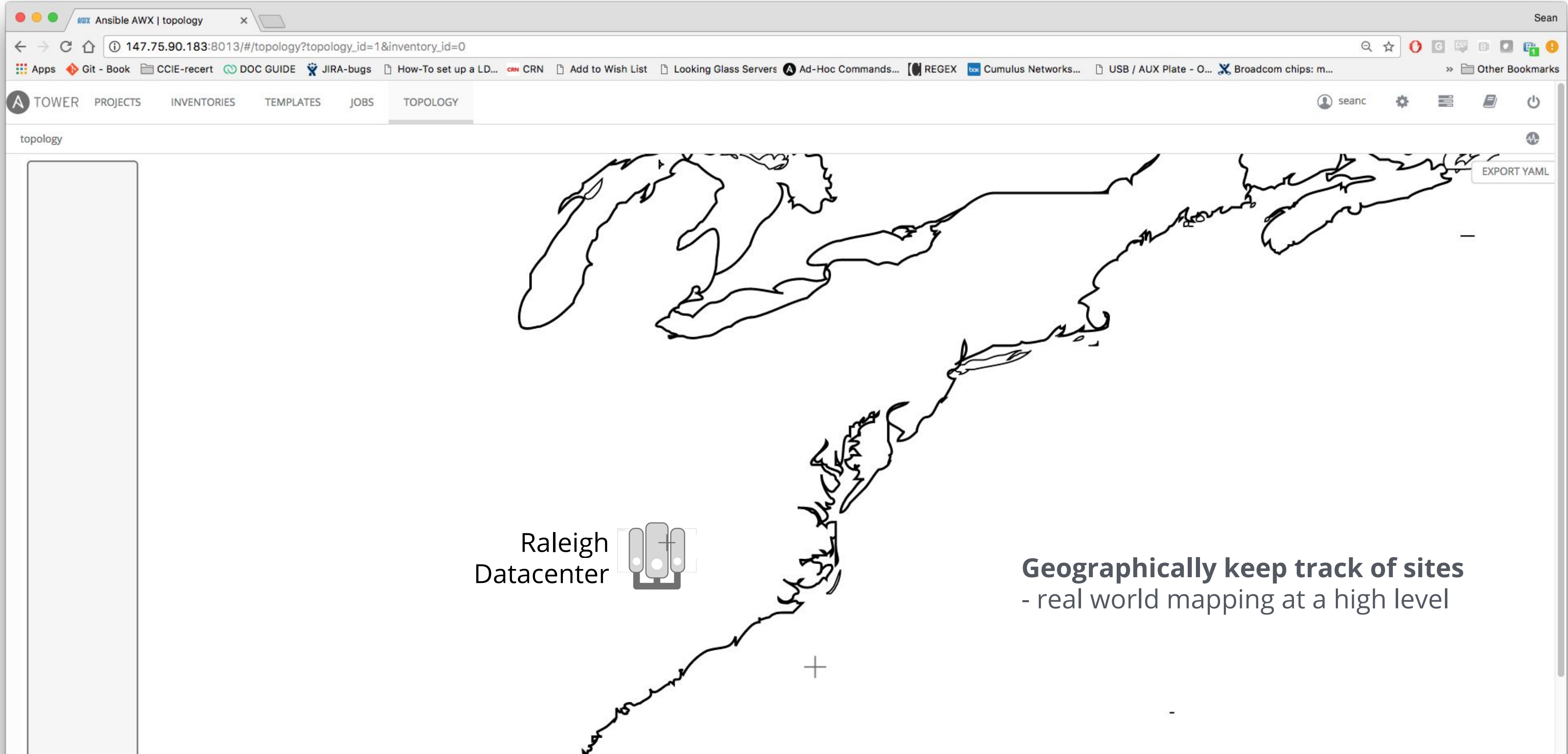
Drag and Drop roles into a device

- device which roles are used where

Look at physical connections

- see this device’s perspective of the network

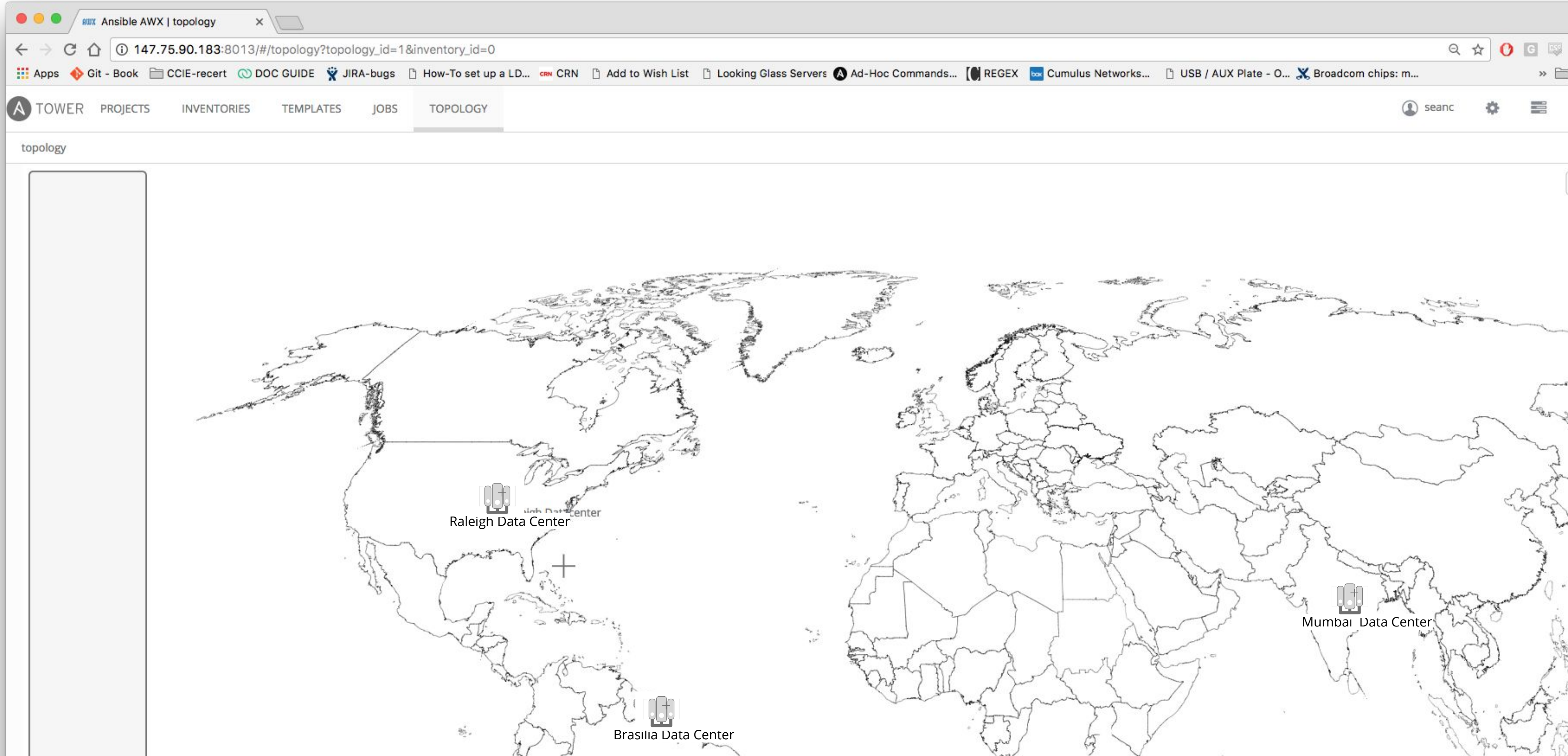
"REGIONAL" SITE VIEW



Geographically keep track of sites

- real world mapping at a high level

"GLOBAL" VIEW


Ansible AWX | topology
147.75.90.183:8013/#/topology?topology_id=1&inventory_id=0
Apps
Git - Book
CCIE-recert
DOC GUIDE
JIRA-bugs
How-To set up a LD...
CRN
Add to Wish List
Looking Glass Servers
Ad-Hoc Commands...
REGEX
Cumulus Networks...
USB / AUX Plate - O...
Broadcom chips: m...
TOWER
PROJECTS
INVENTORIES
TEMPLATES
JOBS
TOPOLOGY
seanc
topology
Raleigh Data Center
Mumbai Data Center
Brasilia Data Center

Automating Complex Tasks: Networks

Problem:

- Deploying, configuring, and maintaining a network requires many manual tasks by skilled artisans. Configuration issues and unknown changes account for a majority of downtime.

Firewall/Load Balancer Updates

Problem:

- Rapid Application development requires many updated to firewalls and load balancers. Manually adding these takes time and is prone to error.
- The task is made more difficult when multiple vendors are deployment.

Hybrid Cloud

Problem:

- Public/Hybrid cloud increases the number of things to manage
- Cloud things are different than
  on-prem things and different between clouds increasing complexity

Workflow Automation

Problem:

- Most enterprises have a ticketing/ approval system for common IT tasks. Once the task goes through the approval process, it ends up in a person’s queue for manual action.

Tier 1 Support Automation

Problem:

- Many enterprises enterprises monitor for errors conditions, but most don’t do anything with them. If they do, there is no good data to figure out the problem.