Ansible Network Automation

Kyle Benson
Global Alliance Architect | Red Hat

Kevin Delgadillo
Principal Product Manager – Orchestration & Automation | F5

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AGENDA

INTRODUCTION

1. Red Hat Is A Network Company(ish)

STRATEGY

2. Ansible Network

ACTIONS

3. Partner Highlight: F5

ANSIBLE

SIMPLE

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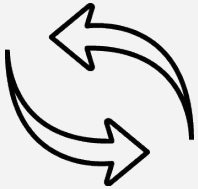

POWERFUL

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AGENTLESS

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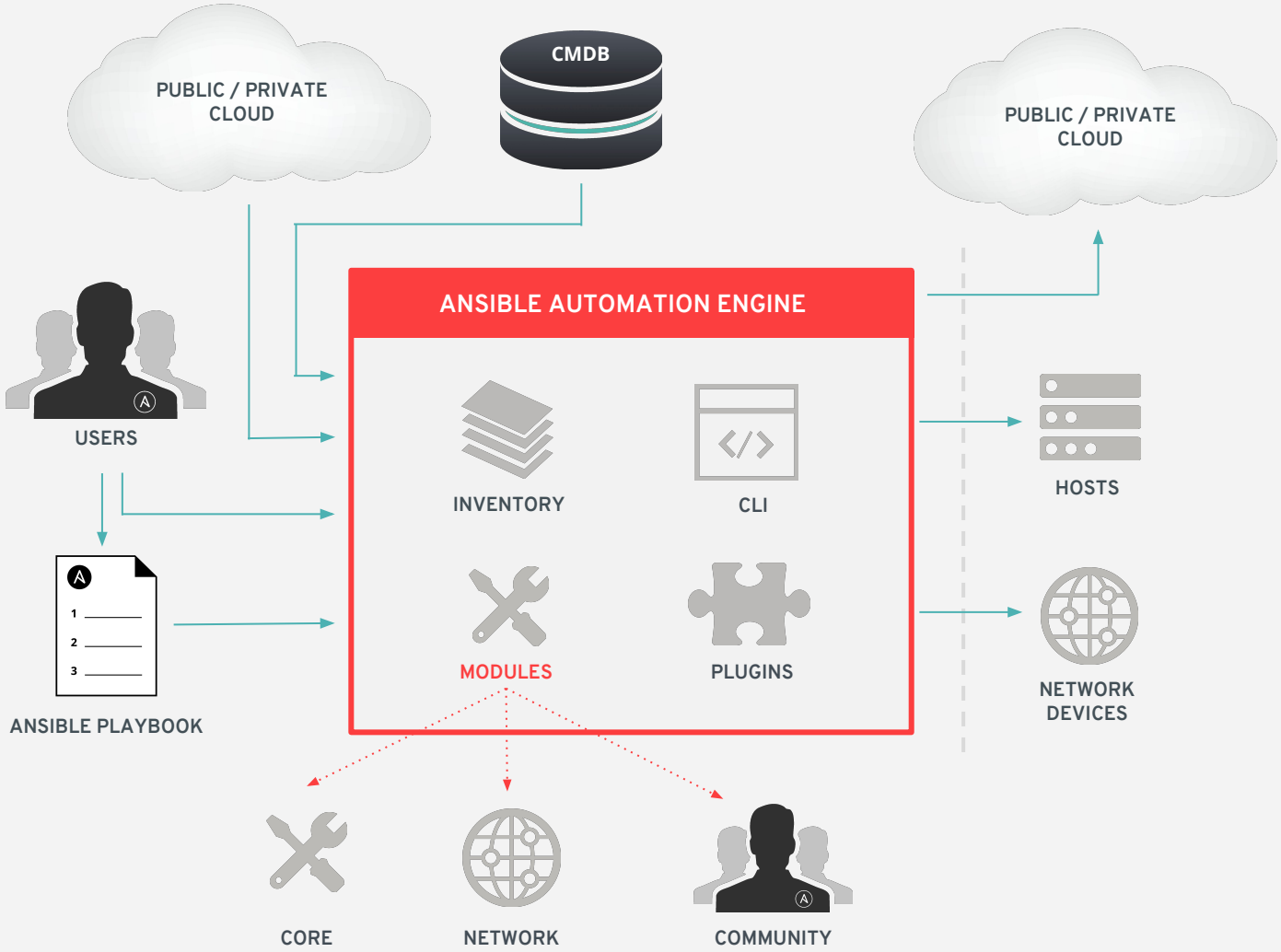

PUBLIC / PRIVATE CLOUD
CMDB
PUBLIC / PRIVATE CLOUD
ANSIBLE AUTOMATION ENGINE
USERS
INVENTORY
CLI
HOSTS
1
2
3
ANSIBLE PLAYBOOK
MODULES
PLUGINS
NETWORK DEVICES
CORE
NETWORK
COMMUNITY

ANSIBLE NETWORK

EVOLVING NETWORK OPERATIONS

...is NOT about

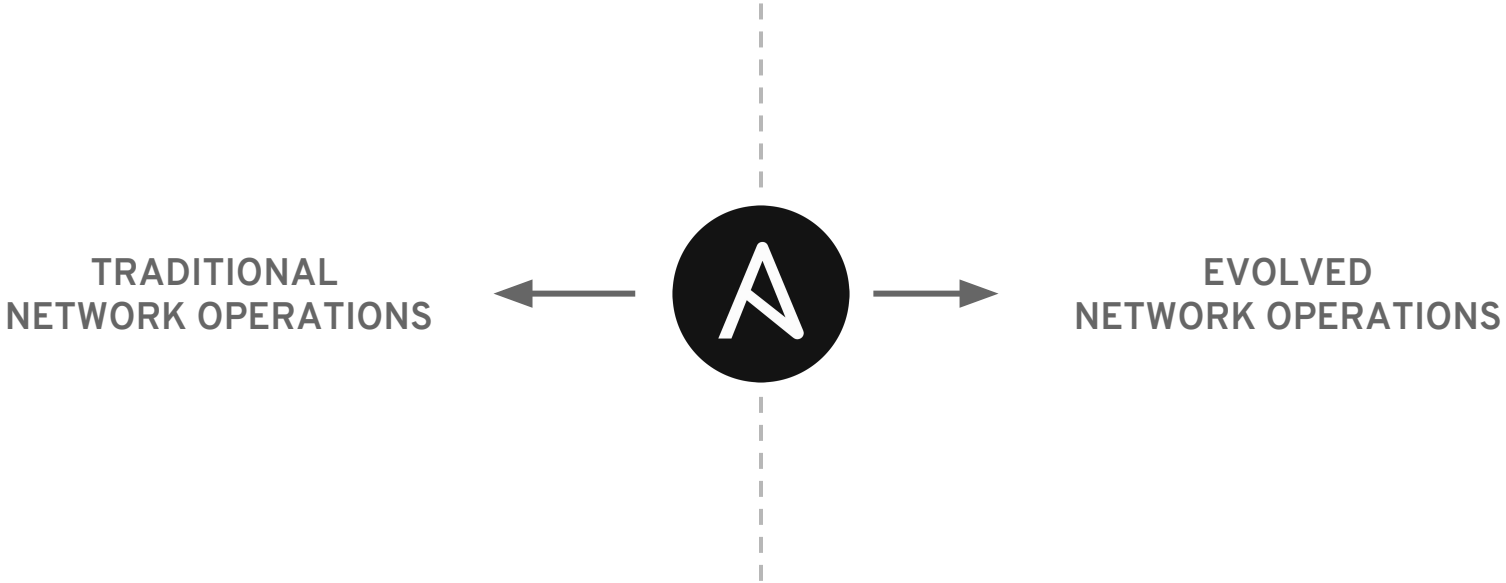
- SDN
- HOST NETWORKING
- VIRTUAL NETWORKING
- CONTROL PLANE OR DATA PLANE

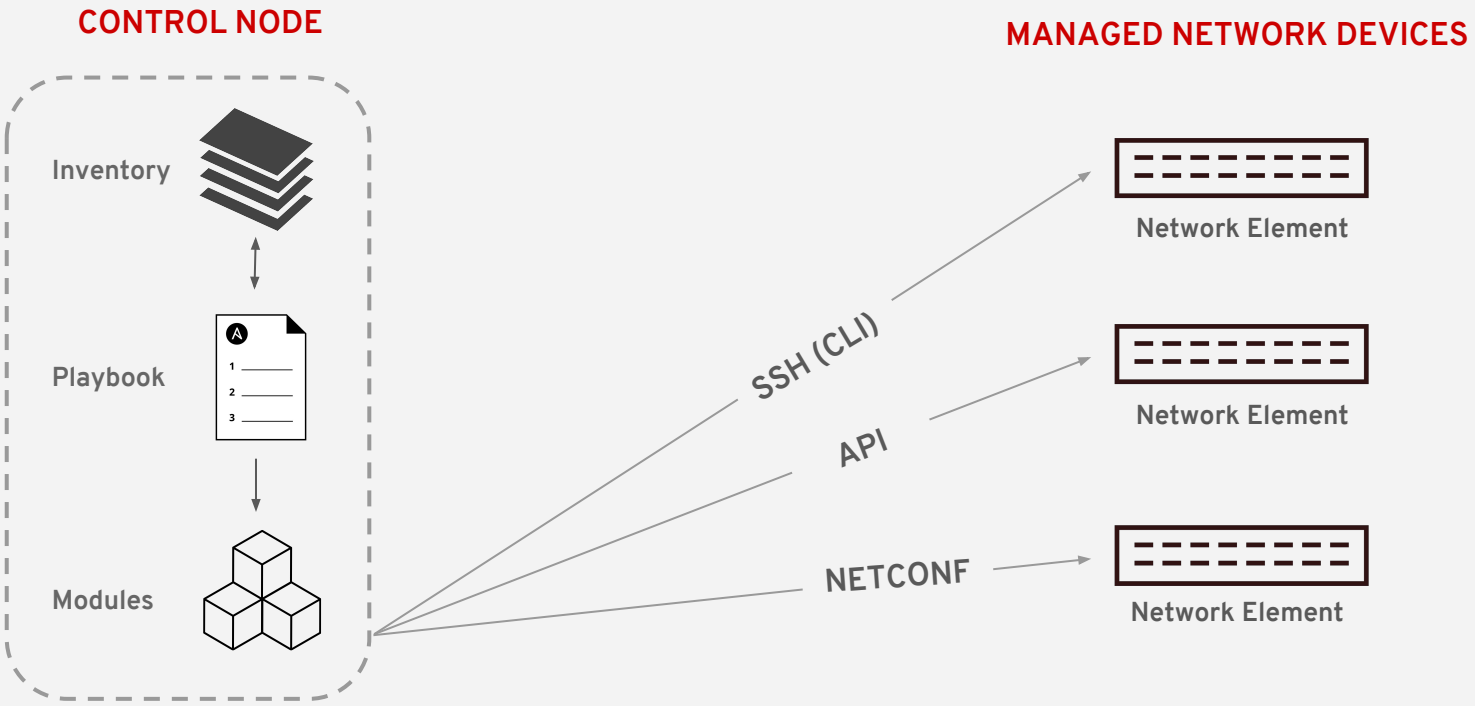
EVOLVING NETWORK OPERATIONS

… IS about:

- OPERATION
- AUGMENTATION
- CONSUMPTION
- SIMPLIFICATION

MODERNIZE NETWORK OPERATIONS





Managed Nodes (Inventory):
A collection of endpoints being managed via SSH or API.

Control Node:
Any client system (server, laptop, VM) running Linux or Mac OSX

Modules:
Handles execution of remote system commands

ANSIBLE NETWORK AUTOMATION

50
Network Platforms

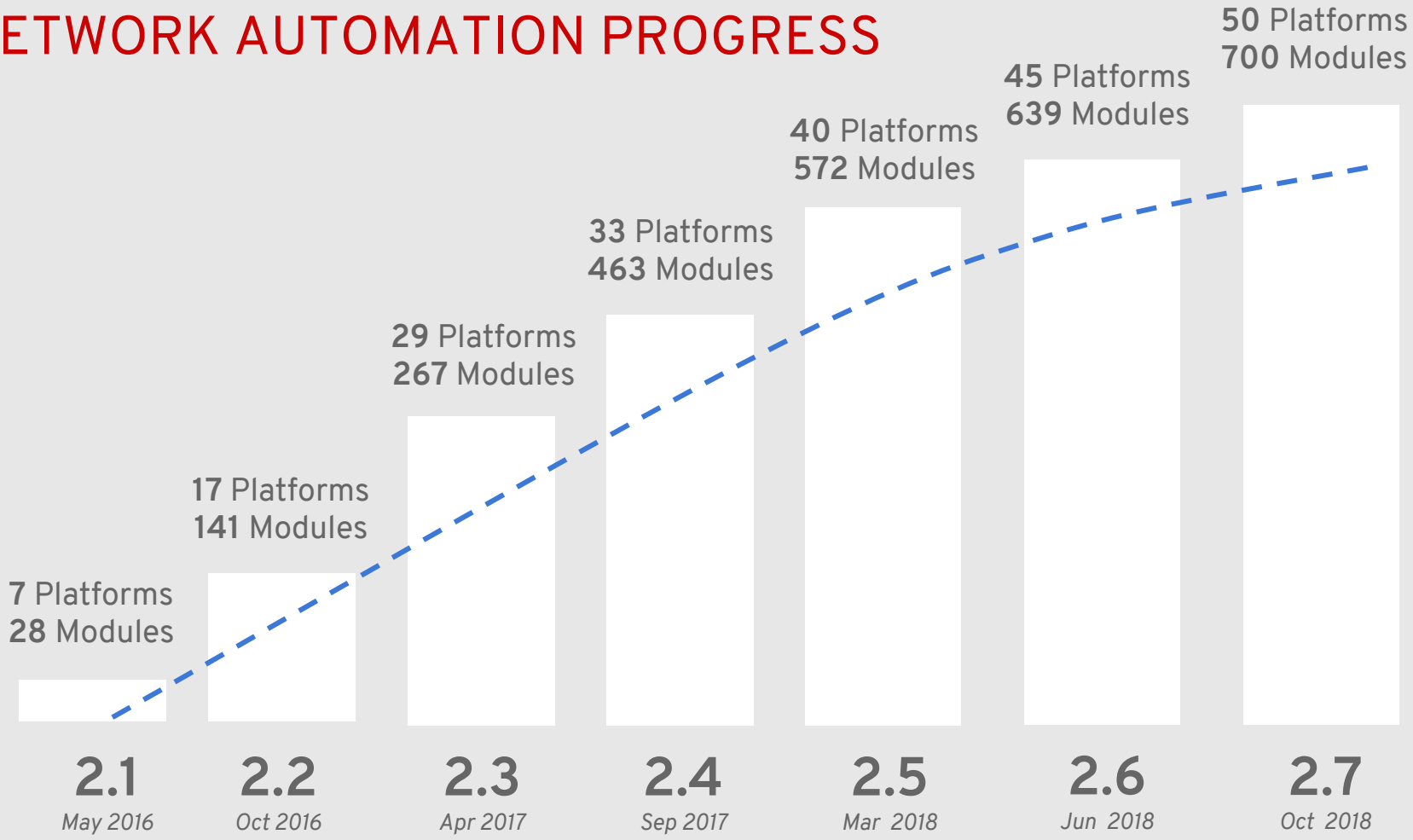
700+
Network Modules

12*
Galaxy Network Roles

ansible.com/for/networks
galaxy.ansible.com/ansible-network

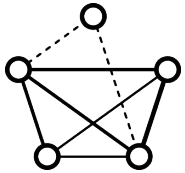
Ansible Network modules comprise 1/3 of all modules that ship with Ansible Engine

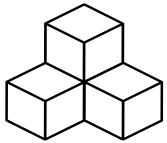
NETWORK AUTOMATION PROGRESS

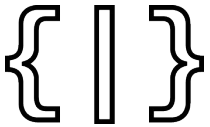


ANSIBLE NETWORK ENGINE

Ansible Network Engine is a set of consumable functions distributed as Ansible Roles that have been optimized for automating the bootstrap, provisioning and configuration management of ***network infrastructure*** and ***multi cloud network connectivity.***





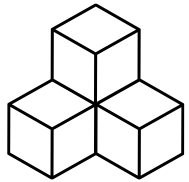


- Ansible Role decoupled from mainline development branch

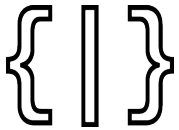
- Incubate new capabilities, features functions for interfacing with network devices and models

- Biweekly release cycle - ship early, ship often approach

ANSIBLE NETWORK ENGINE

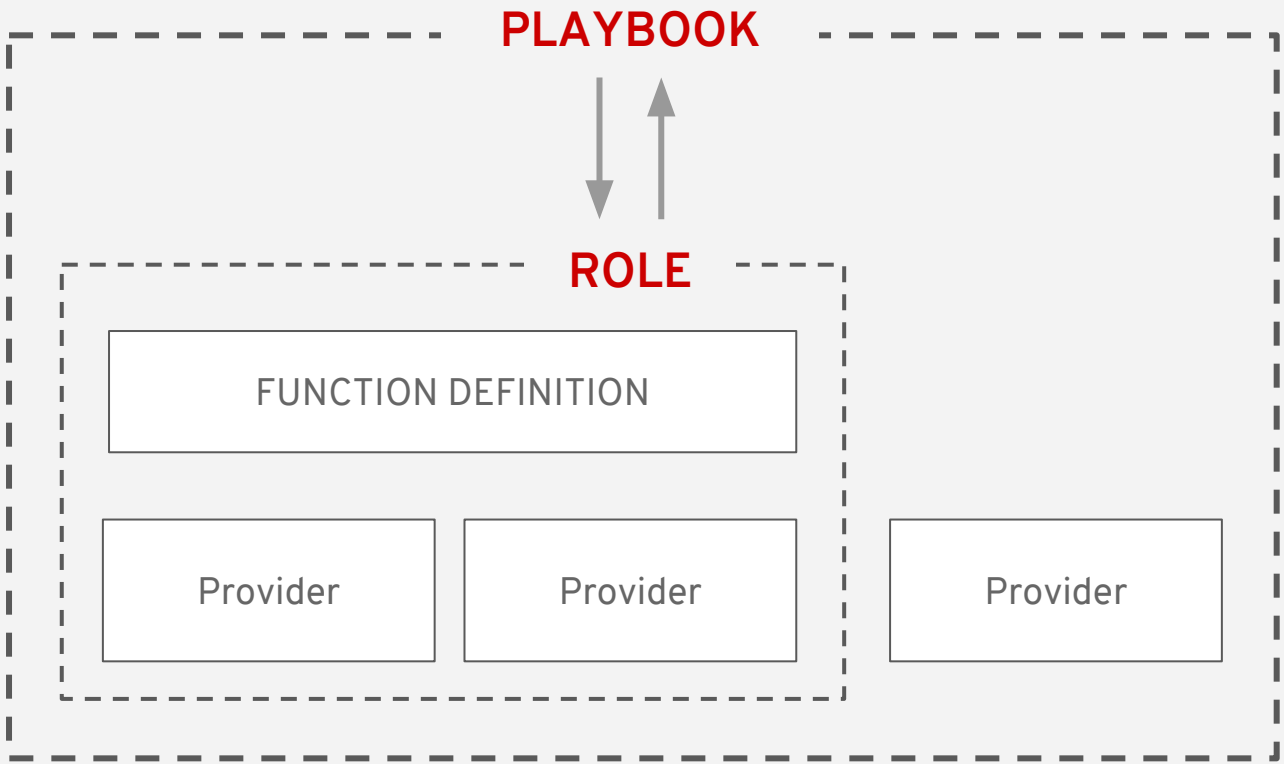


ANSIBLE NETWORK FUNCTIONS

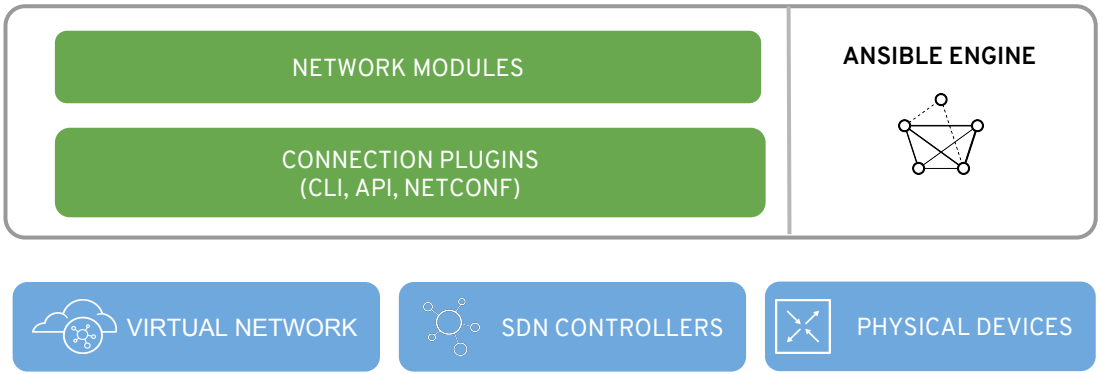


- Extends the Network Engine role - It’s all just Ansible
- Data driven with focused implementation on operational use case
- Extensible by anyone for any platform / device

ANATOMY OF A FUNCTION



ANSIBLE NETWORK STACK ARCHITECTURE



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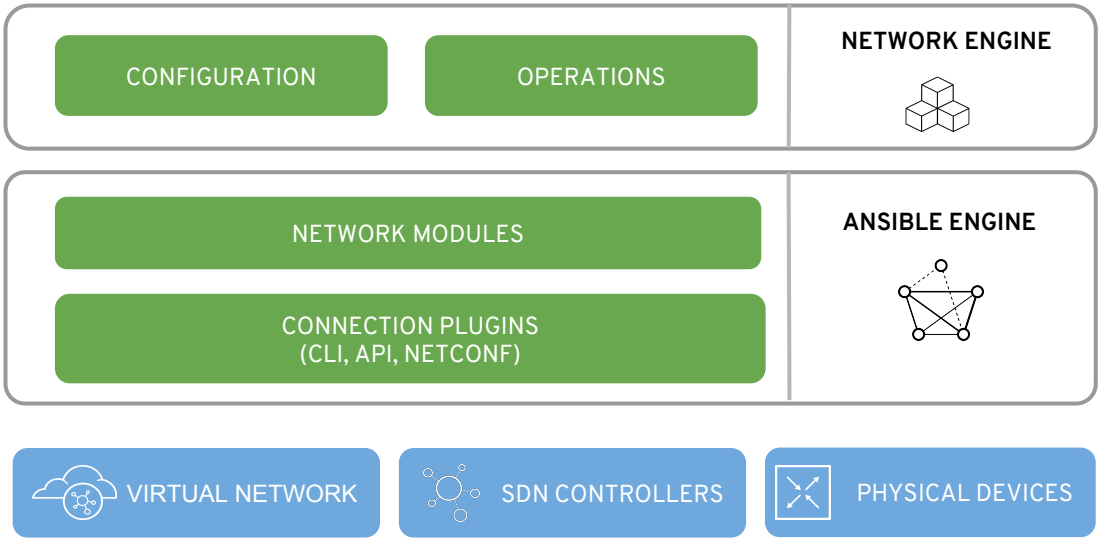

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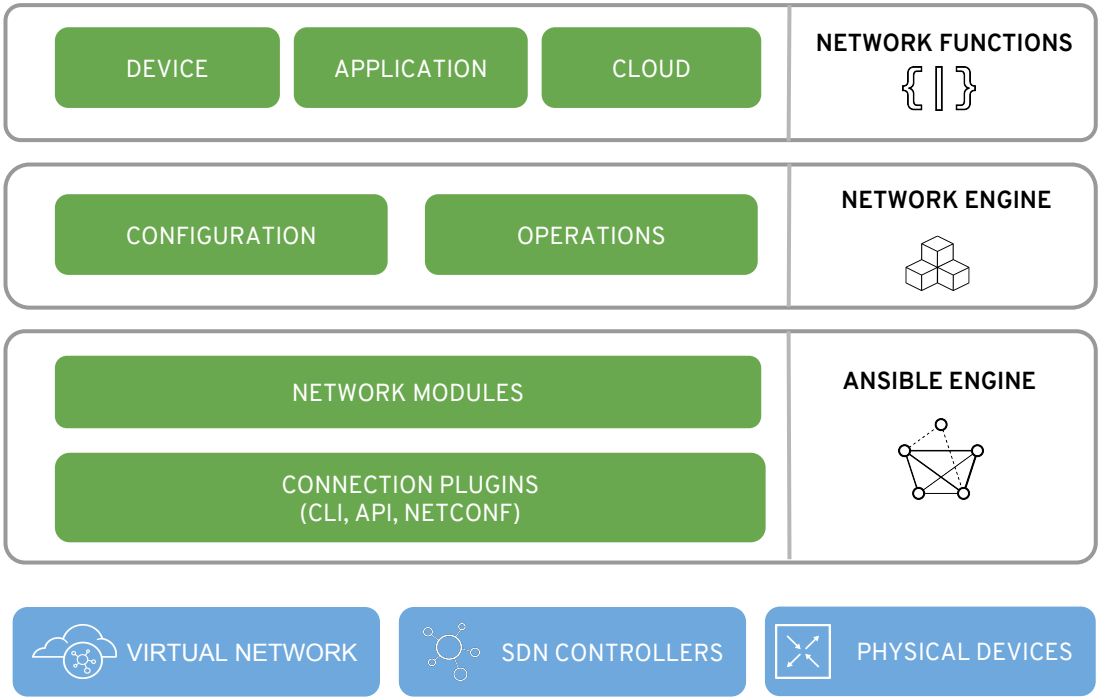

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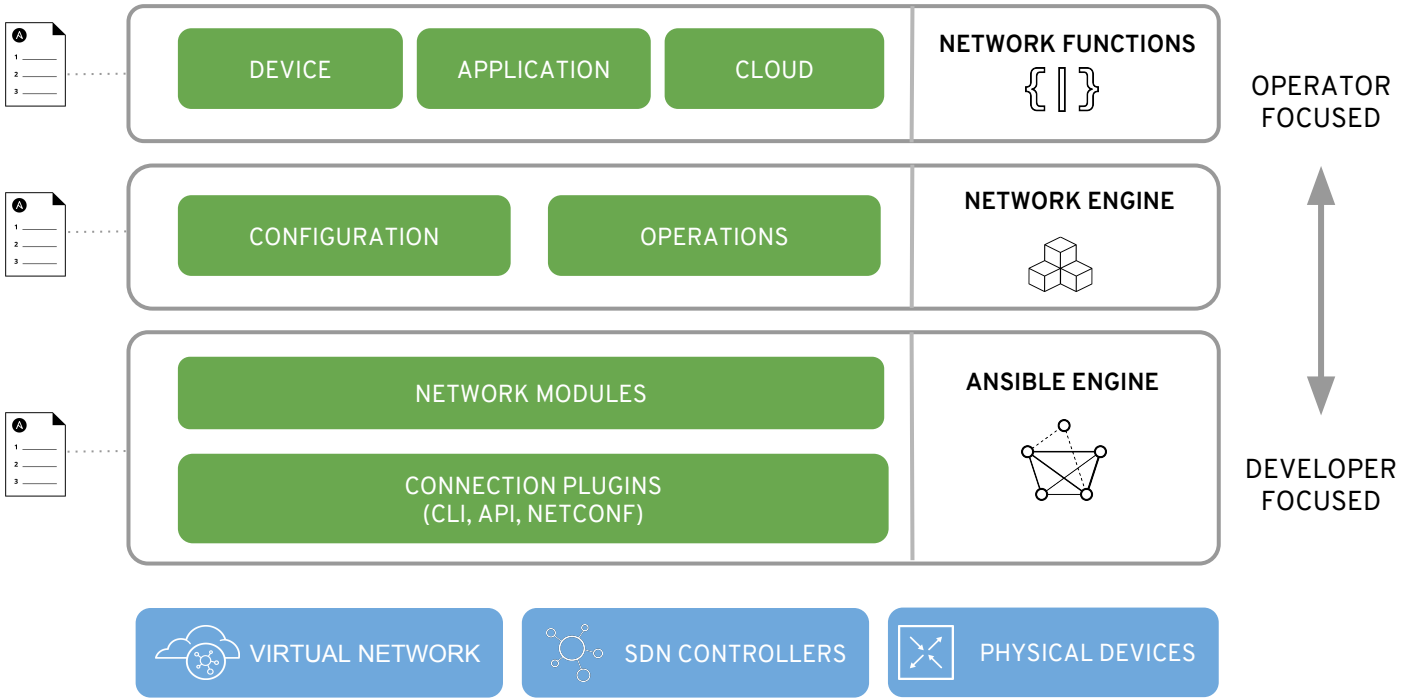

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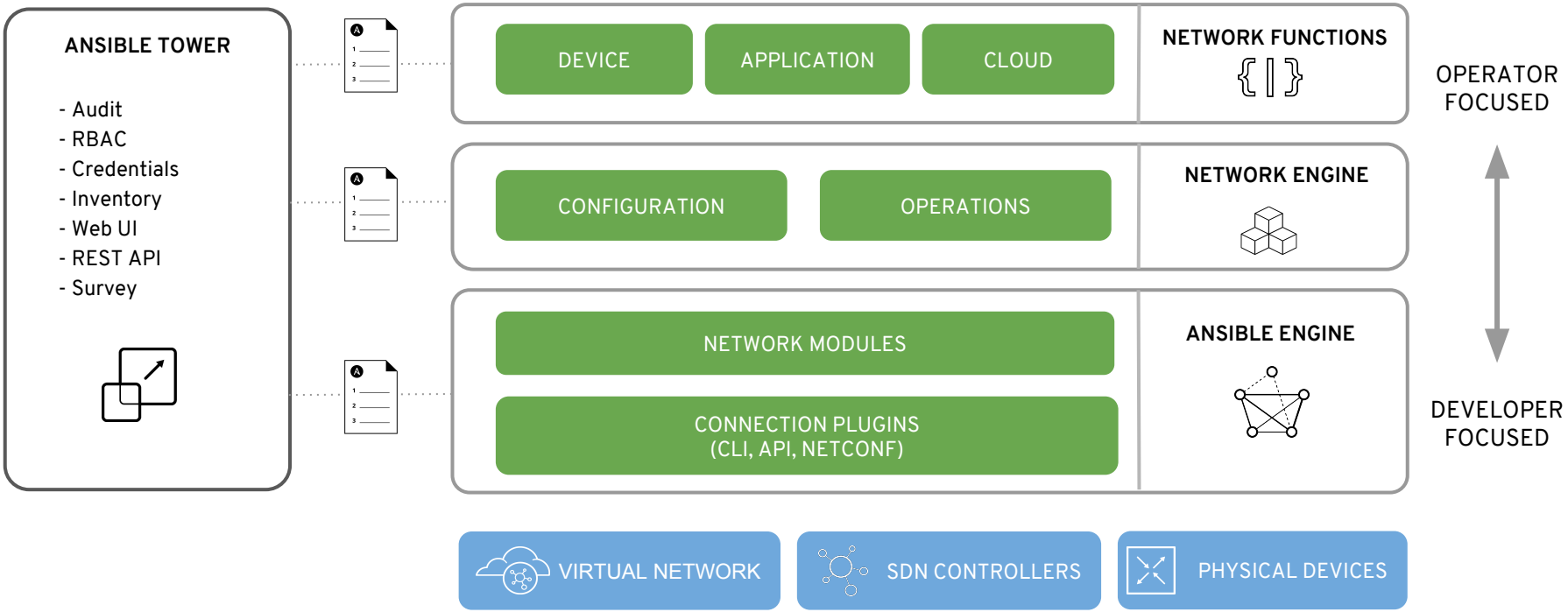
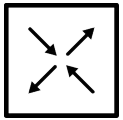




DEVICE CENTRIC NETWORK AUTOMATION

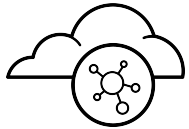
Build and push device configurations

Automate tactical operations on network devices

APPLICATION CENTRIC NETWORK AUTOMATION

Automate network devices in support of applications

Support direct to device and controller based virtualization



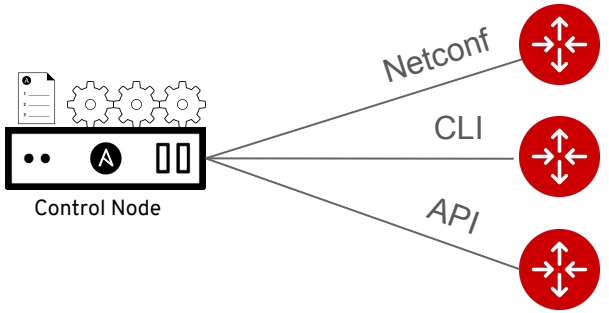
CLOUD CENTRIC NETWORK AUTOMATION

Describe and deploy network connectivity between clouds

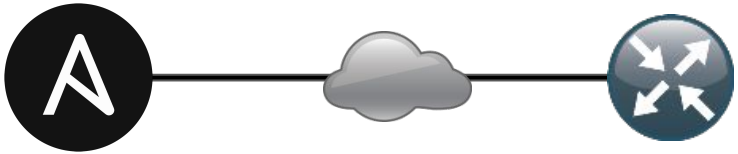
Support public/private and/or public/public clouds

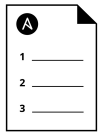
DEVICE CENTRIC NETWORK AUTOMATION

- Primary use case for automating network devices today
- Push configurations / Pull facts from network devices
- Any Model, Any Encoding, Any Transport



USE CASE: OPENCONFIG





openconfig.yaml

fetch

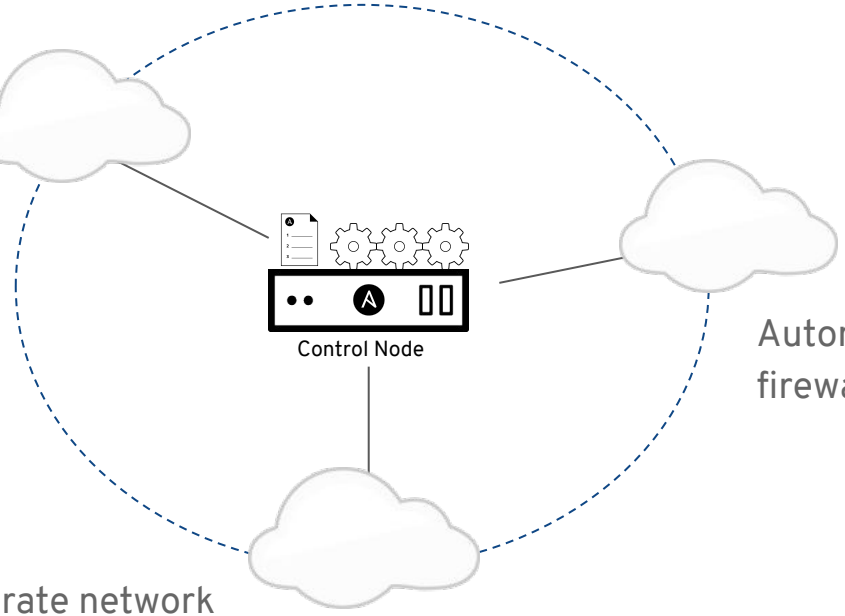
store and validate

push change

1. Make sure netconf is enabled
2. Validate schema name
3. Fetch schema and dependencies
4. Validate input against schema
5. Push change to device

CLOUD CENTRIC NETWORK AUTOMATION

Simplify automating
the underlay network



Automate application services -
firewalls, load balancers

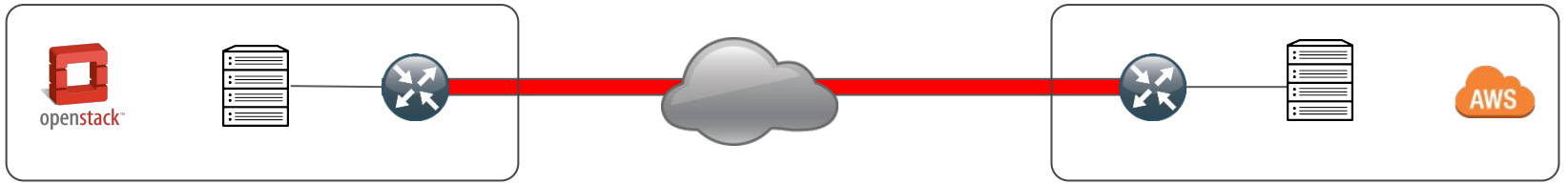
Integrate network
layering into cloud apps

USE CASE: CLOUD VPN

```
---
- hosts: localhost
  connection: local
  gather_facts: no

  tasks:
    - include_role:
        name: cloud-vpn
```

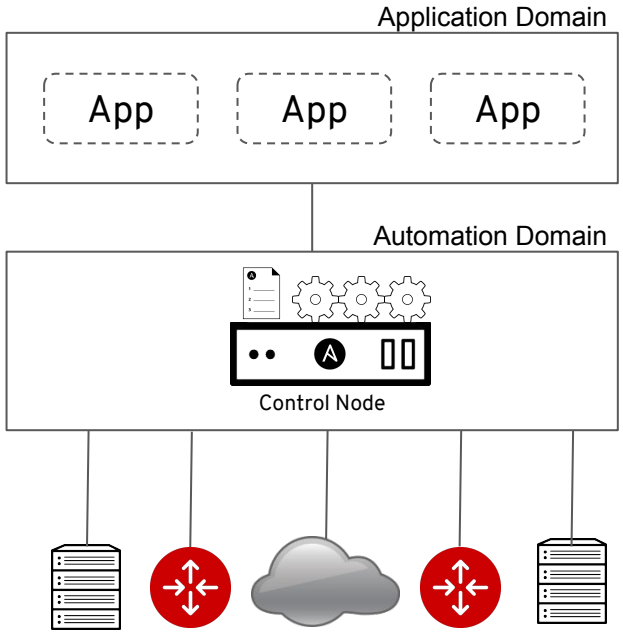
+

```
---
cloud_vpn_name: openstack-vyos-to-aws-vpn

cloud_vpn_responder_type: aws_vpn
cloud_vpn_responder_aws_region: us-west-1

cloud_vpn_initiator_type: openstack_vyos
cloud_vpn_initiator_openstack_cloud: psprygad-cloud
cloud_vpn_initiator_cidr: 192.168.0.0/24
cloud_vpn_initiator_outside_interface: eth0
cloud_vpn_initiator_private_ip: 192.168.0.145
cloud_vpn_initiator_user: admin
cloud_vpn_initiator_ssh_private_key_file: tfd18.pem
cloud_vpn_initiator_key_name: tfd18
cloud_vpn_initiator_image_id: vyos-1.1.8
cloud_vpn_initiator_openstack_external_network: 38.145.32.0/22
```



APPLICATION CENTRIC NETWORK AUTOMATION

- Application domain automates infrastructure using Ansible
- Ansible provides consistent abstraction of resources
- Integrate network changes as part of workload definitions



ANSIBLE CERTIFIED

ANSIBLE CERTIFIED

TRUSTED AUTOMATION

FULLY SUPPORTED

ANSIBLE CERTIFIED

PARTNER HIGHLIGHT: F5

Objective: F5 & Ansible

Integrate seamlessly with the entire product line

- BIG-IP
- BIG-IQ

Get customers used to automating & orchestrating everything F5

- Configuration management
- Infrastructure As Code

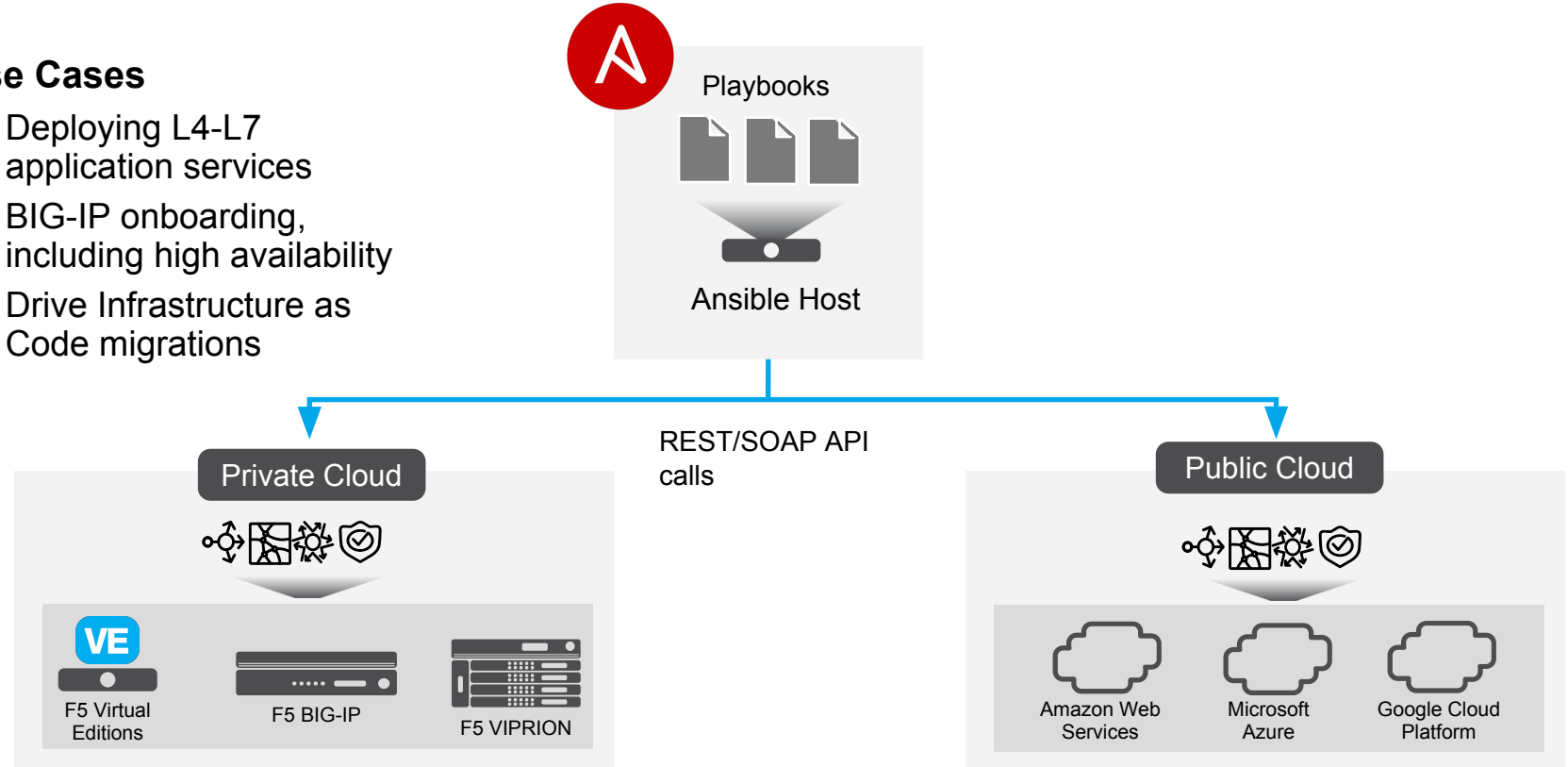
No more hacky scripts

- Ad-hoc shell scripts are not a good substitute for automation frameworks
- Shell scripts not portable
- Ad-hoc scripts are not natively idempotent

Ansible Solution for F5 BIG-IP

Use Cases

- Deploying L4-L7 application services
- BIG-IP onboarding, including high availability
- Drive Infrastructure as Code migrations



Playbook Example

```
---
- name: Virtual Server config on BIG-IP
  hosts: bigip
  gather_facts: false

  tasks:

  - name: Add Virtual Server on BIG-IP
    bigip_virtual_server:
      server: ""
      user: ""
      password: ""
      name: "http_vs"
      destination: "10.168.90.92"
      port: 80
      pool: "web-pool"
      snat: "automap"
      profiles: "http"
      validate_certs: False
    delegate_to: localhost
```

Name of Ansible Module

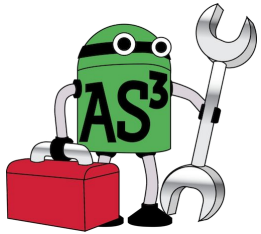
Parameters

Ansible 2.7.0

- Security logging profiles for AFM (HSL)
- DDoS profile create, modify, & apply to virtual
- LTM Persistence Profile
- LTM DNS Monitor
- LTM DNS Nameservers
- Tunnel Configuration (VXLAN)
- AFM Firewall Rules & Policies
- BIG-IP Software Upgrades
- BIG-IP System Authentication
- And more…

Complete list:
https://docs.ansible.com/ansible/latest/modules/list_of_network_modules.html#f5

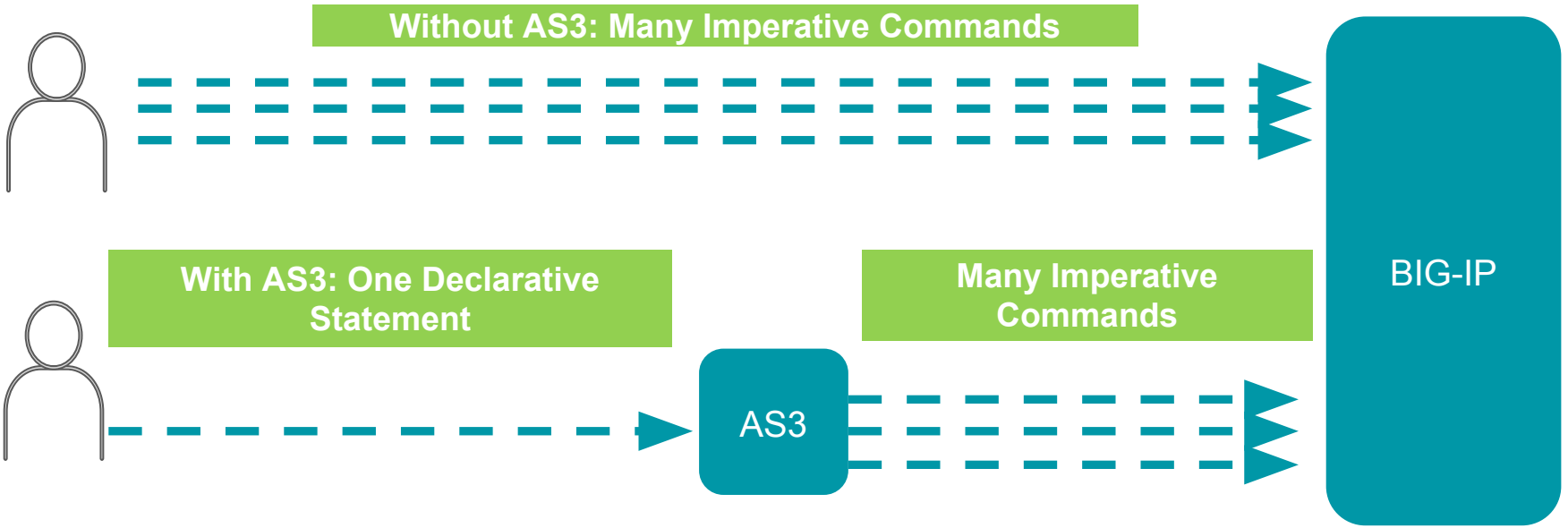
Introducing Application Services 3 Extension (AS3)



- Mechanism for automating & managing L4-L7 configurations on BIG-IP
- Enables complete BIG-IP L4-L7 configuration with single REST API call
- Provides intent-based **declarative** APIs for common use cases (end-state driven)
- Abstracts away all aspects of BIG-IP configuration
- Minimizes required domain expertise
- Node.js iControl LX plug-in → TMOS-independent
- Built for DevOps & integration with CI/CD toolchains
- Moves configuration source-of-truth off of BIG-IP into orchestrator
- Free, supported, & available now: https://github.com/F5Networks/f5-appsvcs-extension

With and Without AS3

Configuring an L4 – L7 app service requires many REST API calls



Where Do I Begin?

Automation is not just a tool, it's a journey it's a strategy

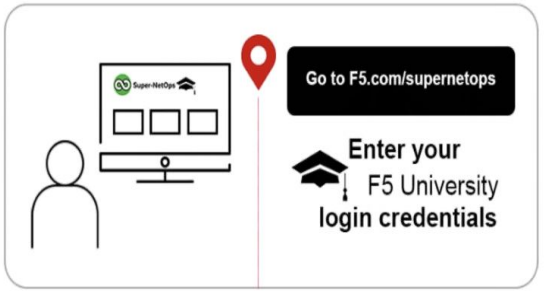
Learn automation practices

- Super NetOps training courses can help
- Join existing Ansible network automation communities

Start small…

- Create Playbooks that read or check only
- Create simple jobs that eliminate the most annoying network tasks

Automate!



CLASS 1: Introduction to Automation & Orchestration

F5 RESTful API

Abstracting BIG-IP services using iApp templates

Using the F5 iWorkflow product to create a Declarative Service Catalog

Deploying services onto the F5 BIG-IP platform

CLASS 2: Continuous Delivery & Deployment

Core DevOps methodology concepts for delivering application services in a continuous delivery and deployment pipeline

Introduction to Infrastructure as Code (IAC) concepts

Creation of a CI/CD pipeline using F5 tools

BIG-IP on Ansible Galaxy

bigip-onboarding 30

Modules to on board the BIG-IP

Type	Ansible
Author	f5devcentral
OS	Ubuntu
Clouds	NA
Tags	bigip, f5, F5, networking, selfip
Last Commit	7 months ago

Watch 5 Star 2

bigip-toggle-nodeStatus 16

Ansible role to enable/disable pool member on BIG-IP

Type	Ansible
Author	f5devcentral
OS	Ubuntu
Clouds	NA
Tags	bigip, f5, F5, networking, selfip
Last Commit	3 months ago

Watch 5 Star 1

bigip-ansible-deploy-iapp 8

Ansible role to deploy an F5 iApp

Type	Ansible
Author	f5devcentral
OS	Ubuntu
Clouds	NA
Tags	bigip, f5, F5, networking, selfip
Last Commit	3 months ago

Watch 3 Star 0

bigip-hardening 28

Ansible role to automate base BIG-IP hardening, and STIG/SRG configuration

Type	Ansible
Author	f5devcentral
OS	Ubuntu
Clouds	NA
Tags	bigip, f5, networking
Last Commit	NA

Watch 8 Star 6

bigip-ansible-virtualserver 20

Ansible role to configure nodes/pools and virtual server on the BIG-IP

Type	Ansible
Author	f5devcentral
OS	Ubuntu
Clouds	NA
Tags	bigip, f5, F5, networking, selfip
Last Commit	3 months ago

Watch 5 Star 0

Please contribute..

Your BIG-IP roles for community!

https://galaxy.ansible.com/list#/roles?page=1&page_size=10&autocomplete=bigip

COME LEARN MORE!

- ansible.com/products/network-automation
- F5 Documentation

THANKS!