

Managing networks hasn't changed much in 30 years

- Networks are mission critical
- Every network is a unique snowflake
- Tactical, opportunistic changes proliferate
- Vendor specific implementations
- Testing is expensive/impossible



F5 and Ansible: Top customer outcomes



AUTOMATE F5 CONFIGURATIONS



CONTINUOUS DELIVERY



OPERATIONAL AGILITY



CONSISTENT RELIABILITY AND SECURITY ACROSS CLOUDS

AUTOMATE F5 CONFIGURATIONS

CHALLENGE

Modern ephemeral environments require easy, consistent ways to manage configurations.

SOLUTION

F5 modules on Ansible and **F5 roles on Ansible Galaxy**.

OUTCOMES

- Manage F5 application services using Ansible Playbooks and roles.
- Write Ansible tasks for F5 once and run them over and over.
- Retrieve and manage F5 inventory ad hoc or in bulk.
- Version Ansible Playbooks to state check and validate by comparing running configurations to desired configurations.

RELATED ARTICLE

[Getting started with Ansible >](#)

F5 and Ansible: Top customer outcomes



AUTOMATE F5 CONFIGURATIONS



CONTINUOUS DELIVERY



OPERATIONAL AGILITY



CONSISTENT RELIABILITY AND
SECURITY ACROSS CLOUDS

CONTINUOUS DELIVERY

CHALLENGE

Release application code quicker with improved efficiency, control, and zero down time.

SOLUTION

F5 BIG-IP VE, F5 DNS, F5 LTM and Ansible integration.

OUTCOMES

- Supports blue-green deployments.
- Programmatic validation before making changes makes the process safer.
- Low-risk deployments and upgrades without scheduling and announcing maintenance windows.
- Faster time to resolution because NetOps can move traffic out of a data center that's experiencing issues.

RELATED ARTICLES

[Customer story: Surescripts Speeds DevOps Work with Red Hat Ansible Automation >](#)

[Tackling Blue-Green Deployments in the Private Cloud >](#)

F5 and Ansible: Top customer outcomes



AUTOMATE F5 CONFIGURATIONS



CONTINUOUS DELIVERY



OPERATIONAL AGILITY



CONSISTENT RELIABILITY AND
SECURITY ACROSS CLOUDS

OPERATIONAL AGILITY

CHALLENGE

Need to reduce time to production for all necessary application services, including network services.

SOLUTION

[F5 Automation Tool Chain](#), [F5 modules for Ansible](#)

OUTCOMES

- Develop, test, and release with enterprise-grade F5 application services by including them as part of CI/CD workflow.
- Admin-defined F5 deployment and configuration templates for the rest of your organization to choose from.
- Scheduled F5 deployment and configuration using [Red Hat Ansible Tower](#).

RELATED ARTICLE

[F5 Automation Toolchain and CI/CD with Ansible Tower](#) >

F5 and Ansible: Top customer outcomes



AUTOMATE F5 CONFIGURATIONS



CONTINUOUS DELIVERY



OPERATIONAL AGILITY



CONSISTENT RELIABILITY AND
SECURITY ACROSS CLOUDS

CONSISTENT RELIABILITY AND SECURITY ACROSS CLOUDS

CHALLENGE

As your app infrastructure expands across multiple clouds, forgetting, or missing, a device when patching or deploying secure configurations can cause outages and even expose your apps to attackers.

SOLUTION

[F5 Automation Tool Chain](#), [Ansible F5 modules](#), [F5 roles on Ansible Galaxy](#), [F5 Cloud Formation Templates \(CFT\)](#), and [F5 Azure Resource Manager \(ARM\) templates](#)

OUTCOMES

- Manage hybrid F5 environments with ease and consistency.
- Red Hat Ansible Tower provides single pane-of-glass management, helping to reduce the time and resources required to manage a distributed infrastructure.
- Create Ansible tasks and workflows to configure F5 devices once, and then apply the same workflows across multiple F5 infrastructures (cloud, virtual, and physical).
- Deploy pre-configured traffic and security policies consistently across multiple cloud environments.

RELATED ARTICLE

[Example: Deploying F5 Application Security Manager with Ansible](#) ›

What You Will Learn

- What is Ansible, its common use cases
- How Ansible works and terminology
- Running Ansible playbooks
- Network modules
- An introduction to roles
- An introduction to Ansible Galaxy



**MANAGING NETWORKS
HASN'T CHANGED
IN 30 YEARS.**

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

What is Ansible?

Red Hat Ansible network automation is enterprise software for automating and managing IT infrastructure.

As a vendor agnostic framework Ansible can automate F5 (BIG-IP, BIG-IQ), Arista (EOS), Cisco (IOS, IOS XR, NX-OS), Juniper (JunOS), Open vSwitch and VyOS.

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

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)



SIMPLE

Human readable automation
No special coding skills needed
Tasks executed in order
Get productive quickly



POWERFUL

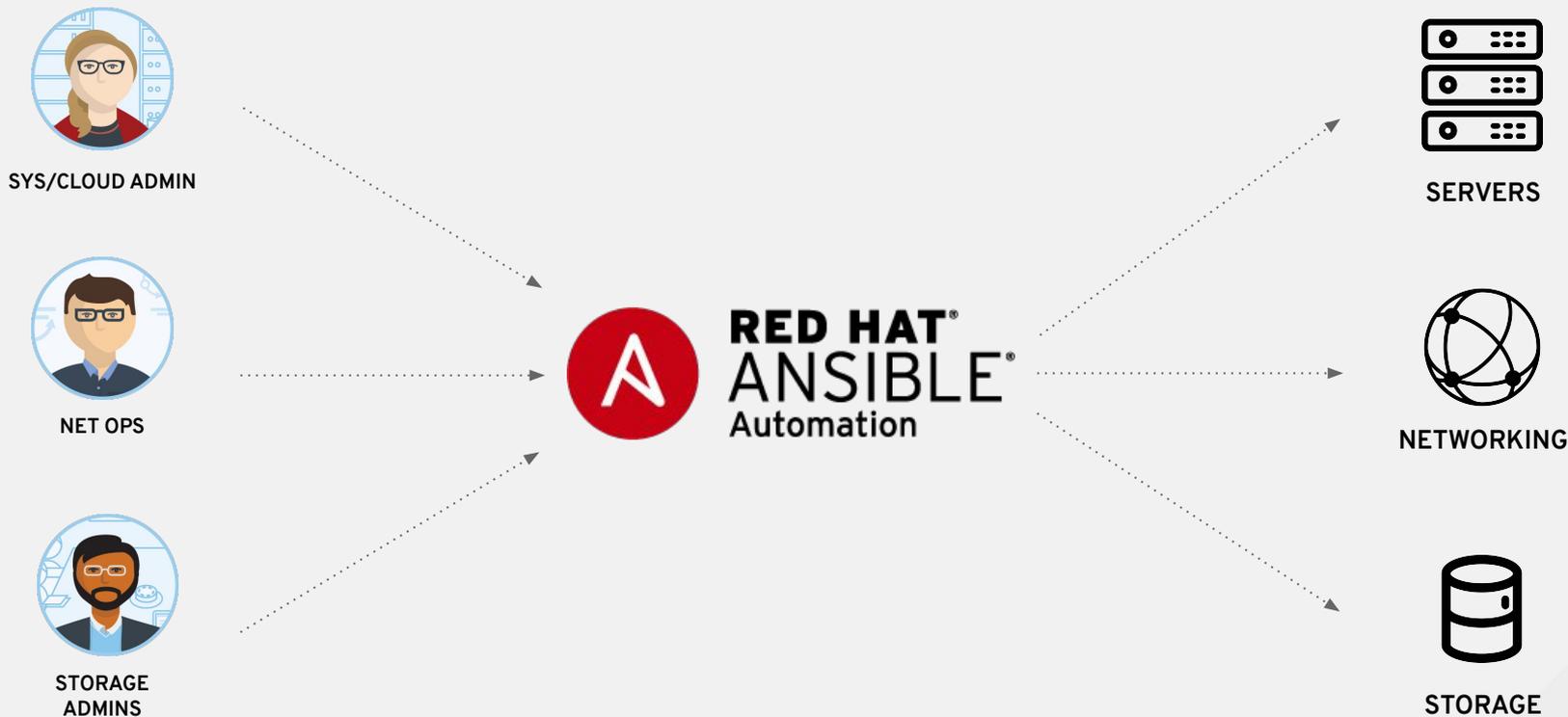
Gather information and audit
Configuration management
Workflow orchestration
Manage ALL IT infrastructure



AGENTLESS

Agentless architecture
Uses OpenSSH and paramiko
No agents to exploit or update
More efficient & more secure

Ansible: The Universal Automation Framework



ANSIBLE NETWORK AUTOMATION

50

Networking
platforms

700+

Networking
modules

ansible.com/networking

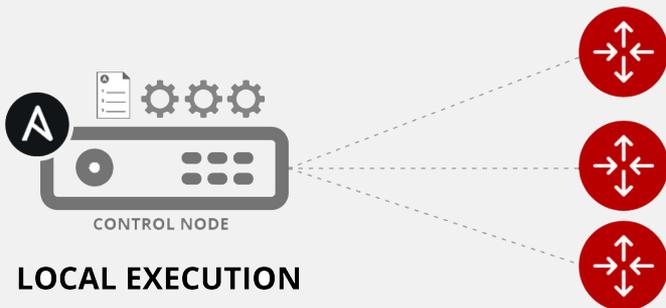
Common use cases

- Backup and restore device configurations
- Upgrade network device OS
- Ensure configuration compliance
- Apply patches to address CVE
- Generate dynamic documentation

Basically anything an operator can do manually, Ansible can automate.

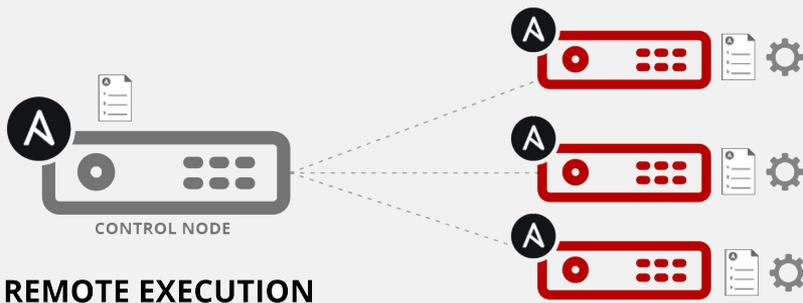
How Ansible Works

Module code is executed locally on the control node

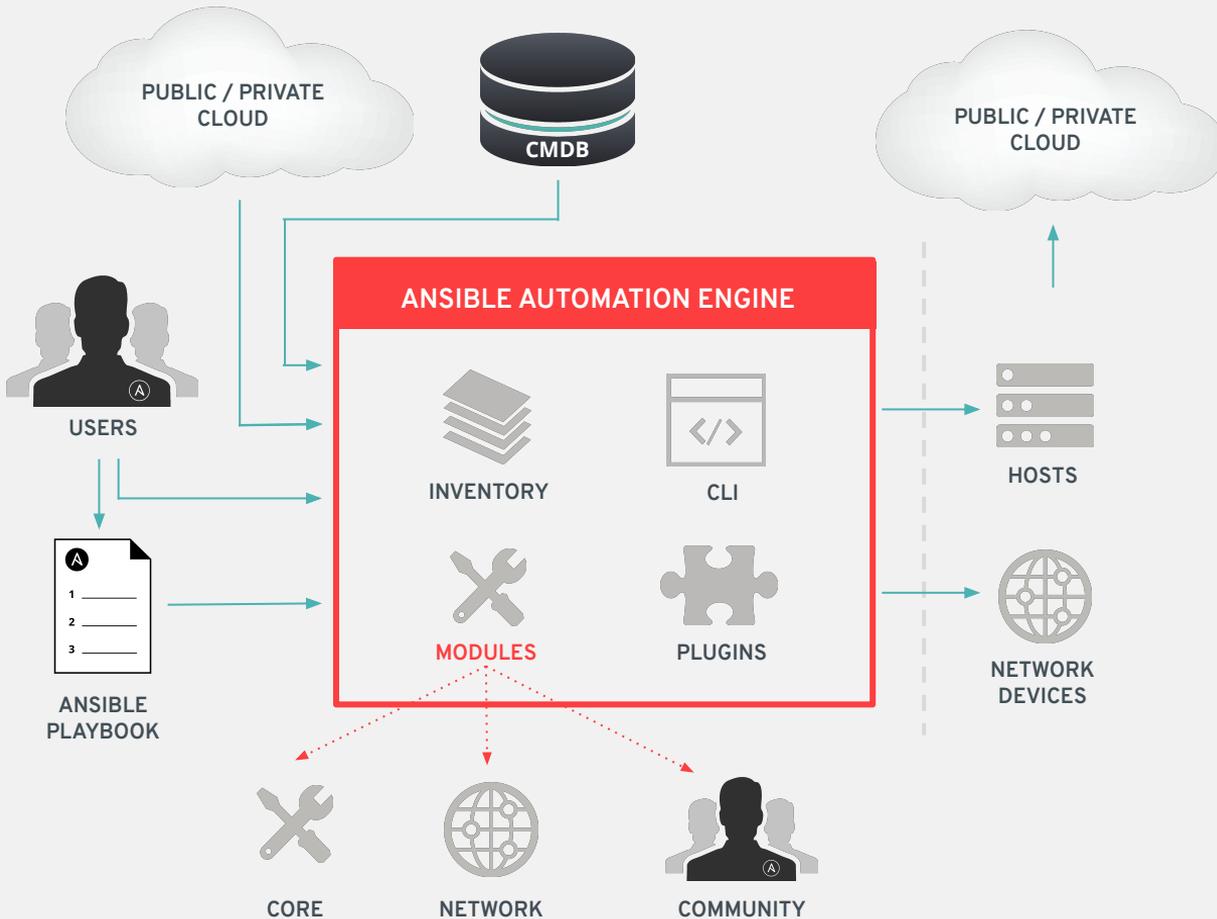


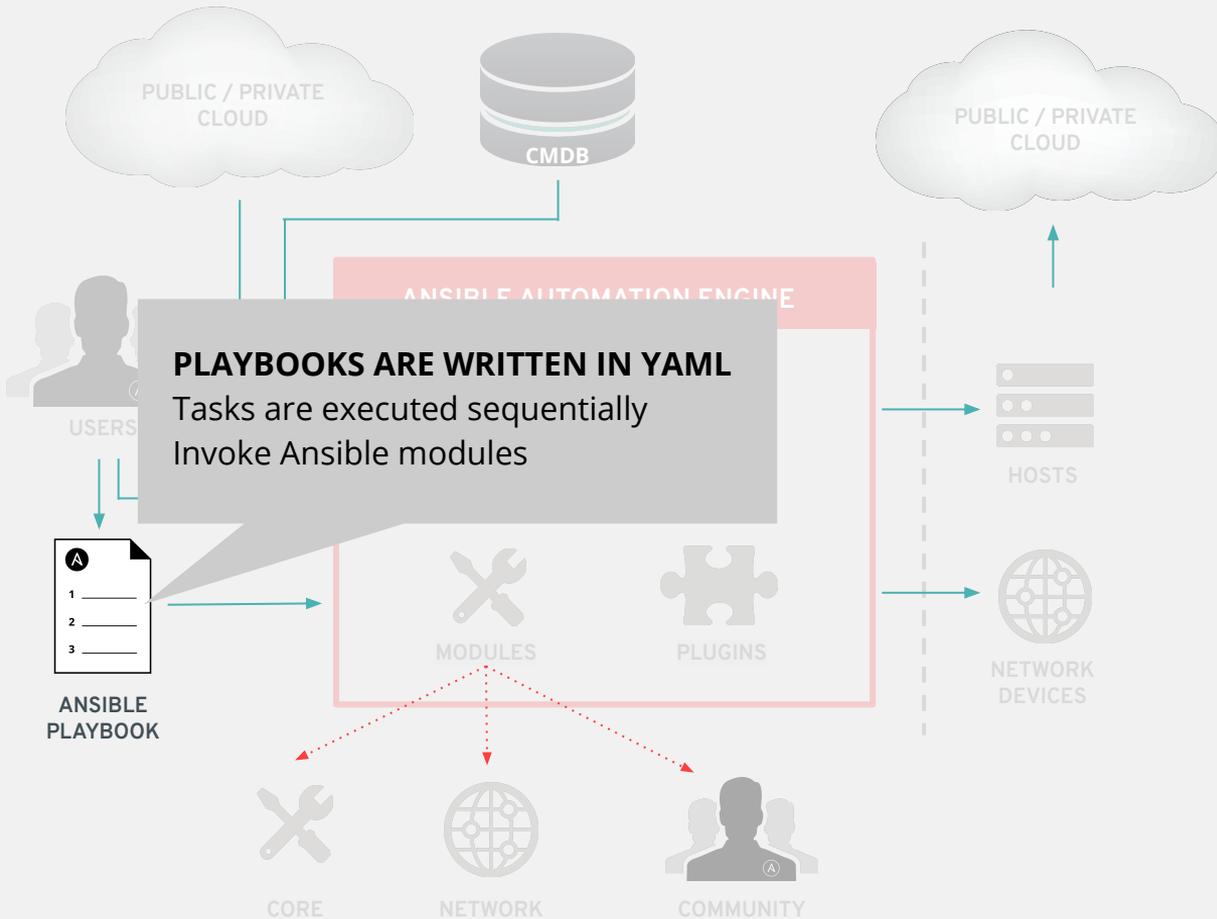
**NETWORKING
DEVICES**

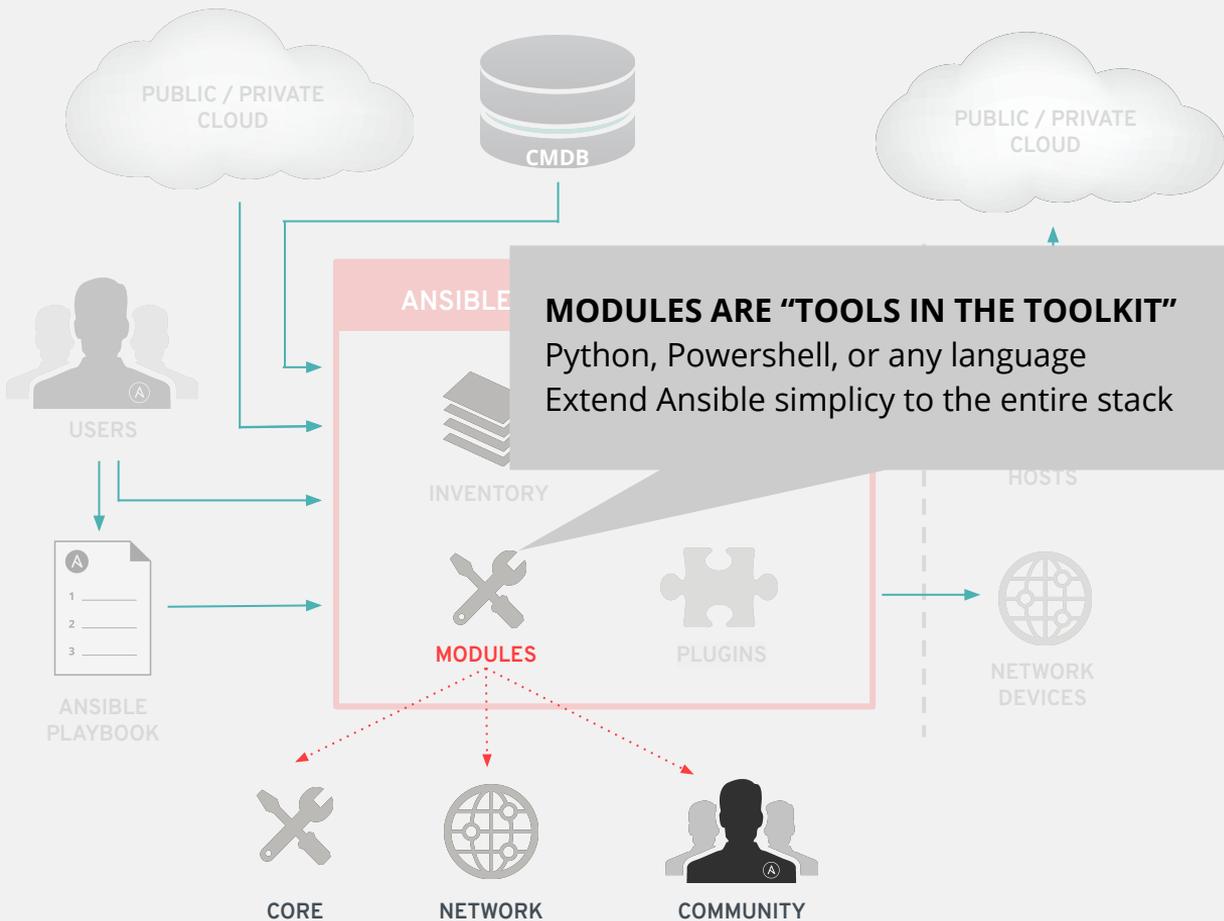
Module code is copied to the managed node, executed, then removed

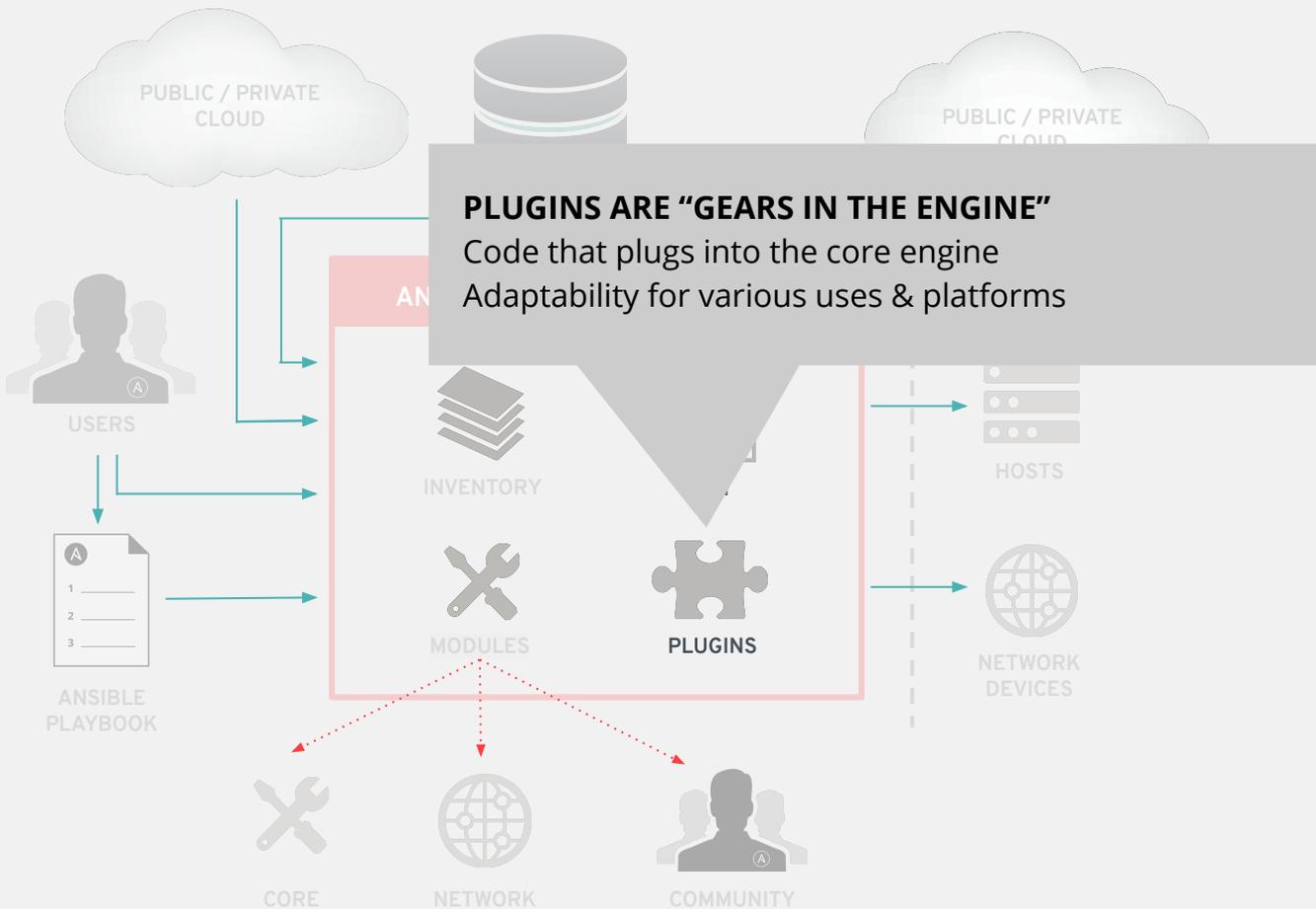


**LINUX/WINDOWS
HOSTS**









Understanding Inventory

```
10.1.1.2  
10.1.1.3  
172.16.1.1  
172.16.1.2  
192.168.1.2  
192.168.1.3
```

Understanding Inventory

There is always a group called **"all"** by default

```
[lb]
f5 ansible_host=34.199.128.69

[control]
ansible ansible_host=107.23.192.217

[webservers]
host1 ansible_host=107.22.141.4
host2 ansible_host=54.146.162.192
```

Groups can be nested

```
[DC:children]
lb
webservers

[rhel:children]
control
webservers
```

Inventory - variables

```
[all:vars]
ansible_user=student2
ansible_ssh_pass=ansible
ansible_port=22
```

Group variables apply for all devices in that group

```
[lb]
f5 ansible_host=34.199.128.69 ansible_user=admin private_ip=172.16.26.136 ansible_ssh_pass=admin
```

```
[webservers]
host1 ansible_host=107.22.141.4 ansible_user=ec2-user private_ip=172.16.170.190
host2 ansible_host=54.146.162.192 ansible_user=ec2-user private_ip=172.16.160.13
```

Host variables apply to the host and override group vars

A Sample Playbook

```
---
- name: BIG-IP SETUP
  hosts: lb
  connection: local
  gather_facts: false

  tasks:

  - name: CREATE NODES
    bigip_node:
      server: "f5.ansible.com"
      user: "admin"
      password: "admin"
      server_port: "8443"
      host: 192.168.0.1
      name: "webserver01"
```

- Playbook is a list of plays.
- Each play is a list of tasks.
- Tasks invoke modules.
- A playbook can contain more than one play.

Lab Time

Exploring the Lab Environment

In this lab you will explore the lab environment and build familiarity with the lab inventory.

Approximate time: 10 mins

Playbook definition for network automation

- Target play execution using hosts
- Define the connection : local
- About gather_facts

Running a playbook

```
[student1@ansible ~]$ ansible-navigator run bigip-facts.yml -m stdout
```

```
PLAY [GRAB F5 FACTS] *****
```

```
TASK [COLLECT BIG-IP FACTS] *****
```

```
ok: [f5]
```

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

```
f5 : ok=1 changed=0 unreachable=0 failed=0
```

Displaying output

Use the optional **verbose** flag during playbook execution

```
[student1@ansible ~]$ ansible-navigator run bigip-facts.yml -m stdout -v
TASK [COLLECT BIG-IP FACTS]
*****
*****

changed: [f5] => {"changed": true, "system_info": {"base_mac_address":
"0a:54:53:51:86:fc", "chassis_serial": "685023ec-071e-3fa0-3849dcf70dff",
"hardware_information": [{"model": "Intel(R) Xeon(R) CPU E5-2676 v3 @ 2.40GHz",
"name": "cpus", "type": "base-board", "versions": [{"name": "cpu stepping",
"version": "2"}],
.
<output truncated for readability>
```

Limiting Playbook execution

Playbook execution can be limited to a subset of devices using the `--limit` flag.

```
$ ansible-navigator run bigip-facts.yml -m stdout --limit f5node1
```

Forget a flag / option ?
Just type `ansible-playbook` then press enter

Use the `--help` flag

Quick Refresher on JSON

Structured Data is easy to work with

```
"system_info": {  
    "base_mac_address": "0a:54:53:51:86:fc",  
    "chassis_serial":  
"685023ec-071e-3fa0-3849dcf70dff",  
    "product_version": "13.1.0.7",  
}
```

```
bigip_facts['system_info']['base_mac_address']
```

```
00a:54:53:51:86:fc
```

A diagram consisting of a horizontal line from the Python code block to a vertical line that ends in an upward-pointing arrow, which then points to the highlighted MAC address value in the JSON object above.

Registering the output

The register parameter is used to collect the output of a task execution. The output of the task is 'registered' in a variable which can then be used for subsequent tasks.

```
- name: COLLECT BIG-IP FACTS
  bigip_device_facts:
    gather_subset:
      - system_info
      server: "{{private_ip}}"
      user: "{{ansible_user}}"
      password: "{{ansible_ssh_pass}}"
      server_port: 8443
    register: bigip_device_facts
```

Displaying output - The "debug" module

The debug module is used like a "print" statement in most programming languages.

```
- name: DISPLAY ONLY THE MAC ADDRESS
  debug:
    var: bigip_device_facts['system_info']['base_mac_address']
```

```
TASK [DISPLAY ONLY THE MAC ADDRESS]*****
ok: [f5] => {
  "bigip_device_facts['system_info']['base_mac_address']": "0a:54:53:51:86:fc"
}
```

Limiting tasks within a play

- Tags allow the user to selectively execute tasks within a play.
- Multiple tags can be associated with a given task.
- Tags can also be applied to entire plays or roles.

```
- name: DISPLAY THE VARIABLE OUTPUT
  debug:
    var: output_variable
  tags: debug
```

Tags are invoked using the `--tags` flag while running the playbook

```
[user@ansible]$ ansible-navigator run bigip-facts.yml -m stdout --tags=debug
```

Limiting tasks within a play - or skip them!

- `--skip-tags` allows you to skip everything

```
- name: DISPLAY THE VARIABLE OUTPUT
  debug:
    var: output_variable
  tags: debugtask
```

Tags are invoked using the `--tags` flag while running the playbook

```
[user@ansible]$ ansible-navigator run bigip-facts.yml -m stdout
--skip-tags=debugtask
```

A note about variables

Other than the user defined variables, Ansible supports many inbuilt variables. For example:

Variable	Explanation
<code>ansible_*</code>	Output of fact gathering
<code>inventory_hostname</code>	magic inbuilt variable that is the name of the host as defined in inventory
<code>hostvars</code>	magic inbuilt variable dictionary variable whose key is <code>inventory_hostname</code> e.g. <code>hostvars[webserver1].my_variable</code>

Lab Time

Exercise 1.1 -Using Ansible to gather data from F5 BIG-IP

In this lab you will write your first playbook and run it to gather facts from a F5 BIG-IP load balancer.

Approximate time: 15 mins

Modules

Modules do the actual work in Ansible, they are what gets executed in each playbook task.

- Typically written in Python (but not limited to it)
- Modules are idempotent
- Modules take user input in the form of parameters

Network modules

Ansible modules for network automation typically references the vendor OS followed by the module name.

- *_facts
- *_command
- *_config

More modules depending on platform

Arista EOS = eos_*

Cisco IOS/IOS-XE = ios_*

Cisco NX-OS = nxos_*

Cisco IOS-XR = iosxr_*

F5 BIG-IP = bigip_*

F5 BIG-IQ = bigiq_*

Juniper Junos = junos_*

VyOS = vyos_*

Modules Documentation

<https://console.redhat.com/ansible/automation-hub>

The screenshot displays the Red Hat Hybrid Cloud Console interface. The top navigation bar includes the Red Hat logo and the text "Red Hat Hybrid Cloud Console". Below this, a breadcrumb trail shows the path: "Partners > f5networks > f5_modules > Documentation". The main content area is titled "f5_modules" and has tabs for "Details", "Documentation" (which is active), "Contents", and "Import log". A "Docs site" link is visible in the top right corner of the content area.

The "Documentation" tab is expanded to show a "Readme" section. The main heading is "f5networks.f5_modules". Below this, a paragraph states: "This collection includes the most recently released ansible modules for BIG-IP and BIG-IQ from F5Networks. This collection packages and distributes playbooks, roles, modules, and plugins."

The "Requirements" section lists the following dependencies:

- ansible >= 2.9
- ipaddress (python < 3.5)

The "Installation" section provides instructions on how to install the collection. It states: "To install in ansible default or defined paths use:" and provides the following command:

```
ansible-galaxy collection install f5networks.f5_modules
```

It also notes: "To specify the installation location use -p. If specifying a folder, make sure to update the `ansible.cfg` so ansible will check this folder as well." and provides the following command:

```
ansible-galaxy collection install f5networks.f5_modules -p collections/
```

For versioning, it says: "To specify the version of the collection to install, include it at the end of the collection with `==1.0.0`:" and provides the following command:

```
ansible-galaxy collection install f5networks.f5_modules==1.0.0
```

The "Semantic Versioning" section explains the versioning scheme: "Semantic Versioning examples below - Increment major (for example: x in x.y.z) version number for an incompatible API change. - Increment minor (for example: y in x.y.z) version number for new functionality in a backwards compatible manner. - Increment patch (for example: z in x.y.z) version number for backwards compatible bug fixes."

The "Deprecation Notice" section states: "Support for versions of Python earlier than 3.5 is being deprecated and will be removed at a future date."

The "Example Usage" section states: "To use a module from a collection, reference the full namespace, collection, and modules name that you want to use:"

On the left side of the console, there is a sidebar menu with the following items: "Overview", "Automation Hub" (with a dropdown arrow), "Collections", "Partners", "Repo Management", "Connect to Hub", "Automation Services Catalog", "Insights", "Reports", "Savings Planner", "Automation Calculator", "Organization Statistics", "Job Explorer", "Clusters", "Notifications", and "Documentation" (with a checkmark icon).

Modules Documentation

Documentation right on the command line

```
[user@ansible]$ ansible-navigator doc bigip_device_facts -m stdout
```

```
> BIGIP_DEVICE_FACTS (/usr/lib/python2.7/site-packages/ansible/modules/network/f5/bigip_device_facts.py)
```

Collect facts from F5 BIG-IP devices.

OPTIONS (= is mandatory):

= gather_subset

When supplied, this argument will restrict the facts returned to a given subset.

Can specify a list of values to include a larger subset.

Inventory - Revisiting Variables

```
[1b]
```

```
f5 ansible_host=34.199.128.69 ansible_user=admin private_ip=172.16.26.136  
ansible_ssh_pass=admin
```

ansible_host	34.199.128.69
ansible_user	admin
private_ip	172.16.26.136
ansible_ssh_pass	admin

Using the F5 bigip_node module

```
- name: CREATE NODES
  bigip_node:
    server: "{{private_ip}}"
    user: "{{ansible_user}}"
    password: "{{ansible_ssh_pass}}"
    server_port: "8443"
    validate_certs: "no"
    host: "{{hostvars[item].ansible_host}}"
    name: "{{hostvars[item].inventory_hostname}}"
  loop: "{{ groups['webservers'] }}"
```

Using the F5 bigip_node module

```
- name: CREATE NODES
```

```
  bigip_node:
```

```
    server: "{{private_ip}}"
```

```
    user: "{{ansible_user}}"
```

```
    password: "{{ansible_ssh_pass}}"
```

```
    server_port: "8443"
```

```
    validate_certs: "no"
```

```
    host: "{{hostvars[item].ansible_host}}"
```

```
    name: "{{hostvars[item].inventory_hostname}}"
```

```
  loop: "{{ groups['webservers'] }}"
```

Information for connecting
to F5 BIG-IP load balancer

Using the F5 bigip_node module

```
- name: CREATE NODES
  bigip_node:
    server: "{{private_ip}}"
    user: "{{ansible_user}}"
    password: "{{ansible_ssh_pass}}"
    server_port: "8443"
    validate_certs: "no"
    host: "{{hostvars[item].ansible_host}}"
    name: "{{hostvars[item].inventory_hostname}}"
  loop: "{{ groups['webservers'] }}"
```

nodes being added

- host refers to the web server IP address
- name is a human identifiable trait can be the DNS name but does not depend on it

Using the F5 bigip_node module

```
- name: CREATE NODES
  bigip_node:
    server: "{{private_ip}}"
    user: "{{ansible_user}}"
    password: "{{ansible_ssh_pass}}
    server_port: "8443"
    validate_certs: "no"
    host: "{{hostvars[item].ansible_host}}"
    name: "{{hostvars[item].inventory_hostname}}"
    loop: "{{ groups['webservers'] }}"
```

Loops over all the web servers in the **group** webservers

Lab Time

Exercise 1.2 -Adding nodes to F5 BIG-IP

In this lab you will be creating a playbook that makes use of the BIG-IP node module to add two RHEL (Red Hat Enterprise Linux) web servers as nodes for the BIG-IP load balancer.

Approximate time: 15 mins

Using the F5 bigip_pool module

```
- name: CREATE POOL
  bigip_pool:
<<login info removed for brevity>>
    name: "http_pool"
    lb_method: "round-robin"
    monitors: "/Common/http"
    monitor_type: "and_list"
```

Using the F5 bigip_pool module

```
- name: CREATE POOL
  bigip_pool:
<<login info removed for brevity>>
  name: "http_pool"
  lb_method: "round-robin"
  monitors: "/Common/http"
  monitor_type: "and_list"
```

The **name** is a user defined name that we will add nodes to in a later exercise

Using the F5 bigip_pool module

```
- name: CREATE POOL
  bigip_pool:
<<login info removed for brevity>>
    name: "http_pool"
    lb_method: "round-robin"
    monitors: "/Common/http"
    monitor_type: "and_list"
```

The **lb_method** refers to the load balancing method, a full list is provided on the module documentation

Using the F5 bigip_pool module

```
- name: CREATE POOL
  bigip_pool:
<<login info removed for brevity>>
    name: "http_pool"
    lb_method: "round-robin"
    monitors: "/Common/http"
    monitor_type: "and_list"
```

The **monitors** parameter refers to the protocol that the F5 BIG-IP load balancer will be listening on

Using the F5 bigip_pool module

```
- name: CREATE POOL
  bigip_pool:
<<login info removed for brevity>>
    name: "http_pool"
    lb_method: "round-robin"
    monitors: "/Common/http"
    monitor_type: "and_list"
```

This **monitor_type** parameter is technically the default. We can actually configure multiple monitors (protocols) simultaneously

F5 Web GUI

The screenshot displays the F5 Web GUI interface. At the top, the browser address bar shows the URL `https://34.199.128.69:8443/xui/`. The page header includes the F5 logo, the text "ONLINE (ACTIVE) Standalone", and navigation tabs for "Main", "Help", and "About". Below the header, there is a status bar with system information: Hostname: `ip-172-16-26-136.ec2.internal`, IP Address: `172.16.26.136`, Date: `Aug 3, 2018`, Time: `7:29 PM (UTC)`, User: `admin`, Role: `Administrator`, and Partition: `Common`. A "Log out" button is visible on the right.

The main content area is titled "Local Traffic » Pools : Pool List". It features a search bar and a "Create..." button. Below this is a table with the following columns: `Status`, `Name`, `Description`, `Application`, `Members`, and `Partition / Path`. The table contains one entry:

<input checked="" type="checkbox"/>	Status	Name	Description	Application	Members	Partition / Path
<input type="checkbox"/>		http_pool			0	Common

Below the table is a "Delete..." button. On the left side of the interface, there is a sidebar menu with the following items: "Statistics", "iApps", "SSL Orchestrator", "Local Traffic" (expanded), "Network Map", "Virtual Servers", "Policies", "Profiles", "Ciphers", "iRules", "Pools" (highlighted), "Nodes", "Monitors", "Traffic Class", and "Address Translation".

F5 Web GUI - Configuration

Click on the pool to get more information.
Monitor 'http' assigned to the pool.

Configuration: Basic ▾

	Active		Available
Health Monitors	/Common http	<< >>	/Common gateway_icmp http_head_f5 https https_443

Lab Time

Exercise 1.3 - Adding a load balancing pool

Demonstrate use of the BIG-IP pool module to configure a load balancing pool in BIG-IP device. A load balancing pool is a logical set of devices, such as web servers, that you group together to receive and process traffic.

Approximate time: 15 mins

Using the F5 bigip_pool_member module

```
- name: ADD POOL MEMBERS

  bigip_pool_member:
<<login info removed for brevity>>

    state: "present"

    name: "{{hostvars[item].inventory_hostname}}"

    host: "{{hostvars[item].ansible_host}}"

    port: "80"

    pool: "http_pool"

    loop: "{{ groups['webservers'] }}"
```

F5 BIG-IP Web GUI

The web servers are now configured and can be found under the Members tab of `http_pool`

Local Traffic » Pools: Pool List » http_pool

Properties Members Statistics

Load Balancing

Load Balancing Method: Round Robin

Priority Group Activation: Disabled

Update

Current Members

<input type="checkbox"/>	Status	Member	Address	Service Port	FQDN	Ephemeral	Ratio	Priority Group	Connection Limit	Partition / Path
<input type="checkbox"/>	●	host2:80	54.146.162.192	80		No	1	0 (Active)	0	Common
<input type="checkbox"/>	●	host1:80	107.22.141.4	80		No	1	0 (Active)	0	Common

Enable Disable Force Offline Remove

Parsing the output

JSON Query Filters:

https://docs.ansible.com/ansible/latest/user_guide/playbooks_filters.html#json-query-filter

```
. . .<<Get output using bigip_device_facts and store in variable>>

- name: "View complete output"
  debug: "msg={{bigip_device_facts}}"

- name: "Show members belonging to pool"
  debug: "msg={{item}}"
  loop: "{{bigip_device_facts.ltm_pools | json_query(query_string)}}"
  vars:
    query_string: "[?name=='http_pool'].members[*].name[]"
```

Lab Time

Exercise 1.4 -Adding members to a pool on F5

Demonstrate use of the BIG-IP pool member module to tie web server nodes into the load balancing pool `http_pool` created in the previous exercises.

Approximate time: 15 mins

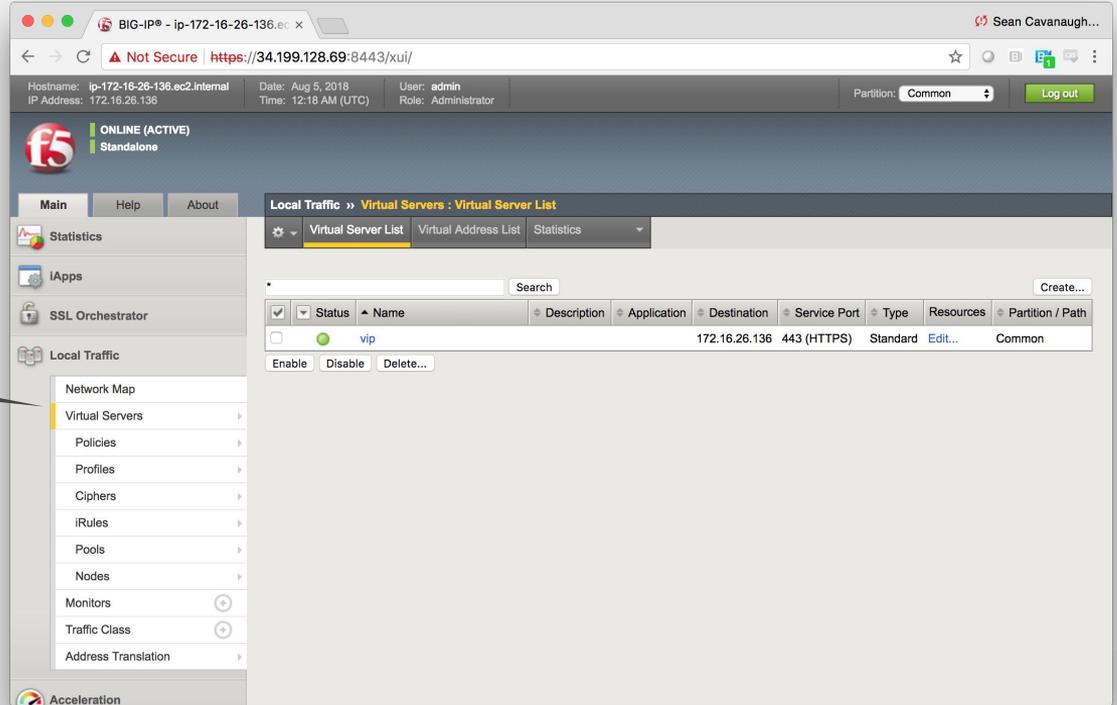
Using the F5 bigip_virtual_server module

```
- name: ADD VIRTUAL SERVER

  bigip_virtual_server:
<<login info removed for brevity>>
    name: "vip"
    destination: "{{private_ip}}"
    port: "443"
    enabled_vlans: "all"
    all_profiles: ['http', 'clientssl', 'oneconnect']
    pool: "http_pool"
    snat: "Automap"
```

F5 BIG-IP Web GUI

The virtual server can be found under Local Traffic -> Virtual Servers



The screenshot displays the F5 BIG-IP Web GUI interface. The browser address bar shows the URL `https://34.199.128.69:8443/xui/`. The page header includes system information: Hostname: `ip-172-16-26-136.ec2.internal`, IP Address: `172.16.26.136`, Date: `Aug 5, 2018`, Time: `12:18 AM (UTC)`, User: `admin`, Role: `Administrator`, and Partition: `Common`. The main navigation menu includes `Main`, `Help`, and `About`. The left sidebar contains a tree view with categories: `Statistics`, `iApps`, `SSL Orchestrator`, `Local Traffic`, and `Acceleration`. The `Local Traffic` category is expanded, showing sub-items: `Network Map`, `Virtual Servers`, `Policies`, `Profiles`, `Clphers`, `iRules`, `Pools`, `Nodes`, `Monitors`, `Traffic Class`, and `Address Translation`. The `Virtual Servers` sub-item is selected, displaying a table of virtual servers. The table has columns: `Status`, `Name`, `Description`, `Application`, `Destination`, `Service Port`, `Type`, `Resources`, and `Partition / Path`. A single virtual server is listed with the name `vip`, destination `172.16.26.136`, service port `443 (HTTPS)`, and type `Standard`. Below the table are buttons for `Enable`, `Disable`, and `Delete...`. The top right corner of the interface shows a `Log out` button.

Status	Name	Description	Application	Destination	Service Port	Type	Resources	Partition / Path
<input type="checkbox"/>	vip			172.16.26.136	443 (HTTPS)	Standard		Common

Lab Time

Exercise 1.5 - Adding a virtual server

Demonstrate use of the BIG-IP virtual server module to create a VIP (virtual IP). The VIP will be tied to the `http_pool` created in earlier exercises. Use a web browser to demonstrate the F5 load balancing between `host1` and `host2`.

Approximate time: 15 mins

Using the F5 bigip_irule module

```
vars:
  irules: ['irule1','irule2']

tasks:
- name: ADD iRules
  bigip_irule:
    <<login info removed for brevity>>
    module: "ltm"
    name: "{{item}}"
    content: "{{lookup('file','{{item}}')}}"
    with_items: "{{irules}}"
```

Lab Time

Exercise 1.6 -Adding a iRule

Demonstrate use of the BIG-IP irule module to upload irules to the BIG-IP and then attach those iRules to the Virtual Server created earlier .

Approximate time: 15 mins

Using the F5 bigip_config module

```
- name: SAVE RUNNING CONFIG ON BIG-IP
```

```
bigip_config:
```

```
  server: "{{private_ip}}"
```

```
  user: "{{ansible_user}}"
```

```
  password: "{{ansible_ssh_pass}}"
```

```
  server_port: "8443"
```

```
  validate_certs: "no"
```

```
  save: yes
```

Lab Time

Exercise 1.7 - Saving running configuration

Demonstrate use of the BIG-IP config module to save the running BIG-IP configuration to disk

Approximate time: 15 mins

Using Provider

Use `provider` to avoid setting the connection details in every module, set it as a fact once as a task and then re-use it.

```
- provider
```

```
  A dict object containing connection details.
```

```
  suboptions:
```

```
    password:
```

```
      server:
```

```
        server_port:
```

```
      user:
```

```
        validate_certs:
```

```
    <<not a complete list>>
```

Using Provider Example

```
tasks:  
  - name: Setup provider  
    set_fact:  
      provider:  
        server: "{{private_ip}}"  
        user: "{{ansible_user}}"  
        password: "{{ansible_ssh_pass}}"  
        server_port: "8443"  
        validate_certs: "no"
```

```
- name: Query BIG-IP facts  
  bigip_device_facts:  
    provider: "{{provider}}"  
    gather_subset:  
      - ltm-pools  
    register: bigip_facts  
  
- name: SAVE RUNNING CONFIG  
  bigip_config:  
    provider: "{{provider}}"  
    save: yes
```

Operational Automation

- Dynamically grab node information from F5 BIG-IP
 - What pools are present?
 - What pool members are part of the pools and what are their IP addresses and Port numbers?
- Disable particular pool member or all pool members
- Verify with Web UI and Ansible Playbooks

Lab Time

Exercise 2.0 - Disabling a pool member

Demonstrate disabling of a node member:port from the pool.

Approximate time: 25 mins

Deleting with the F5 bigip_node module

```
- name: DELETE NODES

bigip_node:
  server: "{{private_ip}}"
  user: "{{ansible_user}}"
  password: "{{ansible_ssh_pass}}"
  server_port: "8443"
  validate_certs: "no"
  name: "{{item}}"
  state: absent
```

Using the **state** parameter with **absent**, the module will make sure the specified configuration is not existent (deleted)

Lab Time

Exercise 2.1 - Deleting F5 BIG-IP Configuration

Demonstrate use of the Ansible state parameter for modules. The state parameter will remove a configuration from the F5 BIG-IP load balancer.

Approximate time: 15 mins

Block

```
- name: BLOCK
```

```
  block:
```

```
    - debug:
```

```
      msg: 'Task 1!'
```

```
    - debug:
```

```
      msg: 'Task 2!'
```

```
    - debug:
```

```
      msg: 'Task 3!'
```

Block

```
- name: BLOCK

block:
  - debug:
      msg: 'Task 1!'
  - debug:
      msg: 'Task 2!'

when:
  - '"Xeon" in check_model'
  - '"E5-2670" in check_model'
```

Block - Rescue

```
- name: Attempt and graceful roll back demo
  block:
    - debug:
        msg: 'I execute normally'
    - command: /bin/false
    - debug:
        msg: 'I never execute, due to the above task failing'
  rescue:
    - debug:
        msg: 'I caught an error'
    - command: /bin/false
    - debug:
        msg: 'I also never execute :-('
```

Block - Rescue

What happens when?

- If a task fails in the block, it will immediately go to **rescue**.
- If there is no **rescue** stanza, the Playbook will stop executing for the host it failed on.
- If there is a **rescue** stanza, the tasks under the rescue stanza will execute.
 - If any tasks under **rescue** fail, the Playbook will stop executing for the host it failed on.
 - If everything executes successfully under the **rescue** the Playbook will continue on like no failures happened. The failure will be recorded in the Play Recap.

Lab Time

Exercise 2.2 - Advanced: Error Handling

Demonstrate the use of the block and the rescue functionality for Ansible Playbooks. This exercise will also tie the previous exercises into one holistic Playbook.

Approximate time: 30 mins

Roles

Roles are Playbooks

- Roles help simplify playbooks.
- Think of them as callable functions for repeated tasks.
- Roles can be distributed/shared; similar to libraries.

Example Playbook

```
# site.yml
---
- hosts: DC
  roles:
    - add_node
    - add_vip
```

Directory Structure

```
site.yml
roles/
  add_node/
    tasks/
      main.yml
  add_vip/
    tasks/
      main.yml
```

Roles - really simple, but powerful

Playbook

```
# site.yml
---
- hosts: routers
  roles:
    - add_node
    - add_vip
```

File Structure

```
add_node/
  tasks/
  main.yml
add_vip/
  tasks/
  main.yml
```

Tasks

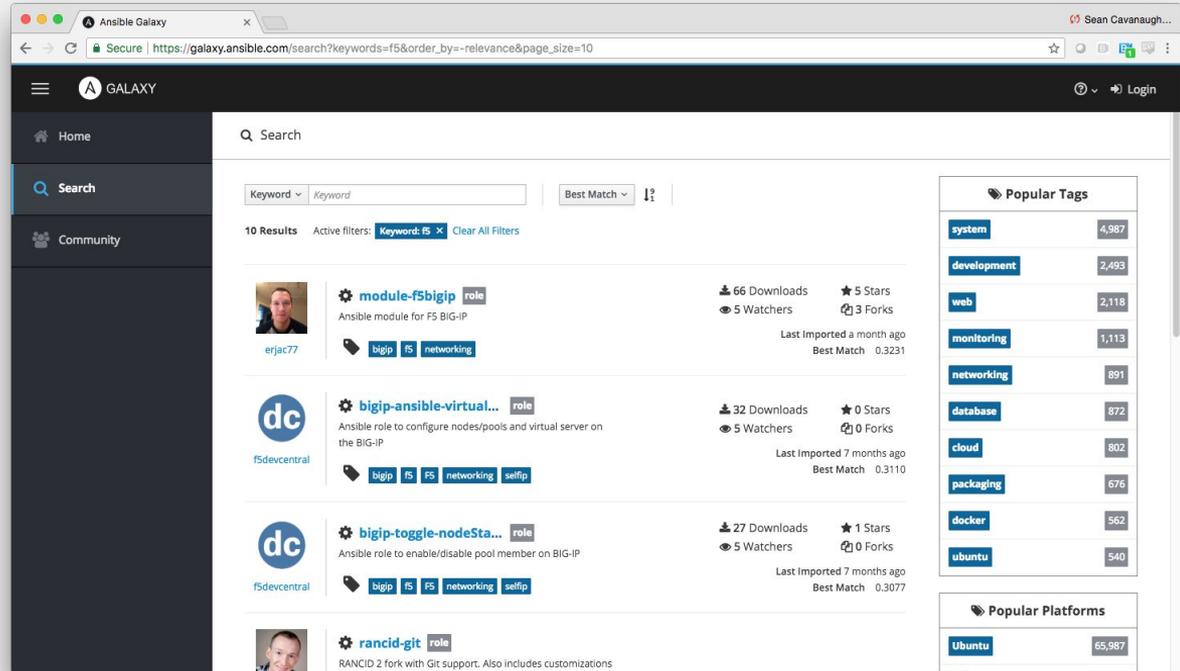
```
- name: CREATE NODES
  bigip_node:
  <<output removed for brevity>>
```

```
- name: ADD VIRTUAL SERVER
  bigip_virtual_server:
  <<output removed for brevity>>
```

Ansible Galaxy

<http://galaxy.ansible.com>

- Ansible Galaxy is a hub for finding, reusing and sharing Ansible roles.
- Jump-start your automation project with content contributed and reviewed by the Ansible community.



The screenshot shows the Ansible Galaxy search results page for the keyword 'fs'. The page displays 10 results, with the first three visible. Each result includes the role name, a brief description, and statistics such as downloads, watchers, stars, and forks. The results are sorted by best match.

Role Name	Description	Downloads	Watchers	Stars	Forks	Last Imported	Best Match
erjac77	Ansible module for FS BIG-IP	66	5	5	3	a month ago	0.3231
fsdecentral	Ansible role to configure nodes/pools and virtual server on the BIG-IP	32	5	0	0	7 months ago	0.3110
fsdecentral	Ansible role to enable/disable pool member on BIG-IP	27	5	1	0	7 months ago	0.3077

Popular Tags:

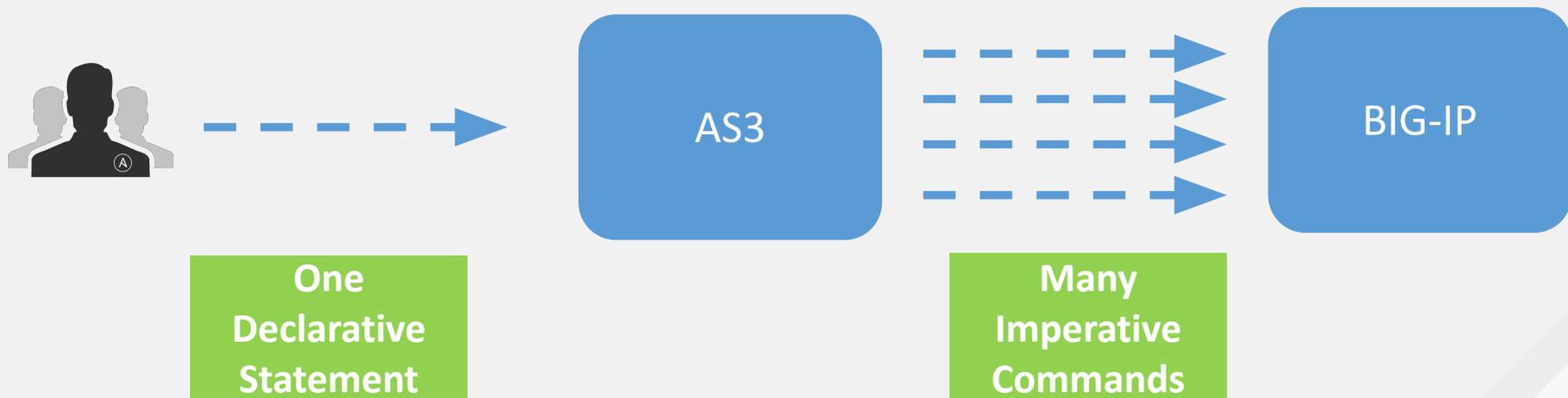
system	4,987
development	2,493
web	2,118
monitoring	1,113
networking	891
database	872
cloud	802
packaging	676
docker	562
ubuntu	540

Popular Platforms:

Ubuntu	65,987
--------	--------

App Services 3 Extension (AS3)

The Application Services 3 Extension uses a declarative model, meaning you send a declaration file using a single Rest API call.



Simple JSON

- Declaration not ordered, nor sequenced
- Variables can be used easily within the AS3 template
- Incremental Declaration capable

```
"web_app": {
  "class": "Application",
  "template": "http",
  "serviceMain": {
    "class": "Service_HTTP",
    "virtualAddresses": [
      "{{private_ip}}"
    ],
    "pool": "app_pool"
  },
  "app_pool": {
    "class": "Pool",
    "monitors": [
      "http"
    ],
    "members": [
<<snippet, output removed for brevity>>>
```

Pushing a Template

Module coming in Ansible 2.7 (Today!)

```
- name: PUSH AS3
  uri:
    url: "https://{{ ansible_host }}:8443/mgmt/shared/appsvcs/declare"
    method: POST
    body: "{{ lookup('template','j2/tenant_base.j2', split_lines=False) }}"
    status_code: 200
    timeout: 300
    body_format: json
    force_basic_auth: yes
    user: "{{ ansible_user }}"
    password: "{{ ansible_ssh_pass }}"
    validate_certs: no
```

Lab Time

Exercise 3.0 - Intro to AS3

Demonstrate building a virtual server (exactly like the Section 1 Ansible F5 Exercises) with F5 AS3

Approximate time: 15 mins

Lab Time

Exercise 3.1 - Operational Change with AS3

Demonstrate changing an existing Web Application AS3 template. There is a problem with the existing template, the serviceMain is showing red. What is wrong?

Approximate time: 15 mins

Lab Time

Exercise 3.2 - Deleting a Web Application

Demonstrate deleting a Web Application with AS3 and the uri module.

Approximate time: 15 mins

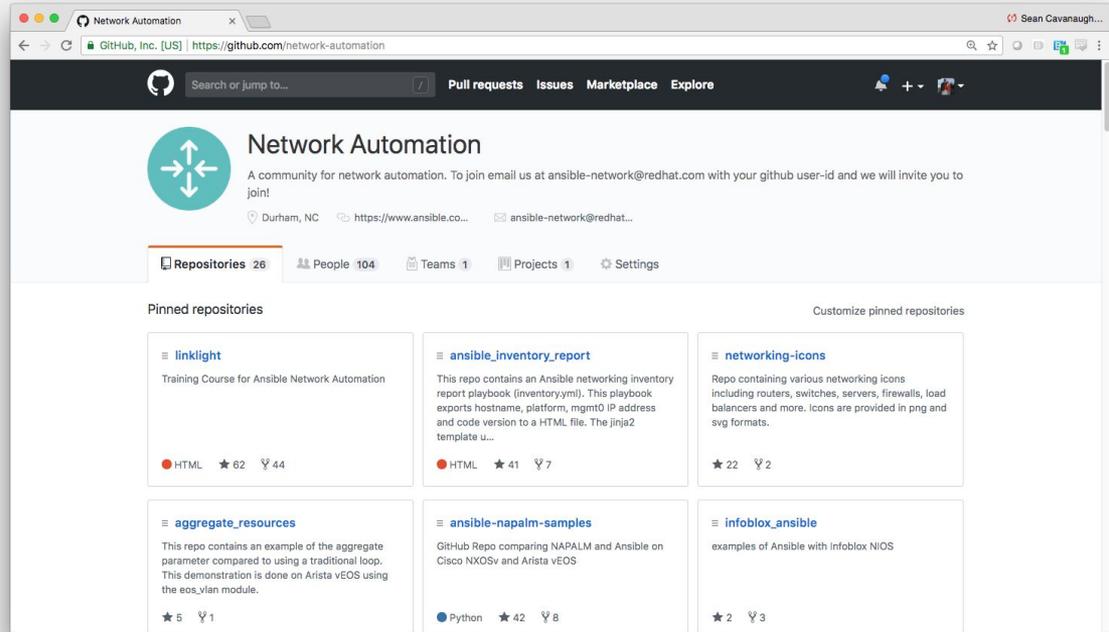
Next Steps

Thanks so much for joining the class. Here are some next steps on how to get more information and join the community!

Bookmark the GitHub Project

<https://www.github.com/network-automation>

- Examples, samples and demos
- Run network topologies right on your laptop



Chat with us

Engage with the community

- **Slack**

<https://ansiblenetwork.slack.com>

Join by clicking here <https://bit.ly/2OfNEBr>

- **IRC**

#ansible-network on freenode

<http://webchat.freenode.net/?channels=ansible-network>

Next Steps

- It's easy to get started
<https://ansible.com/get-started>
- Learn about Ansible & F5
<https://ansible.com/f5>
- Instructor Led Classes
Class DO457: Ansible for Network Automation
<https://red.ht/2MiAqvA>

