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Ansible Automation Platform

Ansible Linux Automation Workshop

Introduction to Ansible for Red Hat Enterprise Linux Automation for System Administrators and Operators

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What you will learn

- Overview of public cloud provisioning
- Converting shell commands into Ansible commands
- Retrieving information from hosts
- Deploying applications at scale
- Self-service IT via surveys
- Overview of System Roles for Red Hat Enterprise Linux
- Overview of Red Hat Insights integration

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Introduction

Topics Covered:

- What is the Ansible Automation Platform?
- What can it do?

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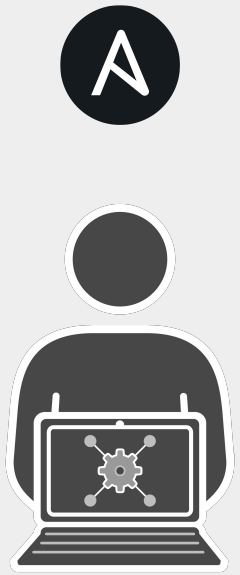

Automation happens when one person meets a problem they never want to solve again

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Ad-hoc Automation is happening in silos

Developers

Ansible used in silo

Security

DIY scripting automation

Infrastructure

Open source config management tool

Network

Proprietary vendor supplied automation

Is organic automation enough?

Teams are automating...

Lines Of Business

Network

Security

Operations

Developers

Infrastructure

Why Ansible?

Simple

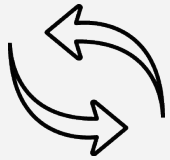
Human readable automation

No special coding skills needed

Tasks executed in order

Usable by every team

Get productive quickly



Powerful

App deployment

Configuration management

Workflow orchestration

Network automation

Orchestrate the app lifecycle

Agentless

Agentless architecture

Uses OpenSSH & WinRM

No agents to exploit or update

Get started immediately

More efficient & more secure

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What can I do using Ansible?

Automate the deployment and management of your entire IT footprint.

Do this...

- Orchestration
- Configuration Management
- Application Deployment
- Provisioning
- Continuous Delivery
- Security and Compliance

On these...

- Firewalls
- Load Balancers
- Applications
- Containers
- Clouds
- Servers
- Infrastructure
- Storage
- Network Devices
- **And more...**

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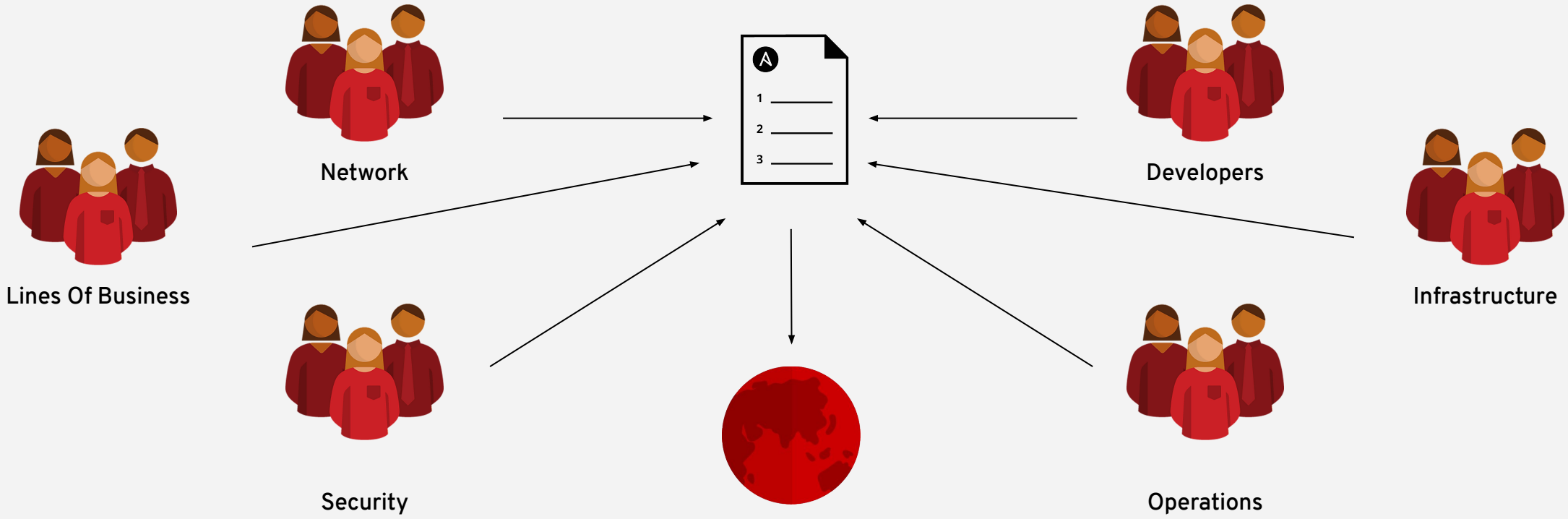
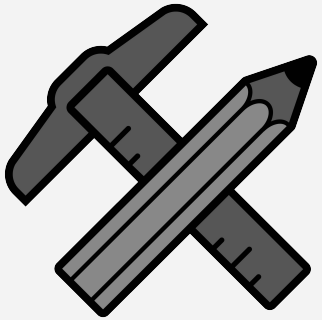
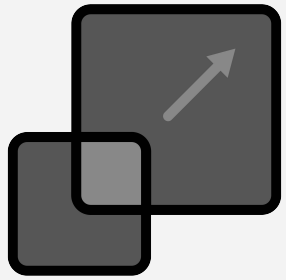
When automation crosses teams, you need an automation platform



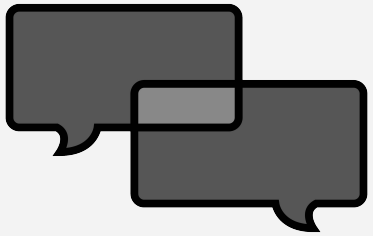
A platform can help you:



Create



Scale



Engage

Red Hat Ansible Automation Platform

Network | Lines of business | Security | Operations | Infrastructure | Developers

Engage	**Ansible Hosted Services:** Engage users with an automation focused experience
Scale	**Ansible Tower:** Operate & control at scale
Create	**Ansible Engine:** Universal language of automation

Fueled by an open source community

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Ansible automates technologies you use

Time to automate is measured in minutes

Cloud

AWS
Azure
Digital Ocean
Google
OpenStack
Rackspace
+more

Operating Systems

RHEL
Linux
Windows
+more

Virt & Container

Docker
VMware
RHV
OpenStack
OpenShift
+more

Storage

Netapp
Red Hat Storage
Infinidat
+more

Windows

ACLs
Files
Packages
IIS
Regedits
Shares
Services
Configs
Users
Domains
+more

Network

A10
Arista
Aruba
Cumulus
Bigswitch
Cisco
Dell
Extreme
F5
Lenovo
MikroTik
Juniper
OpenSwitch
+more

Security

Checkpoint
Cisco
CyberArk
F5
Fortinet
Juniper
IBM
Palo Alto
Snort
+more

Monitoring

Dynatrace
Datadog
LogicMonitor
New Relic
Sensu
+more

Devops

Jira
GitHub
Vagrant
Jenkins
Slack
+more

Red Hat Ansible Tower

by the numbers:

94% Reduction in recovery time following a security incident

84% Savings by deploying workloads to generic systems appliances using Ansible Tower

67% Reduction in man hours required for customer deliveries

Financial summary:

146%

ROI on Ansible Tower

<3 MONTHS

Payback on Ansible Tower

SOURCE: *"The Total Economic Impact™ Of Red Hat Ansible Tower, a June 2018 commissioned study conducted by Forrester Consulting on behalf of Red Hat."*
redhat.com/en/engage/total-economic-impact-ansible-tower-20180710

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Cloud

Topics Covered:

- Understanding the Ansible Infrastructure
- Check the prerequisites

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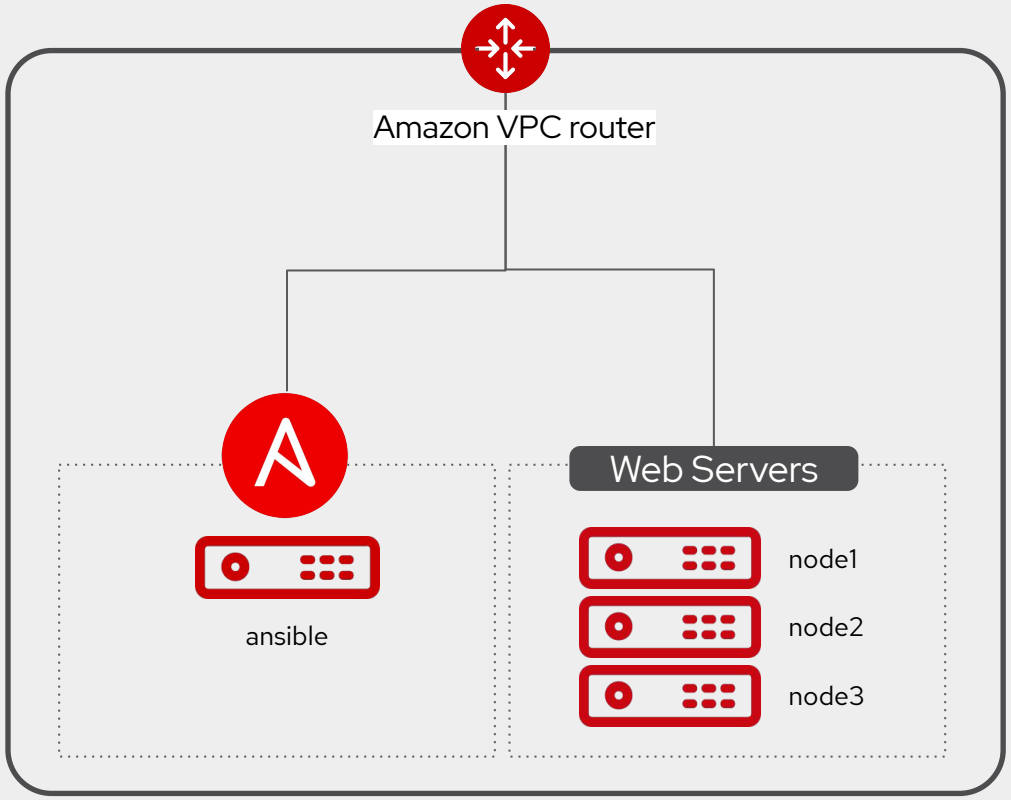
The lab environment today

- **Drink our own champagne.**
  Provisioned by, configured by, and managed by Red Hat Ansible Automation Platform.
  https://github.com/ansible/workshops

- **Learn with the real thing**
  Every student will have their own fully licensed Red Hat Ansible Tower control node. No emulators or simulators here.

- **Red Hat Enterprise Linux**
  All four nodes are enterprise Linux, showcasing real life use-cases to help spark ideas for what you can automate today.

Workbench Topology



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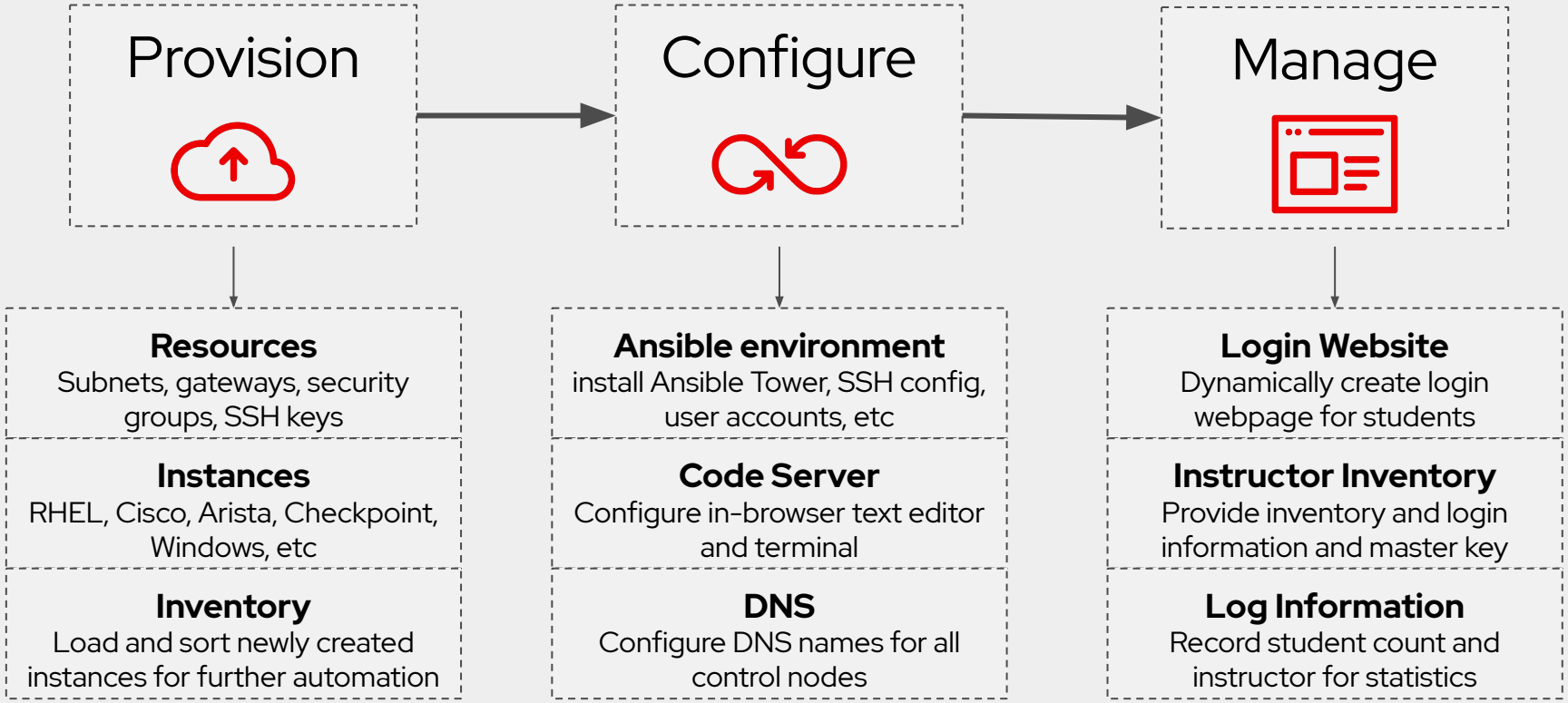
How does it work?



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Exercise 1

Topics Covered:

- Understanding the Ansible Infrastructure
- Check the prerequisites

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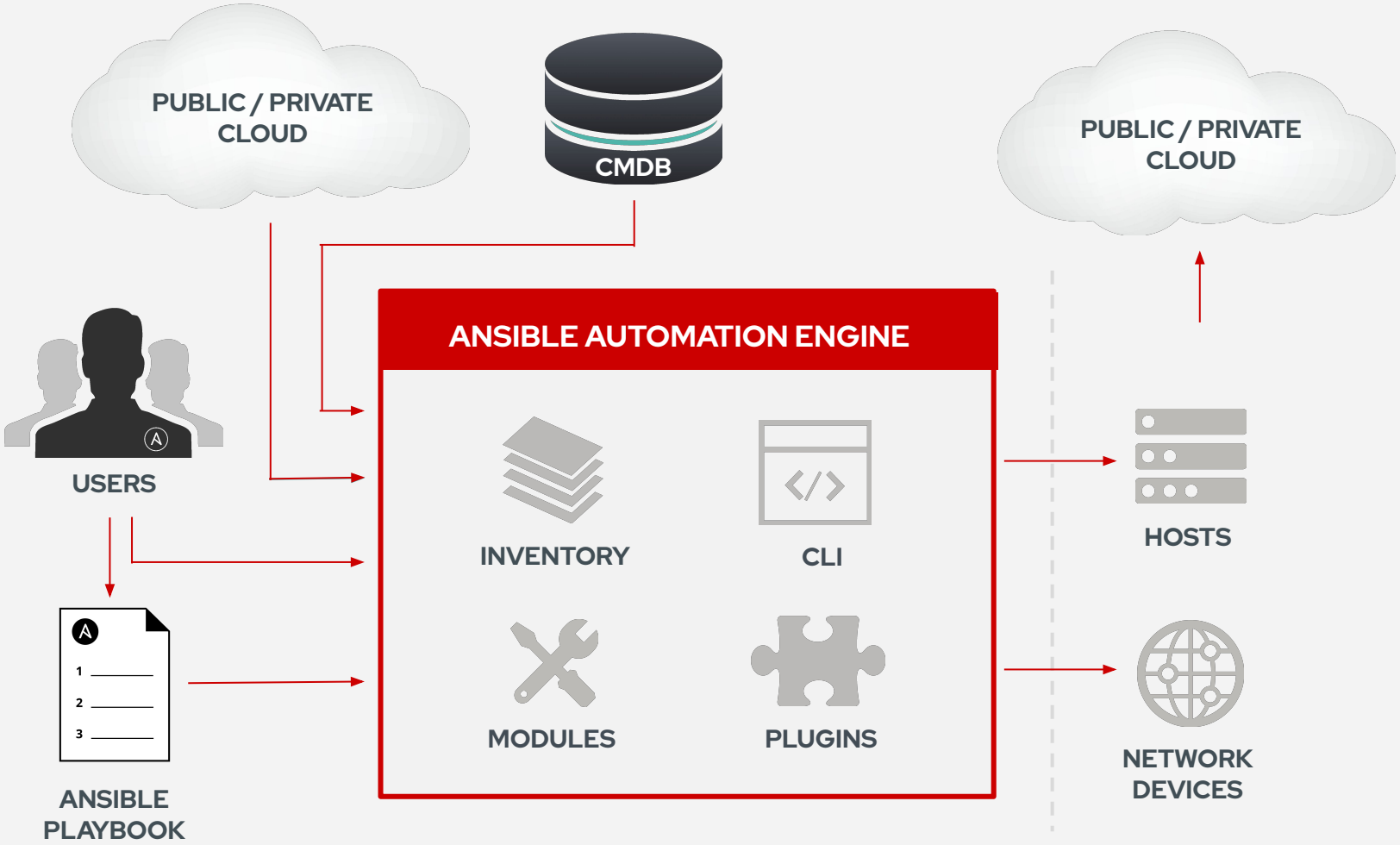
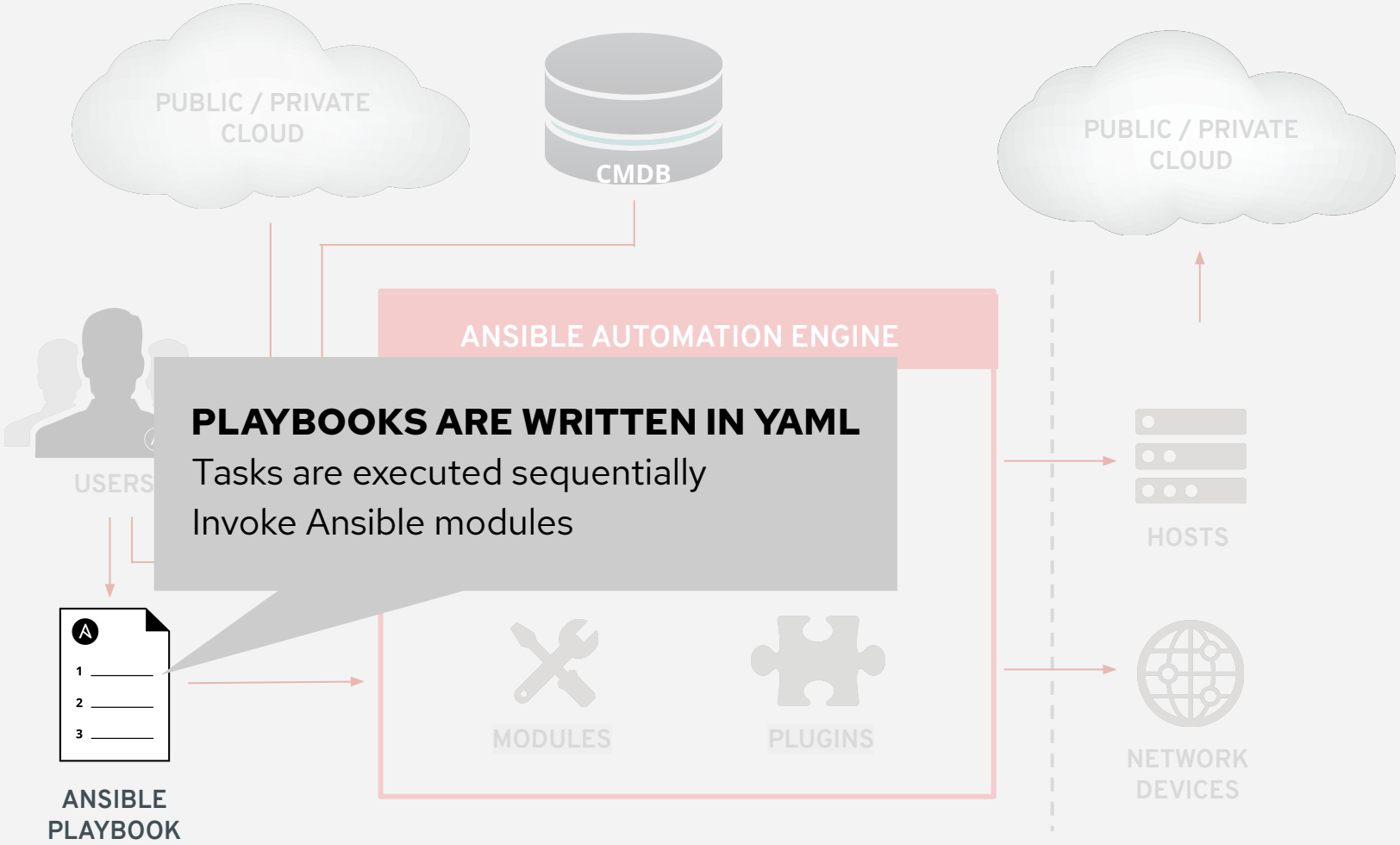

PUBLIC / PRIVATE CLOUD
CMDB
PUBLIC / PRIVATE CLOUD
ANSIBLE AUTOMATION ENGINE
USERS
INVENTORY
CLI
HOSTS
MODULES
PLUGINS
NETWORK DEVICES
ANSIBLE PLAYBOOK

Red Hat



PLAYBOOKS ARE WRITTEN IN YAML

Tasks are executed sequentially

Invoke Ansible modules

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```yaml
---
- name: install and start apache
  hosts: web
  become: yes

  tasks:
    - name: httpd package is present
      yum:
        name: httpd
        state: latest

    - name: latest index.html file is present
      template:
        src: files/index.html
        dest: /var/www/html/

    - name: httpd is started
      service:
        name: httpd
        state: started
```

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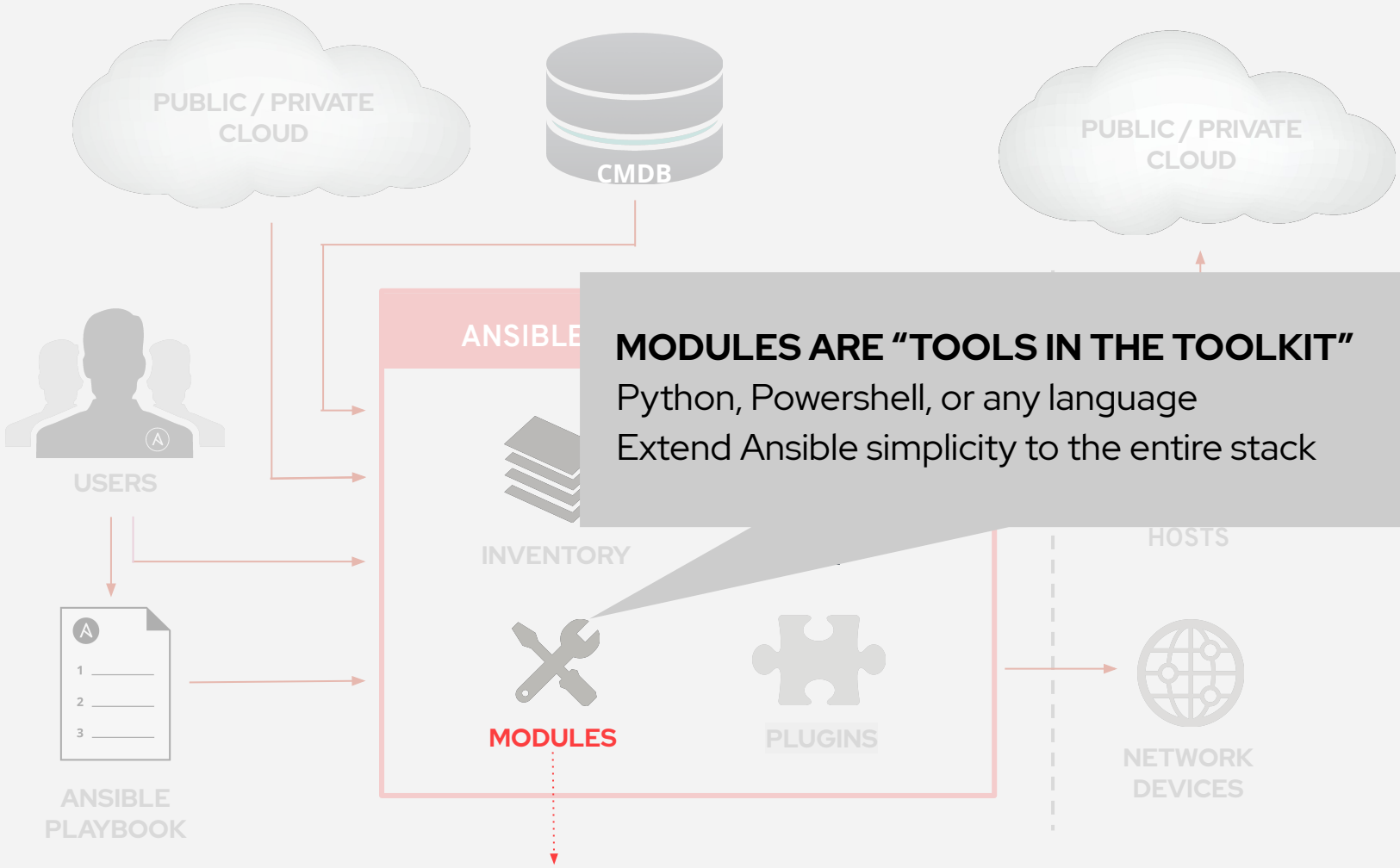


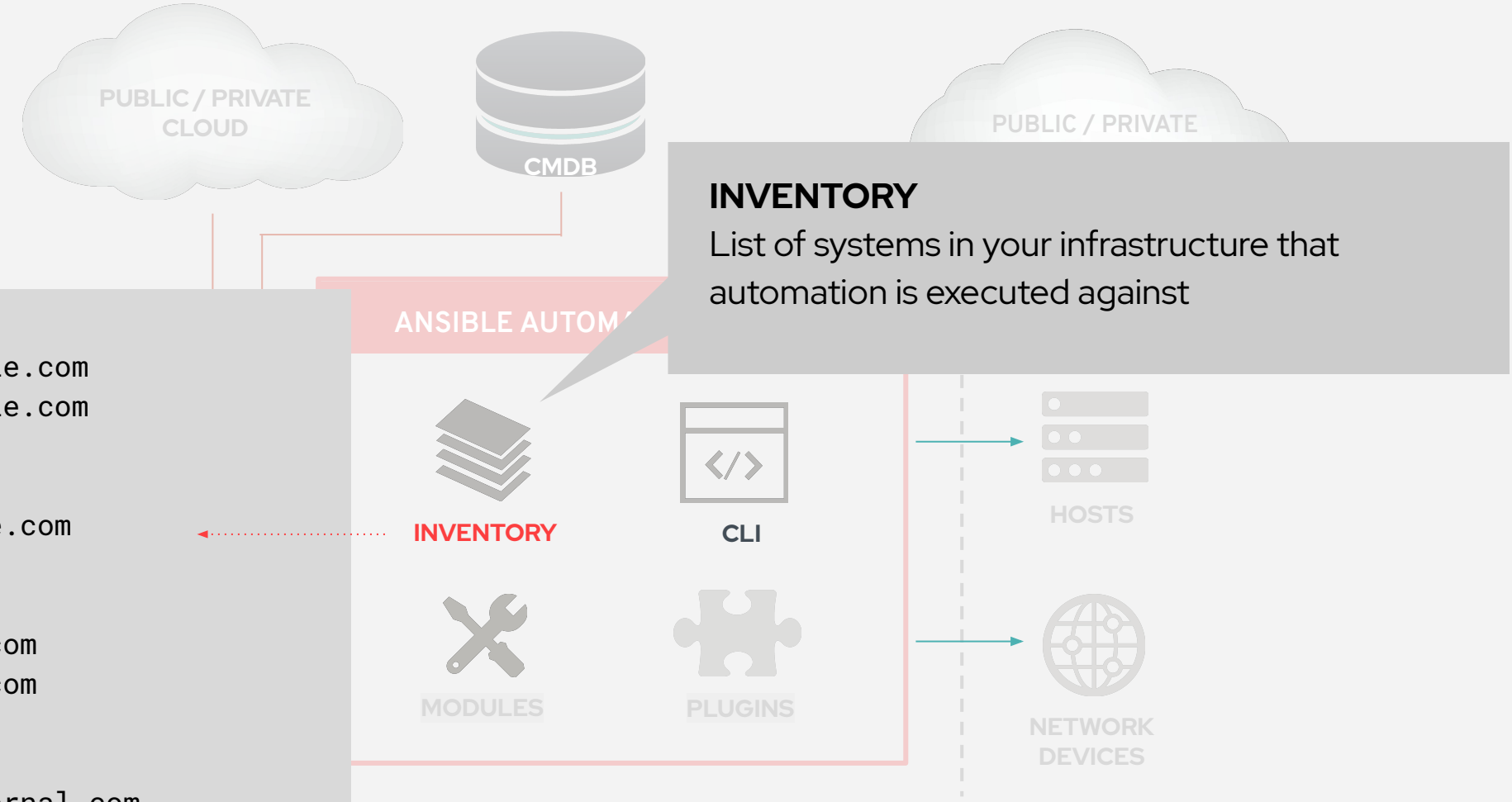
MODULES ARE "TOOLS IN THE TOOLKIT"

Python, Powershell, or any language

Extend Ansible simplicity to the entire stack

```
- name: latest index.html file is present
  template:
    src: files/index.html
    dest: /var/www/html/
```

Red Hat



INVENTORY

List of systems in your infrastructure that automation is executed against

```
[web]
webserver1.example.com
webserver2.example.com

[db]
dbserver1.example.com

[switches]
leaf01.internal.com
leaf02.internal.com

[firewalls]
checkpoint01.internal.com

[lb]
f5-01.internal.com
```

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LINUX AUTOMATION

150+

Linux Modules

AUTOMATE EVERYTHING LINUX

Red Hat Enterprise Linux, BSD, Debian, Ubuntu and many more!

ONLY REQUIREMENTS:
Python 2 (2.6 or later)
***or* Python 3 (3.5 or later)**

ansible.com/get-started

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Lab Time

Complete exercise **1-setup** now in your lab environment

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Exercise 2

Topics Covered:

- Ansible inventories
- Main Ansible config file
- Modules and ad-hoc commands

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Inventory

- Ansible works against multiple systems in an inventory
- Inventory is usually file based
- Can have multiple groups
- Can have variables for each group or even host

Understanding Inventory - Basic

```
node1
node2
node3
ansible
10.20.30.40
```

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Understanding Inventory - Basic

```
[web]
node1 ansible_host=3.22.77.141
node2 ansible_host=3.15.193.71
node3 ansible_host=3.15.1.72

[control]
ansible ansible_host=18.217.162.148
```

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Understanding Inventory - Variables

```
[all:vars]
ansible_user=student1
ansible_ssh_pass=ansible1234
ansible_port=22

[web]
node1 ansible_host=3.22.77.141
node2 ansible_host=3.15.193.71
node3 ansible_host=3.15.1.72

[control]
ansible ansible_host=18.217.162.148
```

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First Ad-Hoc Command: ping

- Single Ansible command to perform a task quickly directly on command line
- Most basic operation that can be performed
- Here: an example Ansible ping - not to be confused with ICMP

```
$ ansible all -m ping
```

Ad-Hoc Commands `ping`

```
# Check connections (submarine ping, not ICMP)
[user@ansible] $ ansible all -m ping

node1 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python":
"/usr/bin/python"
    },
    "changed": false,
    "ping": "pong"
}
```

Bash vs. Ansible

```bash
echo Running mssql-conf setup...
sudo
MSSQL_SA_PASSWORD=$MSSQL_SA_PASSWORD \
   MSSQL_PID=$MSSQL_PID \
   /opt/mssql/bin/mssql-conf -n setup accept-eula


echo 'export PATH="$PATH:/opt/mssql-tools/bin"' >>
~/.bash_profile
echo 'export PATH="$PATH:/opt/mssql-tools/bin"' >>
~/.bashrc
source ~/.bashrc
```

```yaml
- name: Run mssql-conf setup
  command: /opt/mssql/bin/mssql-conf -n setup
accept-eula
  environment:
   - MSSQL_SA_PASSWORD: "{{ MSSQL_SA_PASSWORD }}"
   - MSSQL_PID: "{{ MSSQL_PID }}"
  when: install is changed

- name: Add mssql-tools to $PATH
  lineinfile:
    path: "{{ item }}"
    line: export PATH="$PATH:/opt/mssql-tools/bin"
  loop:
    - ~/.bash_profile
    - ~/.bashrc
```

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Lab Time

Complete exercise **2-adhoc** now in your lab environment

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Exercise 3

Topics Covered:

- Playbooks basics
- Running a playbook

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An Ansible Playbook

A play

```yaml
---
- name: install and start apache
  hosts: web
  become: yes

  tasks:
    - name: httpd package is present
      yum:
        name: httpd
        state: latest

    - name: latest index.html file is present
      template:
        src: files/index.html
        dest: /var/www/html/

    - name: httpd is started
      service:
        name: httpd
        state: started
```

An Ansible Playbook

A task

```
---
- name: install and start apache
  hosts: web
  become: yes

  tasks:
    - name: httpd package is present
      yum:
        name: httpd
        state: latest

    - name: latest index.html file is present
      template:
        src: files/index.html
        dest: /var/www/html/

    - name: httpd is started
      service:
        name: httpd
        state: started
```

An Ansible Playbook

module

```yaml
---
- name: install and start apache
  hosts: web
  become: yes

  tasks:
    - name: httpd package is present
      yum:
        name: httpd
        state: latest

    - name: latest index.html file is present
      template:
        src: files/index.html
        dest: /var/www/html/

    - name: httpd is started
      service:
        name: httpd
        state: started
```

Running an Ansible Playbook:

The most important colors of Ansible

```
A task executed as expected, no change was made.

A task executed as expected, making a change

A task failed to execute successfully
```


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Running an Ansible Playbook

```
[user@ansible] $ ansible-playbook apache.yml

PLAY [webservers] ***************************************************************

TASK [Gathering Facts] **********************************************************
ok: [web2]
ok: [web1]
ok: [web3]

TASK [Ensure httpd package is present] ******************************************
changed: [web2]
changed: [web1]
changed: [web3]

TASK [Ensure latest index.html file is present] *********************************
changed: [web2]
changed: [web1]
changed: [web3]

TASK [Restart httpd] ************************************************************
changed: [web2]
changed: [web1]
changed: [web3]

PLAY RECAP **********************************************************************
web2                    : ok=1    changed=3 unreachable=0   failed=0
web1                    : ok=1    changed=3 unreachable=0   failed=0
web3                    : ok=1    changed=3 unreachable=0   failed=0
```


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Lab Time

Complete exercise **3-playbooks** now in your lab environment

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Exercise 4

Topics Covered:

- Working with variables
- What are facts?

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An Ansible Playbook Variable Example

```yaml
---
- name: variable playbook test
  hosts: localhost

  vars:
    var_one: awesome
    var_two: ansible is
    var_three: "{{ var_two }} {{ var_one }}"

  tasks:

    - name: print out var_three
      debug:
        msg: "{{var_three}}"
```

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An Ansible Playbook Variable Example

```yaml
---
- name: variable playbook test
  hosts: localhost

  vars:
    var_one: awesome
    var_two: ansible is
    var_three: "{{ var_two }} {{ var_one }}"

  tasks:

    - name: print out var_three
      debug:
        msg: "{{var_three}}"
```

ansible is awesome

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Facts

- Structured data in the form of Ansible variables
- Information is capture from the host
- Ad-hoc command **setup** will show facts

```
  "ansible_facts": {
      "ansible_default_ipv4": {
          "address": "10.41.17.37",
          "macaddress": "00:69:08:3b:a9:16",
          "interface": "eth0",
...
```

Ansible Variables and Facts

```yaml
---
- name: Output facts within a playbook
  hosts: all

  tasks:

    - name: Prints Ansible facts
      debug:
        msg: "The default IPv4 address of {{ ansible_fqdn }}
              is {{ ansible_default_ipv4.address }}"
```

```
TASK [Prints Ansible facts] ***********************************************
ok: [node3] =>
  msg: The default IPv4 address of node3 is 172.16.63.104
ok: [node1] =>
  msg: The default IPv4 address of node1 is 172.16.178.80
ok: [node2] =>
  msg: The default IPv4 address of node2 is 172.16.166.120
ok: [ansible] =>
  msg: The default IPv4 address of student1.sean-may4.rhdemo.io is 172.16.86.242
```

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Ansible Inventory - Managing Variables In Files

```
$ tree ansible-files/

├── deploy_index_html.yml
├── files
│   ├── dev_web.html
│   └── prod_web.html
├── group_vars
│   └── web.yml
└── host_vars
    └── node2.yml
```


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Ansible Inventory - Managing Variables In Files

```
├──
deploy_index_html.yml
├── files
│   ├── dev_web.html
│   └── prod_web.html
├── group_vars
│   └── web.yml
└── host_vars
    └── node2.yml
```

```
$ cat group_vars/web.yml
---
stage: dev
```

```
$ cat host_vars/node2.yml
---
stage: prod
```

```yml
- name: copy web.html
  copy:
    src: "{{ stage }}_web.html"
    dest: /var/www/html/index.html
```

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Lab Time

Complete exercise **4-variables** now in your lab environment

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Exercise 5

Topics Covered:

- Surveys

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Surveys

Tower surveys allow you to configure how a job runs via a series of questions, making it simple to customize your jobs in a user-friendly way.

An Ansible Tower survey is a simple question-and-answer form that allows users to customize their job runs. Combine that with Tower's role-based access control, and you can build simple, easy self-service for your users.

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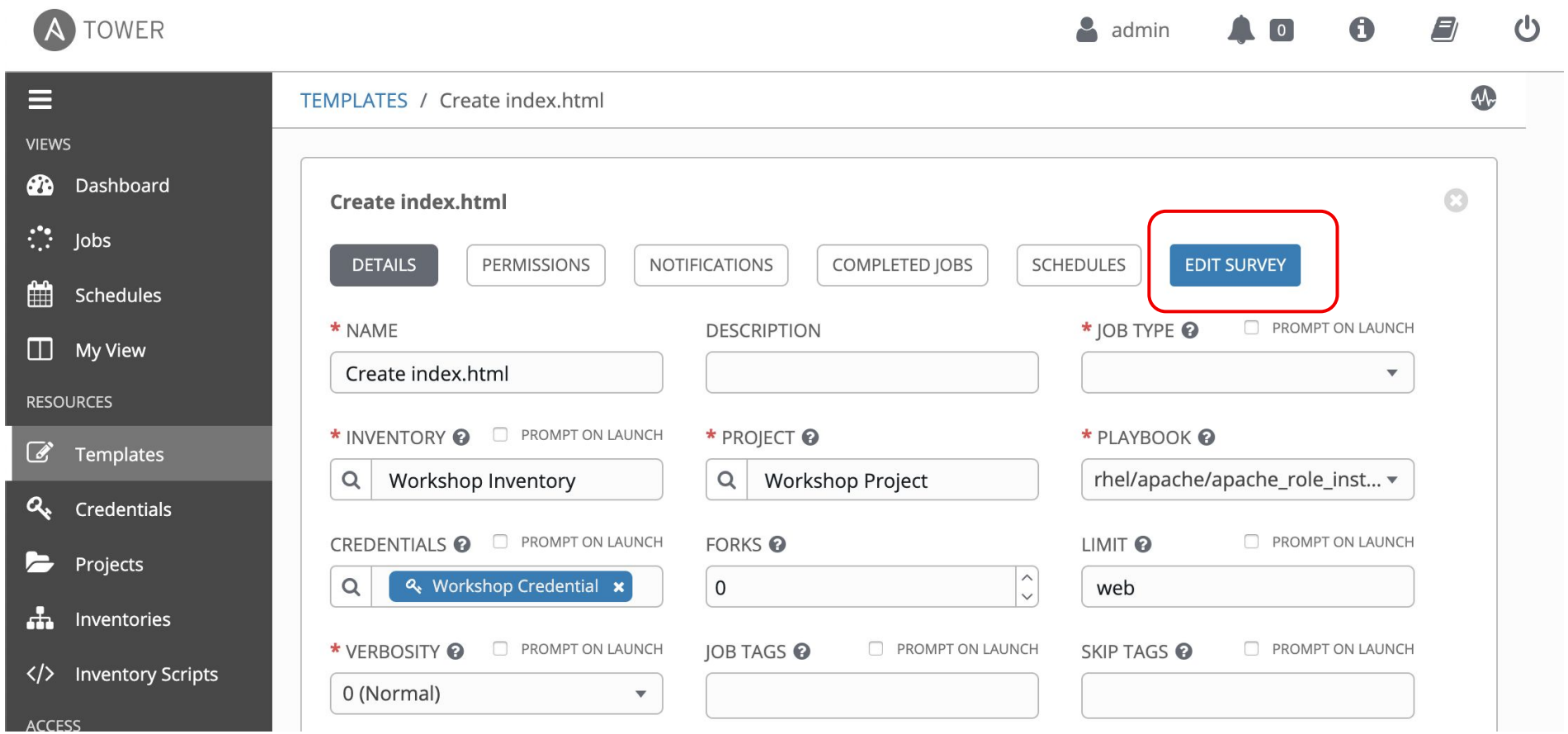
Creating a Survey (1/2)

Once a Job Template is saved, the **Add Survey Button** will appear

Click the button to open the Add Survey window.



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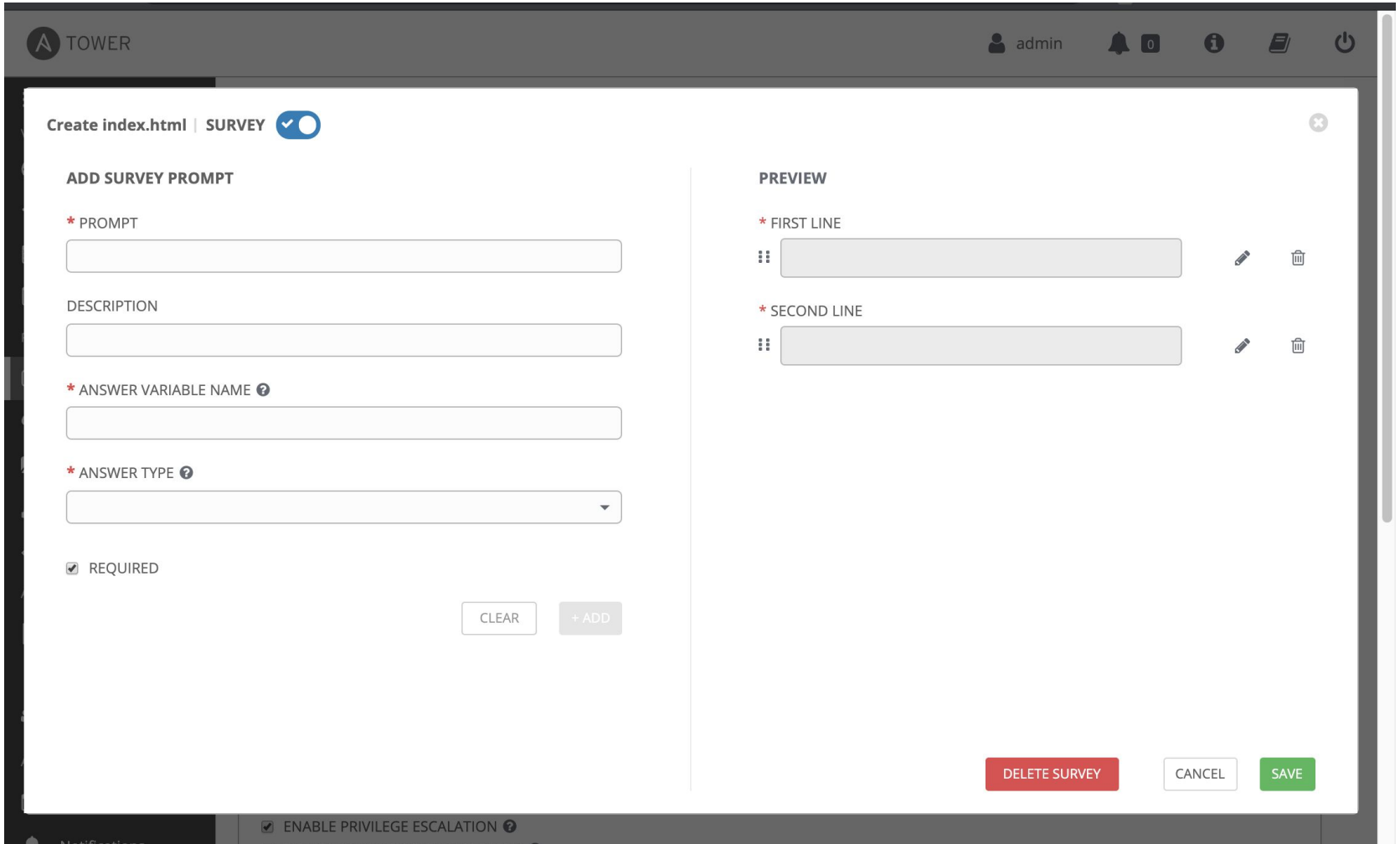
Creating a Survey (2/2)

The Add Survey window allows the Job Template to prompt users for one or more questions. The answers provided become variables for use in the Ansible Playbook.



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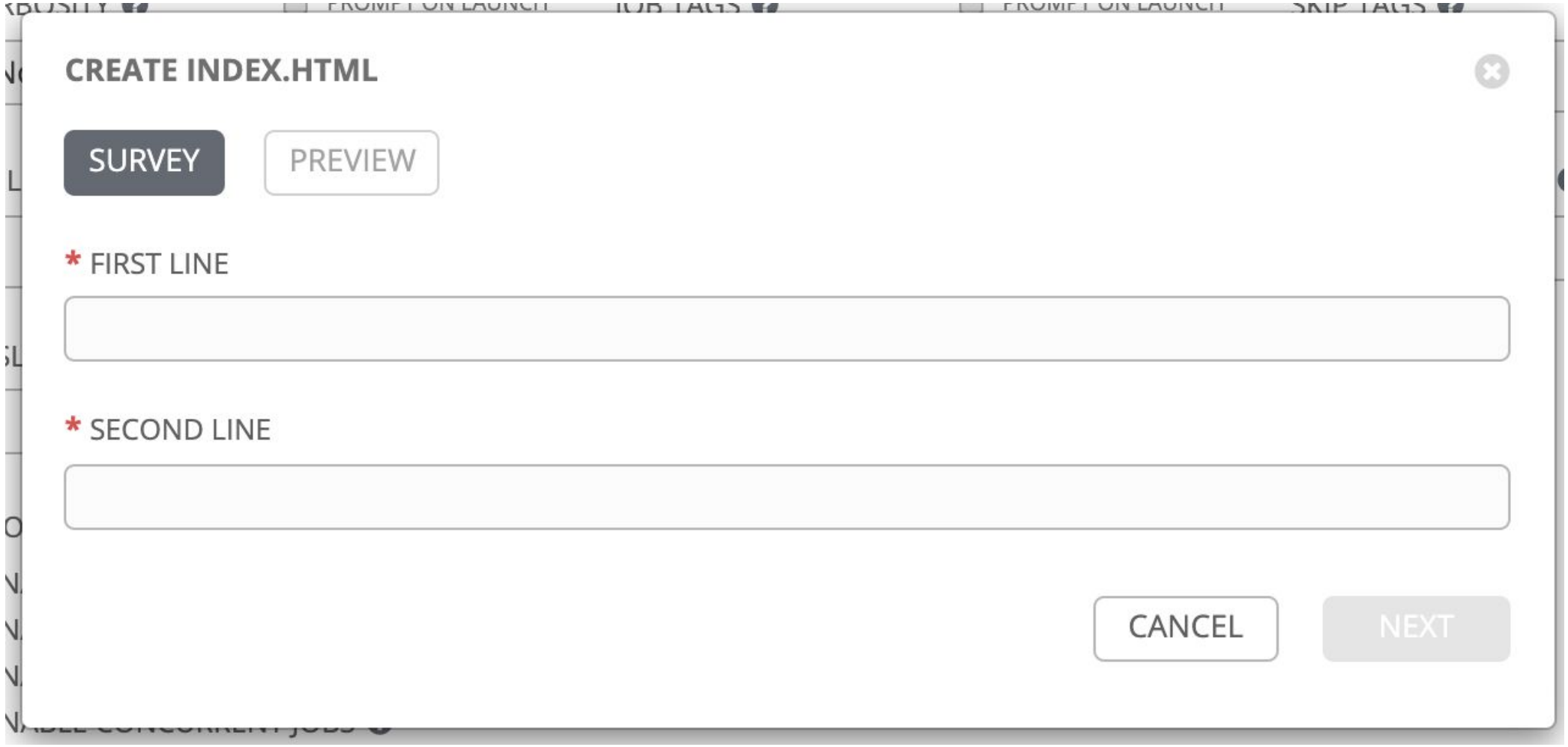
Using a Survey

When launching a job, the user will now be prompted with the Survey. The user can be required to fill out the Survey before the Job Template will execute.



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Lab Time

Complete exercise **5-surveys** now in your lab environment

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Exercise 6

Topics Covered:

- Red Hat Enterprise Linux System Roles

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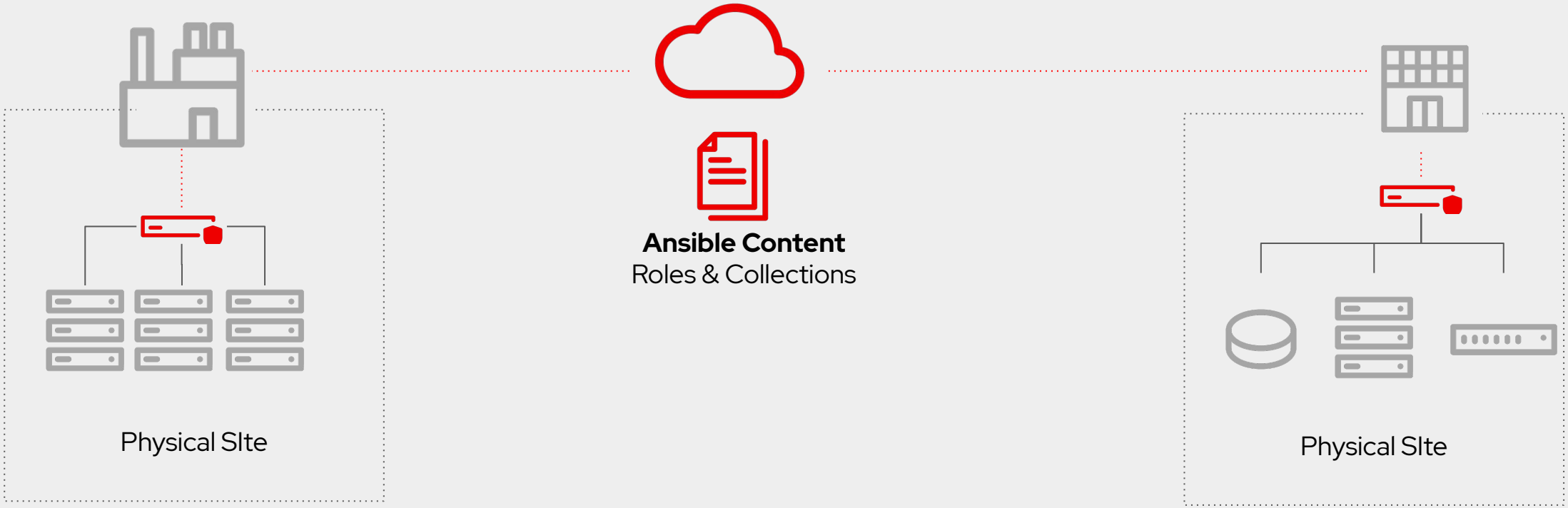
Automation Hub and Ansible Galaxy



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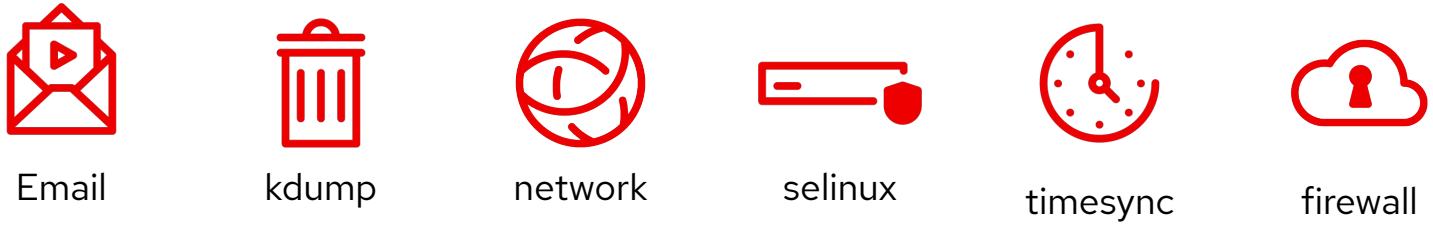
Linux System Roles

- Consistent user interface to provide settings to a given subsystem that is abstract from any particular implementation

Examples



An Ansible Playbook Variable Example

```yaml
---
- name: example system roles playbook
  hosts: web

  tasks:

    - name: Configure Firewall
      include_role:
        name: linux-system-roles.firewall

    - name: Configure Timesync
      include_role:
        name: linux-system-roles.timesync
```

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Exercise 7

Topics Covered:

- Red Hat Insights intro
- Insights integration

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Red Hat Insights

Included with your Red Hat Enterprise Linux subscription

Assesses

customer's Red Hat environments

Remediates

findings with prescriptive remediation steps or an Ansible playbook

Insights

rule contributions directly from Red Hat subject matter experts

Identifying risks for Availability, performance, stability and security

Red Hat

Red Hat

John Spinks

Red Hat Insights

Overview

Rules

Inventory

Remediations

Documentation

Remediations > May2019_Critical_Fixes

May2019_Critical_Fixes

Download Playbook

Delete

Systems reboot

6	0	
No reboot	Reboot required	Auto reboot

Playbook details

Created by: John Spinks

Created: a minute ago

Last modified by: John Spinks

Insights plans with Ansible playbooks

Solve common issues through Ansible Automation

Actions	Resolution	Reboot required	Systems	Type
Dnsmasq with listening processes vulnerable to remote code execution via crafted DNS requests (CVE-2017-14491)	Update dnsmasq package and restart related service(s)		6	Insights

Systems

ic3.example.com

ic4.example.com

ic6.example.com

ic7.example.com

ANSIBLE & INSIGHTS

While Insights includes Ansible playbooks for risks, Insights alone can't perform remediation of the risks.

Insights

- Insights provides Ansible Playbooks for resolving many common risks.
- Dynamically generates Ansible Playbooks for risk remediation
- Playbooks can be downloaded and run via `ansible-playbook` or Satellite

Insights connected to Ansible Tower

- View identified risks in the Tower inventory
- Execute generated Ansible Playbook as a Tower job
- Use Tower for enterprise risk remediation

Next Steps

GET STARTED

ansible.com/get-started

ansible.com/tower-trial

JOIN THE COMMUNITY

ansible.com/community

WORKSHOPS & TRAINING

ansible.com/workshops

Red Hat Training

SHARE YOUR STORY

Follow us @Ansible

Friend us on Facebook

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Thank you

linkedin.com/company/red-hat

youtube.com/AnsibleAutomation

facebook.com/ansibleautomation

twitter.com/ansible

github.com/ansible

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