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Ansible Windows Workshop

Introduction to Ansible Automation for Windows

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Housekeeping

- Timing
- Breaks
- Takeaways

What you will learn

- Introduction to Ansible automation
- How Ansible works for Windows automation
- Understanding Ansible modules and playbooks
- Using Ansible Tower to scale automation to the enterprise
- Reusing automation with Ansible Roles

Introduction

Topics Covered:

- Why Automate?
- How Ansible Windows Automation works
- Understanding Inventory
- An example Ansible Playbook

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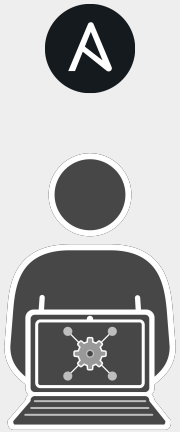

Automation happens when one person meets a problem they never want to solve again

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Teams are automating...

Lines Of Business

Network

Security

Operations

Developers

Infrastructure

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?

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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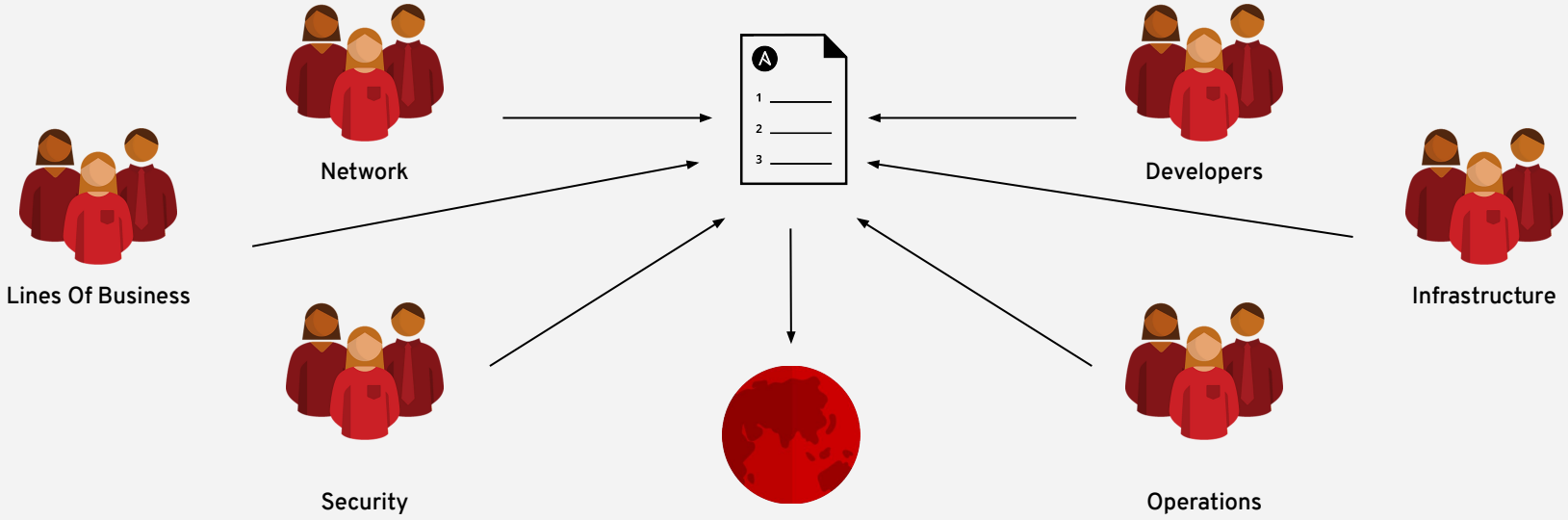
When automation crosses teams, you need an automation platform



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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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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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WINDOWS AUTOMATION

90+

Windows Modules

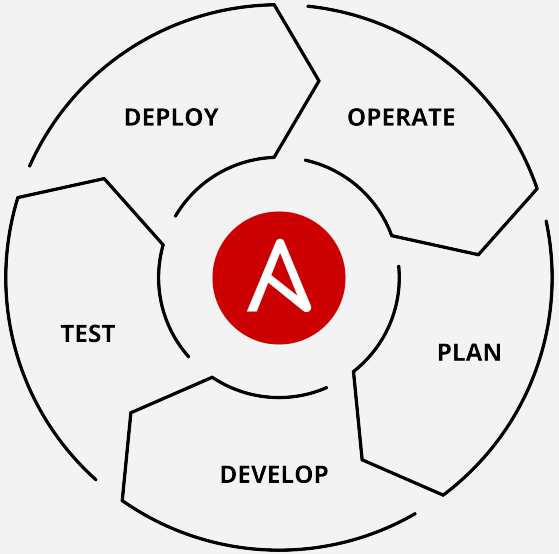
1,300+

Powershell DSC resources

ansible.com/windows

WHAT CAN I DO USING ANSIBLE FOR WINDOWS

Native Windows support uses PowerShell remoting to manage Windows in the same Ansible agentless way



- Install and uninstall MSIs
- Gather facts on Windows hosts
- Enable and disable Windows features
- Start, stop, and manage Windows Services
- Create and Manage local users and groups
- Manage Windows packages via Chocolatey package manager
- Manage and install Windows updates
- Fetch files from remote sites
- Push and execute any Powershell scripts

Ansible automates technologies you use

Time to automate is measured in minutes, 50+ **certified** platforms

Cloud

AWS
Azure
Digital Ocean
Google
OpenStack
Rackspace
+more

Red Hat Products

RHEL
Satellite
Insights
+more

Virt & Container

Docker
Kubernetes
OpenStack
OpenShift
VMware
+more

Storage

Infinidat
Netapp
Pure Storage
+more

Windows

ACLs
Files
Packages
IIS
Registry
Shares
Services
Configs
Users
Domains
Updates
+more

Network

Arista
Aruba
Bigswitch
Cisco
Ericsson
F5
FRR
Juniper
Meraki
OpenvSwitch
Ruckus
VyOS
+more

Security

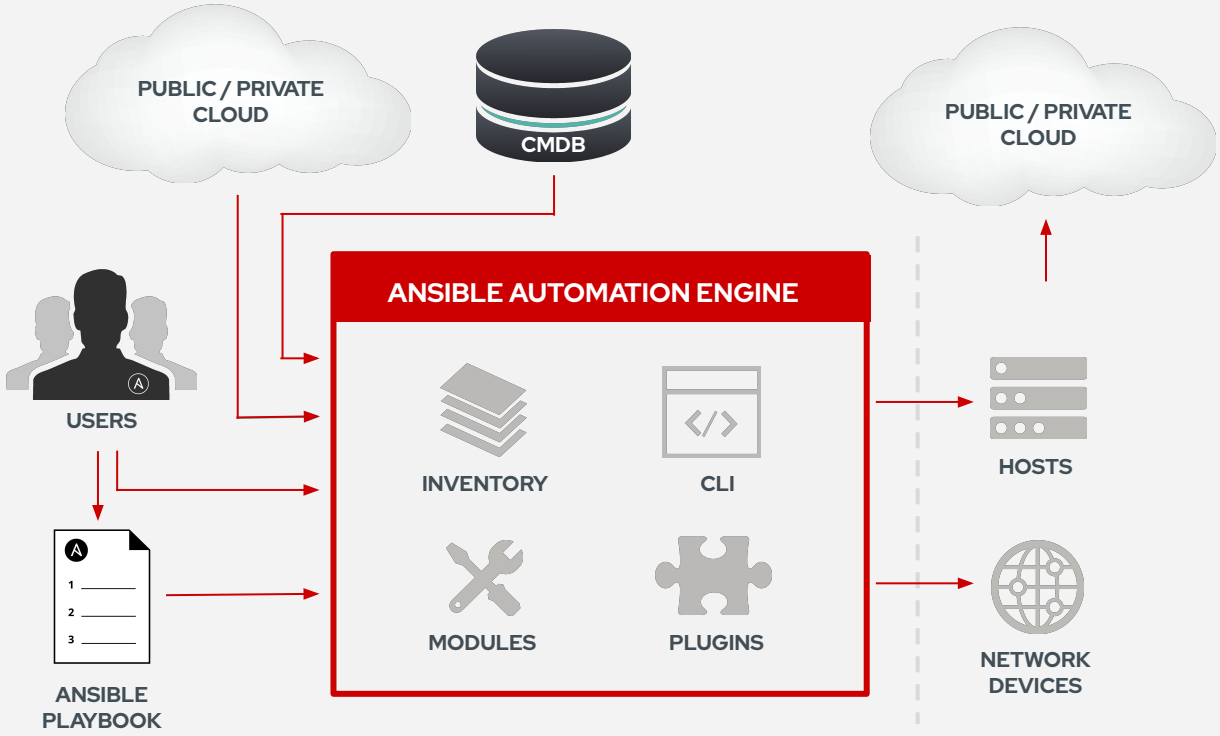
Checkpoint
Cisco
CyberArk
F5
Fortinet
Juniper
IBM
Palo Alto
Snort
+more

Monitoring

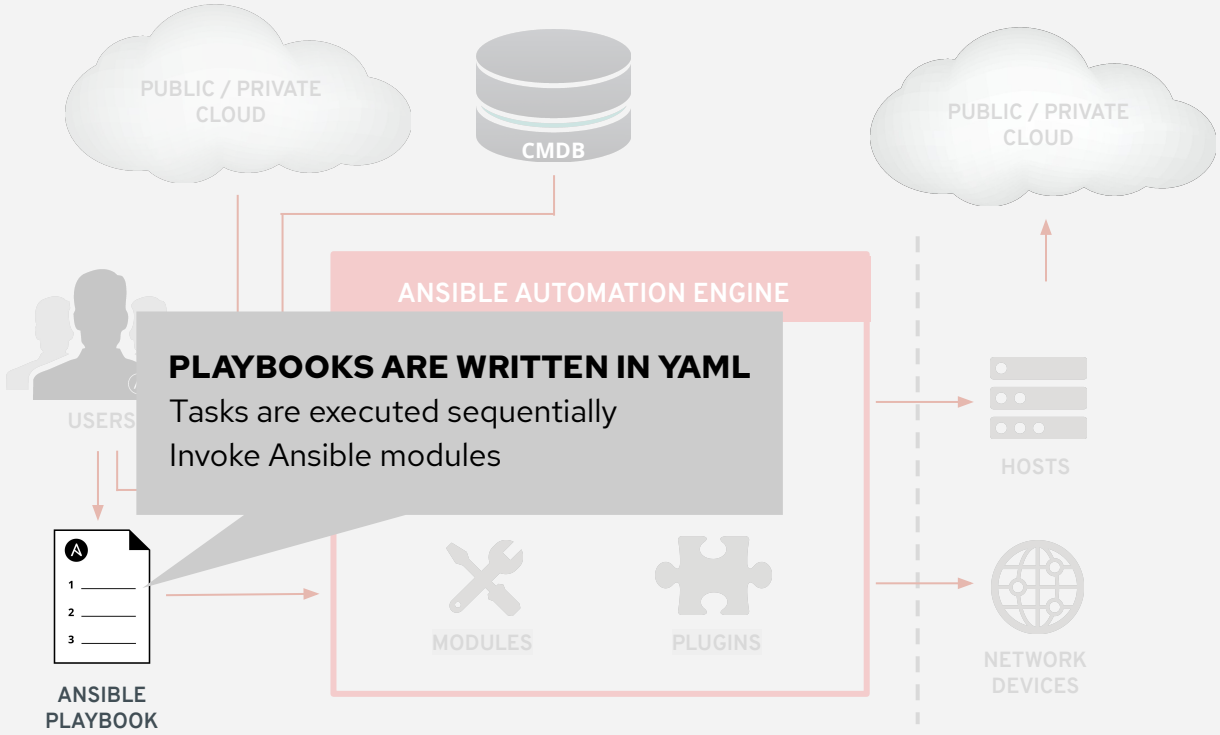
Dynatrace
Datadog
LogicMonitor
New Relic
Sensu
+more

Devops

Jira
GitHub
Vagrant
Jenkins
Slack
+more


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

Red Hat


PUBLIC / PRIVATE CLOUD
CMDB
PUBLIC / PRIVATE CLOUD
ANSIBLE AUTOMATION ENGINE
USERS
PLAYBOOKS ARE WRITTEN IN YAML
Tasks are executed sequentially
Invoke Ansible modules
HOSTS
MODULES
PLUGINS
NETWORK DEVICES
ANSIBLE PLAYBOOK

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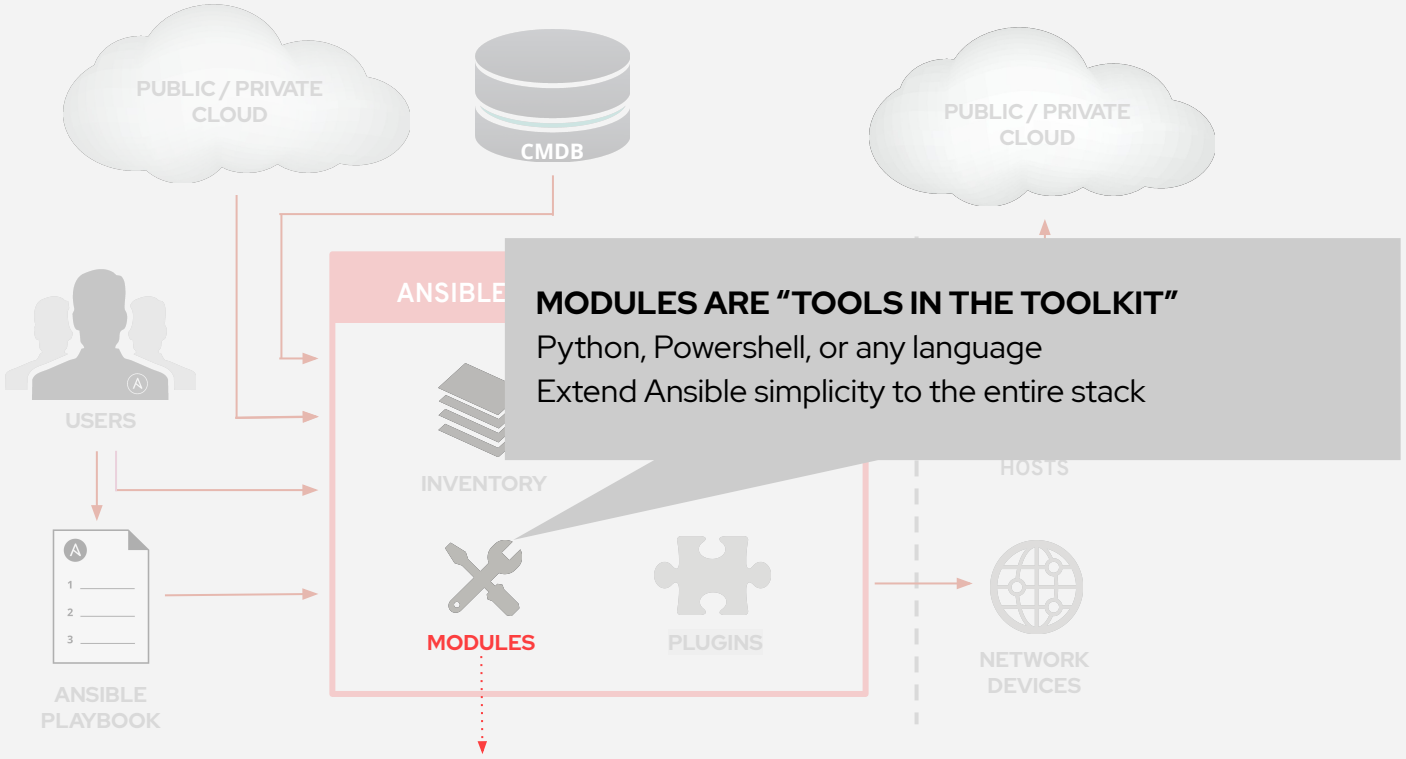
```yaml
---
- name: start IIS/stop firewall
  hosts: windows-web
  become: yes
  tasks:

  - name: IIS is running
    win_service:
      name: W3Svc
      state: running

  - name: firewall service is stopped/disabled
    win_service:
      name: MpsSvc
      state: stopped
      start_mode: disabled
```



MODULES ARE "TOOLS IN THE TOOLKIT"

Python, Powershell, or any language

Extend Ansible simplicity to the entire stack

```
- name: Start the SNMP service
  win_service:
    name: SNMP
    state: started
```

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Modules

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

- Written in Powershell
- Modules can be idempotent
- Modules take user input in the form of parameters

```
tasks:
  - name: start IIS
    win_service:
      name: W3Svc
      state: running
```

Windows modules

Ansible modules for Windows automation typically begin with win_*

win_copy - Copies files to remote locations on windows hosts

win_service - Manage and query Windows services

win_domain - Ensures the existence of a Windows domain

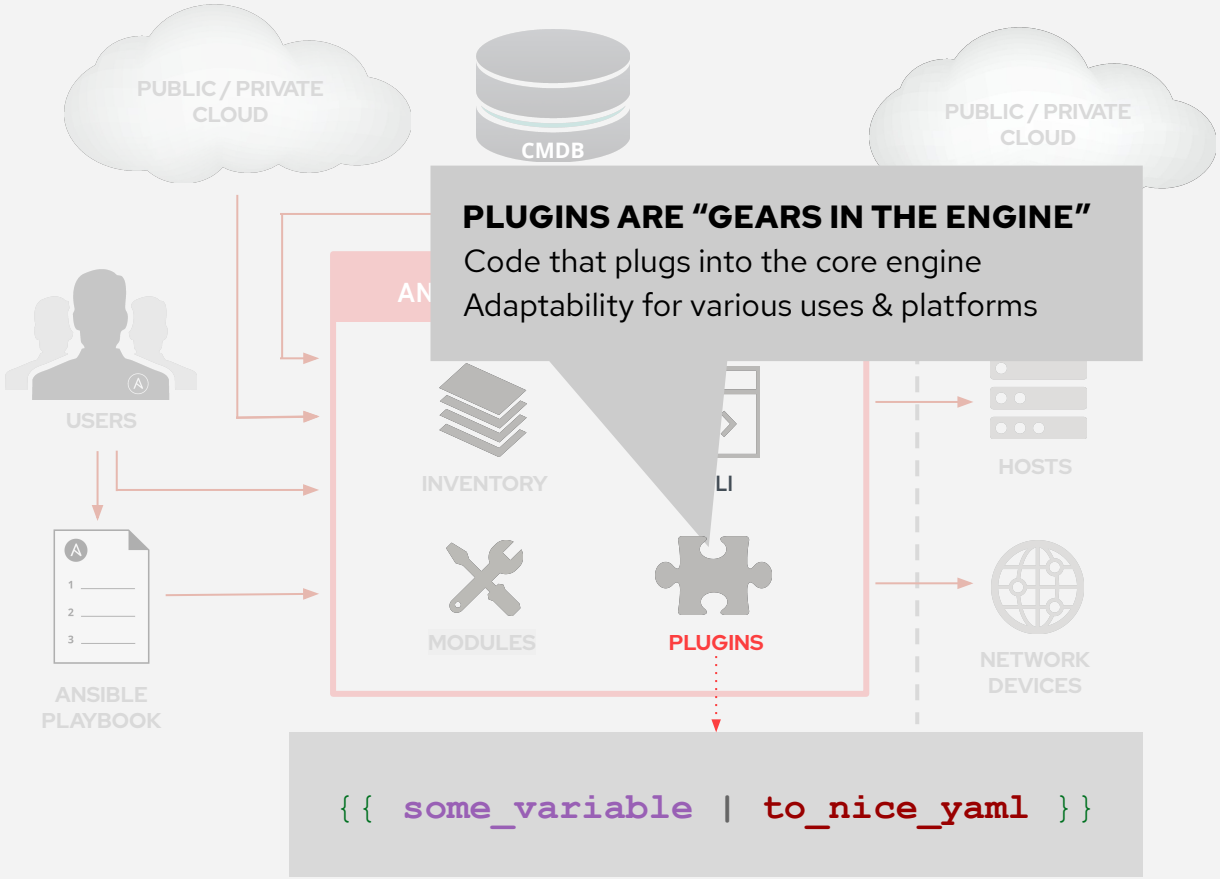
win_reboot - Reboot a windows machine

win_regedit - win_regedit – Add, change, or remove registry keys and values

win_ping - A windows version of the classic ping module

win_dsc - Invokes a PowerShell DSC configuration

win_acl - Set file/directory/registry permissions for a system user or group


PUBLIC / PRIVATE CLOUD
CMDB
PUBLIC / PRIVATE CLOUD
PLUGINS ARE "GEARS IN THE ENGINE"
Code that plugs into the core engine
Adaptability for various uses & platforms
USERS
INVENTORY
HOSTS
MODULES
PLUGINS
NETWORK DEVICES
ANSIBLE PLAYBOOK
{{ some_variable | to_nice_yaml }}

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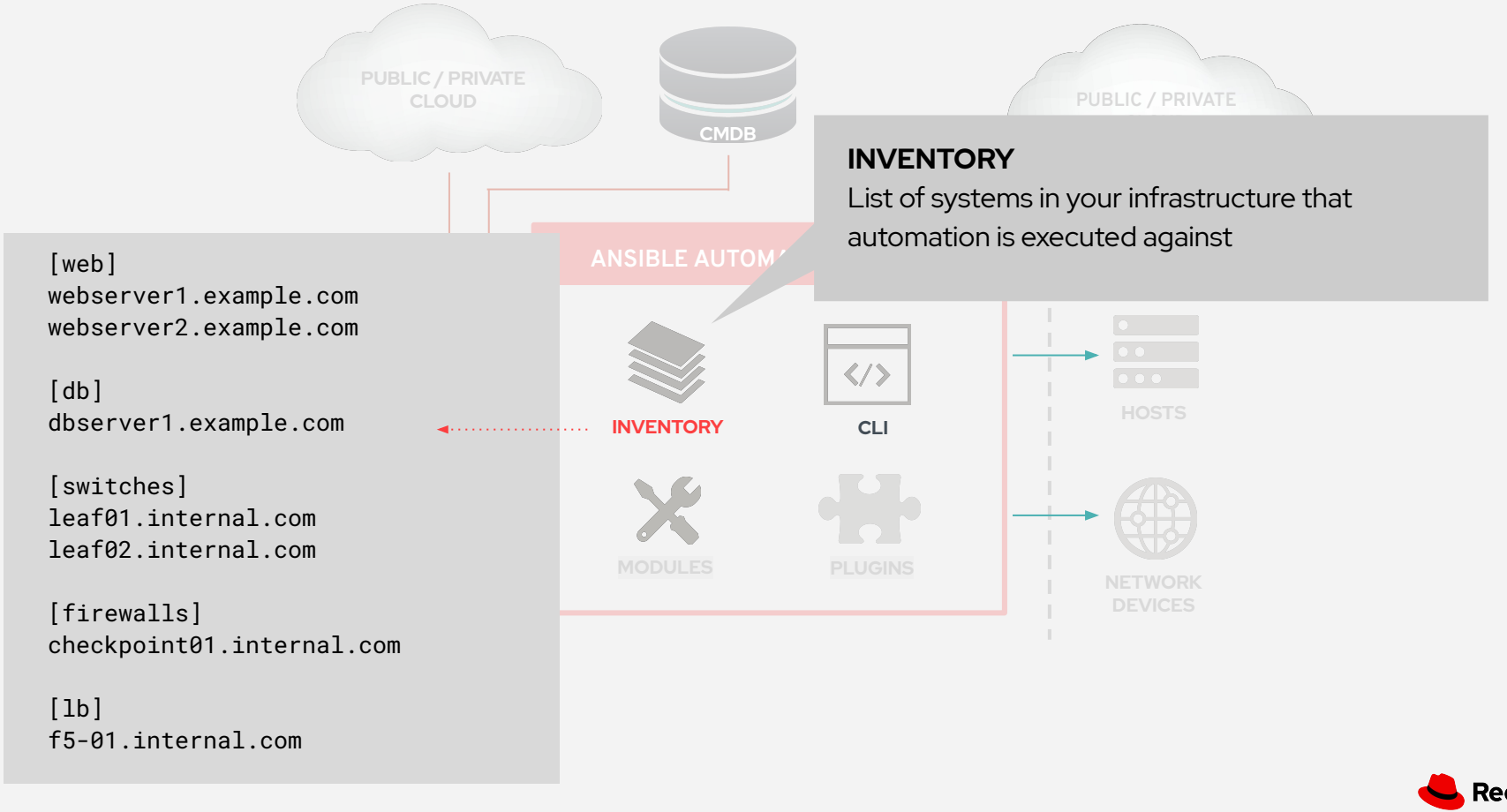
PUBLIC / PRIVATE CLOUD
CMDB
PUBLIC / PRIVATE
INVENTORY
List of systems in your infrastructure that automation is executed against
[web]
webserver1.example.com
webserver2.example.com
[db]
dbserver1.example.com
[switches]
leaf01.internal.com
leaf02.internal.com
[firewalls]
checkpoint01.internal.com
[lb]
f5-01.internal.com
ANSIBLE AUTOM
INVENTORY
CLI
MODULES
PLUGINS
HOSTS
NETWORK DEVICES

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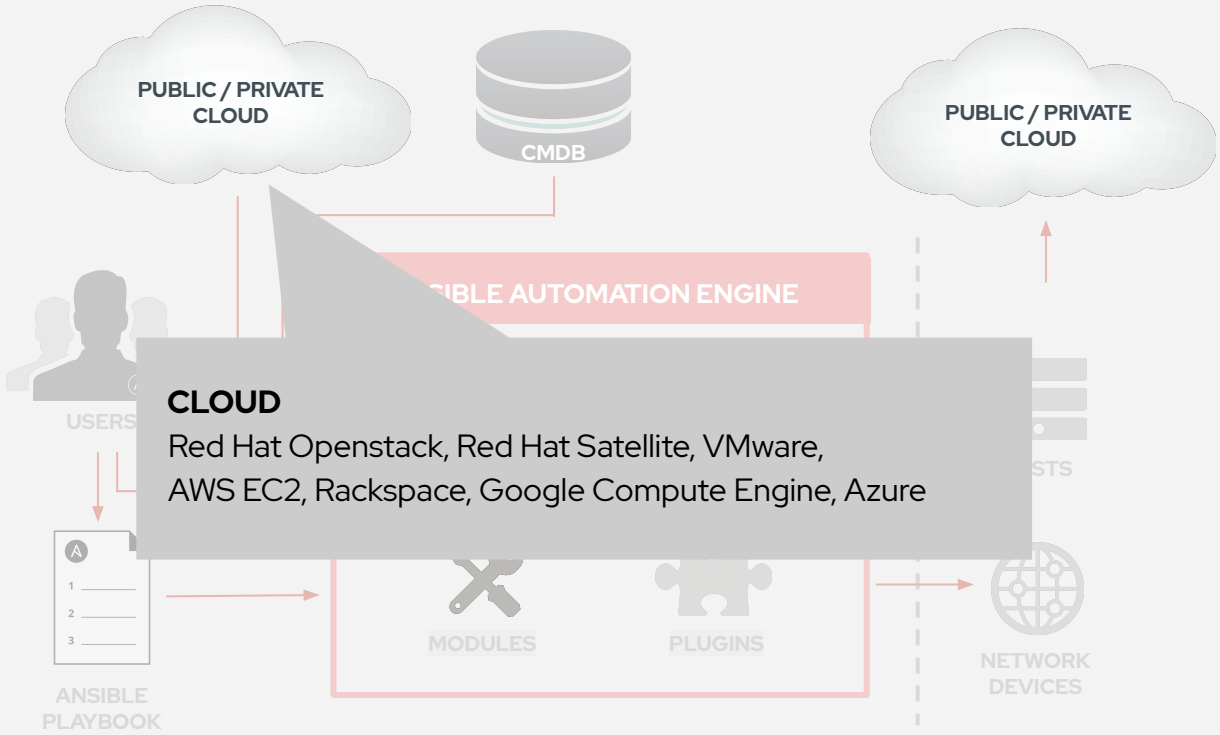
PUBLIC / PRIVATE CLOUD
CMDB
PUBLIC / PRIVATE CLOUD
IBLE AUTOMATION ENGINE
USERS
CLOUD
Red Hat Openstack, Red Hat Satellite, VMware,
AWS EC2, Rackspace, Google Compute Engine, Azure
STS
MODULES
PLUGINS
NETWORK DEVICES
ANSIBLE PLAYBOOK

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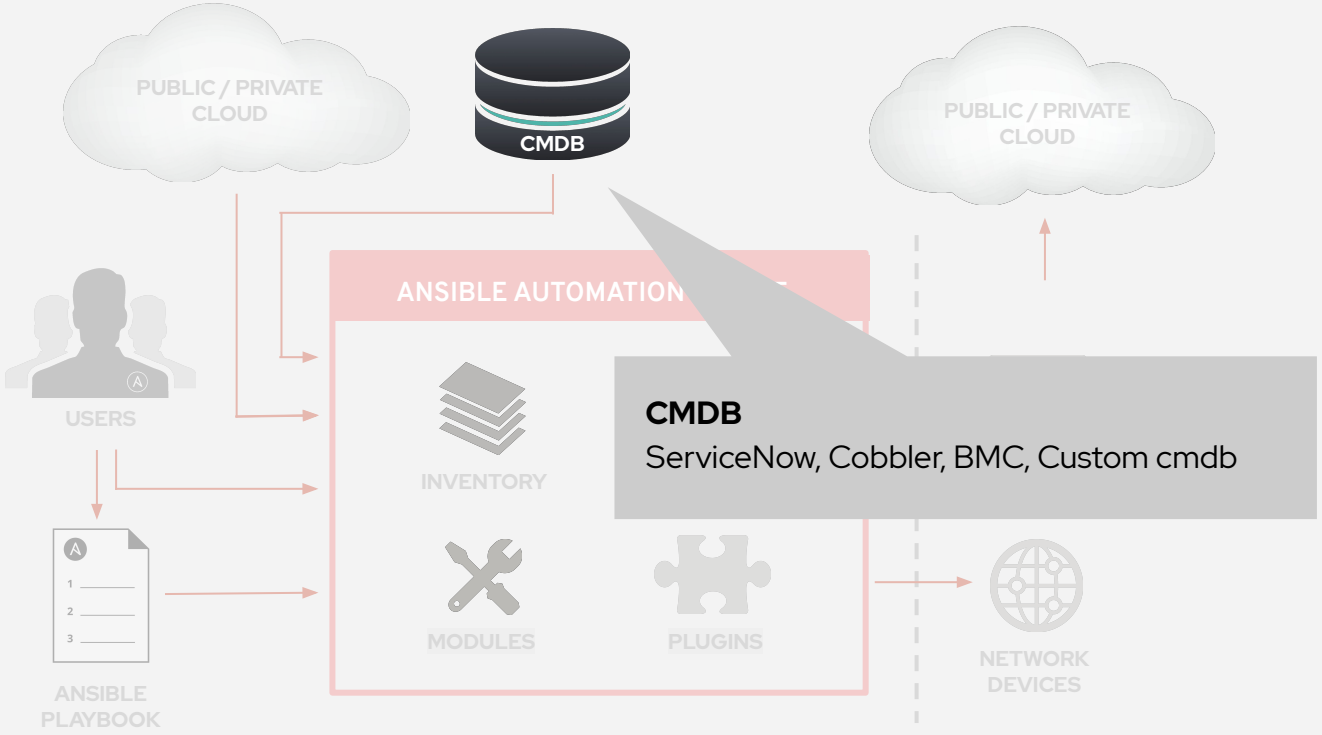
PUBLIC / PRIVATE CLOUD
CMDB
PUBLIC / PRIVATE CLOUD
ANSIBLE AUTOMATION
USERS
INVENTORY
CMDB
ServiceNow, Cobbler, BMC, Custom cmdb
MODULES
PLUGINS
NETWORK DEVICES
ANSIBLE PLAYBOOK

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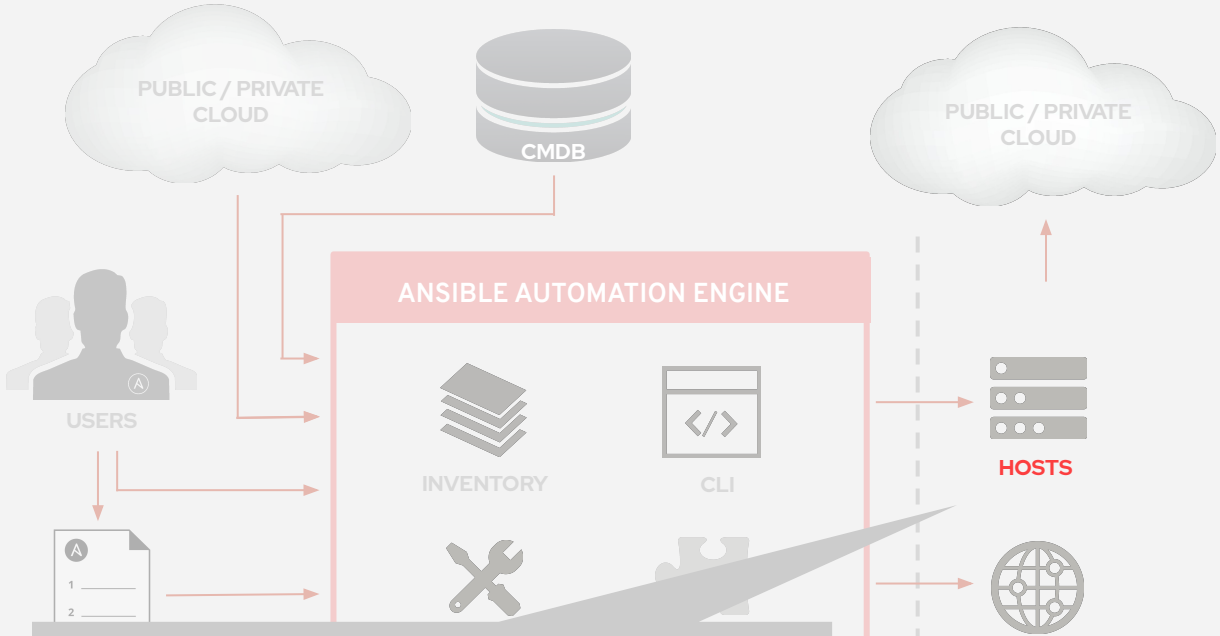

AUTOMATE EVERYTHING

Red Hat Enterprise Linux, Cisco routers, Arista switches, Juniper routers, Windows hosts, Check Point firewalls, NetApp storage, F5 load balancers and more

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Tower Introduction

Topics Covered:

- What is Ansible Tower?
- Job Templates
  - Inventory
  - Credentials
  - Projects

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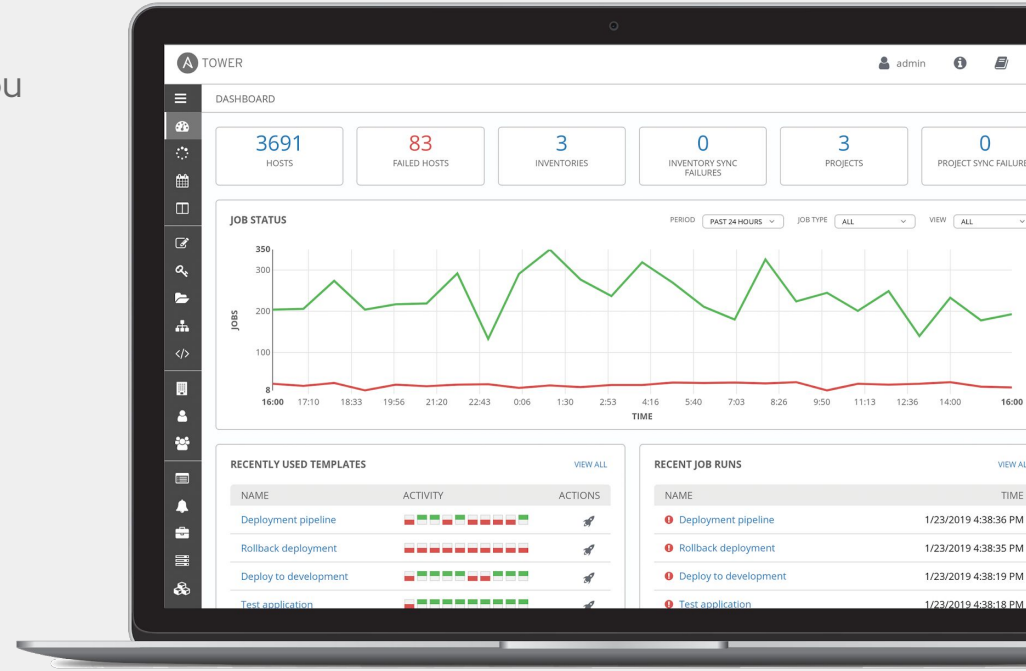
What is Ansible Tower?

Ansible Tower is a UI and RESTful API allowing you to scale IT automation, manage complex deployments and speed productivity.

- Role-based access control
- Deploy entire applications with push-button deployment access
- All automations are centrally logged
- Powerful workflows match your IT processes



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Engage

Ansible SaaS: Engage users with an automation focused experience

Scale

Control	Delegation	Scale
Web UI and API	Role Based Access Controls	Scalable Execution Capacity

Create

Ansible Engine: Universal language of automation

Fueled by an open source community

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Red Hat Ansible Tower

Push button

An intuitive user interface experience makes it easy for novice users to execute playbooks you allow them access to.

RESTful API

With an API first mentality every feature and function of Tower can be API driven. Allow seamless integration with other tools like ServiceNow and Infoblox.

RBAC

Allow restricting playbook access to authorized users. One team can use playbooks in check mode (read-only) while others have full administrative abilities.

Enterprise integrations

Integrate with enterprise authentication like TACACS+, RADIUS, Azure AD. Setup token authentication with OAuth 2. Setup notifications with PagerDuty, Slack and Twilio.

Centralized logging

All automation activity is securely logged. Who ran it, how they customized it, what it did, where it happened - all securely stored and viewable later, or exported through Ansible Tower's API.

Workflows

Ansible Tower's multi-playbook workflows chain any number of playbooks, regardless of whether they use different inventories, run as different users, run at once or utilize different credentials.

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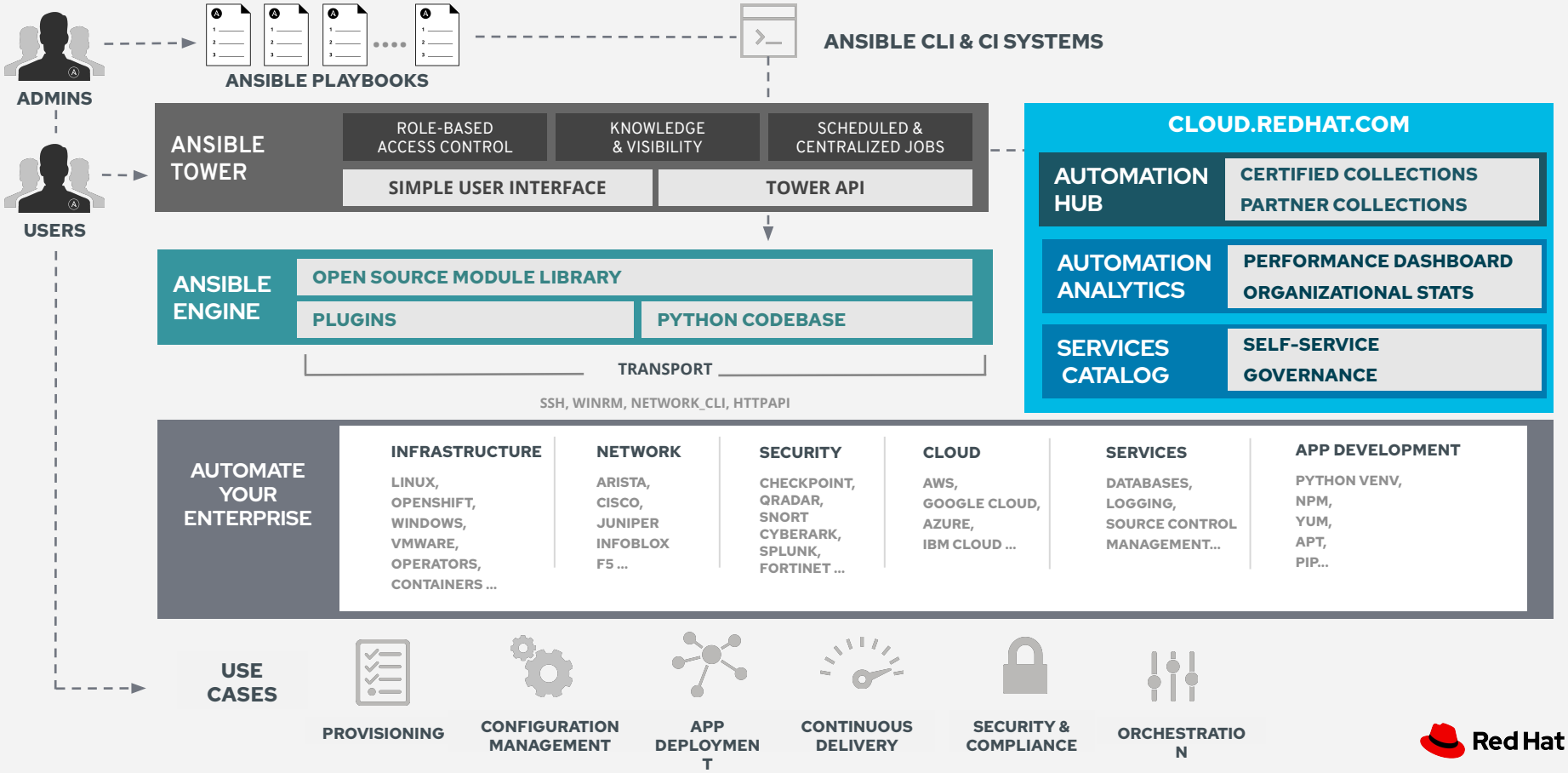

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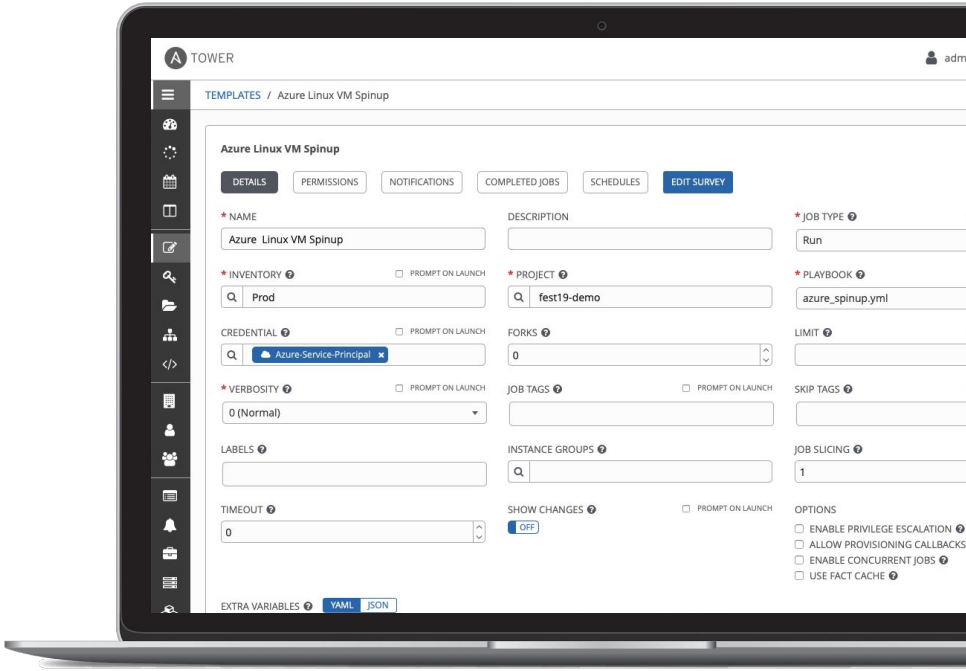
Job Templates

Everything in Ansible Tower revolves around the concept of a **Job Template**. Job Templates allow Ansible Playbooks to be controlled, delegated and scaled for an organization.

Job templates also encourage the reuse of Ansible Playbook content and collaboration between teams.

A **Job Template** requires:

- An **Inventory** to run the job against
- A **Credential** to login to devices.
- A **Project** which contains Ansible Playbooks



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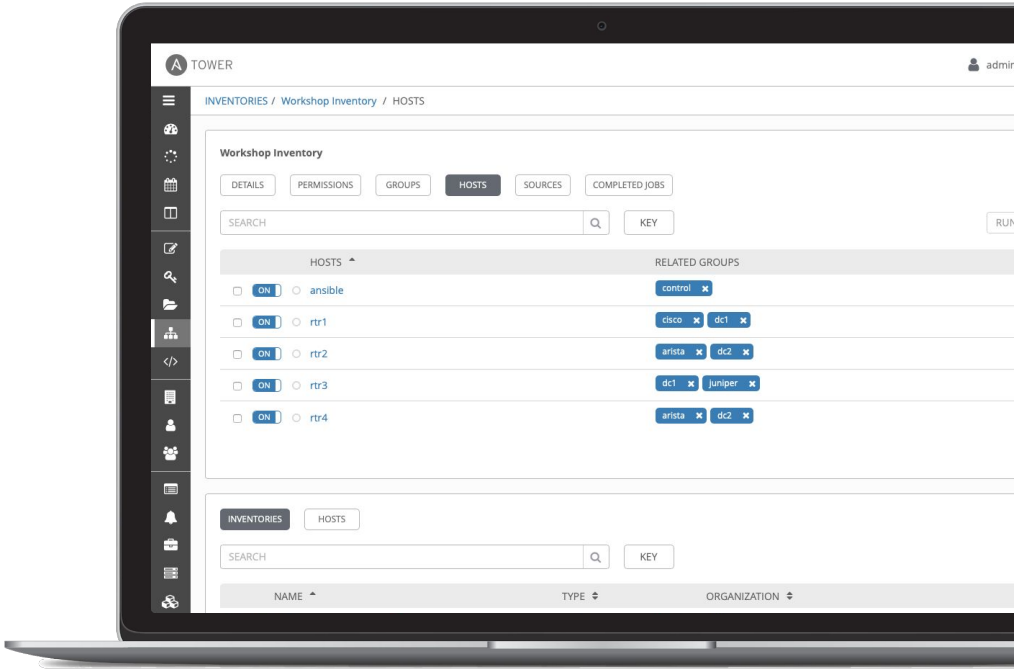
Inventory

Inventory is a collection of hosts (nodes) with associated data and groupings that Ansible Tower can connect to and manage.

- Hosts (nodes)
- Groups
- Inventory-specific data (variables)
- Static or dynamic sources



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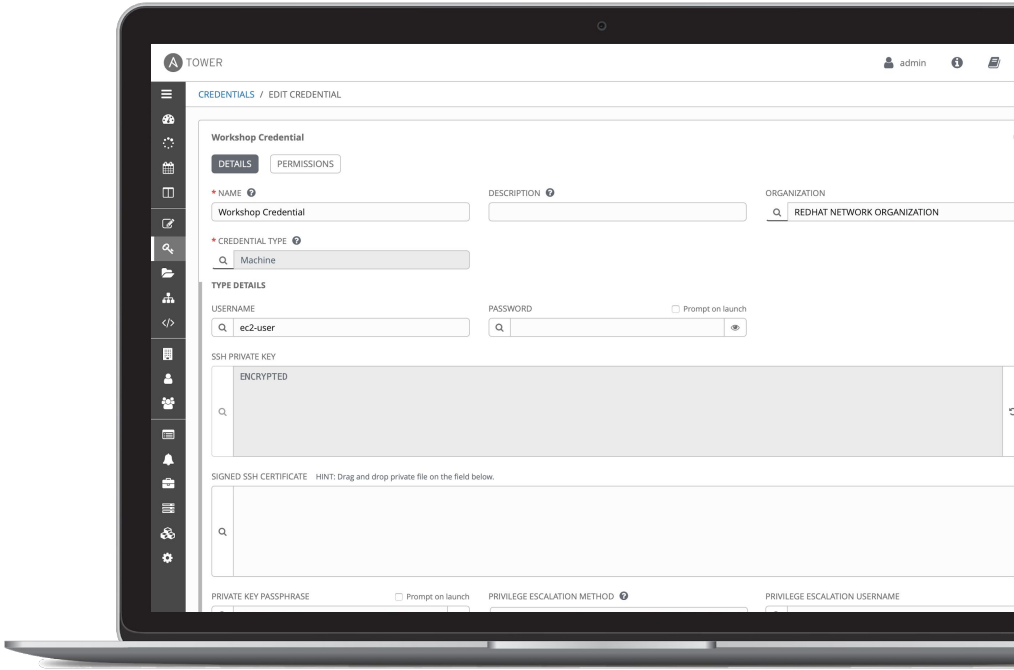
Credentials

Credentials are utilized by Ansible Tower for authentication with various external resources:

- Connecting to remote machines to run jobs
- Syncing with inventory sources
- Importing project content from version control systems
- Connecting to and managing network devices

Centralized management of various credentials allows end users to leverage a secret without ever exposing that secret to them.



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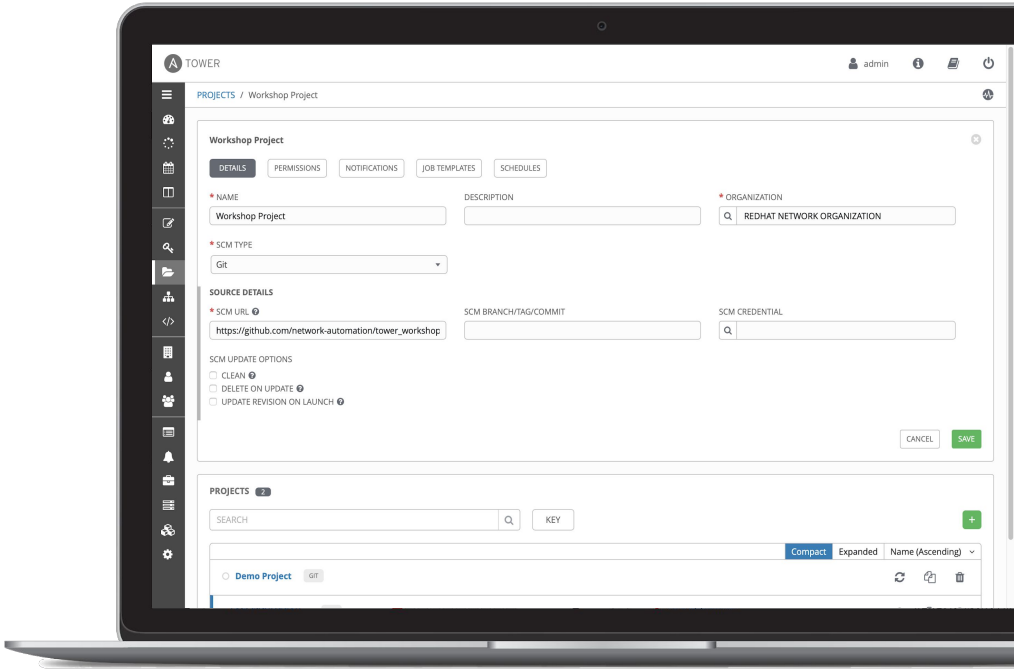
Project

A project is a logical collection of Ansible Playbooks, represented in Ansible Tower.

You can manage Ansible Playbooks and playbook directories by placing them in a source code management system supported by Ansible Tower, including Git, Subversion, and Mercurial.



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Exercise 1

- Configuring Ansible Tower

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Ad-hoc Commands

Topics Covered:

- What are ad-hoc commands
- Common options
- Run from
  - Command line
  - Ansible Tower

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Ad-hoc Commands

An ad-hoc command is a single Ansible task to perform quickly, but don’t want to save for later.

Ad-hoc Commands: Common Options

- **-m MODULE_NAME, --module-name=MODULE_NAME**
  Module name to execute the ad-hoc command
- **-a MODULE_ARGS, --args=MODULE_ARGS**
  Module arguments for the ad-hoc command
- **-b, --become**
  Run ad-hoc command with elevated rights such as sudo, the default method
- **-e EXTRA_VARS, --extra-vars=EXTRA_VARS**
  Set additional variables as key=value or YAML/JSON
- **--version**
  Display the version of Ansible
- **--help**
  Display the MAN page for the Ansible tool

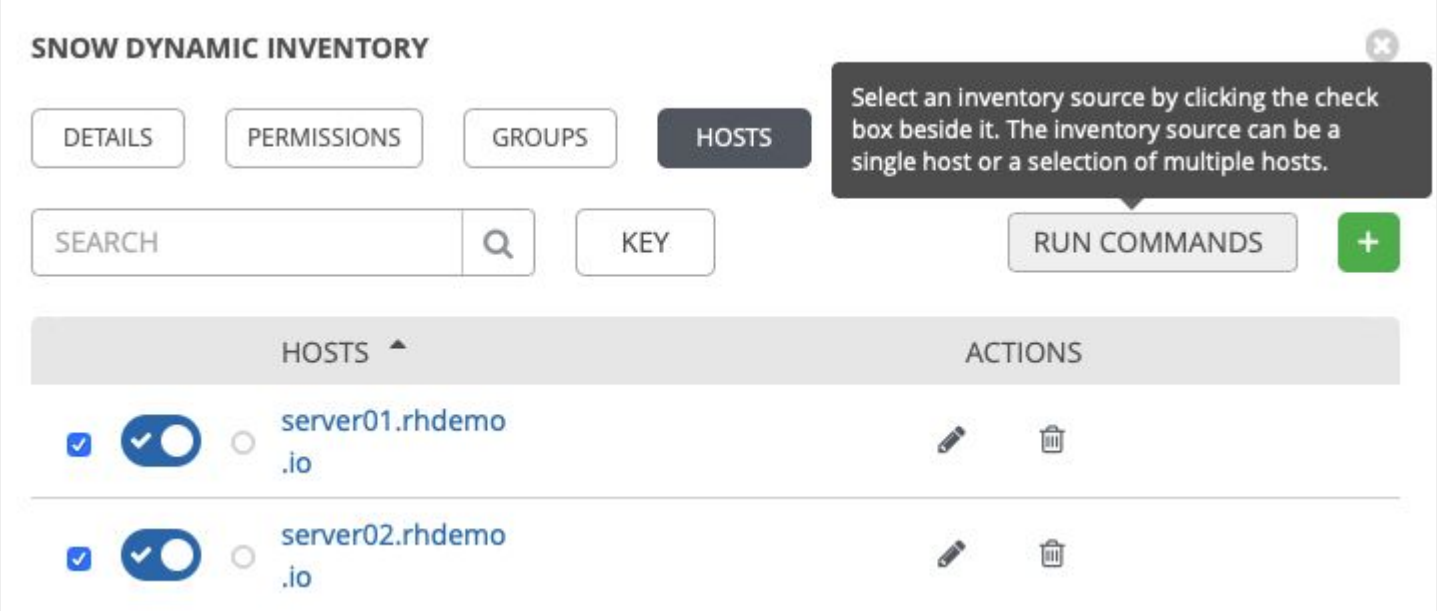
Ad-hoc Commands

```
# check all my inventory hosts are ready to be
# managed by Ansible
$ ansible all -m ping

# collect and display the discovered facts
# for the localhost
$ ansible localhost -m setup

# run the uptime command on all hosts in the
# web group
$ ansible web -m command -a "uptime"
```

Ad-hoc Commands from Tower



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Exercise 2

- Ad-hoc Commands

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Playbooks

Topics Covered:

- Variables
  - Facts
  - Precedence
- Tasks
  - Handlers

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Variables

Ansible can work with metadata from various sources and manage their context in the form of variables.

- Command line parameters
- Plays and tasks
- Files
- Inventory
- Discovered facts
- Roles

Discovered facts

Facts are bits of information derived from examining a host systems that are stored as variables for later use in a play.

```
$ ansible localhost -m setup
localhost | success >> {
  "ansible_facts": {
      "ansible_default_ipv4": {
          "address": "192.168.1.37",
          "alias": "wlan0",
          "gateway": "192.168.1.1",
          "interface": "wlan0",
          "macaddress": "c4:85:08:3b:a9:16",
          "mtu": 1500,
          "netmask": "255.255.255.0",
          "network": "192.168.1.0",
          "type": "ether"
      },
```

Variable Precedence

The order in which the same variable from different sources will override each other.

1. command line values (eg “-u user”)
2. role defaults [1]
3. inventory file or script group vars [2]
4. **inventory group_vars/all** [3]
5. playbook group_vars/all [3]
6. **inventory group_vars/*** [3]
7. playbook group_vars/* [3]
8. inventory file or script host vars [2]
9. **inventory host_vars/*** [3]
10. playbook host_vars/* [3]
11. host facts / cached set_facts [4]
12. play vars
13. play vars_prompt
14. play vars_files
15. role vars (defined in role/vars/main.yml)
16. block vars (only for tasks in block)
17. task vars (only for the task)
18. include_vars
19. set_facts / registered vars
20. role (and include_role) params
21. include params
22. extra vars (**always win precedence**)

Tasks

Tasks are the application of a module to perform a specific unit of work.

- **win_file**: A directory should exist
- **win_package**: A package should be installed
- **win_service**: A service should be running
- **win_template**: Render a configuration file from a template
- **win_get_url**: Fetch an archive file from a URL
- **win_copy**: Copy a file from your repository or a remote source

Tasks

```
tasks:
- name: Ensure IIS Server is present
  win_feature:
    name: Web-Server
    state: present

- name: Ensure latest index.html file is present
  win_copy:
    src: files/index.html
    dest: c:\www\

- name: Restart IIS
  win_service:
    name: IIS Admin Service
    state: restarted
```

Handler Tasks

Handlers are special tasks that run at the end of a play if notified by another task when a change occurs.

> *If a package gets installed or updated, notify a service restart task that it needs to run.*

Handler Tasks

```
tasks:
- name: Ensure IIS Server is present
  win_feature:
    name: Web-Server
    state: present
  notify: Restart IIS

- name: Ensure latest index.html file is present
  win_copy:
    src: files/index.html
    dest: c:\www\

handlers:
- name: Restart IIS
  win_service:
    name: IIS Admin Service
    state: restarted
```

Plays and playbooks

Plays are ordered sets of tasks to execute against host selections from your inventory. A playbook is a file containing one or more plays.

Plays and playbooks

```
---
- name: Ensure IIS is installed and started
  hosts: web
  become: yes
  vars:
    service_name: IIS Admin Service

  tasks:
  - name: Ensure IIS Server is present
    win_feature:
      name: Web-Server
      state: present

  - name: Ensure latest index.html file is present
    win_copy:
      src: files/index.html
      dest: c:\www\

  - name: Ensure IIS is started
    win_service:
      name: "{{ service_name }}"
      state: started
```

Meaningful names

```
---
- name: Ensure IIS is installed and started
  hosts: web
  become: yes
  vars:
    service_name: IIS Admin Service

  tasks:
  - name: Ensure IIS Server is present
    win_feature:
      name: Web-Server
      state: present

  - name: Ensure latest index.html file is present
    win_copy:
      src: files/index.html
      dest: c:\www\

  - name: Ensure IIS is started
    win_service:
      name: "{{ service_name }}"
      state: started
```

Host selector

```
---
- name: Ensure IIS is installed and started
  hosts: web
  become: yes
  vars:
    service_name: IIS Admin Service

  tasks:
  - name: Ensure IIS Server is present
    win_feature:
      name: Web-Server
      state: present

  - name: Ensure latest index.html file is present
    win_copy:
      src: files/index.html
      dest: c:\www\

  - name: Ensure IIS is started
    win_service:
      name: "{{ service_name }}"
      state: started
```

Privilege escalation

```
---
- name: Ensure IIS is installed and started
  hosts: web
  become: yes
  vars:
    service_name: IIS Admin Service

  tasks:
  - name: Ensure IIS Server is present
    win_feature:
      name: Web-Server
      state: present

  - name: Ensure latest index.html file is present
    win_copy:
      src: files/index.html
      dest: c:\www\

  - name: Ensure IIS is started
    win_service:
      name: "{{ service_name }}"
      state: started
```

Plays variables

```
---
- name: Ensure IIS is installed and started
  hosts: web
  become: yes
  vars:
    service_name: IIS Admin Service

  tasks:
  - name: Ensure IIS Server is present
    win_feature:
      name: Web-Server
      state: present

  - name: Ensure latest index.html file is present
    win_copy:
      src: files/index.html
      dest: c:\www\

  - name: Ensure IIS is started
    win_service:
      name: "{{ service_name }}"
      state: started
```

Tasks

```
---
- name: Ensure IIS is installed and started
  hosts: web
  become: yes
  vars:
    service_name: IIS Admin Service

  tasks:
  - name: Ensure IIS Server is present
    win_feature:
      name: Web-Server
      state: present

  - name: Ensure latest index.html file is present
    win_copy:
      src: files/index.html
      dest: c:\www\

  - name: Ensure IIS is started
    win_service:
      name: "{{ service_name }}"
      state: started
```

Exercise 3 & 4

- Your First Playbook

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Advanced playbooks

Topics Covered:

- Templates
- Loops
- Conditionals
- Tags
- Blocks

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Doing more with playbooks

Here are some more essential playbook features that you can apply:

- Templates
- Loops
- Conditionals
- Tags
- Blocks

Doing more with playbooks: **Templates**

Ansible embeds the Jinja2 templating engine that can be used to dynamically:

- Set and modify play variables
- Conditional logic
- Generate files such as configurations from variables

Doing more with playbooks: **Loops**

Loops can do one task on multiple things, such as create a lot of users, install a lot of packages, or repeat a polling step until a certain result is reached.

```
- name: Ensure IIS Server is present
  win_feature:
    name: "{{ item }}"
    state: present
  loop:
  - Web-Server
  - NET-Framework-Core
```

Doing more with playbooks: **Conditionals**

Ansible supports the conditional execution of a task based on the run-time evaluation of variable, fact, or previous task result.

```
- name: Ensure IIS Server is present
  win_feature:
    name: Web-Server
    state: present
  when: ansible_os_family == "Windows"
```

Doing more with playbooks: **Tags**

Tags are useful to be able to run a subset of a playbook on-demand.

```
- name: Ensure IIS Server is present
  win_feature:
    name: "{{ item }}"
    state: present
  with_items:
  - Web-Server
  - NET-Framework-Core
  tags:
    - packages

- name: Copy web.config template to Server
  win_template:
    src: templates/web.config.j2
    dest: C:\inetpub\wwwroot\web.config
  tags:
    - configuration
```

Doing more with playbooks: **Blocks**

Blocks cut down on repetitive task directives, allow for logical grouping of tasks and even in play error handling.

```
- block:
  - name: Ensure IIS Server is present
    win_feature:
      name: "{{ item }}"
      state: present
    with_items:
    - Web-Server

  - name: Copy web.config template to Server
    win_template:
      src: templates/web.config.j2
      dest: C:\inetpub\wwwroot\web.config

  when: ansible_os_family == "Windows"
```

Exercise 5

- Practical Playbook Development

Red Hat
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Platform

Sharing automation

Topics Covered:

- Roles
- Galaxy

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Roles

Roles are a packages of closely related Ansible content that can be shared more easily than plays alone.

- Improves readability and maintainability of complex plays
- Eases sharing, reuse and standardization of automation processes
- Enables Ansible content to exist independently of playbooks, projects -- even organizations
- Provides functional conveniences such as file path resolution and default values

Roles

Project with Embedded Roles Example

```
site.yml
roles/
  common/
    files/
    templates/
    tasks/
    handlers/
    vars/
    defaults/
    meta/
```

```
  iis/
    files/
    templates/
    tasks/
    handlers/
    vars/
    defaults/
    meta/
```

Roles

Project with Embedded Roles Example

```
# site.yml
---
- name: Execute common and iis role
  hosts: web
  roles:
    - common
    - iis
```

Roles

http://galaxy.ansible.com

Ansible Galaxy is a hub for finding, reusing and sharing Ansible content.

Jump-start your automation project with content contributed and reviewed by the Ansible community.

Exercise 6

- A Playbook Using Roles

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Next Steps

GET STARTED

ansible.com/get-started

ansible.com/tower-trial

JOIN THE COMMUNITY

ansible.com/community

WORKSHOPS & TRAINING

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Red Hat Training

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Thank you


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