Red Hat
Ansible Automation
Platform

Getting Started with Ansible

What is the Red Hat Ansible Automation Platform?

The Ansible project is an open source community sponsored by Red Hat. It's also a simple automation language that perfectly describes IT application environments in Ansible Playbooks.

Ansible Engine is a supported product built from the Ansible community project.

Ansible Tower is an enterprise framework for controlling, securing, managing and extending your Ansible automation (community or engine) with a UI and RESTful API.

Why Ansible?

Simple

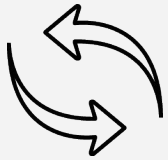
Human readable automation

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

With Ansible you can automate:

CROSS PLATFORM – Linux, Windows, UNIX

Agentless support for all major OS variants, physical, virtual, cloud and network

HUMAN READABLE – YAML

Perfectly describe and document every aspect of your application environment

PERFECT DESCRIPTION OF APPLICATION

Every change can be made by playbooks, ensuring everyone is on the same page

VERSION CONTROLLED

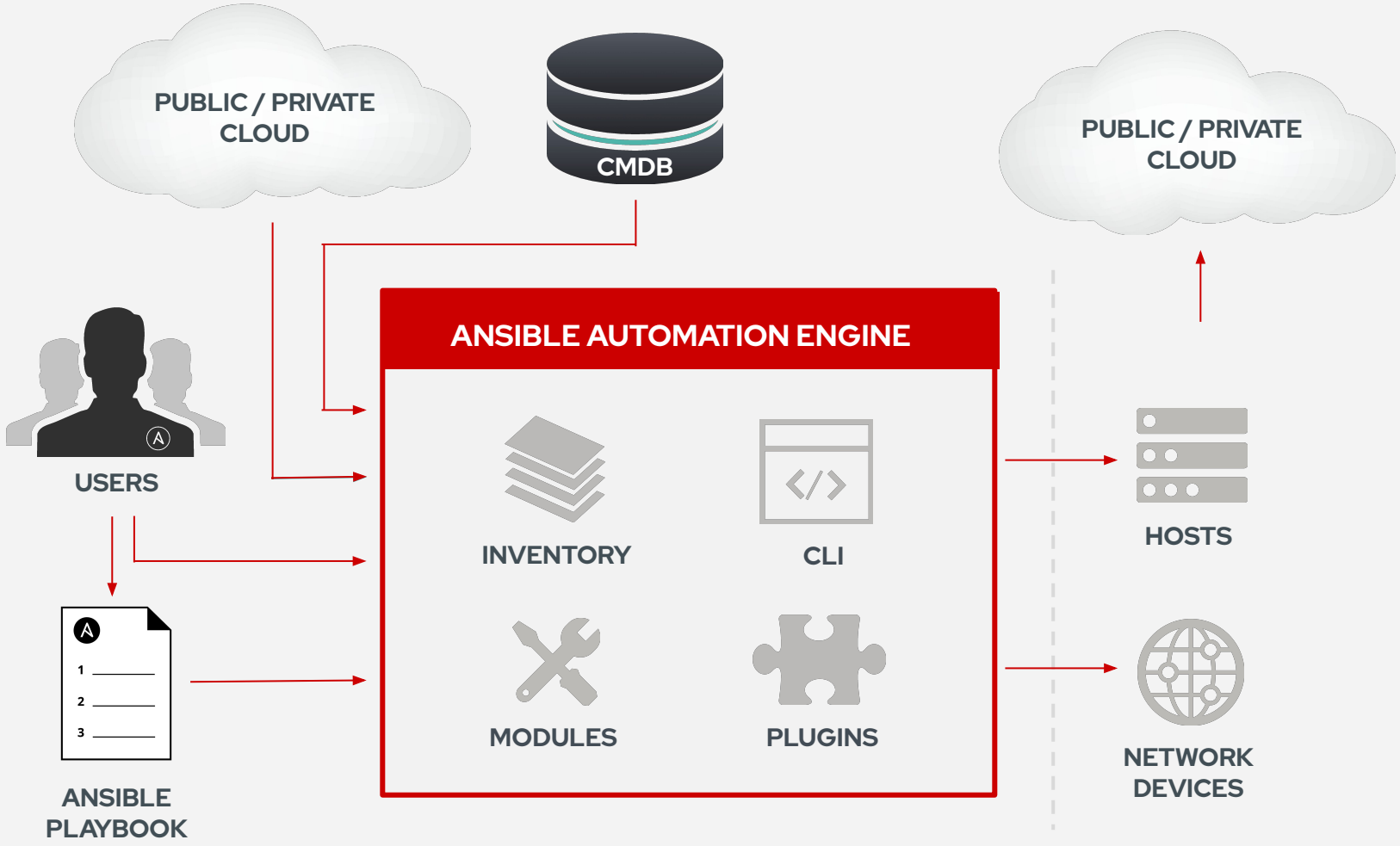
Playbooks are plain-text. Treat them like code in your existing version control.

DYNAMIC INVENTORIES

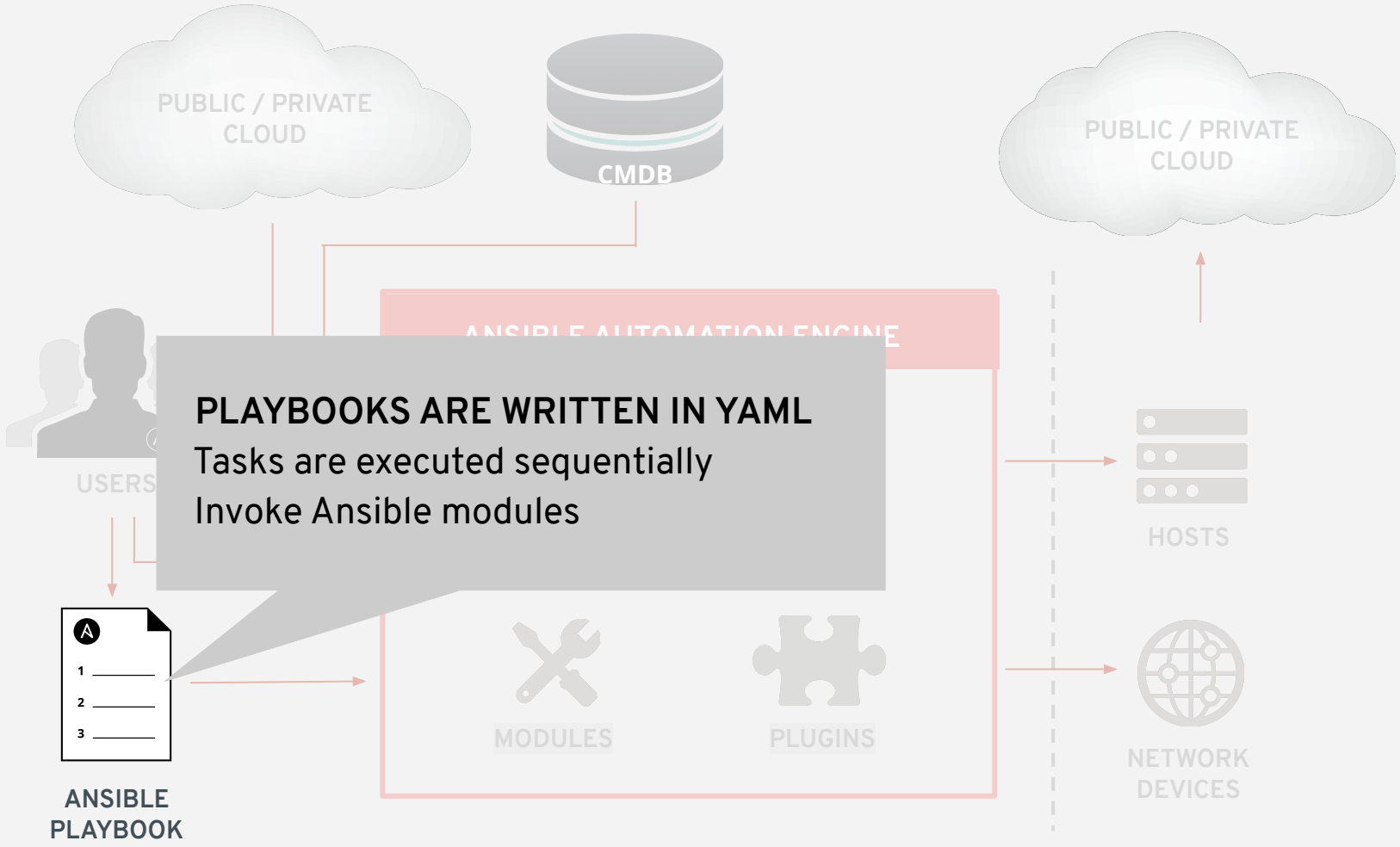
Capture all the servers 100% of the time, regardless of infrastructure, location, etc.

ORCHESTRATION THAT PLAYS WELL WITH OTHERS – HP SA, Puppet, Jenkins, RHNSS, etc.

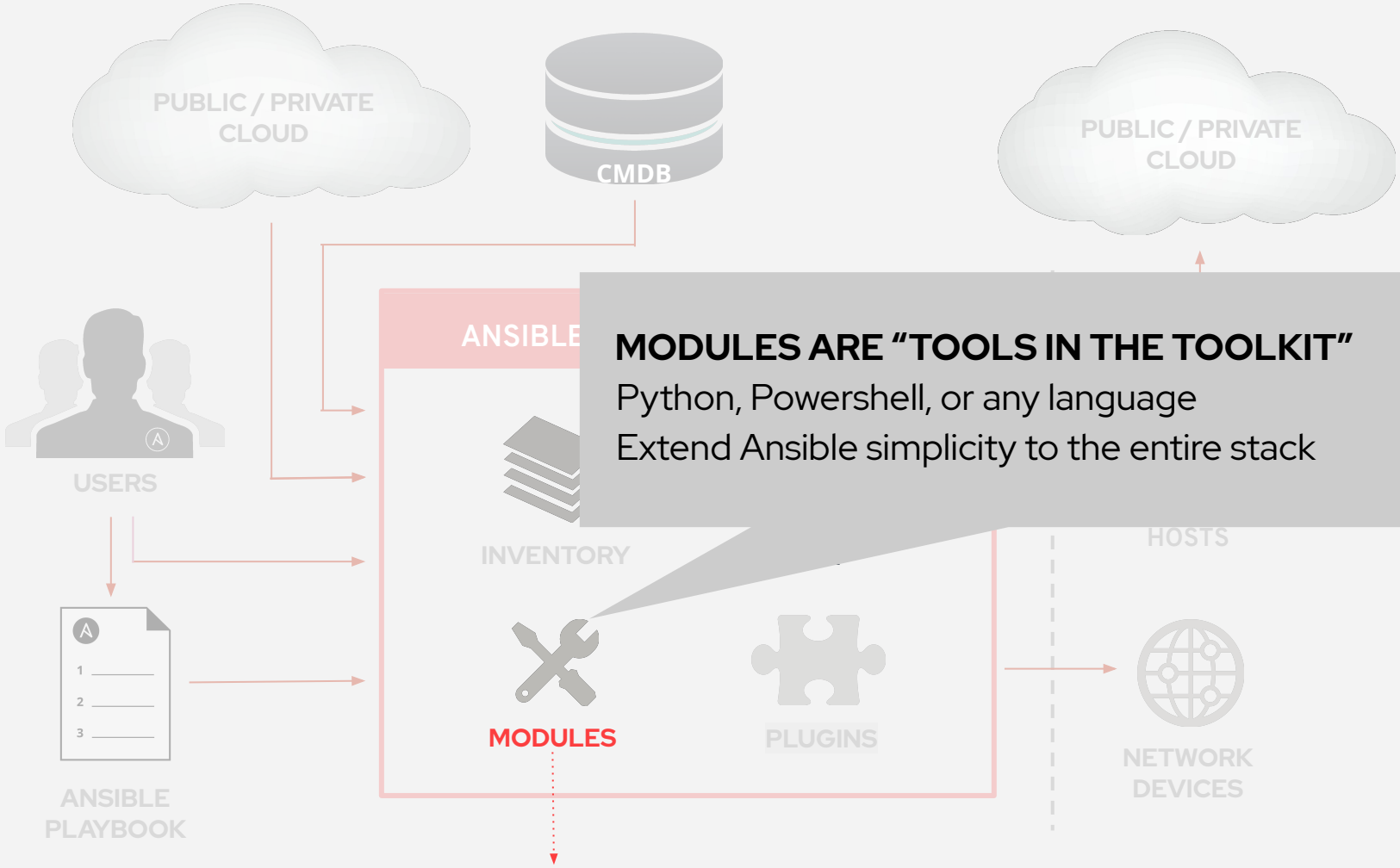
Homogenize existing environments by leveraging current toolsets and update mechanisms.


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

Red Hat


PUBLIC / PRIVATE CLOUD
CMDB
PUBLIC / PRIVATE CLOUD
USERS
PLAYBOOKS ARE WRITTEN IN YAML
Tasks are executed sequentially
Invoke Ansible modules
HOSTS
1
2
3
MODULES
PLUGINS
NETWORK DEVICES
ANSIBLE PLAYBOOK

Red Hat



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/
```

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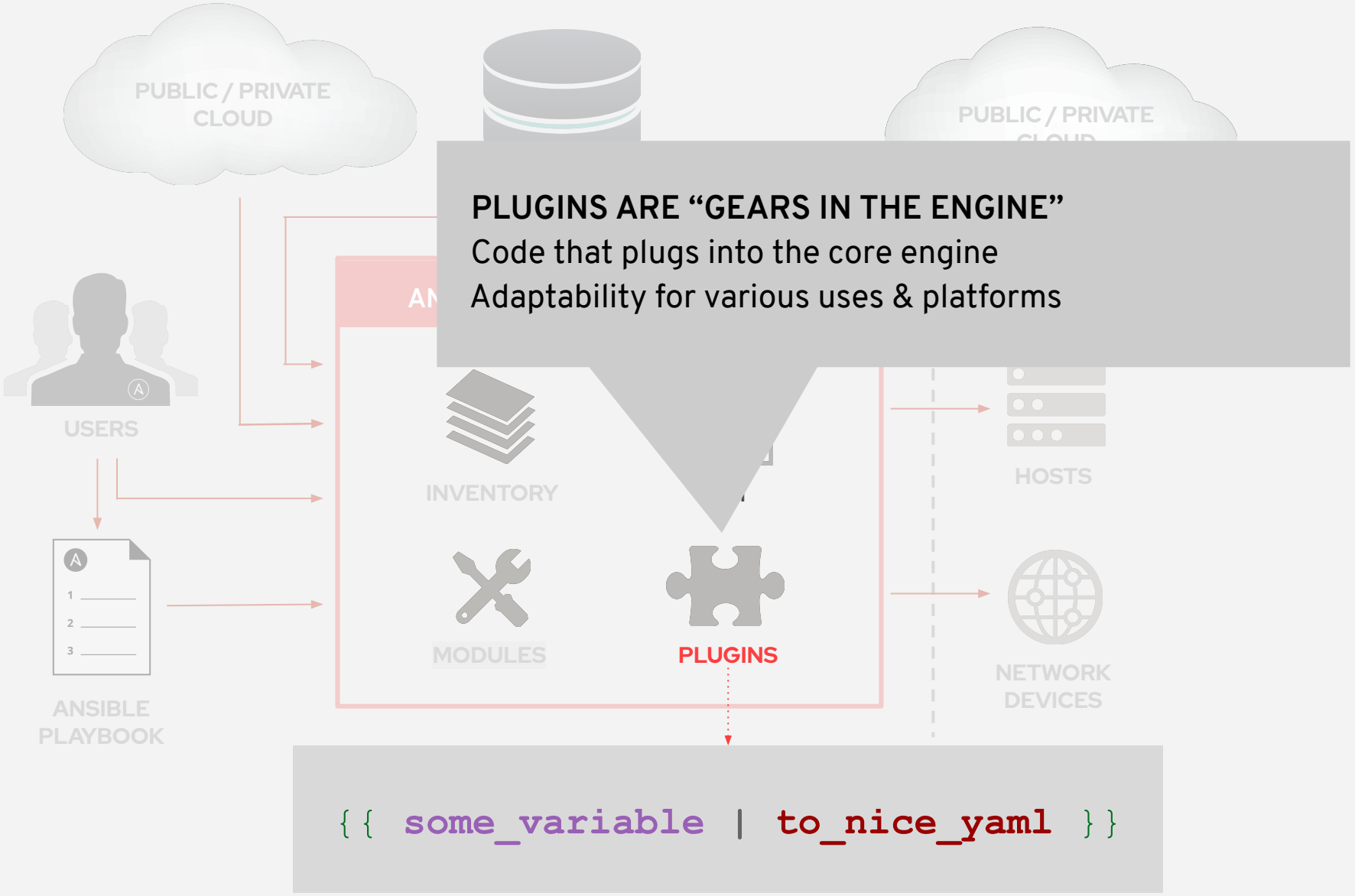
PUBLIC / PRIVATE CLOUD
PUBLIC / PRIVATE
USERS
INVENTORY
HOSTS
MODULES
PLUGINS
NETWORK DEVICES
ANSIBLE PLAYBOOK
PLUGINS ARE “GEARS IN THE ENGINE”
Code that plugs into the core engine
Adaptability for various uses & platforms
{{ some_variable | to_nice_yaml }}

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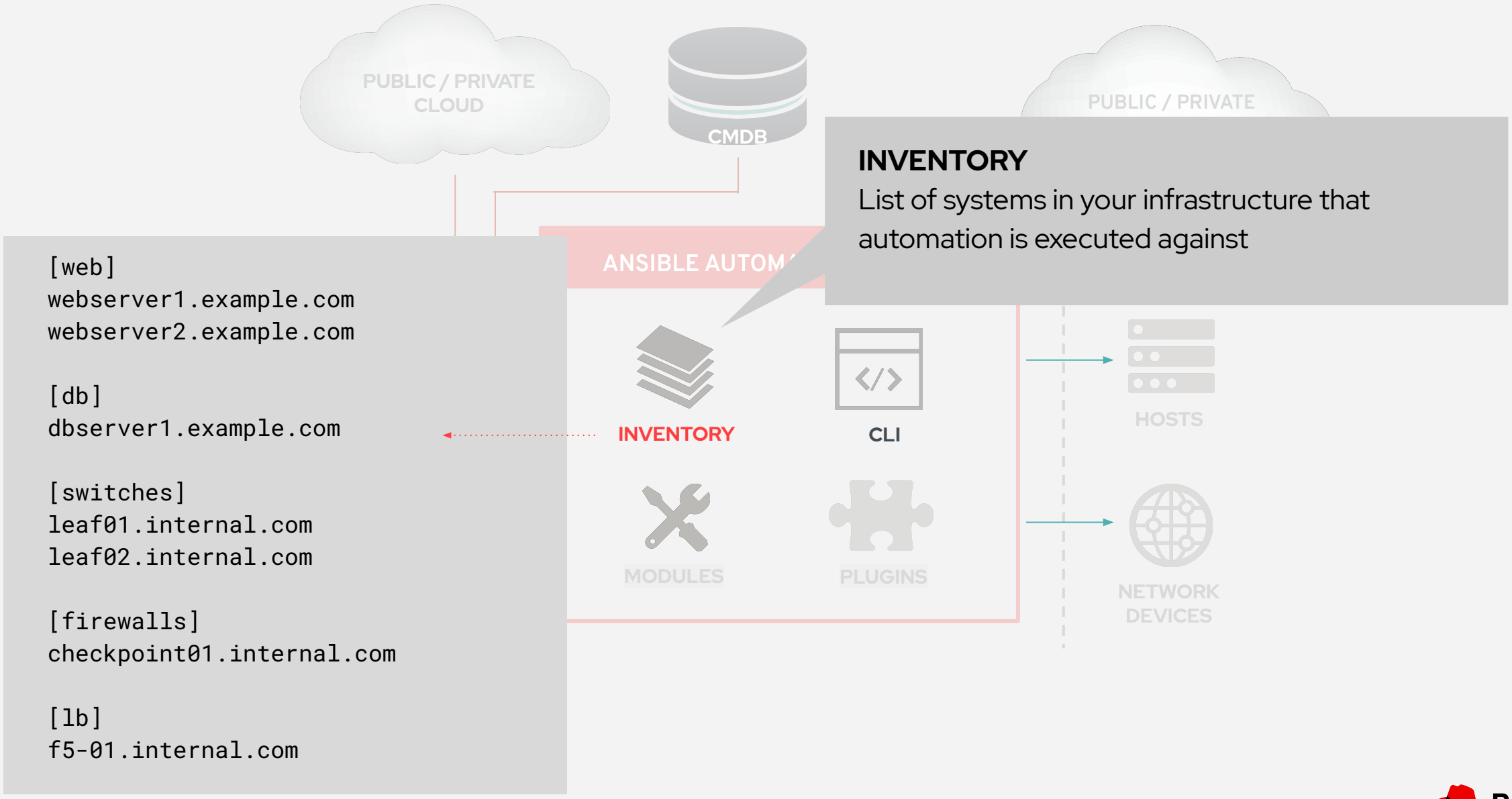
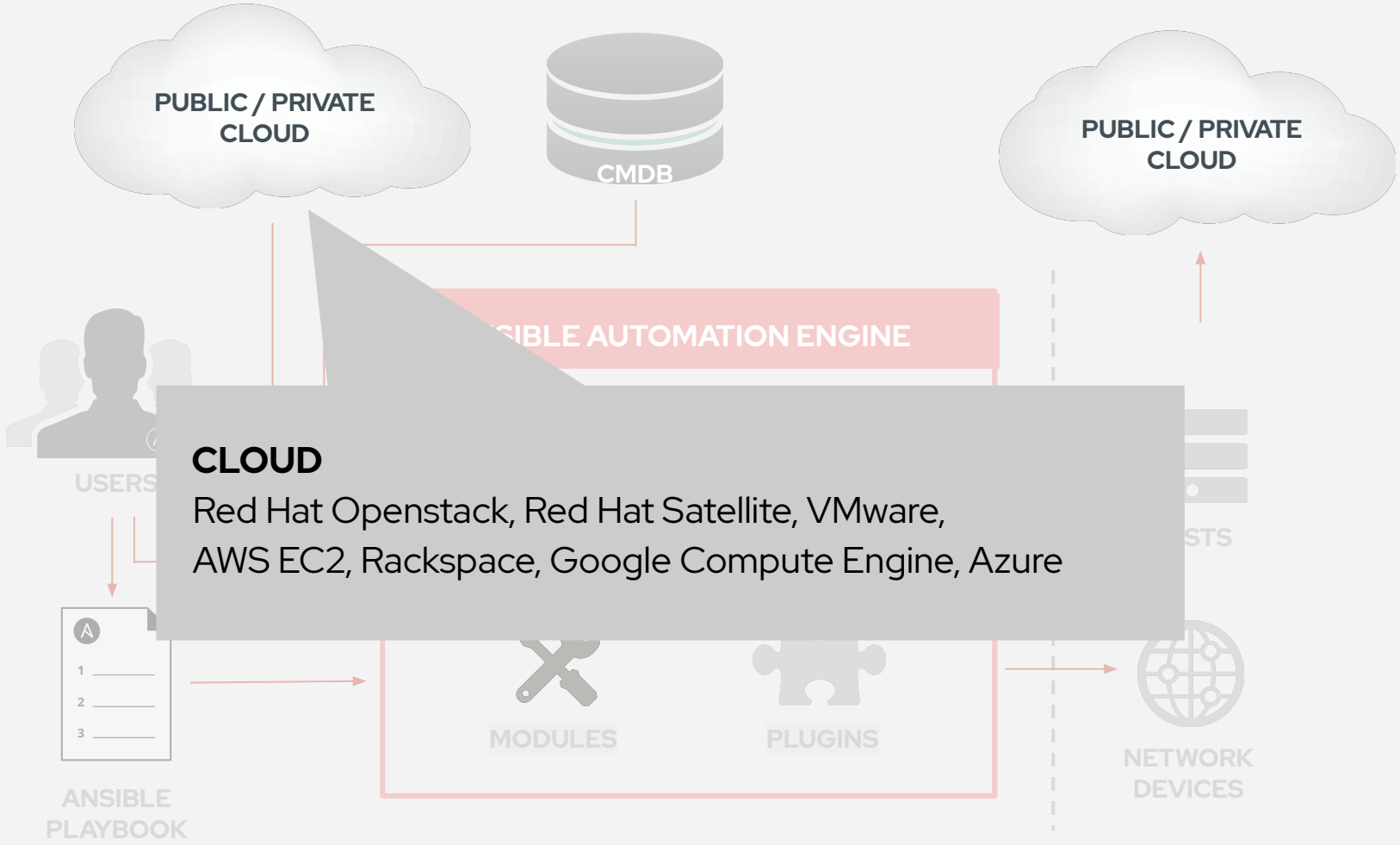

PUBLIC / PRIVATE CLOUD
CMDB
PUBLIC / PRIVATE
INVENTORY
List of systems in your infrastructure that automation is executed against
[web]
webserver1.example.com
webserver2.example.com
[db]
dbserver1.example.com
[switches]
leaf01.internal.com
leaf02.internal.com
[firewalls]
checkpoint01.internal.com
[lb]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

Red Hat



CLOUD

Red Hat Openstack, Red Hat Satellite, VMware,
AWS EC2, Rackspace, Google Compute Engine, Azure

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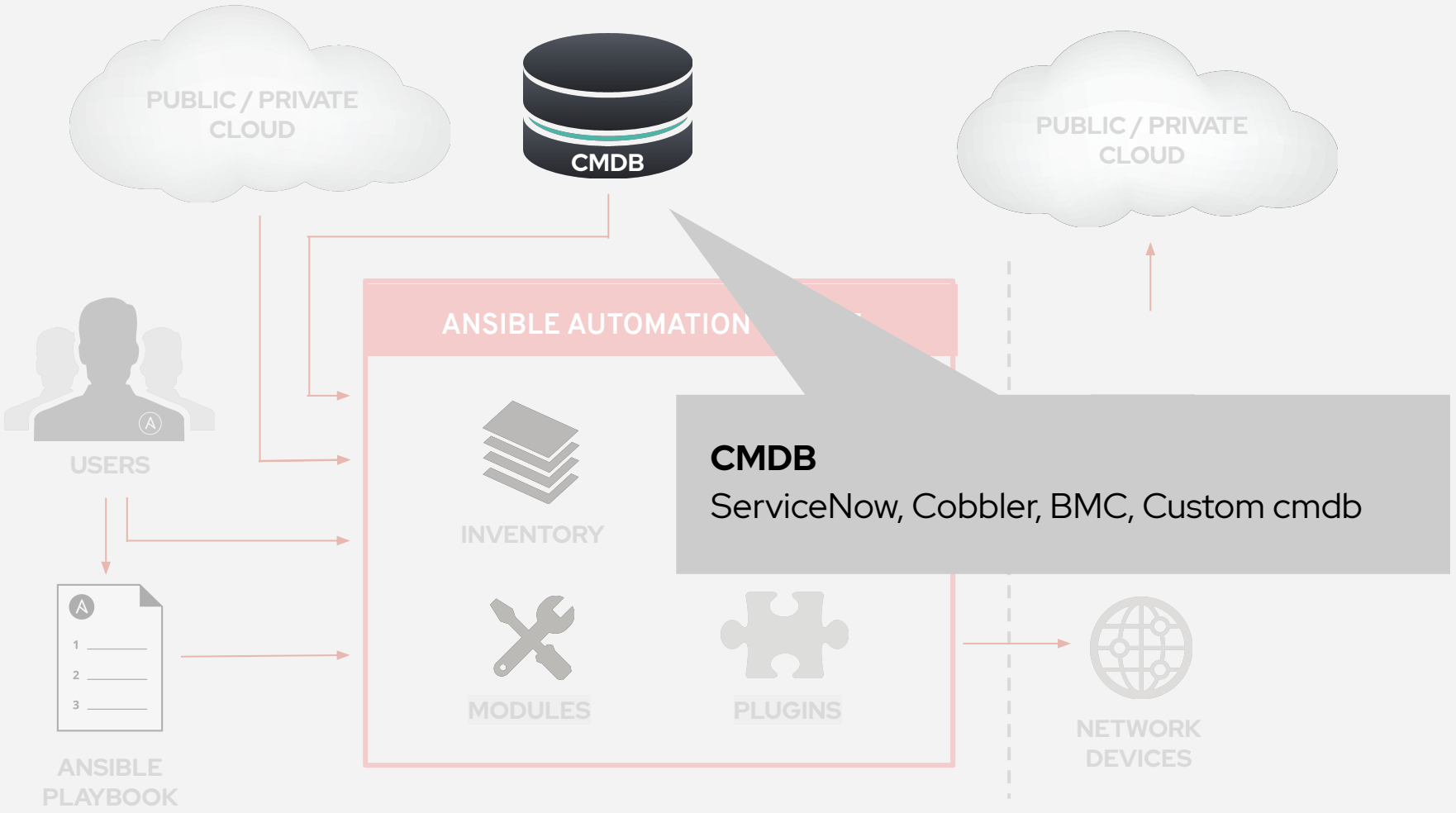
PUBLIC / PRIVATE CLOUD
CMDB
PUBLIC / PRIVATE CLOUD
ANSIBLE AUTOMATION
USERS
INVENTORY
CMDB
ServiceNow, Cobbler, BMC, Custom cmdb
MODULES
PLUGINS
NETWORK DEVICES
ANSIBLE PLAYBOOK

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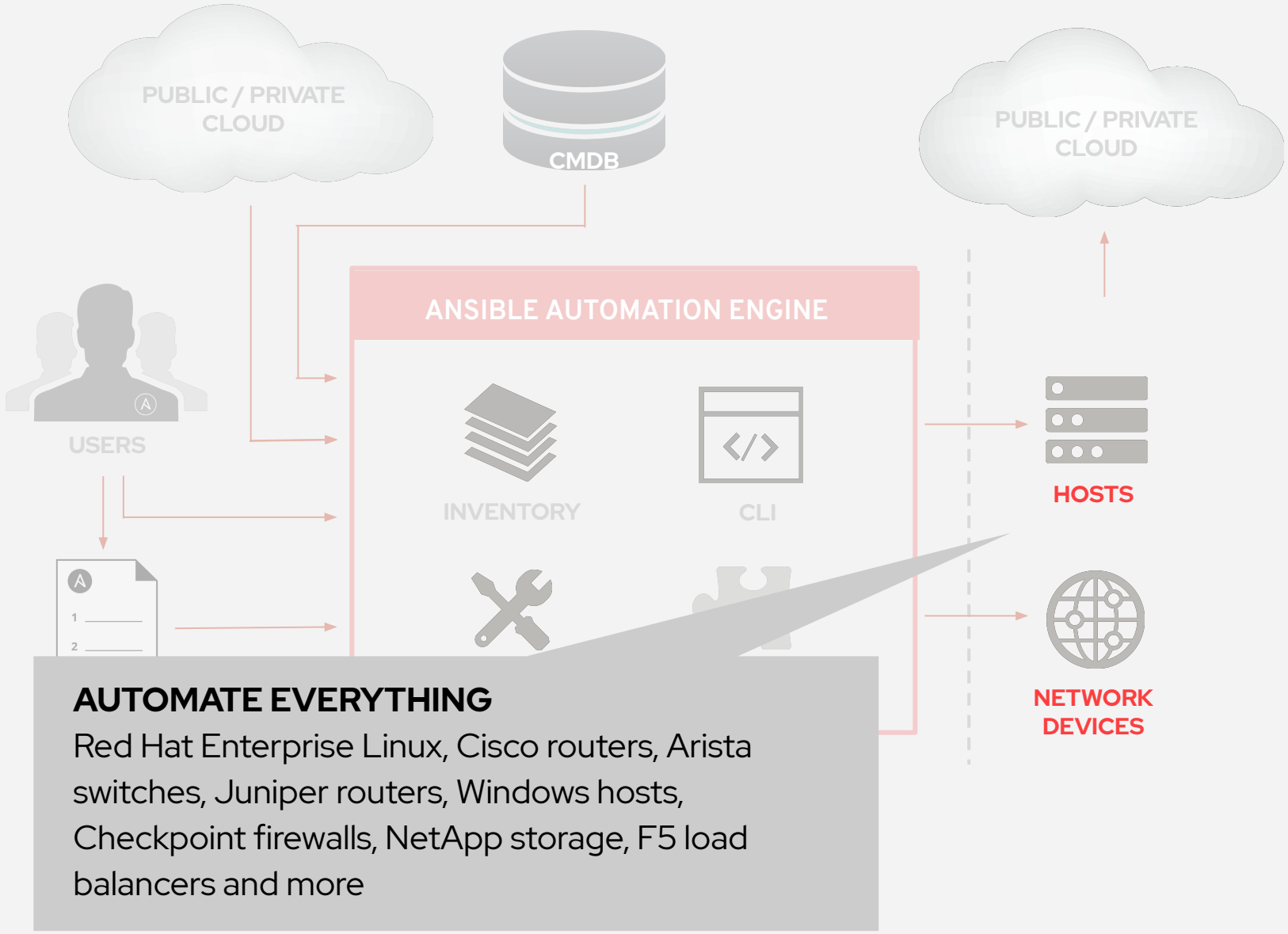
PUBLIC / PRIVATE CLOUD
CMDB
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ANSIBLE AUTOMATION ENGINE
USERS
INVENTORY
CLI
HOSTS
NETWORK DEVICES
AUTOMATE EVERYTHING
Red Hat Enterprise Linux, Cisco routers, Arista switches, Juniper routers, Windows hosts, Checkpoint firewalls, NetApp storage, F5 load balancers and more

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Using Ansible

Ad-hoc commands

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

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

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

Ad-hoc example

Inventory

An inventory is a file containing:

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

Ansible Playbooks

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```
---
- name: install and start apache
  hosts: web
  vars:
    http_port: 80
    max_clients: 200
  remote_user: root

  tasks:
  - name: install httpd
    yum: pkg=httpd state=latest
  - name: write the apache config file
    template: src=/srv/httpd.j2 dest=/etc/httpd.conf
  - name: start httpd
    service: name=httpd state=started
```

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    template: src=/srv/httpd.j2 dest=/etc/httpd.conf
  - name: start httpd
    service: name=httpd state=started
```

```
tasks:
  - name: add cache dir
    file:
      path: /opt/cache
      state: directory

  - name: install nginx
    yum:
      name: nginx
      state: latest
    notify: restart nginx

handlers:
  - name: restart nginx
    service:
      name: nginx
      state: restarted
```

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

Tips/Best Practices

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Simplicity

Simplicity

```
- hosts: web
  tasks:
  - yum:
      name: httpd
      state: latest


  - service:
      name: httpd
      state: started
      enabled: yes
```

Simplicity

```
- hosts: web
  name: install and start apache
  tasks:
    - name: install apache packages
      yum:
        name: httpd
        state: latest

    - name: start apache service
      service:
        name: httpd
        state: started
        enabled: yes
```

Naming example

Inventory

```
10.1.2.75
10.1.5.45
10.1.4.5
10.1.0.40

w14301.example.com
w17802.example.com
w19203.example.com
w19304.example.com
```

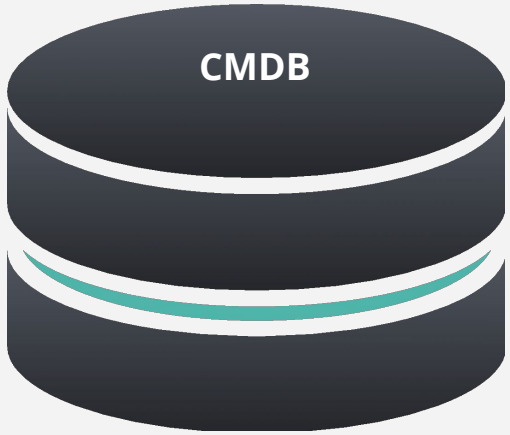
Inventory

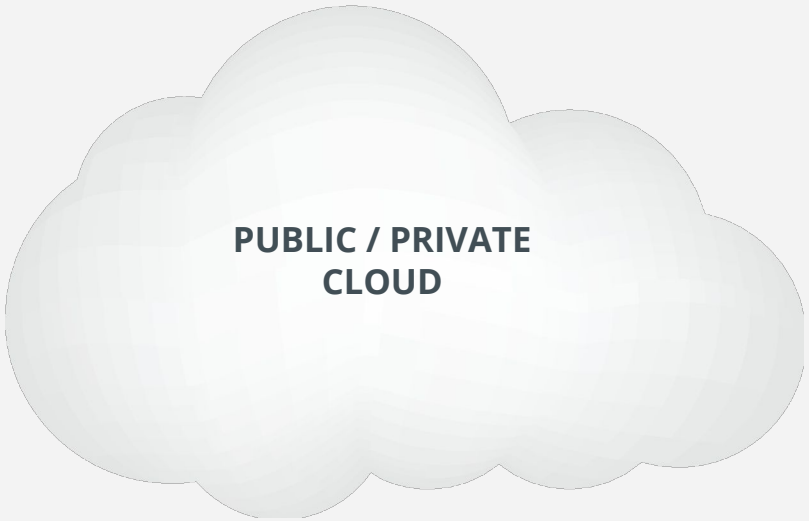
```
db1  ansible_host=10.1.2.75
db2  ansible_host=10.1.5.45
db3  ansible_host=10.1.4.5
db4  ansible_host=10.1.0.40

web1 ansible_host=w14301.example.com
web2 ansible_host=w17802.example.com
web3 ansible_host=w19203.example.com
web4 ansible_host=w19203.example.com
```

Dynamic Inventories

- Stay in sync automatically
- Reduce human error





YAML Syntax

YAML and Syntax

```
- name: install telegraf
  yum: name=telegraf-{{ telegraf_version }} state=present update_cache=yes
disable_gpg_check=yes enablerepo=telegraf
  notify: restart telegraf

- name: configure telegraf
  template: src=telegraf.conf.j2 dest=/etc/telegraf/telegraf.conf

- name: start telegraf
  service: name=telegraf state=started enabled=yes
```

YAML and Syntax

```
- name: install telegraf
  yum: >
      name=telegraf-{{ telegraf_version }}
      state=present
      update_cache=yes
      disable_gpg_check=yes
      enablerepo=telegraf
  notify: restart telegraf

- name: configure telegraf
  template: src=telegraf.conf.j2 dest=/etc/telegraf/telegraf.conf

- name: start telegraf
  service: name=telegraf state=started enabled=yes
```

YAML and Syntax

```
- name: install telegraf
  yum:
    name: telegraf-{{ telegraf_version }}
    state: present
    update_cache: yes
    disable_gpg_check: yes
    enablerepo: telegraf
  notify: restart telegraf

- name: configure telegraf
  template:
    src: telegraf.conf.j2
    dest: /etc/telegraf/telegraf.conf
  notify: restart telegraf

- name: start telegraf
  service:
    name: telegraf
    state: started
    enabled: yes
```

```
ansible-playbook playbook.yml --syntax-check
```

Roles

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Roles

- **Think about the full life-cycle of a service, microservice or container – not a whole stack or environment**
- **Keep provisioning separate from configuration and app deployment**
- **Roles are not classes or object or libraries – those are programming constructs**
- **Keep roles loosely-coupled – limit hard dependencies on other roles or external variables**

Variable Precedence

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

Variable Precedence

1. Extra vars
2. Include params
3. Role (and include_role) params
4. Set_facts / registered vars
5. Include_vars
6. Task vars (only for the task)
7. Block vars (only for tasks in the block)
8. Role vars
9. Play vars_files
10. Play vars_prompt
11. Play vars
12. Host facts / Cached set_facts
13. Playbook host_vars
14. Inventory host_vars
15. Inventory file/script host vars
16. Playbook group_vars
17. Inventory group_vars
18. Playbook group_vars/all
19. Inventory group_vars/all
20. Inventory file or script group vars
21. Role defaults
22. Command line values (*e.g.*, -u user)

Things to Avoid

Things to Avoid

- Using command modules
  - Things like shell, raw, command etc.
- Complex tasks...at first
  - Start small
- Not using source control
  - But no really...

Ansible Content Collections

Collections Q and A

What are they?

- Collections are a distribution format for Ansible content that can include playbooks, roles, modules, and plugins. You can install and use collections through Ansible Galaxy and Automation Hub

How do I get them?

- ansible-galaxy collection install namespace.collection -p /path

Where can I get them?

- Today
  - Galaxy
  - Automation Hub

Collection Directory Structure

- **docs/**: local documentation for the collection
- **galaxy.yml**: source data for the MANIFEST.json that will be part of the collection package
- **playbooks/**: playbook snippets
  - **tasks/**: holds 'task list files' for include_tasks/import_tasks usage
- **plugins/**: all ansible plugins and modules go here, each in its own subdir
  - **modules/**: ansible modules
  - **lookups/**: lookup plugins
  - **filters/**: Jinja2 filter plugins
  - **connection/**: connection plugins required if not using default
- **roles/**: directory for ansible roles
- **tests**/: tests for the collection's content

Collections: Let's Go!

1. Init collection: `ansible-galaxy collection init foo.bar`
2. Sanity testing: `ansible-test sanity`
3. Unit tests: `ansible-test units`
4. Integration tests: `ansible-test integration`
5. Build the collection: `ansible-galaxy collection build`
6. Publish the collection: `ansible-galaxy collection publish`
7. Install the collection: `ansible-galaxy collection install foo.bar`

Thank you

Questions?


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Resource Link Index

https://docs.ansible.com/ansible/latest/user_guide/playbooks_variables.html#variable-precedence-where-should-i-put-a-variable
https://docs.ansible.com/ansible/latest/user_guide/playbooks_variables.html#using-variables
https://docs.ansible.com/ansible/latest/user_guide/playbooks_intro.html
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https://github.com/ansible/ansible-lint
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