

Ansible Overview

Simple Orchestration for your infrastructure culture

Goals

DevOps & Infrastructure Culture

- Configuration management
- DevOps enabling technology

Ansible Overview

- Python + Yaml + SSH
- Secrets
- Learning curve
- Idempotent
- Orchestration
- CLI & Playbooks
- Ansible vs.....

Tower Overview

- Users
- Teams
- Security
- Secrets
- CI/CD
- Clouds

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STANCEWORK.COM - MBURGUGHS



DevOps & Infrastructure Culture

Enabling the business to conduct business

What is Configuration Management?

*infrastructure as code
rebuild business from git
servers in a state
no snowflakes*

What is Server State?

*a known state defined in code
repeatable
always known
no snowflakes*

What is Infrastructure Culture?



define: culture

The set of predominating attitudes and behavior that characterize a group or organization (or computers)

What is DevOps?

DevOps Borat
@DEVOPS_BORAT

In devops is success 5% inspiration, 15% git clone, 25% copy and paste and 55% bulls**t.

RETWEETS 278 FAVORITES 70

*Now hiring!
DevOps Engineers!*

*The DevOps Team
company sponsored DevOps initiative*

everyone needs to learn more DevOps

#DevOps



Patrick Debois
@patrickdebois

Gene Kim
@RealGeneKim



the Devops movement is attempting to encourage the development of communication skills, understanding of the domain in which the software is being written, and, crucially, a sensitivity and passion for the underlying business, and for ensuring it succeeds.

DevOps is a culture
Empathy + Simplicity= a DevOps Culture

The DevOps Team

Now hiring!
DevOps Engineers!

read this great DevOps blog post

company sponsored DevOps initiative

everyone needs to learn more DevOps

#DevOps

:%s/devops/empathy/g

The Empathy Team

Now hiring!
Empathy Engineers!

read this great Empathy blog post
company sponsored Empathy initiative
everyone needs to learn more Empathy

#Empathy

What is empathy?

Empowerment is empathy

Ops & Dev give each other the access they need to make changes in each others worlds

How to get to a DevOps Culture

simple tools
right tool for the job
shared responsibilities
shared ownership
shared vision of the business
empowerment!
no more “re-”deployments
no more migrations
only “deployments”

DevOps enabling technology

?

Ansible Overview

Do not reinvent the wheel
Keep it simple

Two Modes of Operation

- Ansible CLI

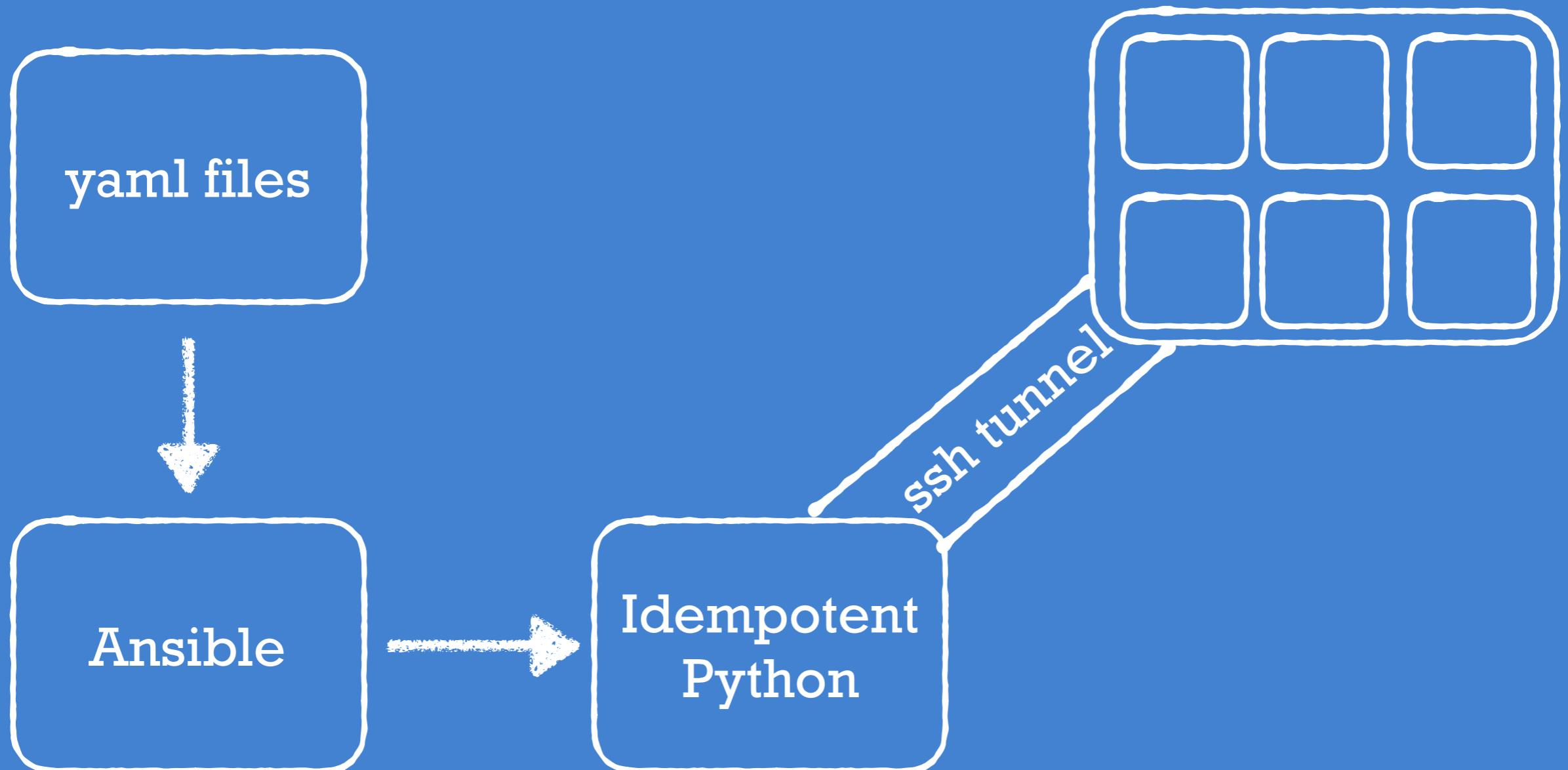
```
2.2.3 in spudbud/
> ansible -i "fed22," -m command -a "cat /etc/redhat-release" all
fed22 | success | rc=0 >>
Fedora release 22 (Twenty Two)
```

Run Linux commands or -

```
--version          SHOW PROGRAM'S VERSION NUMBER AND EXIT
2.2.3 in ServerDelivery/ on master
> ansible -i "fed22,centold," -m user -a "name=bmw325 state=present" all -s
fed22 | success >> {
    "append": false,
    "changed": false,
    "comment": "",
    "group": 1004,
    "home": "/home/bmw325",
    "move_home": false,
    "name": "bmw325",
    "shell": "/bin/bash",
    "state": "present",
    "uid": 1003
}
```

Ansible modules on 1 or 1,000s of servers

Python + Yaml + SSH



SSH

working great since 1995
free VPN
sftp scp sshd

ssh

ssh

ssh

ssh

ssh

ssh

ansible traffic

ssh

ssh

ssh

ssh

ssh

ssh

AES-256

2.2.3 in Ansible/

```
> ansible-vault create bmw325  
Vault password:  
Confirm Vault password:
```

2.2.3 in Ansible/

```
> cat bmw325  
$ANSIBLE_VAULT;1.1;AES256  
38633437626634333432326237303931363832613833643163366462376436303037376430323732  
3930376236396364623062326338653935303932613934330a643036633734613264396434393535  
663362376231643838333138323937393866643166626234336266393033663261366137393933  
3562633035393665660a3864636663306332383135663633313035653439338626265613366234  
62383430376136663365383439313265616331396630366533613865386137616230343762356331  
34386138613065363530376361343662323266643538323136323831363630646532326365626539  
653633623034313563323539666330383439
```

2.2.3 in Ansible/

```
> ansible-vault decrypt bmw325  
Vault password:  
Decryption successful
```

2.2.3 in Ansible/

```
> cat bmw325  
best daily driving car ever built by human hands.
```

Learning curve

5 minutes

```
Ansible-ApacheTomcat
  main.yml
  1  ---
  2  # tasks file for tomcat
  3
  4  - name: ensure Tomcat is installed
  5  yum:
  6    name: tomcat
  7    state: latest
  8
  9  - name: print out Tomcat version
 10 shell: /usr/sbin/tomcat version
 11 register: result
 12
 13 - debug: var=result
 14
 15 - name: deploy the Tomcat sample app to webapps
 16 copy:
 17   src: files/sample.war
 18   dest: /usr/share/tomcat/webapps/
 19   owner: root
 20   group: root
 21   mode: 0644
 22
 23 - name: ensure Tomcat is started at boot time and always running
 24 service:
 25   name: tomcat
 26   state: started
 27   enabled: yes
 28
```

Ansible-ApacheTomcat

main.yml

```
1  ---
2  # tasks file for tomcat
3
4  - name: ensure Tomcat is installed
5    yum:
6      name: tomcat
7      state: latest
8
9  - name: print out Tomcat version
10   shell: /usr/sbin/tomcat version
11   register: result
12
13 - debug: var=result
14
15 - name: deploy the Tomcat sample app to verify
16   copy:
17     src: files/sample.war
18     dest: /usr/share/tomcat/webapps/
19     owner: root
20     group: root
21     mode: 0644
22
23 - name: ensure Tomcat is started at boot time and always running
24   service:
25     name: tomcat
26     state: started
27     enabled: yes
28
```

Permission not needed

```
,
```

2.2.3 in Ansible/

```
> ssh fed22
Last login: Tue Oct 27 05:17:23 2015 from 66.235.30.217
[root@fed22 ~]# exit
logout
Shared connection to 159.203.241.47 closed.
```

2.2.3 in Ansible/

```
> ansible -i "fed22," -m ping all
fed22 | success >> {
    "changed": false,
    "ping": "pong"
}
```

Idempotent

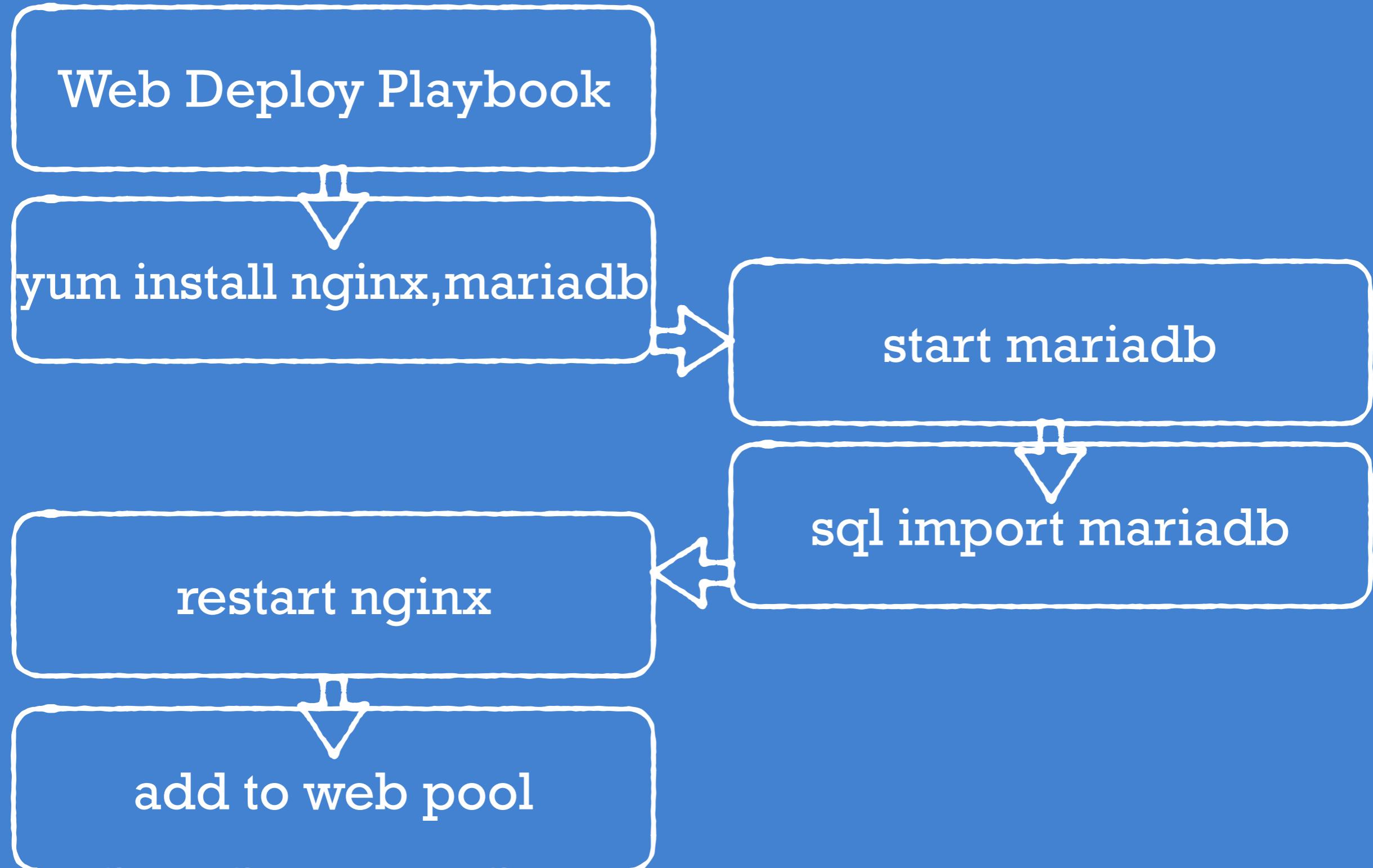
2.2.3 in Ansible/

```
> ansible -i "fed22," -m dnf -a "name=htop state=present" all
fed22 | success >> {
  "changed": true,
  "msg": "",
  "rc": 0,
  "results": [
    "Last metadata expiration check performed 0:26:14 ago on Tue Nov 10 22:05:56 2015.\nDependencies
=====
=====\n Package      Arch      Version      Repository      Size\n=====
=====\nInstalling:\n htop      x86_64    1.0.3-4.fc22    fedora      91 k\n\nTransaction test\nTransaction test succeeded.\nRunning transaction\n  Installing : htop-1.0.3-4.fc22.x86_64
x86_64
]
}
```

2.2.3 in Ansible/

```
> ansible -i "fed22," -m dnf -a "name=htop state=present" all
fed22 | success >> {
  "changed": false,
  "msg": "",
  "rc": 0,
  "results": [
    "htop-1.0.3-4.fc22.x86_64 providing htop is already installed"
]
}
```

Orchestration by default



DevOps Discussion

Ansible CLI

A tool in the SysAdmins toolbox

run *idempotent* linux commands

```
2.2.3 in Ansible/
> ansible -i "fed22," -m dnf -a "name=htop state=present" all
fed22 | success >> {
  "changed": true,
  "msg": "",
  "rc": 0,
  "results": [
    "Last metadata expiration check performed 0:26:14 ago on Tue Nov 10 22:05:56 2015.\nDependencies
=====\\n Package      Arch      Version      Repository      Size\\n=====
==\\nInstalling:\\n htop      x86_64      1.0.3-4.fc22      fedora      91 k\\n\\nTrans
=====\\nInstall 1 Package\\n\\nTotal download size: 91 k\\n\\nInstalled size: 180 k\\nDownload
-----\\nTotal                           105 kB/s |  91 kB   00:00
ction test\\nTransaction test succeeded.\\nRunning transaction\\n  Installing : htop-1.0.3-4.fc22.x86_64
x86_64                           1/1 \\n\\nInstalled:\\n  htop.x86_64 1.0.3-4.fc22
  ]
}

2.2.3 in Ansible/
> ansible -i "fed22," -m dnf -a "name=htop state=present" all
fed22 | success >> {
  "changed": false,
  "msg": "",
  "rc": 0,
  "results": [
    "htop-1.0.3-4.fc22.x86_64 providing htop is already installed"
  ]
}
```

on 1 or 10,000 servers

modules

ANSIBLE

Introduction

Quickstart Video

Playbooks

Playbooks: Special Topics

About Modules

Module Index

All Modules

Cloud Modules

Clustering Modules

Commands Modules

Database Modules

Files Modules

Inventory Modules

Messaging Modules

Monitoring Modules

Network Modules

Notification Modules

Packaging Modules

Source Control Modules

System Modules

Utilities Modules

Web Infrastructure Modules

Docs » System Modules

System Modules

- [alternatives \(E\)](#) - Manages alternative programs for common commands
- [at \(E\)](#) - Schedule the execution of a command or script file via the at command.
- [authorized_key](#) - Adds or removes an SSH authorized key
- [capabilities \(E\)](#) - Manage Linux capabilities
- [cron](#) - Manage cron.d and crontab entries.
- [cronvar \(E\)](#) - Manage variables in crontabs
- [crypttab \(E\)](#) - Encrypted Linux block devices
- [debconf \(E\)](#) - Configure a .deb package
- [facter \(E\)](#) - Runs the discovery program *facter* on the remote system
- [filesystem \(E\)](#) - Makes file system on block device
- [firewalld \(E\)](#) - Manage arbitrary ports/services with firewalld
- [getent \(E\)](#) - a wrapper to the unix getent utility
- [gluster_volume \(E\)](#) - Manage GlusterFS volumes
- [group](#) - Add or remove groups
- [hostname](#) - Manage hostname
- [iptables \(E\)](#) - Modify the systems iptables
- [kernel_blacklist \(E\)](#) - Blacklist kernel modules
- [known_hosts \(E\)](#) - Add or remove a host from the ``known_hosts`` file
- [locale_gen \(E\)](#) - Creates or removes locales.
- [lvg \(E\)](#) - Configure LVM volume groups
- [lvol \(E\)](#) - Configure LVM logical volumes
- [modprobe \(E\)](#) - Add or remove kernel modules
- [mount](#) - Control active and configured mount points
- [ohai \(E\)](#) - Returns inventory data from *Ohai*
- [open_iscsi \(E\)](#) - Manage iscsi targets with open-iscsi

raw ssh

no python needed

```
# Bootstrap a legacy python 2.4 host
- raw: yum -y install python-simplejson
```

gather_facts

```
2.2.3 in spudbud/
> ansible -i "fed22," -m setup all
fed22 | success >> {
    "ansible_facts": {
        "ansible_all_ipv4_addresses": [
            "159.203.241.47",
            "10.134.196.100"
        ],
        "ansible_all_ipv6_addresses": [
            "fe80::601:7cff:fef1:4601",
            "fe80::601:7cff:fef1:4602"
        ],
        "ansible_architecture": "x86_64",
        "ansible_bios_date": "01/01/2011",
        "ansible_bios_version": "Bochs",
        "ansible_cmdline": {
            "BOOT_IMAGE": "/boot/vmlinuz-4.0.4-301.fc22.x86_64",
            "LANG": "en_US.UTF-8",
            "console": "tty1",
            "initrd": "/boot/initramfs-4.0.4-301.fc22.x86_64.img",
            "no_timer_check": true,
            "quiet": true,
            "rhgb": true,
            "ro": true,
            "root": "UUID=01bc7316-b1f4-45c9-a23a-00c5a2336ef2"
        },
        "ansible_distribution": "Fedora",
        "ansible_distribution_major_version": 22,
        "ansible_distribution_minor_version": 4,
        "ansible_distribution_release": "fc22",
        "ansible_distribution_version": "4.0.4-301.fc22.x86_64",
        "ansible_fqdn": "fed22",
        "ansible_hostname": "fed22",
        "ansible_lsb": {
            "id": "Fedora",
            "name": "Fedora",
            "release": "22",
            "version": "22 (Twenty Two)"
        },
        "ansible_processor": "Intel(R) Core(TM) i7-6700HQ CPU @ 2.60GHz",
        "ansible_processor_cores": 8,
        "ansible_processor_families": [
            "Intel(R) Core(TM) i7-6700HQ CPU @ 2.60GHz"
        ],
        "ansible_processor_threads": 8,
        "ansible_processor_vcpus": 8,
        "ansible_python_interpreter": "/usr/bin/python2.7",
        "ansible_python_version": "2.7.12"
    }
}
```

Overview

?

Ansible Playbooks

*a collection of tasks
organized
into roles
&
run in order
with
orchestration*

Ansible Playbooks

Idempotent

```
2.2.3 in ServerDelivery/ on master
> ansible-playbook -i "fed22," site.yml --ask-vault-pass
Vault password:
```

```
< PLAY [all] >
-----
\ ^__^
 \  ooo\_____
    (__)\ )\/\
       ||----w |
       ||     ||
```

```
< GATHERING FACTS >
-----
```

```
\ ^__^
 \  ooo\_____
    (__)\ )\/\
       ||----w |
       ||     ||
```

```
changed: [fed22]
< PLAY RECAP >
-----
\ ^__^
 \  ooo\_____
    (__)\ )\/\
       ||----w |
       ||     ||

fed22 : ok=10    changed=3    unreachable=0    failed=0
```

```
2.2.3 in ServerDelivery/ on master
> █
```

Playbooks are Ansible's configuration, deployment, and orchestration language.

They can describe a policy you want your remote systems to enforce.

At a more advanced level, they can sequence multi-tier rollouts involving rolling updates, and can delegate actions to other hosts, interacting with monitoring servers and load balancers along the way.

Ansible run -> gather_facts

Tasks

```
},
"ansible_distribution": "CentOS",
"ansible_distribution_major_version": "6",
"ansible_distribution_release": "Final",
"ansible_distribution_version": "6.7",
"ansible_domain": ""
```

```
},
"ansible_distribution": "CentOS",
"ansible_distribution_major_version": "7",
"ansible_distribution_release": "Core",
"ansible_distribution_version": "7.1.1503",
"ansible_domain": ""
```

redhat_6.yml

if

redhat_7.yml

Ansible deploys
Tomcat

Ansible deploys
Docker

by gathered facts

Playbooks

?

Ansible vs.

Use the best tool for the job!



This repository

Search

Pull requests Issues Gist



ansible / ansible

Watch ▾

1,117

Unstar

13,697

Fork

4,071

Ansible is a radically simple IT automation platform that makes your applications and systems easier to deploy. Avoid writing scripts or custom code to deploy and update your applications— automate in a language that approaches plain English, using SSH, with no agents to install on remote systems. <http://ansible.com/>

17,011 commits

33 branches

81 releases

1,212 contributors



Branch: devel ▾

ansible / +



abadger Remove dead code

Latest commit c7b6912 43 minutes ago



narrow the scope of import error and make sure non - aliases to ansib...

9 days ago

Code

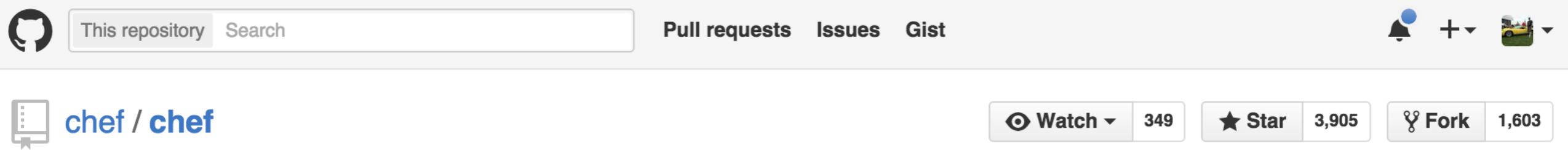
Issues 587

Pull requests 239

Pulse

Graphs

Ansible vs Chef



Ansible vs Salt

This screenshot shows the GitHub repository page for `saltstack / salt`. The page has a blue header with the title "Ansible vs Salt". Below the header is a navigation bar with links for "Pull requests", "Issues", and "Gist". On the left, there's a search bar and a "This repository" button. On the right, there are buttons for "Watch" (474), "Star" (5,864), "Fork" (2,516), and a profile picture. The main content area is currently empty.

Ansible vs Puppet

A screenshot of a GitHub repository page. The header shows the title "Ansible vs Puppet". Below the title, there's a large image of a blue sky with white clouds. The main content area shows the repository details for "puppetlabs/puppet". The repository name is "puppetlabs / puppet". It has 424 pull requests, 3,639 stars, and 1,515 forks. The page also features the GitHub logo, a search bar, and navigation links for "Pull requests", "Issues", and "Gist".

Ansible Tower

Overview

User Management

A TOWER Projects Inventories Job Templates Jobs

admin ✎ 🗑️

Setup > Credentials > Create Credential

*Name

Description

Does this credential belong to a team or user? ?

User Team

*User that owns this credential

*Type ?

Machine

Username

Password

Show Ask at runtime?

Private Key ?

Hint: drag and drop an SSH private key file on the field below

Private Key Passphrase

Show Ask at runtime?

Privilege Escalation ?

Sudo

Privilege Escalation Username

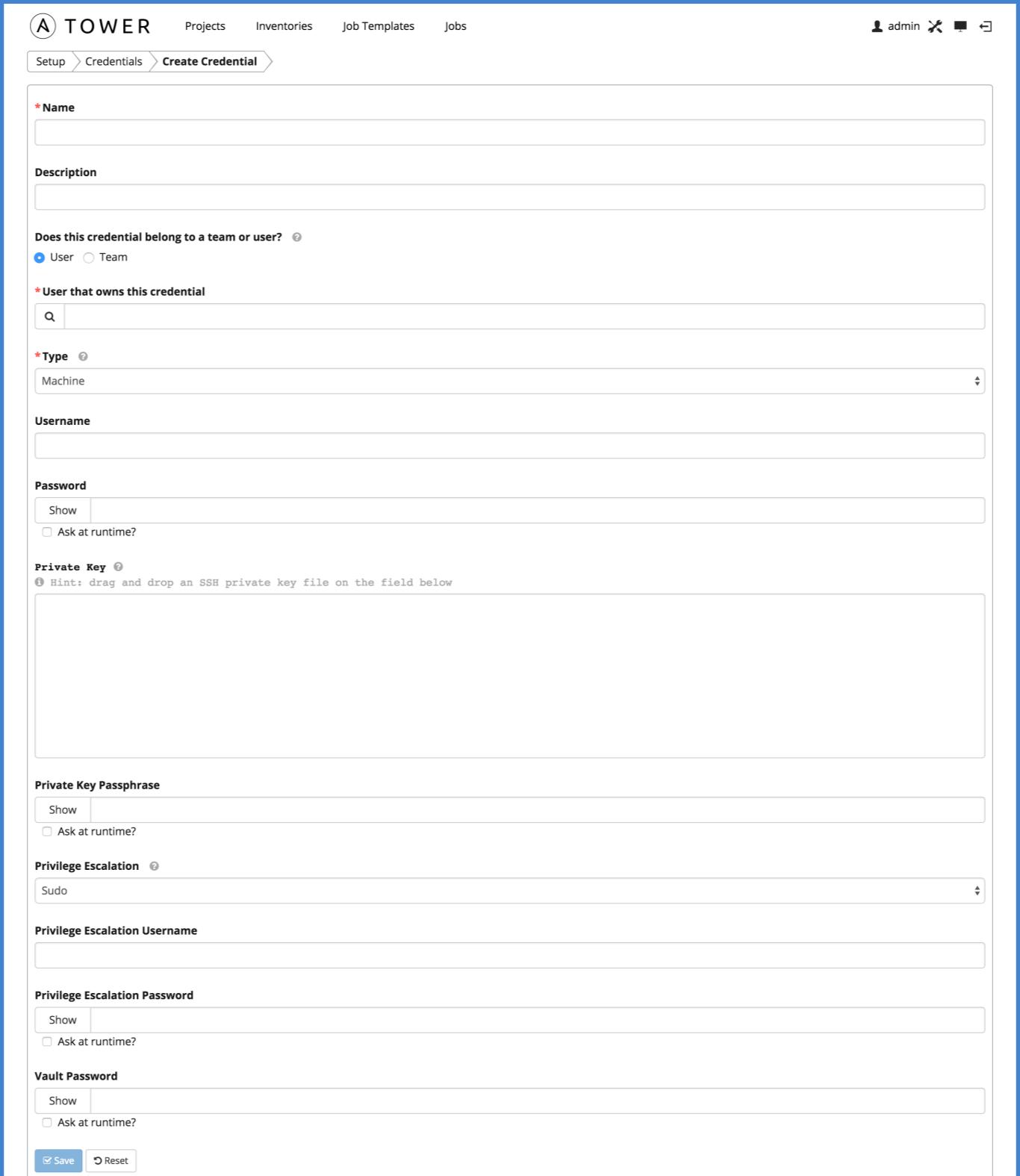
Privilege Escalation Password

Show Ask at runtime?

Vault Password

Show Ask at runtime?

Save



Team Management

A TOWER Projects Inventories Job Templates Jobs

admin ✎ 🖥 ↻

Setup > Users > admin

Properties

* First Name

* Last Name

* Email

admin@example.com

* Username

admin

Password

Show

Confirm Password

Show

Superuser (User has full system administration privileges.)

Created by LDAP

Save

▶ Credentials

▶ Permissions

▶ Admin of Organizations

▶ Organizations

▶ Teams

Security Segmentation

Storing Secrets

AES-256

```
2.2.3 in Ansible/
> ansible-vault create bmw325
Vault password:
Confirm Vault password:

2.2.3 in Ansible/
> cat bmw325
$ANSIBLE_VAULT;1.1;AES256
38633437626634333432326237303931363832613833643163366462376436303037376430323732
3930376236396364623062326338653935303932613934330a643036633734613264396434393535
6633623762316438383331383239373939386643166626234336266393033663261366137393933
3562633035393665660a386463666330633238313566363331303565343933386262656133666234
62383430376136663365383439313265616331396630366533613865386137616230343762356331
3438613861306536353037636134366232326643538323136323831363630646532326365626539
653633623034313563323539666330383439
```

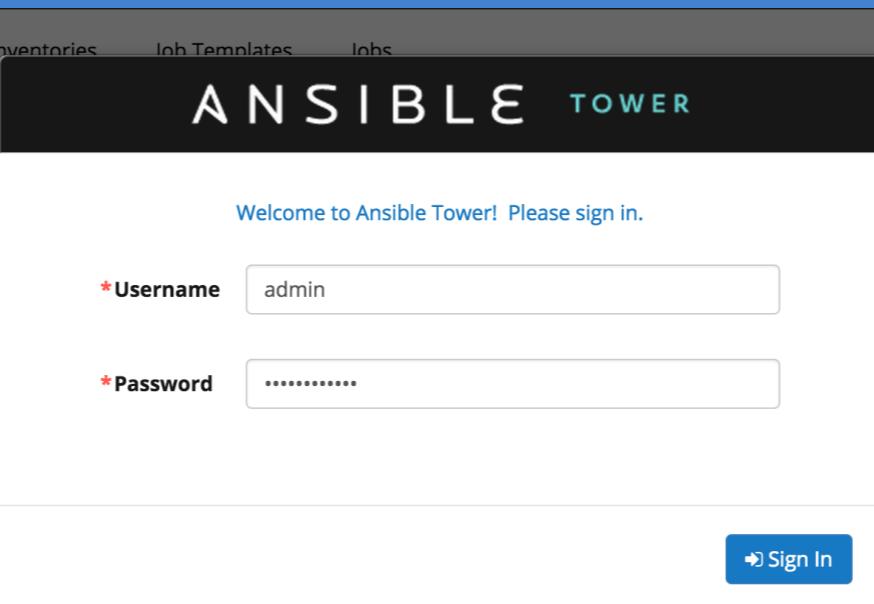
```
2.2.3 in Ansible/
> ansible-vault decrypt bmw325
Vault password:
Decryption successful

2.2.3 in Ansible/
> cat bmw325
best daily driving car ever built by human hands.
```

CI & CD



Jenkins



The image shows a screenshot of the Ansible Tower web interface. At the top, there is a dark header bar with the Ansible Tower logo in the center. Below the header, a modal window is displayed, prompting the user to sign in. The modal has a white background and contains the following text and fields:

- Welcome to Ansible Tower! Please sign in.
- *Username:** admin (in a text input field)
- *Password:** (in a password input field)
- A blue "Sign In" button at the bottom right of the modal.

The background of the main interface is dark grey, showing navigation links like "Projects", "Inventories", "Job Templates", and "Jobs".

Tower

?