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ANSIBLE

Introduction to Ansible - workshop

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THIS IS A FREE INTRODUCTION TRAINING PROVIDED BY RED RED HAT

IT'S NOT RELATED TO OUR GLS GROUP

THIS WORKSHOP WAS INITIATED BY SOME HAPPY SOLUTIONS ARCHITECTS IN CANADA

AGENDA

Ansible Training

1 **Introduction to Ansible**

2 **Ansible commands**
+ LAB

3 **Ansible playbooks**
+ LAB

4 **Ansible variables**
+ LAB

5 **Ansible roles**
+ LAB

6 **Ansible Tower**

INTRODUCTION TO ANSIBLE

WE ARE SERIOUSLY OVERLOADED

- Building VM templates
  - ISO install and configuration
  - Network setup
  - Set up users/group, security, authentication/authorization
  - Software install and configuration
- Building out clusters
  - Cloning N number of VMs from X number of templates
  - Hostname/network configuration
  - Firewalling
- Software deployments
  - Turn off monitoring/alerting
  - Pull nodes out of Load Balanced Group
  - Run DB migrations
  - Deploy application code
  - Restart web server
  - Put nodes back in/turn monitoring back on

- And the list goes on …
  - Storage management
  - Networking
  - Performance Testing
  - OS Upgrades
  - Software Upgrades
  - Troubleshooting
  - Alerting/Monitoring

MANUAL ADMINISTRATION

- Time consuming .
- Error prone .
- Not reproducible .
- No way to track changes .
- Inconsistent .

```
[root@mgmt ~]# ssh server1.example.com
root@server1.example.com's password:
Last login: Sun Jun  5 15:27:37 2016 from mgmt.example.com
[root@server1 ~]# yum install httpd
[root@server1 ~]# vi /etc/resolv.conf
.
.
[root@mgmt ~]# ssh server2.example.com
root@server2.example.com's password:
Last login: Sun Jun  5 15:28:37 2016 from mgmt.example.com
[root@server2 ~]# yum install httpd
[root@server2 ~]#
.
.
[root@mgmt ~]# ssh server3.example.com
root@server3.example.com's password:
Last login: Sun Jun  5 15:29:37 2016 from mgmt.example.com
[root@server3 ~]# yum install httpd
[root@server3 ~]# vi /etc/resolv.conf
.
.
etc..
```

SCRIPTS (poor man's automation)

- Fragile
- Changes really, really hurt
- Hard to maintain
- Error prone
- No way to track changes
- Everyone's rolling their own

```
#!/bin/sh
HOSTS="
server1.example.com
server2.example.com
server3.example.com
db1.example.com
db2.example.com
"
for host in $HOSTS
do
 # Copy DNS settings to all servers
 ssh $host "sudo echo \"nameserver 8.8.8.8 >> /etc/resolv.conf\""
 # Install Apache
 ssh $host "sudo yum install httpd"
done
```

Intro to Ansible

Michael DeHaan (creator cobbler and func)

https://www.ansible.com/blog/2013/12/08/the-origins-of-ansible

" Ansible owes much of it's origins to time I spent at Red Hat's Emerging Technologies group, which was an R&D unit under Red Hat's CTO "
- Michael DeHaan

"...because Puppet was too declarative you couldn't use it to do things like reboot servers or do all the "ad hoc" tasks in between… "
- Michael DeHaan

Simple

AUTOMATE ANYTHING

Can manage almost any *IX through SSH

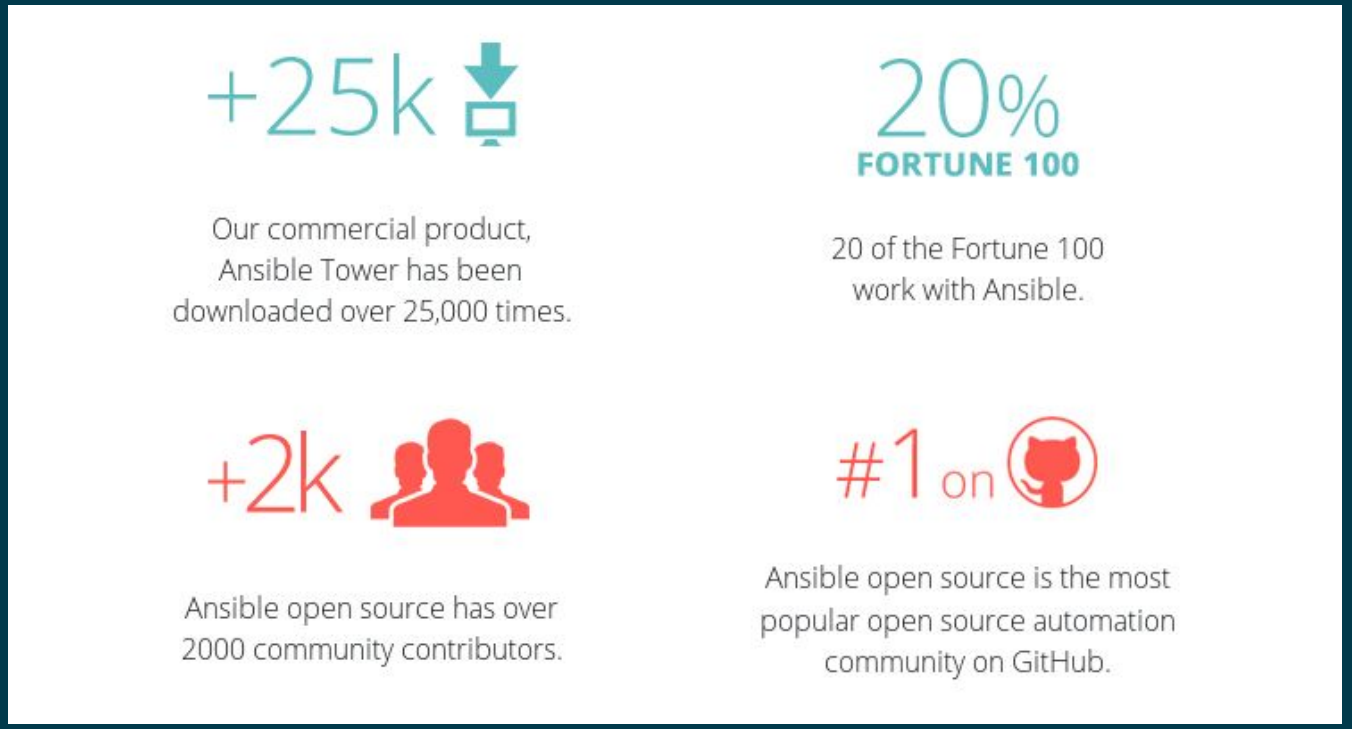
    requires Python 2.4

Windows (powershell, winrm python module)

Cloud, Virtualization, Container and Network components


An **ansible** is a **fictional** machine capable of instantaneous or superluminal communication. It can send and receive messages to and from a corresponding device over any distance whatsoever with no delay. **Ansibles** occur as plot devices in **science fiction** literature
-- wikipedia
redhat.

Ansible growth



“ It's been 18 months since I've been at an OpenStack summit.
One of the most notable changes for me this summit has been Ansible. Everyone seems to be talking about Ansible, and it seems to be mainly customers rather than vendors.
I'm sure if I look around hard enough I'll find someone discussing Puppet or Chef but I'd have to go looking ..... “

Andrew Cathrow, April 2016, on Google+

USE CASES

CONFIG MANAGEMENT

Centralizing configuration file management and deployment is a common use case for Ansible, and it's how many power users are first introduced to the Ansible automation platform.

APP DEPLOYMENT

When you define your application with Ansible, and manage the deployment with Tower, teams are able to effectively manage the entire application lifecycle from development to production.

PROVISIONING

Your apps have to live somewhere. If you're PXE booting and kickstarting bare-metal servers or VMs, or creating virtual or cloud instances from templates, Ansible and Ansible Tower help streamline the process.

NETWORK AUTOMATION

Ansible's simple automation framework means that previously isolated network administrators can finally speak the same language of automation as the rest of the IT organization, extending the capabilities of Ansible to include native support for both legacy and open network infrastructure devices.

CONTINUOUS DELIVERY

Creating a CI/CD pipeline requires buy-in from numerous teams. You can't do it without a simple automation platform that everyone in your organization can use. Ansible Playbooks keep your applications properly deployed (and managed) throughout their entire lifecycle.

SECURITY & COMPLIANCE

When you define your security policy in Ansible, scanning and remediation of site-wide security policy can be integrated into other automated processes and instead of being an afterthought, it'll be integral in everything that is deployed.

ORCHESTRATION

Configurations alone don't define your environment. You need to define how multiple configurations interact and ensure the disparate pieces can be managed as a whole. Out of complexity and chaos, Ansible brings order.


MANAGING NETWORKS
HASN'T CHANGED
IN 30 YEARS.

WHY ANSIBLE + NETWORK?

"When asked what they felt was the most immature component in cloud management, the overwhelming response was the network at 76%; compute and storage got 15% and 9% of the vote respectively."

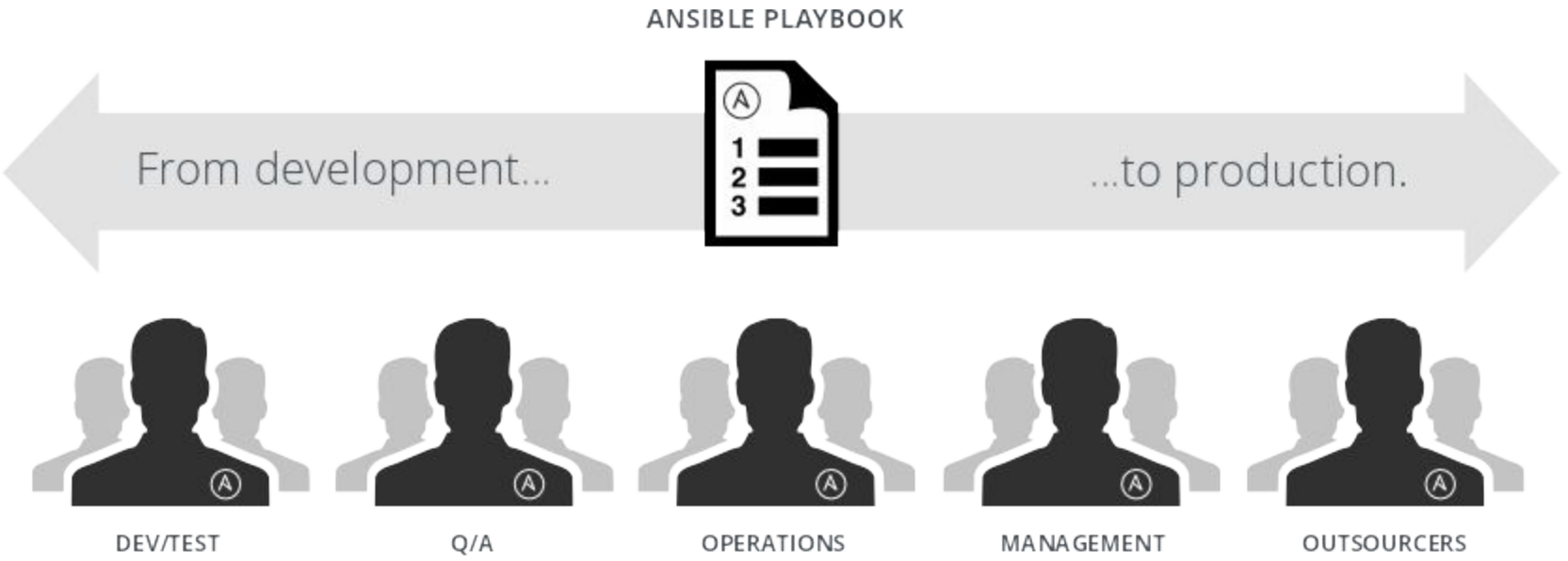
2015 SDx Cloud Management Report: OpenStack and More sdxcentral.com

BENEFITS

Why is Ansible popular?

- **Efficient :** Agentless, minimal setup, desired state (no unnecessary change), push-Based architecture, Easy Targeting Based on Facts
- **Fast :** Easy to learn/to remember, simple declarative language
- **Scalable :** Can managed thousands of nodes, extensible and modular
- **Secure :** SSH transport
- **Large community** : thousands of roles on Ansible Galaxy

ANSIBLE - THE LANGUAGE OF DEVOPS



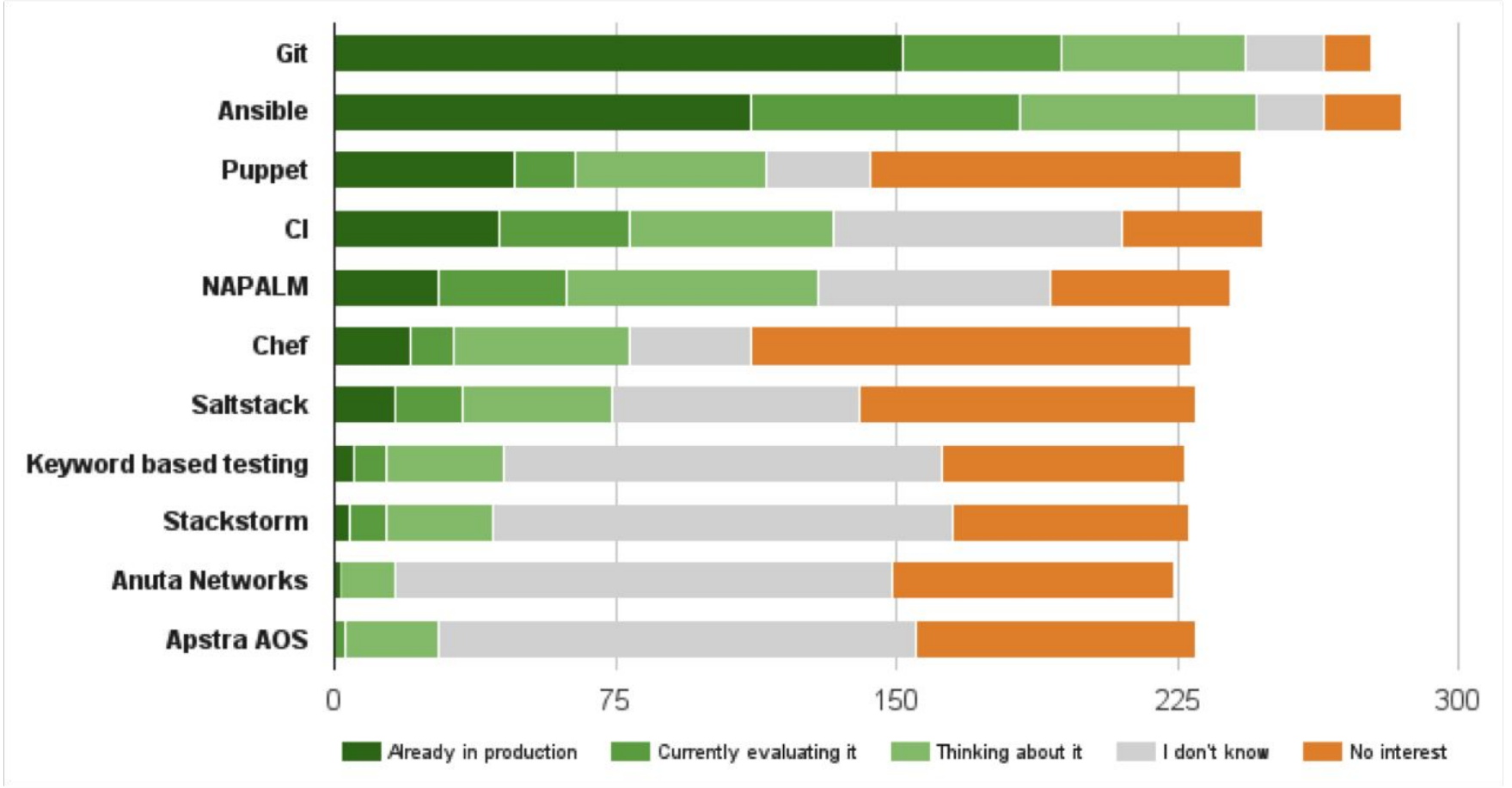
COMMUNICATION IS THE KEY TO DEVOPS.

Ansible is the first **automation language** that can be read and written across IT.

Ansible is the only **automation engine** that can automate the entire **application lifecycle** and **continuous delivery** pipeline.

NETWORKTOCODE – NETDEVOPS SURVEY (NOV. 2016)

"Which of the following tools are you interested in or have you deployed?"



LET'S START !

redhat.

KEY COMPONENTS

Understanding Ansible terms

- ★ **Modules** **(Tools)**
- ★ **Tasks**
- ★ **Inventory**
- ★ **Plays**
- ★ **Playbook** **(Plan)**

INSTALLING ANSIBLE

How-to

```
# ENABLE EPEL REPO
yum install epel-release


# INSTALL ANSIBLE
yum install ansible
```

Does Red Hat offer support for core Ansible?

https://access.redhat.com/articles/2271461

MODULES

What is this?

Bits of code copied to the target system.
Executed to satisfy the task declaration.
Customizable.

The modules that ship with Ansible all are written in Python, but modules can be written in any language.

MODULES

Lots of choice / Ansible secret power...

- ➔ Cloud Modules
- ➔ Clustering Modules
- ➔ Commands Modules
- ➔ Crypto Modules
- ➔ Database Modules
- ➔ Files Modules
- ➔ Identity Modules
- ➔ Inventory Modules
- ➔ Messaging Modules
- ➔ Monitoring Modules
- ➔ Network Modules
- ➔ Notification Modules
- ➔ Remote management Modules
- ➔ Packaging Modules
- ➔ Source Control Modules
- ➔ Storage Modules
- ➔ System Modules
- ➔ Utilities Modules
- ➔ Web Infrastructure Modules
- ➔ Windows Modules

IDEMPO-WHAT?

“Idempotence is the property of certain operations in mathematics and computer science, that can be applied multiple times without changing the result beyond the initial application.”

“When carefully written, an Ansible playbook can be idempotent, in order to prevent unexpected side-effects on the managed systems.”

– Wikipedia

MODULES

Documentation

```
# LIST ALL MODULES
ansible-doc -l


# VIEW MODULE DOCUMENTATION
ansible-doc <module_name>
```

MODULES

commonly used

- apt/yum
- copy
- file
- get_url
- git
- ping
- service
- synchronize
- template
- uri
- user
- wait_for

ANSIBLE COMMANDS

INVENTORY

Use the default one (/etc/ansible/hosts) or create a host file

```
[centos@centos1 ~]$ mkdir ansible ; cd ansible
[centos@centos1 ~]$ vim hosts

[all:vars]
ansible_ssh_user=centos

[web]
web1 ansible_ssh_host=centos2

[admin]
ansible ansible_ssh_host=centos1

[centos@centos1 ~]$ ansible all -i ./hosts -m command -a "uptime"
```

INVENTORY - ALTERNATIVE

```
[centos@centos1 ~]$ cd ansible
[centos@centos1 ansible]$ vim ansible.cfg

[defaults]
inventory=/home/centos/ansible/hosts


[centos@centos1 ~]$ ansible all -m command -a "uptime"
```

COMMANDS

Run your first Ansible command...

```
        (which)             (module)  (arguments)
# ansible all -i ./hosts -m command -a "uptime"

192.168.250.13 | success | rc=0 >>
 18:57:01 up 11:03,  1 user,  load average: 0.00, 0.01, 0.05

192.168.250.11 | success | rc=0 >>
 18:57:02 up 11:03,  1 user,  load average: 0.00, 0.01, 0.05
```

COMMANDS

Other example

```
# INSTALL HTTPD PACKAGE
ansible web -s -i ./hosts -m yum -a "name=httpd state=present"


# START AND ENABLE HTTPD SERVICE
ansible web -s -i ./hosts -m service -a "name=httpd enabled=yes state=started"
```

LAB #1

Ansible commands

Objectives

Using Ansible commands, complete the following tasks:

1. Test Ansible connection to all your hosts using ping module
2. Install EPEL repo on all your hosts
3. Install HTTPD only on your web hosts
4. Change SELINUX to permissive mode (all hosts)

Modules documentation:

http://docs.ansible.com/ansible/list_of_all_modules.html

LAB #1 - SOLUTION

```
ansible all -i ./hosts -m ping
ansible all -i ./hosts -s -m yum -a "name=epel-release state=present"
ansible web -i ./hosts -s -m yum -a "name=httpd state=present"
ansible all -i ./hosts -s -m selinux -a "policy=targeted state=permissive"
```

ANSIBLE PLAYBOOKS

YAML

1. Designed primarily for the representation of data structures
2. Easy to write, human readable format
3. Design objective : abandoning traditional enclosure syntax

AVOID USING CUT AND PASTE !!!

YAML Validator : yamllint.com

PLAYBOOK EXAMPLE

```
---
- name: This is a Play
  hosts: web
  remote_user: centos
  become: yes
  gather_facts: no
  vars:
    state: present

  tasks:
    - name: Install Apache
      yum: name=httpd state={{ state }}
```

PLAYS

Naming

```
- name: This is a Play
```

PLAYS

Host selection

```
- name: This is a Play
  hosts: web
```

PLAYS

Arguments

```
- name: This is a Play
  hosts: web
  remote_user: centos
  become: yes
  gather_facts: no
```

FACTS

Gathers facts about remote host

- **Ansible provides many facts about the system, automatically**
- **Provided by the setup module**
- **If facter (puppet) or ohai (chef) are installed, variables from these programs will also be snapshotted into the JSON file for usage in templating**
  - **These variables are prefixed with facter_ and ohai_ so it's easy to tell their source.**
- **Using the ansible facts and choosing to not install facter and ohai means you can avoid Ruby-dependencies on your remote systems**

http://docs.ansible.com/ansible/setup_module.html

PLAYS

Variables & tasks

```
- name: This is a Play
  hosts: web
  remote_user: centos
  become: yes
  gather_facts: no
  vars:
    state: present

  tasks:
    - name: Install Apache
      yum: name=httpd state={{ state }}
```

**** When a variable is used as the first element to start a value, quotes are mandatory.

RUN AN ANSIBLE PLAYBOOK

```
[centos@centos7-1 ansible]$ ansible-playbook play.yml -i hosts
```

RUN AN ANSIBLE PLAYBOOK

Check mode “Dry run”

```
[centos@centos7-1 ansible]$ ansible-playbook play.yml -i hosts --check
```

PLAYS

Loops

```
- name: This is a Play
  hosts: web
  remote_user: centos
  become: yes
  gather_facts: no
  vars:
    state: present

  tasks:
    - name: Install Apache and PHP
      yum: name={{ item }} state={{ state }}
      with_items:
        - httpd
        - php
```

LOOPS

Many types of general and special purpose loops

- with_nested
- with_dict
- with_fileglob
- with_together
- with_sequence
- until
- with_random_choice
- with_first_found
- with_indexed_items
- with_lines

http://docs.ansible.com/ansible/playbooks_loops.html

HANDLERS

Only run if task has a “changed” status

```
- name: This is a Play
  hosts: web

  tasks:
    - yum: name={{ item }} state=installed
      with_items:
        - httpd
        - memcached
      notify: Restart Apache

    - template: src=templates/web.conf.j2
dest=/etc/httpd/conf.d/web.conf
      notify: Restart Apache

  handlers:
    - name: Restart Apache
      service: name=httpd state=restarted
```

TAGS

Example of tag usage

```
tasks:

    - yum: name={{ item }} state=installed
      with_items:
         - httpd
         - memcached
      tags:
         - packages

    - template: src=templates/src.j2 dest=/etc/foo.conf
      tags:
         - configuration
```

TAGS

Running with tags

```
ansible-playbook example.yml --tags “configuration”

ansible-playbook example.yml --skip-tags "notification"
```

TAGS

Special tags

```
ansible-playbook example.yml --tags “tagged”

ansible-playbook example.yml --tags “untagged”

ansible-playbook example.yml --tags “all”
```

RESULTS

Registering task outputs for debugging or other purposes

```
# Example setting the Apache version
- shell: httpd -v|grep version|awk '{print $3}'|cut -f2 -d'/'
  register: result

- debug: var=result    (will display the result)
```

CONDITIONAL TASKS

Only run this on Red Hat OS

```
- name: This is a Play
  hosts: web
  remote_user: centos
  become: sudo

  tasks:
    - name: install Apache
      yum: name=httpd state=installed
      when: ansible_os_family == "RedHat"
```

BLOCKS

Apply a condition to multiple tasks at once

```
tasks:

  - block:
    - yum: name={{ item }} state=installed
      with_items:
        - httpd
        - memcached
    - template: src=templates/web.conf.j2 dest=/etc/httpd/conf.d/web.conf
    - service: name=bar state=started enabled=True
    when: ansible_distribution == 'CentOS'
```

ERRORS

Ignoring errors

By default, Ansible stop on errors. Add the ingore_error parameter to skip potential errors.

```
- name: ping host
  command: ping -c1 www.foobar.com
  ignore_errors: yes
```

ERRORS

Managing errors using blocks

```
tasks:

 - block:
     - debug: msg='i execute normally'
     - command: /bin/false
     - debug: msg='i never execute, cause ERROR!'
   rescue:
     - debug: msg='I caught an error'
     - command: /bin/false
     - debug: msg='I also never execute :-('
   always:
     - debug: msg="this always executes"
```

LINEINFILE

Add, remove or update a particular line

```
-   lineinfile: dest=/etc/selinux/config regexp=^SELINUX=
    line=SELINUX=enforcing

-   lineinfile: dest=/etc/httpd/conf/httpd.conf regexp="^Listen "
    insertafter="^#Listen " line="Listen 8080"
```

Great example here :
https://relativkreativ.at/articles/how-to-use-ansibles-lineinfile-module-in-a-bulletproof-way

Note : Using template or a dedicated module is more powerful

LAB #2

Configure server groups using a playbook

Objectives

Using an Ansible playbook:

1. Change SELINUX to permissive mode on all your hosts
2. Install HTTPD on your web hosts only
3. Start and Enable HTTPD service on web hosts only if a new httpd package is installed.
4. Copy an motd file saying “Welcome to my server!” to all your hosts
5. Copy an “hello world” index.html file to your web hosts in /var/www/html
6. Modify the sshd_conf to set PermitRootLogin at no, and only if the option is modified
7. EXTRA : as a firewall is activated by default on your servers, open the port 80
8. EXTRA : display the ip address of your webserver

LAB #2 - SOLUTION #1

```
---
- name: Lab2 - All server setup
  hosts: all
  become: yes

  tasks:
       - name: Configure selinux to {{ selinux }}
         selinux:
           policy: targeted
           state: permissive

       - name: Copy motd file
         copy: src=motd dest=/etc/motd


- name: Lab2 - Web server setup
  hosts: web
  become: yes

  tasks:
       - name: Install Apache
         yum: name=httpd state=present
         notify: StartApache

       - name: Copy Index.html
         copy: src=index.html dest=/var/www/html/index.html

       - name: Set ssh root login at no
         lineinfile: dest=/etc/ssh/sshd_config
              line="PermitRootLogin no"
              state=present
         notify: RestartSSH

  handlers:
       - name: StartApache
         service: name=httpd state=started enabled=yes
       - name: RestartSSH
         service: name=sshd state=restarted enabled=yes
[centos@centos1 ansible]$ vim motd ; vim index.html  (put some words in the files)
[centos@centos1 ansible]$ ansible-playbook -i hosts lab2.yaml
```

LAB #2 - SOLUTION EXTRA (firewall + ip)

```
TO ADD IN THE WEBSERVER TASK SECTION
            - name: Open Firewall ports
              firewalld: zone=public port=80/tcp permanent=true state=enabled
              notify: ReloadFirewall
            - debug: var=hostvars[inventory_hostname]['ansible_default_ipv4']['address']

TO ADD IN THE HANDLERS SECTION
            - name: ReloadFirewall
              shell: firewall-cmd --reload
```

LAB #2 - SOLUTION

```
---
- name: Lab2 - All server setup
  hosts: all
  become: yes

  tasks:
        - name: Configure selinux to permissive
          selinux:
            policy: targeted
            state: permissive

        - name: Copy motd file
          copy: src=motd dest=/etc/motd

- name: Lab2 - Web server setup
  hosts: web
  become: yes

  tasks:
        - name: Install Apache
          yum: name=httpd state=present
          notify: StartApache

        - name: Copy Index.html
          copy: src=index.html dest=/var/www/html/index.html

        - name: Set ssh root login at no
          lineinfile: dest=/etc/ssh/sshd_config
                line="PermitRootLogin no"
                state=present
          notify: RestartSSH
        - name: Open Firewall ports
          firewalld: zone=public port=80/tcp permanent=true state=enabled
          notify: ReloadFirewall

        - debug: var=hostvars[inventory_hostname]['ansible_default_ipv4']['address']

  handlers:
        - name: StartApache
          service: name=httpd state=started enabled=yes
        - name: RestartSSH
          service: name=sshd state=restarted enabled=yes
        - name: ReloadFirewall
          shell: firewall-cmd --reload
```

ANSIBLE VARIABLES
AND
CONFIGURATION MANAGEMENT

VARIABLE PRECEDENCE

Ansible v2

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

MAGIC VARIABLES

Ansible creates and maintains information about it's current state and other hosts through a series of "magic" variables.

- **hostvars[inventory_hostname]**

  Show all ansible facts

  Specific variable for specific host

  {{ **hostvars['test.example.com']['ansible_distribution']** }}

- **group_names**

  is a list (array) of all the groups the current host is in

- **groups**

  is a list of all the groups (and hosts) in the inventory.

MAGIC VARIABLES

Using debug mode to view content

```
- name: debug
  hosts: all

  tasks:
    - name: Show hostvars[inventory_hostname]
      debug: var=hostvars[inventory_hostname]

    - name: Show ansible_ssh_host variable in hostvars
      debug: var=hostvars[inventory_hostname].ansible_ssh_host

    - name: Show group_names
      debug: var=group_names

    - name: Show groups
      debug: var=groups
```

```
ansible-playbook -i ../hosts --limit <hostname> debug.yml
```

YAML VARIABLES USE

YAML values beginning with a variable must be quoted

```
vars:
  var1: {{ foo }} <<< ERROR!
  var2: “{{ bar }}”
  var3: Echoing {{ foo }} here is fine
```

Template module

Using Jinja2

Templates allow you to create dynamic configuration files using variables.

```
- template: src=/mytemplates/foo.j2 dest=/etc/file.conf owner=bin group=wheel mode=0644
```

Documentation:
http://docs.ansible.com/ansible/template_module.html

JINJA2

Delimiters

Jinja2 is a modern and designer-friendly templating language for Python, modelled after Django's templates and used by Ansible.

Highly recommend reading about Jinja2 to understand how templates are built.

```
{{ variable }}

{% for server in groups.webservers %}
```

JINJA2

LOOPS

```
{% for server in groups.web %}
{{ server }}  {{ hostvars[server].ansible_default_ipv4.address }}
{% endfor %}
```

```
web1 10.0.1.1
web2 10.0.1.2
web3 10.0.1.3
```

JINJA2

Conditional

```
{% if ansible_processor_cores >= 2 %}
-smp enable
{% else %}
-smp disable
{% endif %}
```

JINJA2

Variable filters

```
{% set my_var='this-is-a-test' %}
{{ my_var | replace('-', '_') }}
```

```
this_is_a_test
```

JINJA2

Variable filters

```
{% set servers = "server1,server2,server3" %}
{% for server in servers.split(",") %}
{{ server }}
{% endfor %}
```

```
server1
server2
server3
```

JINJA2, more filters

Lots of options...

```
# Combine two lists
{{ list1 | union(list2) }}

# Get a random number
{{ 59 | random }} * * * * root /script/from/cron

# md5sum of a filename
{{ filename | md5 }}

# Comparisons
{{ ansible_distribution_version | version_compare('12.04', '>=') }}

# Default if undefined
{{ user_input | default(‘Hello World') }}
```

JINJA2

Testing

```
{% if variable is defined %}

{% if variable is none %}

{% if variable is even %}

{% if variable is string %}

{% if variable is sequence %}
```

Jinja2

Template comments

```
{% for host in groups['app_servers'] %}
   {# this is a comment and won't display #}
   {{ loop.index }} {{ host }}
{% endfor %}
```

Facts

Setting facts in a play

```
# Example setting the Apache version
- shell: httpd -v|grep version|awk '{print $3}'|cut -f2 -d'/'
  register: result

- set_fact:
    apache_version: ”{{ result.stdout }}"
```

LAB #3

Configuration management using variables

Objectives

Copy and modify you lab2 playbook to add the following:

1. Use the debug.yml (see next slide) file to explore all the ansible facts
2. Convert your MOTD file in a template saying : “Welcome to <hostname>!”
3. Install facter on all your hosts then re-execute the debug.yml. You should see a bunch of new variables (facter_)
4. Convert your index.html file into a Jinja2 template to output the following information:

    Web Servers

    centos1 192.168.3.52 - free memory: 337.43 MB

LAB #3 - Help (debug file)

```
---
- name: debug
  hosts: all

  tasks:

    - name: Show hostvars[inventory_hostname]
      debug: var=hostvars[inventory_hostname]

    - name: Show hostvars[inventory_hostname].ansible_ssh_host
      debug: var=hostvars[inventory_hostname].ansible_ssh_host

    - name: Show group_names
      debug: var=group_names

    - name: Show groups
      debug: var=groups

[centos@centos1 ansible]$ ansible-playbook -i ./hosts debug.yaml
```

LAB #3 - SOLUTION - playbook

```
---
- name: Lab3 - All server setup
  hosts: all
  become: yes

  tasks:
    - name: Configure selinux to permissive
      selinux:
        policy: targeted
        state: permissive

    - name: Copy motd template
      template: src=motd.j2 dest=/etc/motd

    - name: Install facter
      package: name=facter state=present

- name: Lab3 - Web server setup
  hosts: web
  become: yes

  tasks:
    - name: Install Apache
      yum: name=httpd state=present
      notify: Restart Apache

    - name: Copy Index.html template
      template: src=index.html.j2 dest=/var/www/html/index.htm

  handlers:
    - name: Restart Apache
      service: name=httpd state=restarted enabled=yes
```

LAB #3 - SOLUTION - template files

motd.j2

```
Welcome to {{ hostvars[inventory_hostname].inventory_hostname }}!
```

index.html.j2

```
Web Servers<br>
{% for server in groups.web %}
{{ hostvars[server].ansible_hostname }} {{ hostvars[server].ansible_default_ipv4.address }} - free memory: {{
hostvars[server].facter_memoryfree }}<br>
{% endfor %}
```

ANSIBLE ROLES

ROLES

A redistributable and reusable collection of:

- **tasks**
- **files**
- **scripts**
- **templates**
- **variables**

ROLES

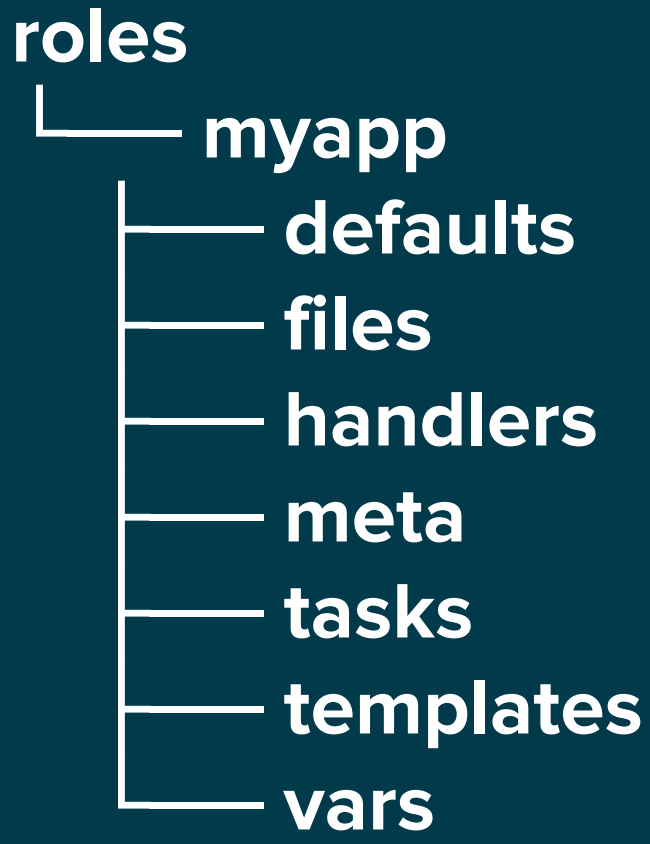
Often used to setup and configure services

- ➔ **install packages**
- ➔ **copying files**
- ➔ **starting deamons**

Examples: Apache, MySQL, Nagios, etc.

ROLES

Directory Structure



ROLES

Create folder structure automatically

```
ansible-galaxy init <role_name>
```

ROLES

Playbook examples

```
---
- hosts: webservers
  roles:
     - common
     - webservers
```

ROLES

Playbook examples

```
---
- hosts: webservers
  roles:
     - common
     - { role: myapp, dir: '/opt/a',  port: 5000 }
     - { role: myapp, dir: '/opt/b',  port: 5001 }
```

ROLES

Playbook examples

```
---
- hosts: webservers
  roles:
    - { role: foo, when: "ansible_os_family == 'RedHat'" }
```

ROLES

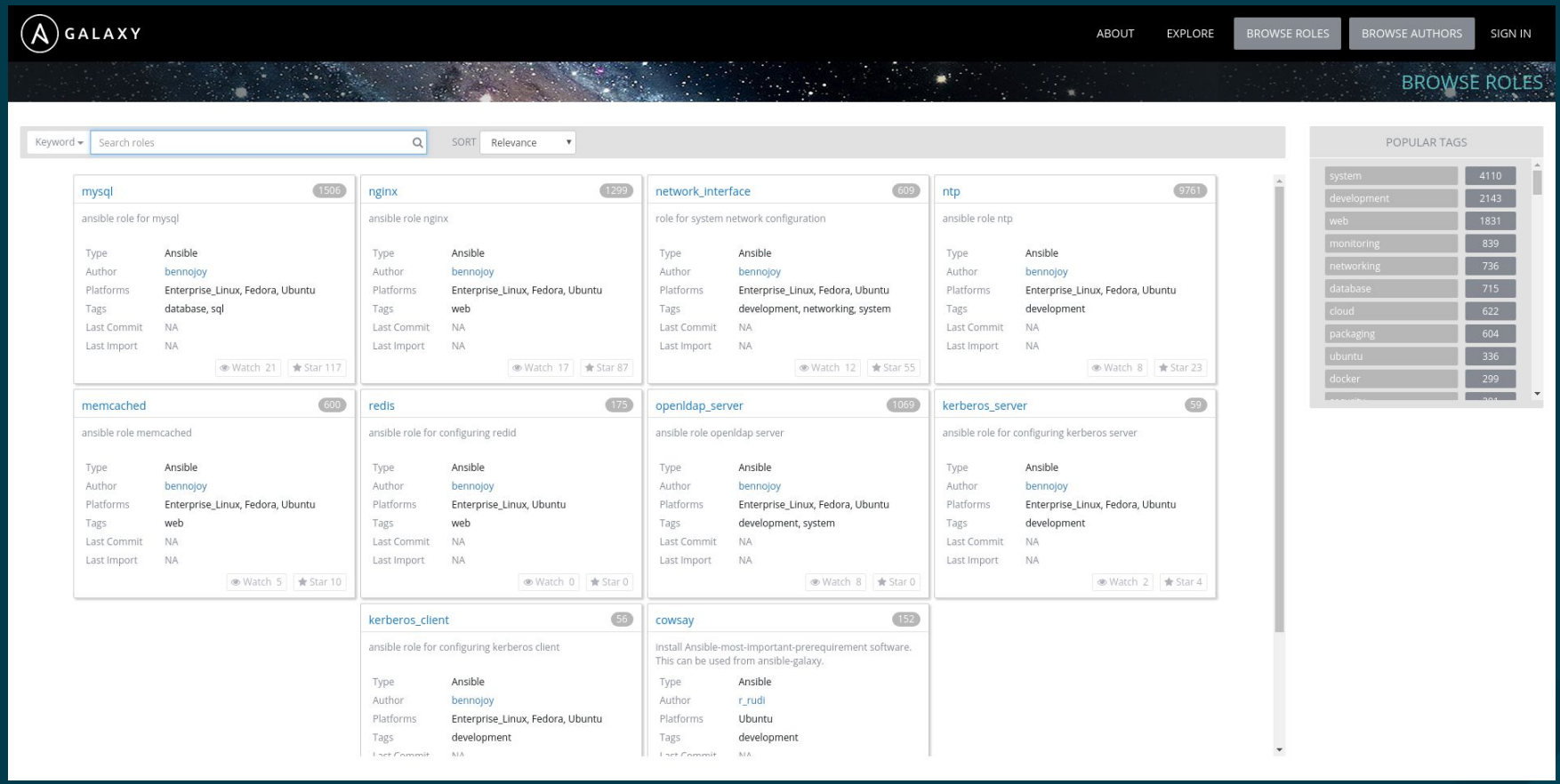
Pre and Post - rolling upgrade example

```
---
- hosts: webservers
  serial: 1

  pre_tasks:
    - command:lb_rm.sh {{ inventory_hostname }}
      delegate_to: lb

   - command: mon_rm.sh {{ inventory_hostname }}
      delegate_to: nagios

  roles:
    - myapp

  post_tasks:
    - command: mon_add.sh {{ inventory_hostname }}
      delegate_to: nagios

     - command: lb_add.sh {{ inventory_hostname }}
       delegate_to: lb
```


http://docs.ansible.com/ansible/playbooks_delegation.html

http://galaxy.ansible.com

ANSIBLE GALAXY



ANSIBLE GALAXY

```
# ansible-galaxy search 'install git' --platforms el
Found 176 roles matching your search:
Name...

# ansible-galaxy install davidkarban.git -p roles

# ansible-galaxy list -p roles

# ansible-galaxy remove -p roles
```

LAB #4

Convert the lab3 playbook in two roles

Objectives

1. Create 2 roles: common and apache
2. Create a playbook to apply those roles.
    a. “common” should be applied to all servers
    b. “apache” should be applied to your “web” group
3. Put the jinja2 templates in the appropriate folder.

LAB #4 - SOLUTION 1/3

Create directories using Ansible galaxy template

```
[centos@centos1 ~]$ cd ansible ; mkdir roles ; cd roles
[centos@centos1 roles]$ ansible-galaxy init common ; ansible-galaxy init apache
```

Setup the apache role

```
[centos@centos1 roles]$ cd apache
[centos@centos1 apache]$ vim tasks/main.yml
---
# tasks file for apache
       - name: Install Apache
         yum: name=httpd state=present
         notify: Start Apache

       - name: Copy Index.html template
         template: src=index.html.j2 dest=/var/www/html/index.html

[centos@centos1 apache]$ vim handlers/main.yml
---
# handlers file for apache
       - name: Start Apache
         service: name=httpd state=restarted enabled=yes
[centos@centos1 apache]$ cp ../../index.html.j2 templates/
```

LAB #4 - SOLUTION 2/3

Setup the common role

```
[centos@centos1 apache]$ cd ../common
[centos@centos1 common]$ vim tasks/main.yml
---
# tasks file for common
       - name: Configure selinux to permissive
         selinux:
           policy: targeted
           state: "{{ selinux }}"

       - name: Copy motd template
         template: src=motd.j2 dest=/etc/motd

       - name: install facter
         yum: name=facter state=present
[centos@centos1 common]$ vim vars/main.yml
# vars file for common
# SELINUX OPTION : enforcing,permissive,disabled
selinux: permissive

[centos@centos1 apache]$ cp ../../motd.j2 templates/
```

LAB #4 - SOLUTION 3/3

Setup the playbook

```
[centos@centos1 common]$ cd ../../
[centos@centos1 ansible]$ vim lab4.yaml
---
- name: Lab4 - All server setup
  hosts: all
  become: yes

  roles:
       - common

- name: Lab4 - Web server setup
  hosts: web
  become: yes

  roles:
       - apache

[centos@centos1 ansible]$ ansible-playbook -i ./hosts install.yml
```

ANSIBLE TOWER

What are the added values ?

- ➔ **Role based access control**
- ➔ **Satellite and Cloudforms integration**
- ➔ **Push button deployment**
- ➔ **Centralized logging & deployment**
- ➔ **Centralized notification to Slack, Twilio, Irc, webooks, ...**
- ➔ **System tracking**
- ➔ **API**

ANSIBLE TOWER
20 minutes demo :
https://www.ansible.com/tower

WHAT'S NEXT ?

ANSIBLE AUTOMATION - 4 DAYS

https://www.redhat.com/en/services/training/do407-automation-ansible

ANSIBLE MEETUP

https://www.meetup.com/Ansible-Montreal/

redhat.

THANK YOU

plus.google.com/+RedHat

facebook.com/redhatinc

linkedin.com/company/red-hat

twitter.com/RedHatNews

youtube.com/user/RedHatVideos

EXTRA STUFF

FIXING VIM FOR YAML EDITION

```
# yum install git (required for plug-vim)
$ cd
$ curl -fLo ~/.vim/autoload/plug.vim --create-dirs
https://raw.githubusercontent.com/junegunn/vim-plug/master/plug.vim
$ vim .vimrc
call plug#begin('~/.vim/plugged')
Plug 'pearofducks/ansible-vim'
call plug#end()

$ vim
:PlugInstall

When you edit a file type :
:set ft=ansible
```

Cisco Network Automation

https://www.youtube.com/watch?v=wbhdJE7DM-A

DEMO STARTS AT 10:24

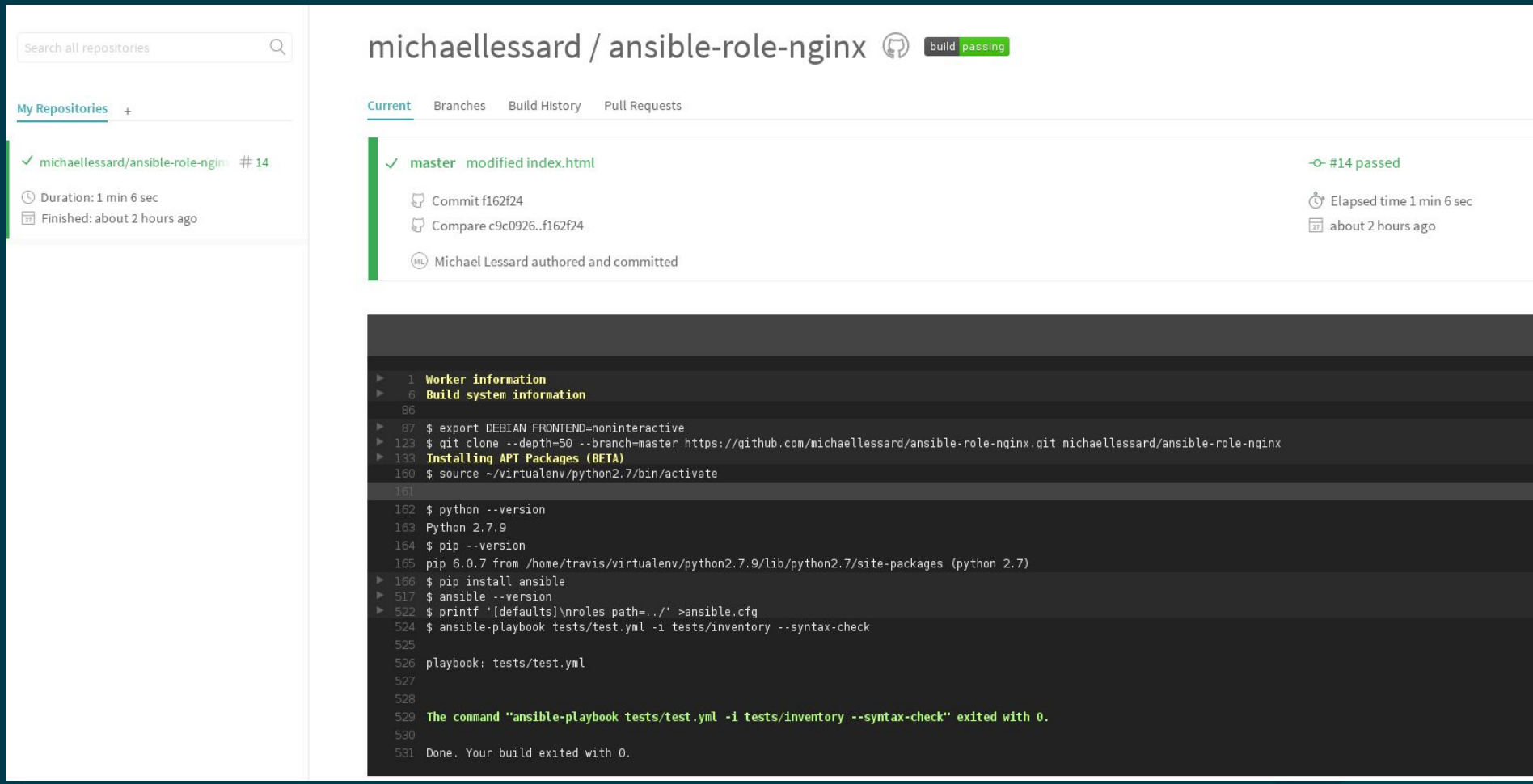
TRAVIS CI INTEGRATION

Setup

Procedure : https://galaxy.ansible.com/intro

ROLES - INTEGRATION WITH TRAVIS CI

Ansible 2+, the magic is in .travis.yml



TRAVIS CI INTEGRATION

```
[centos@centos7-1 nginx]$ vim .travis.yml

---
language: python
python: "2.7"

# Use the new container infrastructure
sudo: required

# Install ansible
addons:
  apt:
       packages:
       - python-pip

install:
  # Install ansible
  - pip install ansible

  # Check ansible version
  - ansible --version

  # Create ansible.cfg with correct roles_path
  - printf '[defaults]\nroles_path=../' >ansible.cfg

script:
  # Basic role syntax check
  - ansible-playbook tests/test.yml -i tests/inventory --syntax-check

notifications:
  webhooks: https://galaxy.ansible.com/api/v1/notifications/
```

Fact caching

Add to your ansible.cfg to speed up playbook execution

```
[defaults]
gathering = smart
fact_caching = jsonfile
fact_caching_connection = /path/to/cachedir
fact_caching_timeout = 86400
```