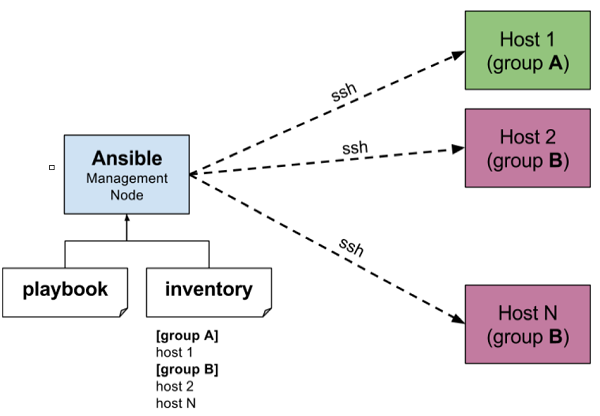
**What is Ansible?**

is an IT automation and configuration management tool

**How Ansible Works?**

**Ansible works** by connecting to your nodes and pushing out small programs, called "**Ansible** modules" to them. **Ansible** then executes these modules (over SSH by default), and removes them when finished. Your library of modules can reside on any machine, and there are no servers, daemons, or databases required.



The management node in the above picture is the controlling node (managing node) which controls the entire execution of the playbook. It’s the node from which you are running the installation. The inventory file provides the list of hosts where the Ansible modules needs to be run and the management node does a SSH connection and executes the small modules on the hosts machine and installs the product/software.

## Installation Process

Mainly, there are two types of machines when we talk about deployment −

* **Control machine** − Machine from where we can manage other machines.
* **Remote machine (node machine)** − Machines which are handled/controlled by control machine.

There can be multiple remote machines which are handled by one control machine. So, for managing remote machines we have to install Ansible on control machine.

### Control Machine Requirements

Ansible can be run from any machine with Python 2 (versions 2.6 or 2.7) or Python 3 (versions 3.5 and higher) installed.

**Note** − Windows does not support control machine.

By default, Ansible uses **ssh** to manage remote machine.

Ansible does not add any database. It does not require any daemons to start or keep it running. While managing remote machines, Ansible **does not** leave any software installed or running on them. Hence, there is no question of how to upgrade it when moving to a new version.

Ansible can be installed on control machine which have above mentioned requirements in different ways. You can install the latest release through Apt, yum, pkg, pip, OpenCSW, pacman, etc.

### Installation through Apt on Ubuntu Machine

For installing Ansible you have to configure PPA on your machine. For this, you have to run the following line of code −

$ sudo apt-get update

$ sudo apt-get install software-properties-common

$ sudo apt-add-repository ppa:ansible/ansible $ sudo apt-get update

$ sudo apt-get install ansible

## Understanding YAML

Every **YAML** file optionally starts with “---” and ends with “...”.

---

* hosts:

…

In this section, we will learn the different ways in which the YAML/YML data is represented.

### key-value pair

YAML uses simple key-value pair to represent the data. The dictionary is represented in key: value pair.

**Note** − There should be space between : and value.

### Example: A student record

--- #Optional YAML start syntax

james:

name: user1

rollNo: 20

div: A

sex: male

… #Optional YAML end syntax

### Abbreviation

You can also use abbreviation to represent dictionaries.

### Example

James: {name: user1, rollNo: 20, div: A, sex: male}

## Representing List

We can also represent List in YAML. Every element(member) of list should be written in a new line with same indentation starting with “- “ (- and space).

### Example

---

countries:

- India

- US

- UK

- Iceland

…

### Abbreviation

You can also use abbreviation to represent lists.

### Example

Countries: [‘India’, ‘US, ‘UK, ‘Iceland’]

### List inside Dictionaries

We can use list inside dictionaries, i.e., value of key is list.

### Example

---

james:

name: User1

rollNo: 20

div: A

sex: male

likes:

- maths

- physics

- english

…

### List of Dictionaries

We can also make list of dictionaries.

### Example

---

- james:

name: james john

rollNo: 34

div: B

sex: male

likes:

- maths

- physics

- english

- robert:

name: robert richardson

rollNo: 53

div: B

sex: male

likes:

- biology

- chemistry

…

YAML uses “|” to include newlines while showing multiple lines and “>” to suppress newlines while showing multiple lines. Due to this we can read and edit large lines. In both the cases intendentation will be ignored.

We can also represent **Boolean** (True/false) values in YAML. where **boolean**values can be case insensitive.

### Example

---

- james:

name: james john

rollNo: 34

div: B

sex: male

likes:

- maths

- physics

- english

result:

maths: 87

chemistry: 45

biology: 56

physics: 70

english: 80

passed: TRUE

messageIncludeNewLines: |

Congratulation!!

You passed with 79%

messageExcludeNewLines: >

Congratulation!!

You passed with 79%

## Some common words related to Ansible.

**Service/Server** − A process on the machine that provides the service.

**Machine** − A physical server, vm(virtual machine) or a container.

**Target machine** − A machine we are about to configure with Ansible.

**Task** − An action(run this, delete that) etc managed by Ansible.

**Playbook** − The yml file where Ansible commands are written and yml is executed on a machine.

## Parallelism and Shell Commands

Reboot your company server in 12 parallel forks at time. For this, we need to set up SSHagent for connection.

$ ssh-agent bash

$ ssh-add ~/.ssh/id\_rsa

To run reboot for all your company servers in a group, 'abc', in 12 parallel forks −

$ Ansible abc -a "/sbin/reboot" -f 12

By default, Ansible will run the above Ad-hoc commands form current user account. If you want to change this behavior, you will have to pass the username in Ad-hoc commands as follows −

$ Ansible abc -a "/sbin/reboot" -f 12 -u username

## File Transfer

You can use the Ad-hoc commands for doing **SCP** (Secure Copy Protocol) lots of files in parallel on multiple machines.

### Transferring file to many servers/machines

$ Ansible abc -m copy -a "src = /etc/yum.conf dest = /tmp/yum.conf"

### Creating new directory

$ Ansible abc -m file -a "dest = /path/user1/new mode = 777 owner = user1 group = user1 state = directory"

### Deleting whole directory and files

$ Ansible abc -m file -a "dest = /path/user1/new state = absent"

## Managing Packages

The Ad-hoc commands are available for yum and apt. Following are some Ad-hoc commands using yum.

The following command checks if yum package is installed or not, but does not update it.

$ Ansible abc -m yum -a "name = demo-tomcat-1 state = present"

The following command check the package is not installed.

$ Ansible abc -m yum -a "name = demo-tomcat-1 state = absent"

The following command checks the latest version of package is installed.

$ Ansible abc -m yum -a "name = demo-tomcat-1 state = latest"

## Gathering Facts

Facts can be used for implementing conditional statements in playbook. You can find adhoc information of all your facts through the following Ad-hoc command −

$ Ansible all -m setup

## Playbook Structure

Each playbook is an aggregation of one or more plays in it. Playbooks are structured using Plays. There can be more than one play inside a playbook.

The function of a play is to map a set of instructions defined against a particular host.

YAML is a strict typed language; so, extra care needs to be taken while writing the YAML files. There are different YAML editors but we will prefer to use a simple editor like notepad++. Just open notepad++ and copy and paste the below yaml and change the language to YAML (Language → YAML).

A YAML starts with --- (3 hyphens)

## Create a Playbook

Let us start by writing a sample YAML file. We will walk through each section written in a yaml file.

---

name: install and configure DB

hosts: testServer

become: yes

vars:

oracle\_db\_port\_value : 1521

tasks:

-name: Install the Oracle DB

yum: <code to install the DB>

-name: Ensure the installed service is enabled and running

service:

name: <your service name>

The above is a sample Playbook where we are trying to cover the basic syntax of a playbook. Save the above content in a file as **test.yml**. A YAML syntax needs to follow the correct indentation and one needs to be a little careful while writing the syntax.

## The Different YAML Tags

Let us now go through the different YAML tags. The different tags are described below −

### name: “copy file “

This tag specifies the name of the Ansible playbook. As in what this playbook will be doing. Any logical name can be given to the playbook.

### hosts

This tag specifies the lists of hosts or host group against which we want to run the task. The hosts field/tag is mandatory. It tells Ansible on which hosts to run the listed tasks. The tasks can be run on the same machine or on a remote machine. One can run the tasks on multiple machines and hence hosts tag can have a group of hosts’ entry as well.

### vars

Vars tag lets you define the variables which you can use in your playbook. Usage is similar to variables in any programming language.

### tasks

All playbooks should contain tasks or a list of tasks to be executed. Tasks are a list of actions one needs to perform. A tasks field contains the name of the task. This works as the help text for the user. It is not mandatory but proves useful in debugging the playbook. Each task internally links to a piece of code called a module. A module that should be executed, and arguments that are required for the module you want to execute.

# Ansible - Roles

## Creating a New Role

The directory structure for roles is essential to create a new role.

### Role Structure

Roles have a structured layout on the file system. The default structure can be changed but for now let us stick to defaults.

Each role is a directory tree in itself. The role name is the directory name within the /roles directory.

$ ansible-galaxy -h

### Usage

ansible-galaxy [delete|import|info|init|install|list|login|remove|search|setup] [--help] [options] ...

### Options

* **-h, --help** − Show this help message and exit.
* **-v, --verbose** − Verbose mode (-vvv for more, -vvvv to enable connection debugging)
* **--version** − Show program's version number and exit.

### Creating a Role Directory

The above command has created the role directories.

$ ansible-galaxy init vivekrole

ERROR! The API server (https://galaxy.ansible.com/api/) is not responding, please try again later.

$ ansible-galaxy init --force --offline vivekrole

- vivekrole was created successfully

$ tree vivekrole/

vivekrole/

├── defaults

│ └── main.yml

├── files ├── handlers

│ └── main.yml

├── meta

│ └── main.yml

├── README.md ├── tasks

│ └── main.yml

├── templates ├── tests │ ├── inventory

│ └── test.yml

└── vars

└── main.yml

8 directories, 8 files

Not all the directories will be used in the example and we will show the use of some of them in the example.

## Utilizing Roles in Playbook

This is the code of the playbook we have written for demo purpose. This code is of the playbook vivek\_orchestrate.yml. We have defined the hosts: **tomcat-node** and called the two roles – **install-tomcat** and **start-tomcat**.

The problem statement is that we have a war which we need to deploy on a machine via Ansible.

---

- hosts: tomcat-node

roles:

- {role: install-tomcat}

- {role: start-tomcat}

Contents of our directory structure from where we are running the playbook.



$ ls

ansible.cfg hosts roles vivek\_orchestrate.retry vivek\_orchestrate.yml



There is a tasks directory under each directory and it contains a main.yml. The main.yml contents of install-tomcat are −

---

#Install vivek artifacts

-

block:

- name: Install Tomcat artifacts

action: >

yum name = "demo-tomcat-1" state = present

register: Output

always:

- debug:

msg:

- "Install Tomcat artifacts task ended with message: {{Output}}"

- "Installed Tomcat artifacts - {{Output.changed}}"

The contents of main.yml of the start tomcat are −

#Start Tomcat

-

block:

- name: Start Tomcat

command: <path of tomcat>/bin/startup.sh"

register: output

become: true

always:

- debug:

msg:

- "Start Tomcat task ended with message: {{output}}"

- "Tomcat started - {{output.changed}}"

The advantage of breaking the playbook into roles is that anyone who wants to use the Install tomcat feature can call the Install Tomcat role.

## Breaking a Playbook into a Role

If not for the roles, the content of the main.yml of the respective role can be copied in the playbook **yml** file. But to have modularity, roles were created.

Any logical entity which can be reused as a reusable function, that entity can be moved to role. The example for this is shown above

Ran the command to run the playbook.

-vvv option for verbose output – verbose output

$ cd vivek-playbook/

This is the command to run the playbook

$ sudo ansible-playbook -i hosts vivek\_orchestrate.yml –vvv

-----------------------------------------------------------------

-----------------------------------------------------------------------

### Output

The generated output is as seen on the screen −

Using **/users/demo/vivek-playbook/ansible.cfg** as config file.

PLAYBOOK: vivek\_orchestrate.yml \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

1 plays in vivek\_orchestrate.yml

PLAY [tomcat-node] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

TASK [Gathering Facts] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Tuesday 21 November 2017 13:02:05 +0530 (0:00:00.056) 0:00:00.056 \*\*\*\*\*\*

Using module file /usr/lib/python2.7/sitepackages/ansible/modules/system/setup.py

<localhost> ESTABLISH LOCAL CONNECTION FOR USER: root

<localhost> EXEC /bin/sh -c 'echo ~ && sleep 0'

<localhost> EXEC /bin/sh -c '( umask 77 && mkdir -p "` echo

/root/.ansible/tmp/ansible-tmp-1511249525.88-259535494116870 `" &&

echo ansible-tmp-1511249525.88-259535494116870="`

echo /root/.ansible/tmp/ansibletmp-1511249525.88-259535494116870 `" ) && sleep 0'

<localhost> PUT /tmp/tmpPEPrkd TO

/root/.ansible/tmp/ansible-tmp-1511249525.88259535494116870/setup.py

<localhost> EXEC /bin/sh -c 'chmod u+x

/root/.ansible/tmp/ansible-tmp1511249525.88-259535494116870/

/root/.ansible/tmp/ansible-tmp-1511249525.88259535494116870/setup.py && sleep 0'

<localhost> EXEC /bin/sh -c '/usr/bin/python

/root/.ansible/tmp/ansible-tmp1511249525.88-259535494116870/setup.py; rm -rf

"/root/.ansible/tmp/ansible-tmp1511249525.88-259535494116870/" > /dev/null 2>&1 && sleep 0'

ok: [server1]

META: ran handlers

TASK [install-tomcat : Install Tomcat artifacts] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

task path: /users/demo/vivek-playbook/roles/install-tomcat/tasks/main.yml:5

Tuesday 21 November 2017 13:02:07 +0530 (0:00:01.515) 0:00:01.572 \*\*\*\*\*\*

Using module file /usr/lib/python2.7/sitepackages/ansible/modules/packaging/os/yum.py

<localhost> ESTABLISH LOCAL CONNECTION FOR USER: root

<localhost> EXEC /bin/sh -c 'echo ~ && sleep 0'

<localhost> EXEC /bin/sh -c '( umask 77 && mkdir -p "` echo

/root/.ansible/tmp/ansible-tmp-1511249527.34-40247177825302 `" && echo

ansibletmp-1511249527.34-40247177825302="` echo

/root/.ansible/tmp/ansible-tmp1511249527.34-40247177825302 `" ) && sleep 0'

<localhost> PUT /tmp/tmpu83chg TO

/root/.ansible/tmp/ansible-tmp-1511249527.3440247177825302/yum.py

<localhost> EXEC /bin/sh -c 'chmod u+x

/root/.ansible/tmp/ansible-tmp1511249527.34-40247177825302/

/root/.ansible/tmp/ansible-tmp-1511249527.3440247177825302/yum.py && sleep 0'

<localhost> EXEC /bin/sh -c '/usr/bin/python

/root/.ansible/tmp/ansible-tmp1511249527.34-40247177825302/yum.py; rm -rf

"/root/.ansible/tmp/ansible-tmp1511249527.34-40247177825302/" > /dev/null 2>

&1 && sleep 0'

changed: [server1] => {

"changed": true,

"invocation": {

"module\_args": {

"conf\_file": null,

"disable\_gpg\_check": false,

"disablerepo": null,

"enablerepo": null,

"exclude": null,

"install\_repoquery": true,

"installroot": "/",

"list": null,

"name": ["demo-tomcat-1"],

"skip\_broken": false,

"state": "present",

"update\_cache": false,

"validate\_certs": true

}

},

"msg": "",

"rc": 0,

"results": [

"Loaded plugins: product-id,

search-disabled-repos,

subscriptionmanager\nThis system is not registered to Red Hat Subscription Management.

You can use subscription-manager to register.\nResolving Dependencies\n-->

Running transaction check\n--->

Package demo-tomcat-1.noarch 0:SNAPSHOT-1 will be installed\n--> Finished Dependency

Resolution\n\nDependencies Resolved\n

\n================================================================================\n

Package Arch Version Repository

Size\n==================================================================\nInstalling:\n

demo-tomcat-1 noarch SNAPSHOT-1 demo-repo1 7.1 M\n\nTransaction

Summary\n==================================================================\nInstall 1

Package\n\nTotal download size: 7.1 M\nInstalled size: 7.9 M\nDownloading

packages:\nRunning transaction

check\nRunning transaction test\nTransaction test succeeded\nRunning transaction\n Installing :

demotomcat-1-SNAPSHOT-1.noarch 1/1 \n Verifying :

demo-tomcat-1-SNAPSHOT-1.noarch 1/1 \n\nInstalled:\n

demo-tomcat-1.noarch 0:SNAPSHOT-1 \n\nComplete!\n"

]

}

TASK [install-tomcat : debug] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

task path: /users/demo/vivek-playbook/roles/install-tomcat/tasks/main.yml:11

Tuesday 21 November 2017 13:02:13 +0530 (0:00:06.757) 0:00:08.329 \*\*\*\*\*\*

ok: [server1] => {

"changed": false,

"msg": [

"Install Tomcat artifacts task ended with message: {

u'msg': u'', u'changed': True, u'results':

[u'Loaded plugins: product-id,

search-disabledrepos,

subscription-manager\\nThis system is not registered to Red Hat Subscription Management.

You can use subscription-manager to register.\\nResolving Dependencies\\n-->

Running transaction check\\n--->

Package demo-tomcat-1.noarch 0:SNAPSHOT-1 will be installed\\n-->

Finished Dependency Resolution\\n

\\nDependencies

Resolved\\n\\n==================================================================\\n

Package Arch Version Repository

Size\\n========================================================================

=====\\nInstalling:\\n demo-tomcat-1 noarch SNAPSHOT-1 demo-repo1 7.1 M\\n\\nTransaction

Summary\\n=========================================================\\nInstall 1

Package\\n\\nTotal download size: 7.1 M\\nInstalled size: 7.9 M\\nDownloading

packages:\\nRunning

transaction check\\nRunning transaction test\\nTransaction test succeeded\\nRunning

transaction\\n

Installing : demo-tomcat-1-SNAPSHOT-1.noarch 1/1 \\n Verifying :

demo-tomcat-1-SNAPSHOT-1.noarch

1/1 \\n\\nInstalled:\\n demo-tomcat-1.noarch 0:SNAPSHOT-1 \\n\\nComplete!\\n'], u'rc': 0

}",

"Installed Tomcat artifacts - True"

]

}

TASK [install-tomcat : Clean DEMO environment] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

task path: /users/demo/vivek-playbook/roles/install-tomcat/tasks/main.yml:19

Tuesday 21 November 2017 13:02:13 +0530 (0:00:00.057) 0:00:08.387 \*\*\*\*\*\*

[WARNING]: when statements should not include jinja2 templating delimiters such as {{ }} or

{% %}. Found: {{installationOutput.changed}}

Using module file /usr/lib/python2.7/sitepackages/ansible/modules/files/file.py

<localhost> ESTABLISH LOCAL CONNECTION FOR USER: root

<localhost> EXEC /bin/sh -c 'echo ~ && sleep 0'

<localhost> EXEC /bin/sh -c '( umask 77 && mkdir -p "` echo

/root/.ansible/tmp/ansible-tmp-1511249534.13-128345805983963 `" && echo

ansible-tmp-1511249534.13-128345805983963="` echo

/root/.ansible/tmp/ansibletmp-1511249534.13-128345805983963 `" ) && sleep 0'

<localhost> PUT /tmp/tmp0aXel7 TO

/root/.ansible/tmp/ansible-tmp-1511249534.13128345805983963/file.py

<localhost> EXEC /bin/sh -c 'chmod u+x

/root/.ansible/tmp/ansible-tmp1511249534.13-128345805983963/

/root/.ansible/tmp/ansible-tmp-1511249534.13128345805983963/file.py && sleep 0'

<localhost> EXEC /bin/sh -c '/usr/bin/python

/root/.ansible/tmp/ansible-tmp1511249534.13-128345805983963/file.py; rm -rf

"/root/.ansible/tmp/ansible-tmp1511249534.13-128345805983963/" > /dev/null 2>&1

&& sleep 0'

changed: [server1] => {

"changed": true,

"diff": {

"after": {

"path": "/users/demo/DEMO",

"state": "absent"

},

"before": {

"path": "/users/demo/DEMO",

"state": "directory"

}

},

"invocation": {

"module\_args": {

"attributes": null,

"backup": null,

"content": null,

"delimiter": null,

"diff\_peek": null,

"directory\_mode": null,

"follow": false,

"force": false,

"group": null,

"mode": null,

"original\_basename": null,

"owner": null,

"path": "/users/demo/DEMO",

"recurse": false,

"regexp": null,

"remote\_src": null,

"selevel": null,

"serole": null,

"setype": null,

"seuser": null,

"src": null,

"state": "absent",

"unsafe\_writes": null,

"validate": null

}

},

"path": "/users/demo/DEMO",

"state": "absent"

}

TASK [install-tomcat : debug] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

task path: /users/demo/vivek-playbook/roles/install-tomcat/tasks/main.yml:29

Tuesday 21 November 2017 13:02:14 +0530 (0:00:00.257) 0:00:08.645 \*\*\*\*\*\*

ok: [server1] => {

"changed": false,

"msg": [

"Clean DEMO environment task ended with message:{u'diff': {u'after': {u'path':

u'/users/demo/DEMO', u'state': u'absent'},

u'before': {u'path': u'/users/demo/DEMO', u'state': u'directory'}}, u'state': u'absent',

u'changed': True, u'path': u'/users/demo/DEMO'}",

"check value :True"

]

}

TASK [install-tomcat : Copy Tomcat to user home] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

task path: /users/demo/vivek-playbook/roles/install-tomcat/tasks/main.yml:37

Tuesday 21 November 2017 13:02:14 +0530 (0:00:00.055) 0:00:08.701 \*\*\*\*\*\*

[WARNING]: when statements should not include jinja2 templating delimiters such as {{ }} or

{% %}. Found: {{installationOutput.changed}}

Using module file /usr/lib/python2.7/sitepackages/ansible/modules/commands/command.py

<localhost> ESTABLISH LOCAL CONNECTION FOR USER: root

<localhost> EXEC /bin/sh -c 'echo ~ && sleep 0'

<localhost> EXEC /bin/sh -c '( umask 77 && mkdir -p "` echo

/root/.ansible/tmp/ansible-tmp-1511249534.43-41077200718443 `" && echo

ansibletmp-1511249534.43-41077200718443="` echo

/root/.ansible/tmp/ansible-tmp1511249534.43-41077200718443 `" ) && sleep 0'

<localhost> PUT /tmp/tmp25deWs TO

/root/.ansible/tmp/ansible-tmp-1511249534.4341077200718443/command.py

<localhost> EXEC /bin/sh -c 'chmod u+x

/root/.ansible/tmp/ansible-tmp1511249534.43-41077200718443/

/root/.ansible/tmp/ansible-tmp-1511249534.4341077200718443/command.py && sleep 0'

<localhost> EXEC /bin/sh -c '/usr/bin/python

/root/.ansible/tmp/ansible-tmp1511249534.43-41077200718443/command.py; rm -rf

"/root/.ansible/tmp/ansibletmp-1511249534.43-41077200718443/" > /dev/null 2>&1

&& sleep 0'

changed: [server1] => {

"changed": true,

"cmd": [

"cp",

"-r",

"/opt/ansible/tomcat/demo",

"/users/demo/DEMO/"

],

"delta": "0:00:00.017923",

"end": "2017-11-21 13:02:14.547633",

"invocation": {

"module\_args": {

"\_raw\_params": "cp -r /opt/ansible/tomcat/demo /users/demo/DEMO/",

"\_uses\_shell": false,

"chdir": null,

"creates": null,

"executable": null,

"removes": null,

"warn": true

}

},

"rc": 0,

"start": "2017-11-21 13:02:14.529710",

"stderr": "",

"stderr\_lines": [],

"stdout": "",

"stdout\_lines": []

}

TASK [install-tomcat : debug] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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task path: /users/demo/vivek-playbook/roles/install-tomcat/tasks/main.yml:47

Tuesday 21 November 2017 13:02:14 +0530 (0:00:00.260) 0:00:08.961 \*\*\*\*\*\*

ok: [server1] => {

"changed": false,

"msg": "Copy Tomcat to user home task ended with message {

'stderr\_lines': [], u'changed': True, u'end': u'2017-11-21 13:02:14.547633', u'stdout':

u'', u'cmd': [u'cp', u'-r', u'/opt/ansible/tomcat/demo', u'/users/demo/DEMO/'], u'rc': 0,

u'start': u'2017-11-21 13:02:14.529710', u'stderr': u'', u'delta': u'0:00:00.017923',

'stdout\_lines': []}"

}

TASK [start-tomcat : Start Tomcat] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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task path: /users/demo/vivek-playbook/roles/start-tomcat/tasks/main.yml:5

Tuesday 21 November 2017 13:02:14 +0530 (0:00:00.044) 0:00:09.006 \*\*\*\*\*\*

Using module file /usr/lib/python2.7/sitepackages/ansible/modules/commands/command.py

<localhost> ESTABLISH LOCAL CONNECTION FOR USER: root

<localhost> EXEC /bin/sh -c 'echo ~ && sleep 0'

<localhost> EXEC /bin/sh -c '( umask 77 && mkdir -p "` echo

/root/.ansible/tmp/ansible-tmp-1511249534.63-46501211251197 `" && echo

ansibletmp-1511249534.63-46501211251197="` echo

/root/.ansible/tmp/ansible-tmp1511249534.63-46501211251197 `" ) && sleep 0'

<localhost> PUT /tmp/tmp9f06MQ TO

/root/.ansible/tmp/ansible-tmp-1511249534.6346501211251197/command.py

<localhost> EXEC /bin/sh -c 'chmod u+x

/root/.ansible/tmp/ansible-tmp1511249534.63-46501211251197/

/root/.ansible/tmp/ansible-tmp-1511249534.6346501211251197/command.py && sleep 0'

<localhost> EXEC /bin/sh -c '/usr/bin/python

/root/.ansible/tmp/ansible-tmp1511249534.63-46501211251197/command.py; rm -rf

"/root/.ansible/tmp/ansibletmp-1511249534.63-46501211251197/" > /dev/null 2>&1

&& sleep 0'

changed: [server1] => {

"changed": true,

"cmd": [ "/users/demo/DEMO/bin/startup.sh" ],

"delta": "0:00:00.020024",

"end": "2017-11-21 13:02:14.741649",

"invocation": {

"module\_args": {

"\_raw\_params": "/users/demo/DEMO/bin/startup.sh",

"\_uses\_shell": false,

"chdir": null,

"creates": null,

"executable": null,

"removes": null,

"warn": true

}

},

"rc": 0,

"start": "2017-11-21 13:02:14.721625",

"stderr": "",

"stderr\_lines": [],

"stdout": "Tomcat started.",

"stdout\_lines": [ "Tomcat started." ]

}

TASK [start-tomcat : debug] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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task path: /users/demo/vivek-playbook/roles/start-tomcat/tasks/main.yml:10

Tuesday 21 November 2017 13:02:14 +0530 (0:00:00.150) 0:00:09.156 \*\*\*\*\*\*

ok: [server1] => {

"changed": false,

"msg": [

"Start Tomcat task ended with message: {'

stderr\_lines': [], u'changed': True, u'end': u'2017-11-21 13:02:14.741649', u'stdout':

u'Tomcat started.', u'cmd': [u'/users/demo/DEMO/bin/startup.sh'], u'rc': 0, u'start':

u'2017-11-21 13:02:14.721625', u'stderr': u'', u'delta': u'0:00:00.020024',

'stdout\_lines': [u'Tomcat started.']}",

"Tomcat started - True"

]

}

META: ran handlers

META: ran handlers

PLAY RECAP \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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server1 : ok = 9 changed = 4 unreachable = 0 failed = 0

Tuesday 21 November 2017 13:02:14 +0530 (0:00:00.042) 0:00:09.198 \*\*\*\*\*\*

===============================================================================

install-tomcat : Install Tomcat artifacts ------------------------------- 6.76s

/users/demo/vivek-playbook/roles/install-tomcat/tasks/main.yml:5 --------------

Gathering Facts --------------------------------------------------------- 1.52s

------------------------------------------------------------------------------

install-tomcat : Copy Tomcat to user home ------------------------------- 0.26s

/users/demo/vivek-playbook/roles/install-tomcat/tasks/main.yml:37 -------------

install-tomcat : Clean DEMO environment --------------------------------- 0.26s

/users/demo/vivek-playbook/roles/install-tomcat/tasks/main.yml:19 -------------

start-tomcat : Start Tomcat --------------------------------------------- 0.15s

/users/demo/vivek-playbook/roles/start-tomcat/tasks/main.yml:5 ----------------

install-tomcat : debug -------------------------------------------------- 0.06s

/users/demo/vivek-playbook/roles/install-tomcat/tasks/main.yml:11 -------------

install-tomcat : debug -------------------------------------------------- 0.06s

/users/demo/vivek-playbook/roles/install-tomcat/tasks/main.yml:29 -------------

install-tomcat : debug -------------------------------------------------- 0.04s

/users/demo/vivek-playbook/roles/install-tomcat/tasks/main.yml:47 -------------

start-tomcat : debug ---------------------------------------------------- 0.04s

/users/demo/vivek-playbook/roles/start-tomcat/tasks/main.yml:10 ---------------

Hit the following URL and you will be directed to a page as shown below −**http://10.76.0.134:11677/HelloWorld/HelloWorld**

# Ansible - Variables

### Example

- hosts : <your hosts>

vars:

tomcat\_port : 8080

In the above example, we have defined a variable name **tomcat\_port** and assigned the value 8080 to that variable and can use that in your playbook wherever needed.

Now taking a reference from the example shared. The following code is from one of the roles (install-tomcat) −

block:

- name: Install Tomcat artifacts

action: >

yum name = "demo-tomcat-1" state = present

register: Output

always:

- debug:

msg:

- "Install Tomcat artifacts task ended with message: {{Output}}"

- "Installed Tomcat artifacts - {{Output.changed}}"

Here, the output is the variable used.

Let us walk through all the keywords used in the above code −

* **block** − Ansible syntax to execute a given block.
* **name** − Relevant name of the block - this is used in logging and helps in debugging that which all blocks were successfully executed.
* **action** − The code next to action tag is the task to be executed. The action again is a Ansible keyword used in yaml.
* **register** − The output of the action is registered using the register keyword and Output is the variable name which holds the action output.
* **always** − Again a Ansible keyword , it states that below will always be executed.
* **msg** − Displays the message.

### Usage of variable - {{Output}} -->

This will read the value of variable Output. Also as it is used in the msg tab, it will print the value of the output variable.

Additionally, you can use the sub properties of the variable as well. Like in the case checking {{Output.changed}} whether the output got changed and accordingly use it.

## Exception Handling in Playbooks

Exception handling in Ansible is similar to exception handling in any programming language. An example of the exception handling in playbook is shown below.

tasks:

- name: Name of the task to be executed

block:

- debug: msg = 'Just a debug message , relevant for logging'

- command: <the command to execute>

rescue:

- debug: msg = 'There was an exception.. '

- command: <Rescue mechanism for the above exception occurred)

always:

- debug: msg = "this will execute in all scenarios. Always will get logged"

Following is the syntax for exception handling.

* **rescue** and **always** are the keywords specific to exception handling.
* Block is where the code is written (anything to be executed on the Unix machine).
* If the command written inside the block feature fails, then the execution reaches rescue block and it gets executed. In case there is no error in the command under block feature, then rescue will not be executed.
* **Always** gets executed in all cases.
* So if we compare the same with java, then it is similar to try, catch and finally block.
* Here, **Block** is similar to **try block** where you write the code to be executed and **rescue** is similar to **catch block** and **always** is similar to **finally**.

## Loops

Below is the example to demonstrate the usage of Loops in Ansible.

The tasks is to copy the set of all the war files from one directory to tomcat webapps folder.

Most of the commands used in the example below are already covered before. Here, we will concentrate on the usage of loops.

Initially in the 'shell' command we have done ls \*.war. So, it will list all the war files in the directory.

Output of that command is taken in a variable named output.

To loop, the 'with\_items' syntax is being used.

with\_items: "{{output.stdout\_lines}}" --> output.stdout\_lines gives us the line by line output and then we loop on the output with the with\_items command of Ansible.

Attaching the example output just to make one understand how we used the stdout\_lines in the with\_items command.

---

#Tsting

- hosts: tomcat-node

tasks:

- name: Install Apache

shell: "ls \*.war"

register: output

args:

chdir: /opt/ansible/tomcat/demo/webapps

- file:

src: '/opt/ansible/tomcat/demo/webapps/{{ item }}'

dest: '/users/demo/vivek/{{ item }}'

state: link

with\_items: "{{output.stdout\_lines}}"

Loop

## Blocks

The playbook in totality is broken into blocks. The smallest piece of steps to execute is written in block. Writing the specific instruction in blocks helps to segregate functionality and handle it with exception handling if needed.

Example of blocks is covered in variable usage,exception handling and loops above.

## Conditionals

Conditionals are used where one needs to run a specific step based on a condition.

---

#Tsting

- hosts: all

vars:

test1: "Hello Vivek"

tasks:

- name: Testing Ansible variable

debug:

msg: "Equals"

when: test1 == "Hello Vivek"

In this case, Equals will be printed as the test1 variable is equal as mentioned in the when condition. **when** can be used with a logical OR and logical AND condition as in all the programming languages.



Just change the value of test1 variable from Hello Vivek to say Hello World and see the output.

