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**Activity 4: Running Elevated Ad hoc Commands**

1. **Objectives:**

1.1 Use commands that makes changes to remote machines

1.2 Use playbook in automating ansible commands

2. **Discussion:**

*Provide screenshots for each task*.

**Elevated Ad hoc commands**

So far, we have not performed ansible commands that makes changes to the remote servers. We manage to gather facts and connect to the remote machines, but we still did not make changes on those machines. In this activity, we will learn to use commands that would install, update, and upgrade packages in the remote machines. We will also create a playbook that will be used for automations.

**Playbooks** record and execute **Ansible**'s configuration, deployment, and orchestration functions. They can describe a policy you want your remote systems to enforce, or a set of steps in a general IT process. If Ansible modules are the tools in your workshop, playbooks are your instruction manuals, and your inventory of hosts are your raw material. At a basic level, playbooks can be used to manage configurations of and deployments to remote machines. 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. You can check this documentation if you want to learn more about playbooks. Working with playbooks — Ansible Documentation

**Task 1: Run elevated ad hoc commands**

1. Locally, we use the command *sudo apt update* when we want to download package information from all configured resources. The sources often defined in /etc/apt/sources.list file and other files located in /etc/apt/sources.list.d/ directory. So, when you run update command, it downloads the package information from the Internet. It is useful to get info on an updated version of packages or their dependencies. We can only run

an apt update command in a remote machine. Issue the following command:

*ansible all -m apt -a update_cache=true*

What is the result of the command? Is it successful?

```
dnzl@workstation:~/sysad2$ ansible all -m apt -a update_cache=true
192.168.56.102 | FAILED! => {
    "changed": false,
    "msg": "Failed to lock apt for exclusive operation: Failed to lock director
y /var/lib/apt/lists/: E:Could not open lock file /var/lib/apt/lists/lock - ope
n (13: Permission denied)"
}
192.168.56.103 | FAILED! => {
    "changed": false,
    "msg": "Failed to lock apt for exclusive operation: Failed to lock director
y /var/lib/apt/lists/: E:Could not open lock file /var/lib/apt/lists/lock - ope
n (13: Permission denied)"
}
```

Try editing the command and add something that would elevate the privilege. Issue the command *ansible all -m apt -a update_cache=true --become --ask-become-pass.* Enter the sudo password when prompted. You will notice now that the output of this command is a success. The *update_cache=true* is the same thing as running *sudo apt update*. The --become command elevate the privileges and the *--ask-become-pass* asks for the password. For now, even if we only have changed the packaged index, we were able to change something on the remote server.

```
dnzl@workstation:~/sysad2$ ansible all -m apt -a update_cache=true --become --a
sk-become-pass
BECOME password:
192.168.56.102 | CHANGED => {
    "cache_update_time": 1694428611,
    "cache_updated": true,
    "changed": true
}
192.168.56.103 | CHANGED => {
    "cache_update_time": 1694428611,
    "cache_updated": true,
    "changed": true
}
```

You may notice after the second command was executed, the status is CHANGED compared to the first command, which is FAILED.

2. Let's try to install VIM, which is an almost compatible version of the UNIX editor Vi. To do this, we will just changed the module part in 1.1 instruction. Here is the command: *ansible all -m apt -a name=vim-nox --become --ask-become-pass.* The command would take some time after typing the

password because the local machine instructed the remote servers to actually install the package.

```
dnzl@workstation:~/sysad2$ ansible all -m apt -a name=vim-nox --become --ask-be
come-pass
BECOME password:
192.168.56.102 | CHANGED => {
    "cache_update_time": 1694428611,
    "cache_updated": false,
    "changed": true,
    "stderr": "",
    "stderr_lines": [],
    "stdout": "Reading package lists...\nBuilding dependency tree...\nReading s
tate information...\nThe following package was automatically installed and is n
o longer required:\n  libllvm7\nUse 'sudo apt autoremove' to remove it.\nThe fo
llowing additional packages will be installed:\n  fonts-lato javascript-common
libjs-jquery liblua5.2-0 libruby2.5 libtcl8.6\n  rake ruby ruby-did-you-mean ru
by-minitest ruby-net-telnet ruby-power-assert\n  ruby-test-unit ruby2.5 rubygem
s-integration vim-runtime\nSuggested packages:\n  apache2 | lighttpd | httpd tc
l8.6 ri ruby-dev bundler cscope vim-doc\nThe following NEW packages will be ins
talled:\n  fonts-lato javascript-common libjs-jquery liblua5.2-0 libruby2.5 lib
tcl8.6\n  rake ruby ruby-did-you-mean ruby-minitest ruby-net-telnet ruby-power-
assert\n  ruby-test-unit ruby2.5 rubygems-integration vim-nox vim-runtime\n0 up
graded, 17 newly installed, 0 to remove and 0 not upgraded.\nNeed to get 13.8 M
B of archives.\nAfter this operation, 64.5 MB of additional disk space will be
used.\nGet:1 http://ph.archive.ubuntu.com/ubuntu bionic/main amd64 fonts-lato a
ll 2.0-2 [2698 kB]\nGet:2 http://ph.archive.ubuntu.com/ubuntu bionic/main amd64
 javascript-common all 11 [6066 B]\nGet:3 http://ph.archive.ubuntu.com/ubuntu b
ionic/main amd64 libjs-jquery all 3.2.1-1 [152 kB]\nGet:4 http://ph.archive.ubu
ntu.com/ubuntu bionic/main amd64 liblua5.2-0 amd64 5.2.4-1.1build1 [108 kB]\nGe
t:5 http://ph.archive.ubuntu.com/ubuntu bionic/main amd64 rubygems-integration
all 1.11 [4994 B]\nGet:6 http://ph.archive.ubuntu.com/ubuntu bionic-updates/mai
```

2.1 Verify that you have installed the package in the remote servers. Issue the command *which vim* and the command *apt search vim-nox* respectively. Was the command successful?

```
dnzl@workstation:~/sysad2$ apt search vim-nox
Sorting... Done
Full Text Search... Done
vim-nox/bionic-updates,bionic-security 2:8.0.1453-1ubuntu1.13 amd64
  Vi IMproved - enhanced vi editor - with scripting languages support

vim-tiny/bionic-updates,bionic-security,now 2:8.0.1453-1ubuntu1.13 amd64 [insta
lled]
  Vi IMproved - enhanced vi editor - compact version
```

2.2 Check the logs in the servers using the following commands: *cd /var/log*. After this, issue the command *ls,* go to the folder *apt* and open history.log. Describe what you see in the history.log.

```
dnzl@workstation:~/sysad2$ cd /var/log
dnzl@workstation:/var/log$ ls
alternatives.log    btmp             installer          syslog.3.gz
alternatives.log.1  btmp.1           journal            tallylog
apport.log          cups             kern.log           ubuntu-advantage.log
apport.log.1        dist-upgrade     kern.log.1         ubuntu-advantage.log.1
apt                 dpkg.log         kern.log.2.gz      ufw.log
auth.log            dpkg.log.1       kern.log.3.gz      ufw.log.1
auth.log.1          faillog          lastlog            ufw.log.2.gz
auth.log.2.gz       fontconfig.log   speech-dispatcher  ufw.log.3.gz
auth.log.3.gz       gdm3             syslog             unattended-upgrades
boot.log            gpu-manager.log  syslog.1           wtmp
bootstrap.log       hp               syslog.2.gz        wtmp.1
dnzl@workstation:/var/log$ cd apt
dnzl@workstation:/var/log/apt$ cat history.log

Start-Date: 2023-09-11  17:02:41
Commandline: apt install python3-pip
Requested-By: dnzl (1000)
Install: libgcc-7-dev:amd64 (7.5.0-3ubuntu1~18.04, automatic), libmpx2:amd64 (8
.4.0-1ubuntu1~18.04, automatic), python3-dev:amd64 (3.6.7-1~18.04, automatic),
python3-distutils:amd64 (3.6.9-1~18.04, automatic), linux-libc-dev:amd64 (4.15.
0-213.224, automatic), libfakeroot:amd64 (1.22-2ubuntu1, automatic), libc6-dev:
amd64 (2.27-3ubuntu1.6, automatic), libpython3.6-dev:amd64 (3.6.9-1~18.04ubuntu
1.12, automatic), libexpat1-dev:amd64 (2.2.5-3ubuntu0.9, automatic), libalgorit
hm-diff-perl:amd64 (1.19.03-1, automatic), libalgorithm-merge-perl:amd64 (0.08-
3, automatic), libitm1:amd64 (8.4.0-1ubuntu1~18.04, automatic), g++:amd64 (4:7.
4.0-1ubuntu2.3, automatic), python3-pip:amd64 (9.0.1-2.3~ubuntu1.18.04.8), pyth
on3-wheel:amd64 (0.30.0-0.2ubuntu0.1, automatic), gcc:amd64 (4:7.4.0-1ubuntu2.3
```

3. This time, we will install a package called snapd. Snap is pre-installed in Ubuntu system. However, our goal is to create a command that checks for the latest installation package.

   3.1 Issue the command: *ansible all -m apt -a name=snapd --become --ask-become-pass*

   Can you describe the result of this command? Is it a success? Did it change anything in the remote servers?

```
dnzl@workstation:~/sysad2$ ansible all -m apt -a name=snapd --become --ask-beco
me-pass
BECOME password:
192.168.56.102 | SUCCESS => {
    "cache_update_time": 1694428611,
    "cache_updated": false,
    "changed": false
}
192.168.56.103 | SUCCESS => {
    "cache_update_time": 1694428611,
    "cache_updated": false,
    "changed": false
}
```

3.2 Now, try to issue this command: *ansible all -m apt -a "name=snapd state=latest" --become --ask-become-pass*

Describe the output of this command. Notice how we added the command *state=latest* and placed them in double quotations.

```
dnzl@workstation:~/sysad2$ ansible all -m apt -a "name=snapd state=latest" --be
come --ask-become-pass
BECOME password:
192.168.56.103 | SUCCESS => {
    "cache_update_time": 1694428611,
    "cache_updated": false,
    "changed": false
}
192.168.56.102 | SUCCESS => {
    "cache_update_time": 1694428611,
    "cache_updated": false,
    "changed": false
}
```

4. At this point, make sure to commit all changes to GitHub.

```
dnzl@workstation:~/sysad2$ git add *
dnzl@workstation:~/sysad2$ git commit -m "ACT 4"
[main 68402d7] ACT 4
 2 files changed, 24 insertions(+)
 create mode 100644 install_apache.yml
 create mode 100644 uninstall_indian.yml
dnzl@workstation:~/sysad2$ git push origin
Username for 'https://github.com': ddinglasan
Password for 'https://ddinglasan@github.com':
Counting objects: 4, done.
Delta compression using up to 2 threads.
Compressing objects: 100% (4/4), done.
Writing objects: 100% (4/4), 539 bytes | 539.00 KiB/s, done.
Total 4 (delta 1), reused 0 (delta 0)
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/ddinglasan/sysad2.git
   32ec613..68402d7  main -> main
```

**Task 2: Writing our First Playbook**

1. With ad hoc commands, we can simplify the administration of remote servers. For example, we can install updates, packages, and applications, etc. However, the real strength of ansible comes from its playbooks. When we write a playbook, we can define the state that we want our servers to be in and the place or commands that ansible will carry out to bring to that state. You can use an editor to create a playbook. Before we proceed, make sure that you are in the directory of the repository that we use in the previous activities (*CPE232_yourname*). Issue the command *nano*

*install_apache.yml*. This will create a playbook file called *install_apache.yml*. The .yml is the basic standard extension for playbook files.

```
dnzl@workstation:~/sysad2$ nano install_apache.yml
```

When the editor appears, type the following:

```
  GNU nano 4.8                 install_apache.yml
---
- hosts: all
  become: true
  tasks:

  - name: install apache2 package
    apt:
      name: apache2
```

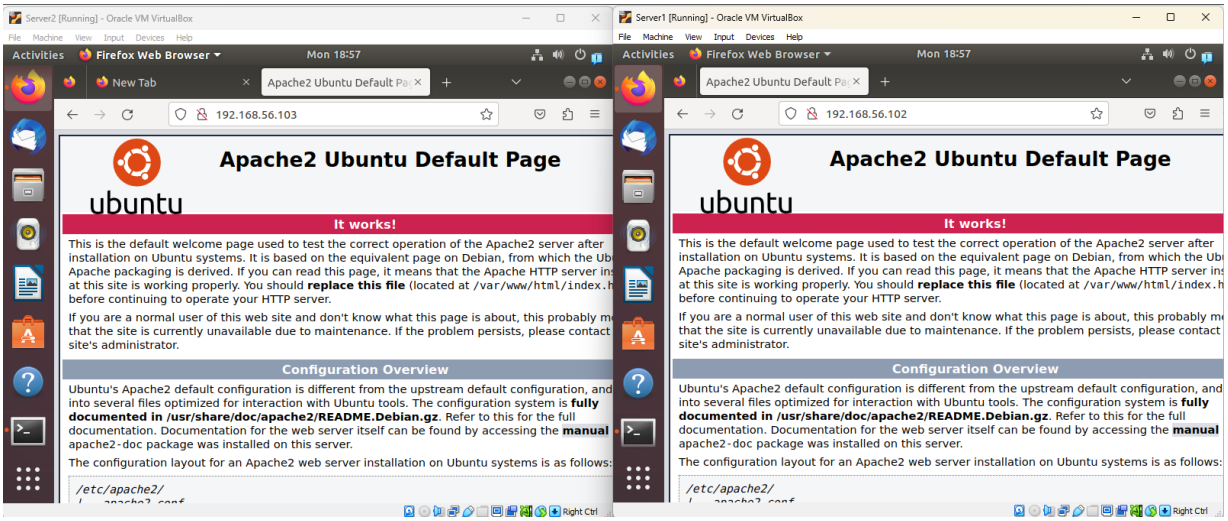
```
  GNU nano 2.9.3                    install_apache.yml

---
- hosts: all
  become: true
  tasks:

  - name: install apache2 package
    apt:
      name: apache2
```

Make sure to save the file. Take note also of the alignments of the texts.

2. Run the yml file using the command: *ansible-playbook --ask-become-pass install_apache.yml.* Describe the result of this command.

```
dnzl@workstation:~/sysad2$ ansible-playbook --ask-become-pass install_apache.yml
BECOME password:

PLAY [all] *********************************************************************

TASK [Gathering Facts] *********************************************************
ok: [192.168.56.103]
ok: [192.168.56.102]

TASK [install apache2 package] *************************************************
changed: [192.168.56.103]
changed: [192.168.56.102]

PLAY RECAP *********************************************************************
192.168.56.102             : ok=2    changed=1    unreachable=0    failed=0
skipped=0    rescued=0    ignored=0
192.168.56.103             : ok=2    changed=1    unreachable=0    failed=0
skipped=0    rescued=0    ignored=0
```

3. To verify that apache2 was installed automatically in the remote servers, go to the web browsers on each server and type its IP address. You should see something like this.




4. Try to edit the *install_apache.yml* and change the name of the package to any name that will not be recognized. What is the output?

```
  GNU nano 2.9.3                    uninstall_indian.yml

---
- hosts: all
  become: true
  tasks:

  - name: install apache2 package
    apt:
      name: apache2
```

```
dnzl@workstation:~/sysad2$ ansible-playbook --ask-become-pass uninstall_indian.
yml
BECOME password:

PLAY [all] *********************************************************************
*

TASK [Gathering Facts] *********************************************************
*
ok: [192.168.56.103]
ok: [192.168.56.102]

TASK [install apache2 package] *************************************************
*
ok: [192.168.56.103]
ok: [192.168.56.102]

PLAY RECAP *********************************************************************
*
192.168.56.102             : ok=2    changed=0    unreachable=0    failed=0
skipped=0    rescued=0    ignored=0
192.168.56.103             : ok=2    changed=0    unreachable=0    failed=0
skipped=0    rescued=0    ignored=0
```

5. This time, we are going to put additional task to our playbook. Edit the *install_apache.yml*. As you can see, we are now adding an additional command, which is the *update_cache*. This command updates existing package-indexes on a supporting distro but not upgrading installed-packages (utilities) that were being installed.

```
---
- hosts: all
  become: true
  tasks:

  - name: update repository index
    apt:
      update_cache: yes

  - name: install apache2 package
    apt:
      name: apache2
```

Save the changes to this file and exit.

```
 GNU nano 2.9.3                  install_apache.yml

---
- hosts: all
  become: true
  tasks:

  - name: update repository index
    apt:
      update_cache: yes

  - name: install apache2 package
    apt:
      name: apache2
```

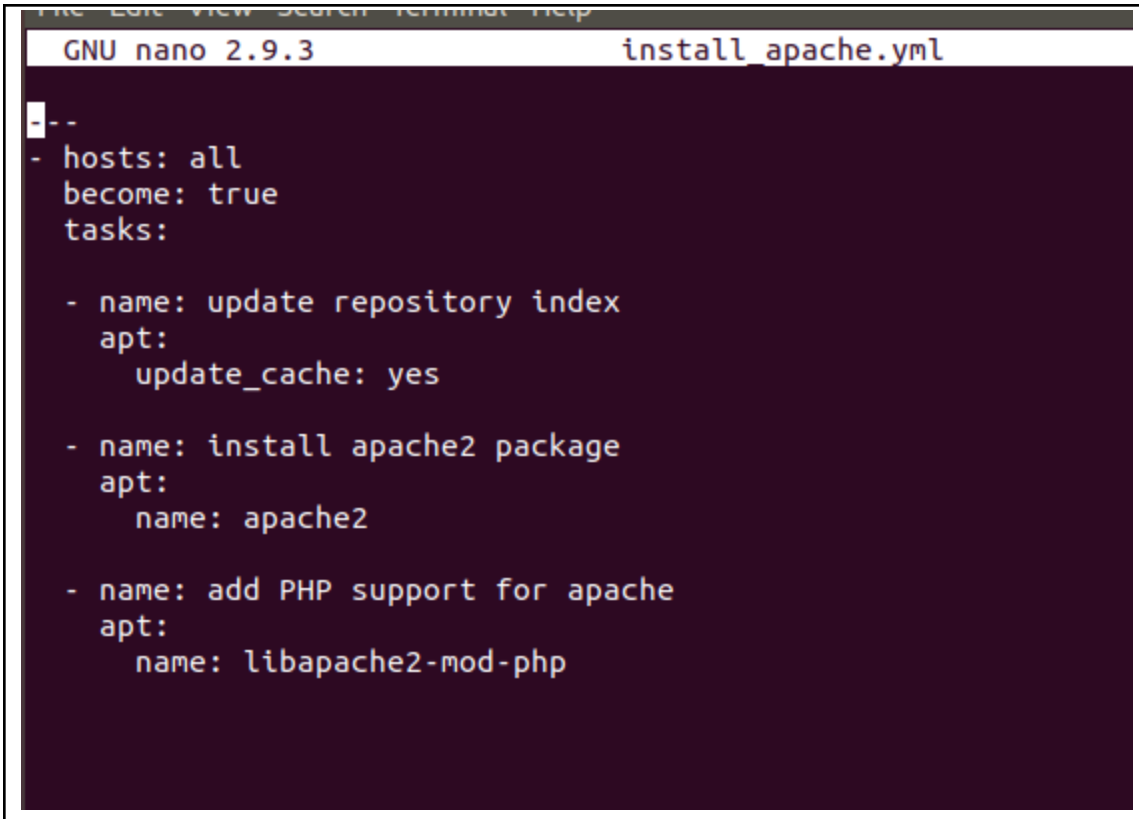
6. Run the playbook and describe the output. Did the new command change anything on the remote servers?

```
dnzl@workstation:~/sysad2$ ansible-playbook --ask-become-pass install_apache.yml
BECOME password:

PLAY [all] *********************************************************************

TASK [Gathering Facts] *********************************************************
ok: [192.168.56.103]
ok: [192.168.56.102]

TASK [update repository index] *************************************************
changed: [192.168.56.102]
changed: [192.168.56.103]

TASK [install apache2 package] *************************************************
ok: [192.168.56.102]
ok: [192.168.56.103]

PLAY RECAP *********************************************************************
192.168.56.102             : ok=3    changed=1    unreachable=0    failed=0
skipped=0    rescued=0    ignored=0
192.168.56.103             : ok=3    changed=1    unreachable=0    failed=0
skipped=0    rescued=0    ignored=0
```

7. Edit again the *install_apache.yml*. This time, we are going to add a PHP support for the apache package we installed earlier.

```
---
- hosts: all
  become: true
  tasks:

  - name: update repository index
    apt:
      update_cache: yes

  - name: install apache2 package
    apt:
      name: apache2

  - name: add PHP support for apache
    apt:
      name: libapache2-mod-php
```

Save the changes to this file and exit.




8. Run the playbook and describe the output. Did the new command change anything on the remote servers?

```
dnzl@workstation:~/sysad2$ ansible-playbook --ask-become-pass install_apache.yml
BECOME password:

PLAY [all] *********************************************************************
*

TASK [Gathering Facts] *********************************************************
*
ok: [192.168.56.102]
ok: [192.168.56.103]

TASK [update repository index] *************************************************
*
changed: [192.168.56.103]
changed: [192.168.56.102]

TASK [install apache2 package] *************************************************
*
ok: [192.168.56.102]
ok: [192.168.56.103]

TASK [add PHP support for apache] **********************************************
*
changed: [192.168.56.102]
changed: [192.168.56.103]

PLAY RECAP *********************************************************************
*
192.168.56.102             : ok=4    changed=2    unreachable=0    failed=0
skipped=0    rescued=0    ignored=0
192.168.56.103             : ok=4    changed=2    unreachable=0    failed=0
skipped=0    rescued=0    ignored=0
```

9. Finally, make sure that we are in sync with GitHub. Provide the link of your GitHub repository.

   *https://github.com/ddinglasan/sysad2.git*

**Reflections:**

Answer the following:

1. What is the importance of using a playbook?
   It is important because it is reusable and its configuration is simple and can be deployed to many devices.
2. Summarize what we have done on this activity.

In the first task I learned how to run elevated ad hoc commands. I learned that –become can elevate privileges and –ask-become-pass asks the user for the

password.I used these commands to install vim and snapd. In the second task I created a playbook that will install apache, updates existing package-indexes, and add PHP support for the apache package.

**Conclusions:**

In this activity, I learned the basic usage of ansible and how it elevated the experience of managing remote servers. I also learned the importance of the ansible playbook because it makes the job easier.