

## Lab Work Task. Day 2

### Task

A) On Control Machine:

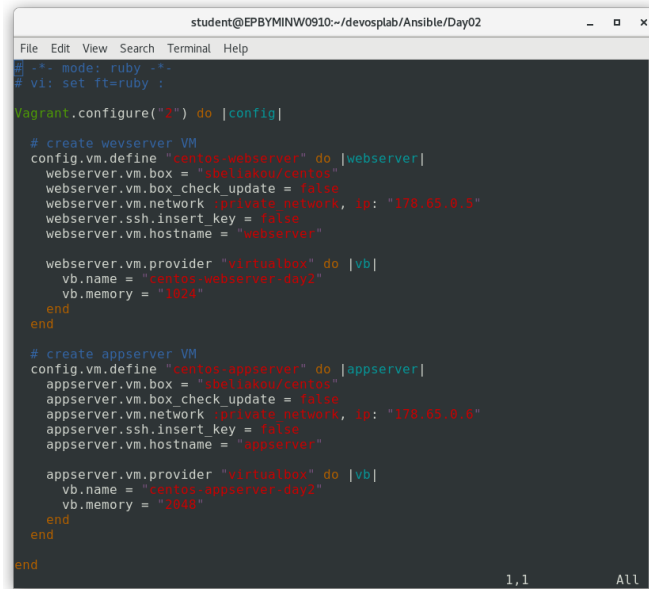
Create folder ~/ansible/day2. All working files should be placed there (Vagrantfile, playbooks, roles folder with custom roles, inventory)



Picture 1

B) Spin up 2 VMs form single Vagrantfile. Compose Inventory:

- Specify groups;
- Define group vars;
- Define host vars;
- Define ansible connection settings (common for all hosts/groups in inventory).

A screenshot of a text editor window titled 'student@EPBYMINW0910:~/devoslab/Ansible/Day02'. The editor shows a Vagrantfile with Ruby syntax. It defines two VMs: 'webserver' and 'appserver'. Both are based on 'centos' and use the 'virtualbox' provider. The 'webserver' VM has a memory of 1024 and IP 178.65.0.5. The 'appserver' VM has a memory of 2048 and IP 178.65.0.6. The file ends with 'end' and 'All' at the bottom right.

```
student@EPBYMINW0910:~/devoslab/Ansible/Day02
File Edit View Search Terminal Help
# -*- mode: ruby -*-
# vi: set ft=ruby :

Vagrant.configure("2") do |config|

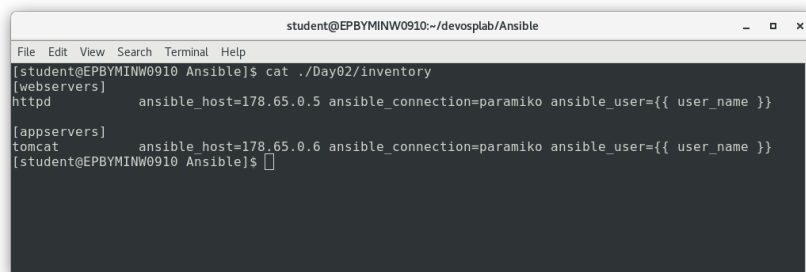
  # create wevserver VM
  config.vm.define "centos-webserver" do |webserver|
    webserver.vm.box = "stallanov/centos"
    webserver.vm.box_check_update = false
    webserver.vm.network :private_network, ip: "178.65.0.5"
    webserver.ssh.insert_key = false
    webserver.vm.hostname = "webserver"

    webserver.vm.provider "virtualbox" do |vb|
      vb.name = "centos-webserver-day2"
      vb.memory = "1024"
    end
  end

  # create appserver VM
  config.vm.define "centos-appserver" do |appserver|
    appserver.vm.box = "stallanov/centos"
    appserver.vm.box_check_update = false
    appserver.vm.network :private_network, ip: "178.65.0.6"
    appserver.ssh.insert_key = false
    appserver.vm.hostname = "appserver"

    appserver.vm.provider "virtualbox" do |vb|
      vb.name = "centos-appserver-day2"
      vb.memory = "2048"
    end
  end
end
1,1 All
```

Picture 2 – Vagrantfile

A screenshot of a terminal window showing the contents of an Ansible inventory file. The file lists two groups: 'webservers' with host 'httpd' and 'appservers' with host 'tomcat'. Both hosts have the same connection and user settings.

```
student@EPBYMINW0910:~/devoslab/Ansible
File Edit View Search Terminal Help
[student@EPBYMINW0910 Ansible]$ cat ./Day02/inventory
[webservers]
httpd      ansible_host=178.65.0.5 ansible_connection=paramiko ansible_user={{ user_name }}

[appservers]
tomcat     ansible_host=178.65.0.6 ansible_connection=paramiko ansible_user={{ user_name }}
[student@EPBYMINW0910 Ansible]$
```

Picture 2.1 – cat inventory file

C) Develop following Roles:

- common (provides common system updates/configuration/so on);
- devops\_user (creates “devops:devops” user, updates authorized keys file, configures sudoers, disables requiretty setting for this user);

```

student@EPBYMINW0910:~/devoslab/Ansible/Day02
student@EPBYMINW0910:~/devoslab/Ansible/Day02 118x47
[student@EPBYMINW0910 Day02]$ ansible-playbook -i inventory playbook.yml -u root -k -v
No config file found: using defaults
SSH password:

PLAY [all] *****

TASK [Gathering Facts] *****
ok: [httpd]
ok: [tomcat]
ok: [https]

TASK [creating user : user create] *****
ok: [httpd] => [{"changed": false, "comment": "", "group": 1001, "home": "/home/devops", "move_home": false, "name": "devops", "shell": "/bin/bash", "state": "present", "uid": 1001}]
ok: [tomcat] => [{"changed": false, "comment": "", "group": 1001, "home": "/home/devops", "move_home": false, "name": "devops", "shell": "/bin/bash", "state": "present", "uid": 1001}]

TASK [creating user : Create Group] *****
ok: [https] => [{"changed": false, "gid": 1001, "name": "devops", "state": "present", "system": false}]
ok: [tomcat] => [{"changed": false, "gid": 1001, "name": "devops", "state": "present", "system": false}]

TASK [creating user : user key] *****
ok: [httpd] => [{"changed": false, "comment": null, "exclusive": false, "follow": false, "key": "ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQDAQjPFP1NPfNlNKL1nX6J952xIMns9B2d2W0Fn+c22rXBC5KH8wEL0paxscT7/4Gnw3g0f+u0qBrz21g0A1s/W7DHA451HLLSH0R09Fnd01zz18CJ0+QAwXodcNKrwey2Q0RPSMaU5S0yWeIe5HLCT7XUN0p4yCACPRH10T5Ck34BhvR0JAKtK9PL0ygsPM2U+oc5Booteu0uyAGHKNLcqr7E05SHvB92w7cZAXYXnSw+E7yD0G+bx5tdswKlvs0vcrxm/1kwuFLx2KaPV01Y2scAGsd0179Cr+55+Tm5XPCfCk5iNDBTfZr29PMI/r7wJEDr02Kj/FT student@EPBYMINW0910.minsk.epam.com", "key_options": null, "keyfile": "/home/devops/.ssh/authorized_keys", "manage_dir": true, "path": null, "state": "present", "user": "devops", "validate_certs": true}]
ok: [tomcat] => [{"changed": false, "comment": null, "exclusive": false, "follow": false, "key": "ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQDAQjPFP1NPfNlNKL1nX6J952xIMns9B2d2W0Fn+c22rXBC5KH8wEL0paxscT7/4Gnw3g0f+u0qBrz21g0A1s/W7DHA451HLLSH0R09Fnd01zz18CJ0+QAwXodcNKrwey2Q0RPSMaU5S0yWeIe5HLCT7XUN0p4yCACPRH10T5Ck34BhvR0JAKtK9PL0ygsPM2U+oc5Booteu0uyAGHKNLcqr7E05SHvB92w7cZAXYXnSw+E7yD0G+bx5tdswKlvs0vcrxm/1kwuFLx2KaPV01Y2scAGsd0179Cr+55+Tm5XPCfCk5iNDBTfZr29PMI/r7wJEDr02Kj/FT student@EPBYMINW0910.minsk.epam.com", "key_options": null, "keyfile": "/home/devops/.ssh/authorized_keys", "manage_dir": true, "path": null, "state": "present", "user": "devops", "validate_certs": true}]

TASK [creating user : user access] *****
ok: [https] => [{"changed": false, "checksum": "0d7fdb5b469d0d7315f81778b38c843ad2888724", "dest": "/etc/sudoers.d/devops", "gid": 0, "group": "root", "mode": "0644", "owner": "root", "path": "/etc/sudoers.d/devops", "size": 64, "state": "file", "uid": 0}]
ok: [tomcat] => [{"changed": false, "checksum": "0d7fdb5b469d0d7315f81778b38c843ad2888724", "dest": "/etc/sudoers.d/devops", "gid": 0, "group": "root", "mode": "0644", "owner": "root", "path": "/etc/sudoers.d/devops", "size": 64, "state": "file", "uid": 0}]

PLAY RECAP *****
httpd      : ok=5    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
tomcat     : ok=5    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

[student@EPBYMINW0910 Day02]$

```

Picture 3.1

```

student@EPBYMINW0910:~/devoslab/Ansible/Day02
File Edit View Search Terminal Help
[student@EPBYMINW0910 Day02]$ ssh devops@178.65.0.5
Last login: Mon Jul 15 11:28:05 2019 from 178.65.0.1
[devops@webserver ~]$ cat /etc/passwd | grep devops
devops:x:1001:1001::/home/devops:/bin/bash
[devops@webserver ~]$ exit
logout
Connection to 178.65.0.5 closed.
[student@EPBYMINW0910 Day02]$ ssh devops@178.65.0.6
Last failed login: Mon Jul 15 11:01:18 UTC 2019 from 178.65.0.1 on ssh:notty
There were 2 failed login attempts since the last successful login.
[devops@appserver ~]$ cat /etc/passwd | grep devops
devops:x:1001:1001::/home/devops:/bin/bash
[devops@appserver ~]$ exit
logout
Connection to 178.65.0.6 closed.
[student@EPBYMINW0910 Day02]$

```

Picture 3.2 – Proof

- java (installs java, verifies java installation; supports java version customization);

```

student@EPBYMINW0910:~/devosplab/Ansible/Day02
student@EPBYMINW0910:~/devosplab/Ansible/Day02 118x32

TASK [Gathering Facts] *****
ok: [tomcat]

TASK [java : java installation] *****
changed: [tomcat] => ("changed": true, "changes": [{"installed": ["java-1.8.0-openjdk"]}], "msg": "", "rc": 0, "results":
d hostfile\n + base; mirror.datacenter.by\n + epel: fedora-epel.koyanet.lv\n + extras: mirror.datacenter.by\n + update
ction check\n--> Package java-1.8.0-openjdk.x86_64 1:1.8.0.212.b04-0.el7_6 will be installed\n--> Processing Depend
or package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Processing Dependency: xorg-x11-fonts-Type1 for pac
sing Dependency: libjvm.so(SUNWprivate.1.1)(64bit) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n-->
ge: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Processing Dependency: libjava.so(SUNWprivate.1.1)(64bit) f
Processing Dependency: libxcomposite(x86-64) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Proce
0.0.212.b04-0.el7_6.x86_64\n--> Processing Dependency: fontconfig(x86-64) for package: 1:java-1.8.0-openjdk-1.8.0.212.
or package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Processing Dependency: libjpeg.so.62()(64bit) for p
sing Dependency: libjava.so()(64bit) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Processing
1.8.0.212.b04-0.el7_6.x86_64\n--> Processing Dependency: libXtst.so.6()(64bit) for package: 1:java-1.8.0-openjdk-1.8.0
()(64bit) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Processing Dependency: libX11.so.6()(64bi
--> Processing Dependency: libXext.so.6()(64bit) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> P
0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Running transaction check\n--> Package fontconfig.x86_64 0:12.13.0-4.3.el7
tem for package: fontconfig-2.13.0-4.3.el7.x86_64\n--> Processing Dependency: dejavu-sans-fonts for package: fontconfi
ll be installed\n--> Processing Dependency: libSM.so.6()(64bit) for package: glib-4.1.6-9.el7.x86_64\n--> Processin
x86_64\n--> Package gtk2.x86_64 0:2.24.31-1.el7 will be installed\n--> Processing Dependency: pango >= 1.20.0-1 for p
rr >= 3.6.1 for package: gtk2-2.24.31-1.el7.x86_64\n--> Processing Dependency: librandr >= 1.2.99.4-2 for package: gl
for package: gtk2-2.24.31-1.el7.x86_64\n--> Processing Dependency: hicolor-icon-theme for package: gtk2-2.24.31-1.el7
ge: gtk2-2.24.31-1.el7.x86_64\n--> Processing Dependency: libpangot2-1.0.so.0()(64bit) for package: gtk2-2.24.31-1.el
) for package: gtk2-2.24.31-1.el7.x86_64\n--> Processing Dependency: libpango-1.0.so.0()(64bit) for package: gtk2-2.24
()(64bit) for package: gtk2-2.24.31-1.el7.x86_64\n--> Processing Dependency: libcups.so.2()(64bit) for package: gtk2-2.24
() for package: gtk2-2.24.31-1.el7.x86_64\n--> Processing Dependency: libatk-1.0.so.0()(64bit) for package: gtk2-2.24
) for package: gtk2-2.24.31-1.el7.x86_64\n--> Processing Dependency: libXinerama.so.1()(64bit) for package: gtk2-2.24
for package: gtk2-2.24.31-1.el7.x86_64\n--> Package java-1.8.0-openjdk-headless.x86_64 1:1.8.0.212.b04-0.el7_6 will b
package: 1:java-1.8.0-openjdk-headless-1.8.0.212.b04-0.el7_6.x86_64\n--> Processing Dependency: copy-jdk-configs >= 3.3

```

Picture 3.3

```

student@EPBYMINW0910:~/devosplab/Ansible/Day02
student@EPBYMINW0910:~/devosplab/Ansible/Day02 118x32

arch 0:2.33-6.el7                                \n fontconfig.x86_64 0:12.13.0-4.3.el7
el7                                              \n fribidi.x86_64 0:1.0.2-1.el7
                                              \n glib.x86_64 0:4.1.6-9.el7
                                              \n graphite2.x86_6
gtk-update-icon-cache.x86_64 0:3.22.30-3.el7      \n gtk2.x86_64 0:2.24.31-1.el7
.5-2.el7                                         \n hicolor-icon-theme.noarch 0:0.12-7.el7
                                              \n java-1.8.0-openjdk-headless.x86_64 1:1.8.0.212.b04-0.el7_6
                                              \n libICE.x86_64 0:1
SM.x86_64 0:1.2.2-2.el7                         \n libX11.x86_64 0:1.6.5-2.el7
1.6.5-2.el7                                     \n libXau.x86_64 0:1.0.8-2.1.el7
                                              \n libXcursor.x86_64 0:1.1.15-1.el7
                                              \n libXext.x86_64 0:1.3.3-3.el7
                                              \n libXfixes.x86_64 0:
ft.x86_64 0:2.3.2-2.el7                         \n libXi.x86_64 0:1.7.9-1.el7
3-2.1.el7                                       \n libXrandr.x86_64 0:1.5.1-2.el7
                                              \n libXtst.x86_64 0:1.2.3-1.el7
                                              \n libXv.x86_64 0:1.1.3-3.el7
nd-egl.x86_64 1:1.0.1-0.8.git5baae5.el7         \n libglvnd-glx.x86_64 1:1.0.1-0.8.git5baae5
90-0.el7                                         \n libthai.x86_64 0:0.1.14-9.el7
                                              \n libwayland-client.x86_64 0:1.15.0-1.el7
                                              \n libxcb.x86_64 0:1.13-1.el7
x86_64 0:1.1.28-5.el7                           \n libxshmfence.x86_64 0:1
.el7_6                                           \n mesa-libGL.x86_64 0:18.0.5-4.el7_6
                                              \n mesa-libglapi.x86_64 0:18.0.5-4.el7_6
                                              \n pcsc-lite-libs.x86_64 0:1.8.8-8.el7
apackages.noarch 0:3.4.1-11.el7                \n python-lxml.x86_64 0:3.2.1-4.el7
                                              \n tzdata-java.noarch 0:2019b-1.el7
                                              \n xorg-x11-fonts-Type1.noarch 0:7.5-9.el7
                                              \n\nComplete

PLAY RECAP *****
localhost:  : ok=5    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
tomcat      : ok=7    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

[student@EPBYMINW0910 Day02]$

```

Picture 3.4

```

devops@appserver:~
devops@appserver:~ 118x32

[student@EPBYMINW0910 Day02]$ ssh devops@178.65.0.6
Last login: Mon Jul 15 11:54:47 2019 from 178.65.0.1
[devops@appserver ~]$ java -version
openjdk version "1.8.0_212"
OpenJDK Runtime Environment (build 1.8.0_212-b04)
OpenJDK 64-Bit Server VM (build 25.212-b04, mixed mode)
[devops@appserver ~]$

```

Picture 3.5 – Check Java version on appserver

- tomcat (installs tomcat from sources - war, creates tomcat user with custom uid, creates tomcat user's group with custom gid, configures systemd to start tomcat automatically, verifies tomcat installation; supports tomcat customization: JAVA\_OPTS, version, etc; role has dependency on java role);

```

student@EPBYMINW0910:~/devosplab/Ansible/Day02
TASK [Gathering Facts] *****
ok: [tomcat]

TASK [tomcat : tomcat download] *****
changed: [tomcat] => {"changed": false, "checksum_dest": null, "checksum_src": null, "dest": "/home/devops/apache-tomcat-8.5.42.tar.gz", "elapsed": 0, "gid": 1002, "group": "tomcat", "mode": "0644", "msg": "file already exists", "owner": "tomcat", "size": 9711748, "state": "file", "uid": 1002, "url": "http://ftp.byfly.by/pub/apache.org/tomcat/tomcat-8/v8.5.42/bin/apache-tomcat-8.5.42.tar.gz"}

TASK [tomcat : tomcat unarchive] *****
changed: [tomcat] => {"changed": true, "dest": "/opt/", "extract_results": {"cmd": ["/usr/bin/gtar", "--extract", "-C", "/opt/", "-z", "-f", "/home/devops/apache-tomcat-8.5.42.tar.gz"], "err": "", "out": "", "rc": 0, "gid": 0, "group": "root", "handler": "TgzArchive", "mode": "0755", "owner": "root", "size": 66, "src": "/home/devops/apache-tomcat-8.5.42.tar.gz", "state": "directory", "uid": 0}}

TASK [tomcat : tomcat shell operation] *****
changed: [tomcat] => {"changed": true, "cmd": "groupadd tomcat\\nuseradd -g tomcat -d /opt/apache-tomcat-8.5.42 -s /bin/nologin tomcat\\nchown -R tomcat:tomcat /opt/apache-tomcat-8.5.42\\n\\nexport CATALINA_HOME=/opt/apache-tomcat-8.5.42\\n", "delta": "0:00:00.011728", "end": "2019-07-15 12:39:26.616252", "rc": 0, "start": "2019-07-15 12:39:26.604524", "stderr": "groupadd: group 'tomcat' already exists\\nuseradd: user 'tomcat' already exists", "stderr_lines": ["groupadd: gr", "oup 'tomcat' already exists", "useradd: user 'tomcat' already exists"], "stdout": "", "stdout_lines": []}

TASK [tomcat : tomcat web-user settings] *****
changed: [tomcat] => {"backup file": "/opt/apache-tomcat-8.5.42/conf/tomcat-users.xml.30350.2019-07-15@12:39:28-", "changed": true, "checksum": "0e5c0be7d4a57d0e641a2a66cec086b1b571ede1", "dest": "/opt/apache-tomcat-8.5.42/conf/tomcat-users.xml", "gid": 1002, "group": "tomcat", "md5sum": "be2e4b4351dc0d35a9c2eed22cf712c5", "mode": "0600", "owner": "tomcat", "size": 441, "src": "/root/.ansible/tmp/ansible-tmp-1563194366.78-233282676304749/source", "state": "file", "uid": 1002}

TASK [tomcat : tomcat context.xml setup changes] *****
changed: [tomcat] => {"backup file": "/opt/apache-tomcat-8.5.42/webapps/manager/META-INF/context.xml.38445.2019-07-15@12:39:28-", "changed": true, "checksum": "d5099b03f7bcd4a5b5410a3ad6d48e64a7c8480", "dest": "/opt/apache-tomcat-8.5.42"}

```

Picture 3.6

```

student@EPBYMINW0910:~/devosplab/Ansible/Day02
errors=no, start time=[Mon 2019-07-15 12:35:47 UTC], stop time=[Mon 2019-07-15 12:35:48 UTC], pid=29515, code=exit
ed, status=0 }, {"FailureAction": "none", "FileDescriptorStoreMax": "0", "FragmentPath": "/etc/systemd/system/tomcat.
service", "Group": "tomcat", "GuessMainPID": "yes", "IOScheduling": "0", "Id": "tomcat.service", "IgnoreOnIsolate": "n
o", "IgnoreOnSnapshot": "no", "IgnoreSIGPIPE": "yes", "InactiveEnterTimestamp": "Mon 2019-07-15 12:35:48 UTC", "Inacti
veEnterTimestampMonotonic": "9406802341", "InactiveExitTimestamp": "Mon 2019-07-15 12:35:48 UTC", "InactiveExitTimeSta
mpMonotonic": "9406803089", "JobTimeoutAction": "none", "JobTimeoutUsec": "0", "KillMode": "control-group", "KillSigna
l": "15", "LimitAS": "18446744073709551615", "LimitCORE": "18446744073709551615", "LimitCPU": "18446744073709551615",
"LimitDATA": "18446744073709551615", "LimitFSIZE": "18446744073709551615", "LimitLOCKS": "18446744073709551615", "Lim
itMEMLOCK": "65536", "LimitMSGQUOE": "819200", "LimitNICE": "0", "LimitNOFILE": "4096", "LimitNPROC": "7260", "LimitRS
S": "18446744073709551615", "LimitRTTIME": "18446744073709551615", "LimitsIOPELINDING": "7260", "Lim
itSTACK": "18446744073709551615", "LoadState": "loaded", "MainPID": "29564", "MemoryAccounting": "no", "MemoryCurrent":
"18446744073709551615", "MemoryLimit": "18446744073709551615", "MountFlags": "0", "Names": "tomcat.service", "NeedDa
emonReload": "no", "Nice": "0", "NoNewPrivileges": "no", "NonBlocking": "no", "NotifyAccess": "none", "OOMScoreAdjust":
"0", "OnFailureJobMode": "replace", "PermissionsStartOnly": "no", "PrivateDevices": "no", "PrivateNetwork": "no", "P
rivateTmp": "no", "ProtectHome": "no", "ProtectSystem": "no", "RefuseManualStart": "no", "RefuseManualStop": "no", "Re
mainAfterExit": "no", "Requires": "basic.target", "Restart": "on-failure", "RestartUsec": "100ms", "Result": "success",
"RootDirectoryStartOnly": "no", "RuntimeDirectoryMode": "0755", "SameProcessGroup": "no", "SecureBits": "0", "SendSI
GHUP": "no", "SendSIGILL": "yes", "Slice": "system.slice", "StandardError": "inherit", "StandardInput": "null", "Stan
dardOutput": "journal", "StartLimitAction": "none", "StartLimitBurst": "5", "StartLimitInterval": "100000000", "Startup
BlockIOWeight": "18446744073709551615", "StartupCPUShares": "18446744073709551615", "StatusErrno": "0", "StopWhenUnnee
ded": "no", "SubState": "running", "SyslogLevelPrefix": "yes", "SyslogPriority": "30", "SystemCallErrorNumber": "0", "
TTYReset": "no", "TTYVHangup": "no", "TTYVDisallocate": "no", "TasksAccounting": "no", "TasksCurrent": "1844674407370
9551615", "TasksMax": "18446744073709551615", "TimeoutStartUsec": "1min 30s", "TimeoutStopUsec": "1min 30s", "TimerSla
ckNsec": "500000", "Transient": "no", "Type": "forking", "UMask": "0022", "UnitFilePreset": "disabled", "UnitFileState":
"enabled", "User": "tomcat", "WantedBy": "multi-user.target", "Wants": "system.slice", "WatchdogTimestamp": "Mon 201
9-07-15 12:35:48 UTC", "WatchdogTimestampMonotonic": "9406810460", "WatchdogUsec": "0"}}

PLAY RECAP *****
ntsd      : ok=5   changed=0   unreachable=0   failed=0   skipped=0   rescued=0   ignored=0
tomcat    : ok=14  changed=6   unreachable=0   failed=0   skipped=0   rescued=0   ignored=0

[student@EPBYMINW0910 Day02]$

```

Picture 3.7

Add JAVA to /role/tomcat/meta/main.yml

```

dependencies:
- role: java
  java_version: 1.8.0

```

```

student@EPBYMINW0910:~/devosplab/Ansible/Day02
student@EPBYMINW0910:~/devosplab/Ansible/Day02 118x32

PLAY [appservers] *****

TASK [Gathering Facts] *****
ok: [tomcat]

TASK [java : java installation] *****
changed: [tomcat] => {"changed": true, "changes": {"installed": ["java-1.8.0-openjdk"]}, "msg": "", "rc": 0, "results":
: ["Loaded plugins: fastestmirror\nLoading mirror speeds from cached hostfile\n * base: ftp.byfly.by\n * epel: mirror.
datacenter.by\n * extras: ftp.byfly.by\n * updates: ftp.byfly.by\nResolving Dependencies\n--> Running transaction chec
k\n--> Package java-1.8.0-openjdk.x86_64 1:1.8.0.212.b04-0.el7_6 will be installed\n--> Processing Dependency: java-1
.8.0-openjdk-headless(x86-64) = 1:1.8.0.212.b04-0.el7_6 for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64
\n--> Processing Dependency: xorg-x11-fonts-Type1 for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n-->
Processing Dependency: libjvm.so(SUNWprivate 1.1)(64bit) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_6
4\n--> Processing Dependency: libjpeg.so.62(libjpeg 6.2)(64bit) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7
_6.x86_64\n--> Processing Dependency: libjava.so(SUNWprivate 1.1)(64bit) for package: 1:java-1.8.0-openjdk-1.8.0.212.b0
4-0.el7_6.x86_64\n--> Processing Dependency: libxcomposite(x86-64) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.e
l7_6.x86_64\n--> Processing Dependency: gtk2(x86-64) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n
--> Processing Dependency: fontconfig(x86-64) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Proce
ssing Dependency: libjvm.so()(64bit) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Processing De
pendency: libjpeg.so.62()(64bit) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Processing Depen
dency: libjava.so()(64bit) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Processing Dependency: l
ibgif.so.4()(64bit) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Processing Dependency: libxtst
.so.6()(64bit) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Processing Dependency: librender.a
r.1()(64bit) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Processing Dependency: libxi.so.6()(6
4bit) for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Processing Dependency: libxext.so.6()(64bit)
 for package: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Processing Dependency: libx11.so.6()(64bit) for p
ackage: 1:java-1.8.0-openjdk-1.8.0.212.b04-0.el7_6.x86_64\n--> Running transaction check\n--> Package fontconfig.x86
_64 0:12.13.0-4.3.el7 will be installed\n--> Processing Dependency: fontpackages-filesystem for package: fontconfig-2.13

```

Picture 3.8

- httpd (installs apache httpd service, forwards requests to tomcat through custom VirtualHost, verifies http installation and running state).

```

student@EPBYMINW0910:~/devosplab/Ansible/Day02
student@EPBYMINW0910:~/devosplab/Ansible/Day02 118x32

PLAY RECAP *****
httpd      : ok=10  changed=3  unreachable=0  failed=0  skipped=0  rescued=0  ignored=0
tomcat     : ok=15  changed=5  unreachable=0  failed=0  skipped=0  rescued=0  ignored=0

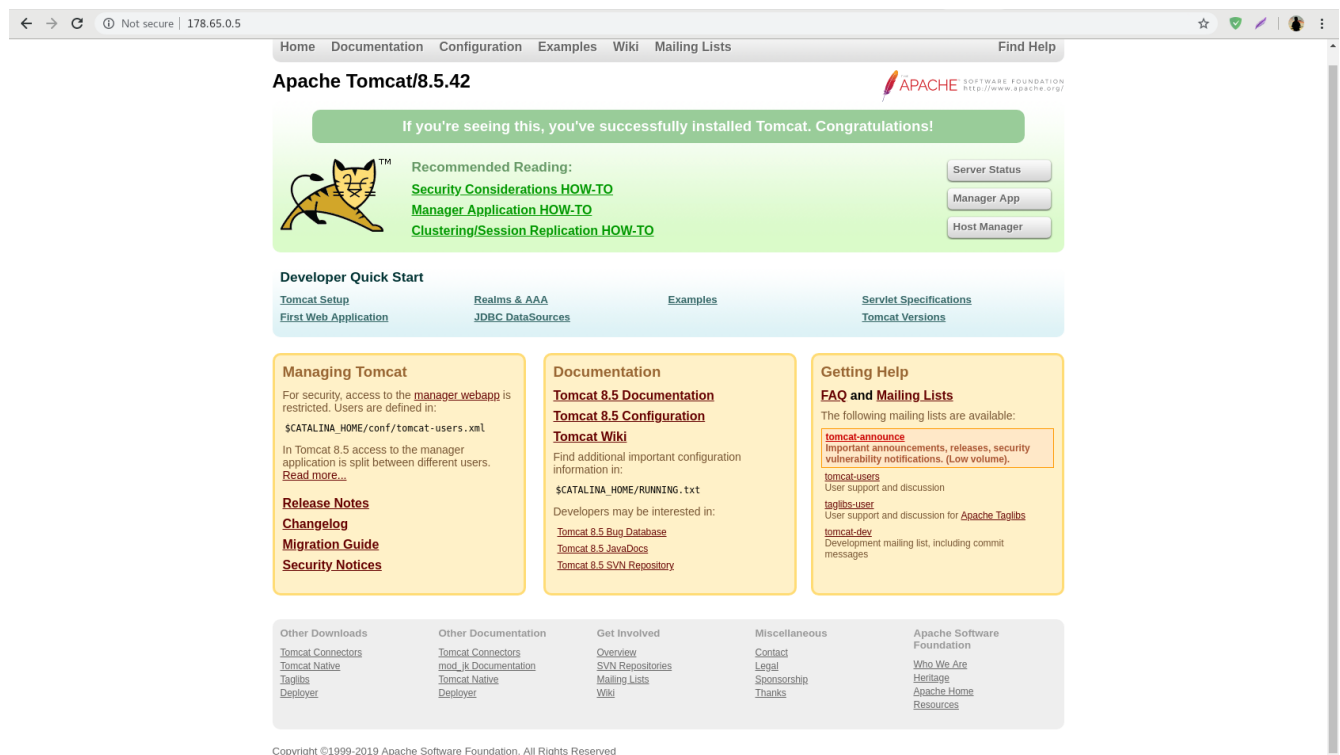
[student@EPBYMINW0910 Day02]$

```

Picture 3.8

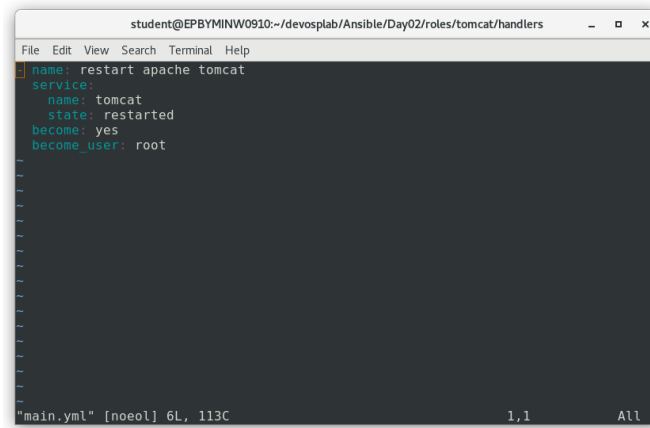
```
devops@webserver:~  
[student@EPBYMINW0910 Day02]$ ssh devops@178.65.0.5  
Last login: Mon Jul 15 14:31:30 2019 from 178.65.0.1  
[devops@webserver ~]$ sudo cat /etc/httpd/conf.d/tomcat.conf  
<VirtualHost *:80>  
  
ProxyPreserveHost On  
  
ProxyPass / http://178.65.0.6:8080/  
  
ProxyPassReverse / http://178.65.0.6:8080/  
  
</VirtualHost>  
[devops@webserver ~]$ sudo systemctl status httpd  
● httpd.service - The Apache HTTP Server  
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disabled)  
   Active: active (running) since Mon 2019-07-15 14:30:15 UTC; 1min 36s ago  
     Docs: man:httd(8)  
           man:apachectl(8)  
  Process: 22452 ExecStop=/bin/kill -WINCH ${MAINPID} (code=exited, status=0/SUCCESS)  
 Main PID: 22457 (httpd)  
   Status: "Total requests: 2; Current requests/sec: 0; Current traffic:  0 B/sec"  
    CGroup: /system.slice/httpd.service  
            └─22457 /usr/sbin/httpd -DFOREGROUND  
              └─22458 /usr/sbin/httpd -DFOREGROUND  
                └─22459 /usr/sbin/httpd -DFOREGROUND  
                  └─22460 /usr/sbin/httpd -DFOREGROUND  
                    └─22461 /usr/sbin/httpd -DFOREGROUND  
                      └─22462 /usr/sbin/httpd -DFOREGROUND  
                        └─22472 /usr/sbin/httpd -DFOREGROUND  
  
Jul 15 14:30:15 webserver systemd[1]: Stopped The Apache HTTP Server.  
Jul 15 14:30:15 webserver systemd[1]: Starting The Apache HTTP Server...
```

Picture 3.8 – Check proxy settings and service status



Picture 3.9 – Check results

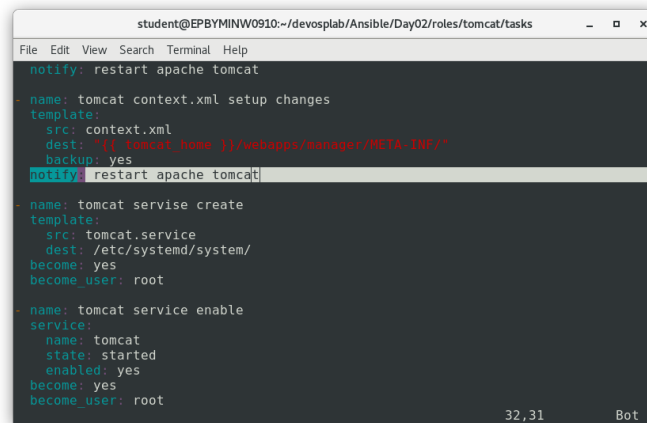
D) Make sure that all necessary application state changes are being done with handlers on demand.



```
student@EPBYMINW0910:~/devoslab/Ansible/Day02/roles/tomcat/handlers
File Edit View Search Terminal Help
- name: restart apache tomcat
  service:
    name: tomcat
    state: restarted
    become: yes
    become_user: root

"main.yml" [noeol] 6L, 113C 1,1 All
```

Picture 4.1

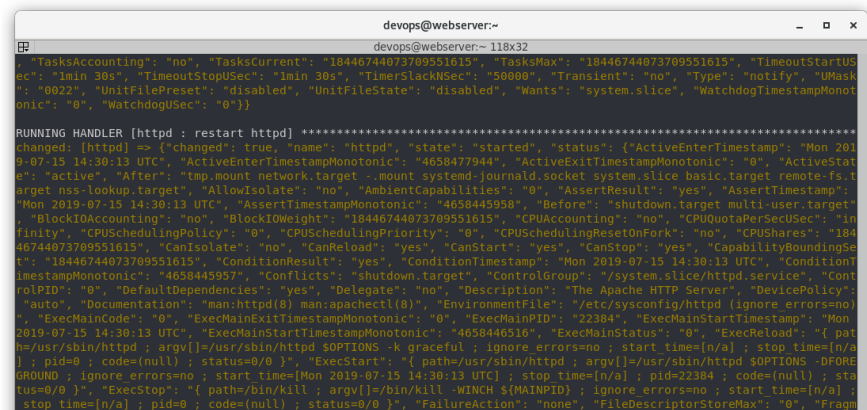


```
student@EPBYMINW0910:~/devoslab/Ansible/Day02/roles/tomcat/tasks
File Edit View Search Terminal Help
- notify: restart apache tomcat
- name: tomcat context.xml setup changes
  template:
    src: context.xml
    dest: "{{ tomcat_home }}/webapps/manager/META-INF/
    backup: yes
  notify: restart apache tomcat
- name: tomcat service create
  template:
    src: tomcat.service
    dest: /etc/systemd/system/
    become: yes
    become_user: root
- name: tomcat service enable
  service:
    name: tomcat
    state: started
    enabled: yes
    become: yes
    become_user: root

32,31 Bot
```

Picture 4.2

And httpd handlers you may see in /role/httpd/handlers/main.yml



```
devops@webserver:~
devops@webserver:~ 118x32
*****
changed: [httpd] => {"changed": true, "name": "httpd", "state": "started", "status": {"ActiveEnterTimestamp": "Mon 2019-07-15 14:30:13 UTC", "ActiveEnterTimestampMonotonic": "4658477944", "ActiveExitTimestampMonotonic": "0", "ActiveState": "active", "After": "tmp.mount network.target -.mount systemd-journald.socket system.slice basic.target remote-fs.target nss-lookup.target", "AllowIsolate": "no", "AmbientCapabilities": "0", "AssertResult": "yes", "AssertTimestamp": "Mon 2019-07-15 14:30:13 UTC", "AssertTimestampMonotonic": "4658445950", "Before": "shutdown.target multi-user.target", "BlockIOAccounting": "no", "BlockIOWeight": "18446744073709551615", "CPUsAccounting": "no", "CPUQuotaPerSecUse": "infinity", "CPUSchedulingPolicy": "0", "CPUSchedulingPriority": "0", "CPUSchedulingResetOnFork": "no", "CPUShares": "18446744073709551615", "CanIsolate": "no", "CanReload": "yes", "CanStart": "yes", "CanStop": "yes", "CapabilityBoundingSet": "18446744073709551615", "ConditionResult": "yes", "ConditionTimestamp": "Mon 2019-07-15 14:30:13 UTC", "ConditionTimestampMonotonic": "4658445957", "Conflicts": "shutdown.target", "ControlGroup": "/system.slice/httpd.service", "ControlPID": "0", "DefaultDependencies": "yes", "Delegate": "no", "Description": "The Apache HTTP Server", "DevicePolicy": "auto", "Documentation": "man:httpd(8) man:apachectl(8)", "EnvironmentFile": "/etc/sysconfig/httpd (ignore errors=no)", "ExecMainCode": "0", "ExecMainExitTimestampMonotonic": "0", "ExecMainPID": "22384", "ExecMainStartTimestamp": "Mon 2019-07-15 14:30:13 UTC", "ExecMainStartTimestampMonotonic": "465844610", "ExecMainStatus": "0", "ExecReload": "{ path=/usr/sbin/httpd ; argv[]={path=/usr/sbin/httpd ; argv[]={path=/usr/sbin/httpd $OPTIONS -k graceful ; ignore errors=no ; start time=[n/a] ; stop time=[n/a] ; pid=0 ; code=null} ; status=0/0 }", "ExecStart": "{ path=/usr/sbin/httpd ; argv[]={path=/usr/sbin/httpd $OPTIONS -DFOREGROUND ; ignore errors=no ; start time=[Mon 2019-07-15 14:30:13 UTC] ; stop time=[n/a] ; pid=22384 ; code=null} ; status=0/0 }", "ExecStop": "{ path=/bin/kill ; argv[]={path=/bin/kill -WINCH $(MAINPID) ; ignore errors=no ; start time=[n/a] ; stop time=[n/a] ; pid=0 ; code=null} ; status=0/0 }", "FailureAction": "none", "FileDescriptorStoreMax": "0", "Fragm
```

Picture 4.3 – Restart service after change proxy configs



E) All roles should leave facts about configured/provisioned software on the system (Verify system's configuration with ad-hoc command – setup module - after provisioning)

```
$ ansible all -i inventory -m setup -a 'filter=ansible_all_ipv4_addresses' -u devops
```



```
student@EPBYMINW0910:~/devoslab/Ansible/Day02
student@EPBYMINW0910:~/devoslab/Ansible/Day02 120x35
[student@EPBYMINW0910 Day02]$ ansible all -i inventory -m setup -a 'filter=ansible_all_ipv4_addresses' -u devops
[WARNING]: Platform linux on host tomcat is using the discovered Python interpreter at /usr/bin/python, but future
installation of another Python interpreter could change this. See
https://docs.ansible.com/ansible/2.8/reference_appendices/interpreter_discovery.html for more information.

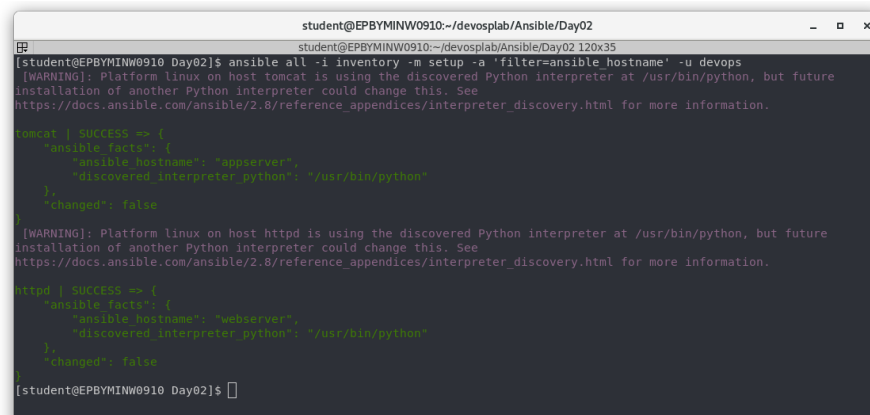
tomcat | SUCCESS => {
  "ansible_facts": {
    "ansible_all_ipv4_addresses": [
      "178.65.0.6",
      "18.0.2.15"
    ],
    "discovered_interpreter_python": "/usr/bin/python"
  },
  "changed": false
}

[WARNING]: Platform linux on host httpd is using the discovered Python interpreter at /usr/bin/python, but future
installation of another Python interpreter could change this. See
https://docs.ansible.com/ansible/2.8/reference_appendices/interpreter_discovery.html for more information.

httpd | SUCCESS => {
  "ansible_facts": {
    "ansible_all_ipv4_addresses": [
      "18.0.2.15",
      "178.65.0.5"
    ],
    "discovered_interpreter_python": "/usr/bin/python"
  },
  "changed": false
}
[student@EPBYMINW0910 Day02]$
```

Picture 5.1 – IPv4 addresses

```
$ ansible all -i inventory -m setup -a 'filter=ansible_hostname' -u devops
```



```
student@EPBYMINW0910:~/devoslab/Ansible/Day02
student@EPBYMINW0910:~/devoslab/Ansible/Day02 120x35
[student@EPBYMINW0910 Day02]$ ansible all -i inventory -m setup -a 'filter=ansible_hostname' -u devops
[WARNING]: Platform linux on host tomcat is using the discovered Python interpreter at /usr/bin/python, but future
installation of another Python interpreter could change this. See
https://docs.ansible.com/ansible/2.8/reference_appendices/interpreter_discovery.html for more information.

tomcat | SUCCESS => {
  "ansible_facts": {
    "ansible_hostname": "appserver",
    "discovered_interpreter_python": "/usr/bin/python"
  },
  "changed": false
}

[WARNING]: Platform linux on host httpd is using the discovered Python interpreter at /usr/bin/python, but future
installation of another Python interpreter could change this. See
https://docs.ansible.com/ansible/2.8/reference_appendices/interpreter_discovery.html for more information.

httpd | SUCCESS => {
  "ansible_facts": {
    "ansible_hostname": "webserver",
    "discovered_interpreter_python": "/usr/bin/python"
  },
  "changed": false
}
[student@EPBYMINW0910 Day02]$
```

Picture 5.2 – Hostname

```
$ ansible all -i inventory -m setup -a 'filter=ansible_processor' -u devops
```

```
student@EPBYMINW0910:~/devoslab/Ansible/Day02
student@EPBYMINW0910:~/devoslab/Ansible/Day02 120x35
https://docs.ansible.com/ansible/2.8/reference_appendices/interpreter_discovery.html for more information.

tomcat | SUCCESS => {
  "ansible_facts": {
    "ansible_processor": {
      "g":
        "GenuineIntel",
        "Intel(R) Core(TM) i5-4570 CPU @ 3.20GHz",
        "i":
        "GenuineIntel",
        "Intel(R) Core(TM) i5-4570 CPU @ 3.20GHz"
      },
    "discovered_interpreter_python": "/usr/bin/python"
  },
  "changed": false
}

[WARNING]: Platform linux on host httpd is using the discovered Python interpreter at /usr/bin/python, but future
installation of another Python interpreter could change this. See
https://docs.ansible.com/ansible/2.8/reference_appendices/interpreter_discovery.html for more information.

httpd | SUCCESS => {
  "ansible_facts": {
    "ansible_processor": {
      "g":
        "GenuineIntel",
        "Intel(R) Core(TM) i5-4570 CPU @ 3.20GHz",
        "i":
        "GenuineIntel",
        "Intel(R) Core(TM) i5-4570 CPU @ 3.20GHz"
      },
    "discovered_interpreter_python": "/usr/bin/python"
  },
  "changed": false
}

[student@EPBYMINW0910 Day02]$
```

Picture 5.3 – Processor

```
$ ansible all -i inventory -m setup -a 'filter=ansible_processor_cores' -u devops
```

```
student@EPBYMINW0910:~/devoslab/Ansible/Day02
student@EPBYMINW0910:~/devoslab/Ansible/Day02 120x35
[student@EPBYMINW0910 Day02]$ ansible all -i inventory -m setup -a 'filter=ansible_processor_cores' -u devops
[WARNING]: Platform linux on host tomcat is using the discovered Python interpreter at /usr/bin/python, but future
installation of another Python interpreter could change this. See
https://docs.ansible.com/ansible/2.8/reference_appendices/interpreter_discovery.html for more information.

tomcat | SUCCESS => {
  "ansible_facts": {
    "ansible_processor_cores": 2,
    "discovered_interpreter_python": "/usr/bin/python"
  },
  "changed": false
}

[WARNING]: Platform linux on host httpd is using the discovered Python interpreter at /usr/bin/python, but future
installation of another Python interpreter could change this. See
https://docs.ansible.com/ansible/2.8/reference_appendices/interpreter_discovery.html for more information.

httpd | SUCCESS => {
  "ansible_facts": {
    "ansible_processor_cores": 2,
    "discovered_interpreter_python": "/usr/bin/python"
  },
  "changed": false
}

[student@EPBYMINW0910 Day02]$
```

Picture 5.4 – Number processor cores

F) Develop provision.yml playbook:

- Sections pre\_tasks, tasks, roles, post\_tasks;

```
TASK [install net-tools] *****
ok: [httpd] => { "changed": false, "msg": "", "rc": 0, "results": ["net-tools-2.0-0.24.20131004git.el7.x86_64 providing net-tools is already installed"]}
ok: [tomcat] => { "changed": false, "msg": "", "rc": 0, "results": ["net-tools-2.0-0.24.20131004git.el7.x86_64 providing net-tools is already installed"]}

TASK [creating_user : user create] *****
|
```

Picture 6.1 – Pre\_tasks install net-tools

```
TASK [debug] *****
ok: [httpd] => {
  "msg": "Works at the end"
}
ok: [tomcat] => {
  "msg": "Works at the end"
}

PLAY RECAP *****
httpd      : ok=12  changed=0  unreachable=0  failed=0  skipped=0  rescued=0  ignored=0
tomcat     : ok=10  changed=5  unreachable=0  failed=0  skipped=0  rescued=0  ignored=0

[student@EPBYMINW0910 Day02]$
```

Picture 6.1 – Post\_tasks debug info

- Specify tomcat version in playbook, inventory (group vars, host vars), extra vars – try different.

```
student@EPBYMINW0910:~/devoslab/Ansible/Day02
File Edit View Search Terminal Help
# Create user on All hosts
- hosts: all
  roles:
    - role: creating_user
      user_name: hleb

# install net-tools to example
pre_tasks:
  - name: install net-tools
    yum:
      name: net-tools
      state: present

# installing Tomcat + Java on Appserver host
- hosts: appservers
  roles:
    - role: tomcat
      user_name: hleb
      tomcat_version: tomcat-8
      tomcat_release: 8.5.42
      username_tomcat: tomcat
      usergroup_tomcat: tomcat

# installing HTTPD on Webserver host
- hosts: webserver
  roles:
    - role: httpd

- hosts: webserver:appservers
  post_tasks:
    - debug: msg="Works at the end"

~
"playbook.yml" [noeol] 31L, 610C 1,1 All
```

Picture 7.1 – Filed “user\_name” is hleb

```
$ ansible-playbook -i inventory playbook.yml --extra-vars
"{\"user_name\": \"devops\"}" -u root -k -v
```

```

student@EPBYMINW0910:~/devosplab/Ansible/Day02
student@EPBYMINW0910:~/devosplab/Ansible/Day02 120x35

PLAY [webservers:appservers] *****

TASK [Gathering Facts] *****
ok: [httpd]
ok: [tomcat]

TASK [debug] *****
ok: [httpd] => {
  "msg": "Works at the end"
}
ok: [tomcat] => {
  "msg": "Works at the end"
}

PLAY RECAP *****
httpd      : ok=12  changed=0  unreachable=0  failed=0  skipped=0  rescued=0  ignored=0
tomcat     : ok=10  changed=5  unreachable=0  failed=0  skipped=0  rescued=0  ignored=0

[student@EPBYMINW0910 Day02]$ ansible-playbook -i inventory playbook.yml --extra-vars "{\\"user_name\\":\\"devops\\"}" -u root -k -v

```

Picture 7.2 – Successful trying extra vars

```

student@EPBYMINW0910:~/devosplab/Ansible/Day02
student@EPBYMINW0910:~/devosplab/Ansible/Day02 120x35

PLAY [webservers] *****

TASK [Gathering Facts] *****
ok: [httpd]

TASK [httpd : httpd installation] *****
ok: [httpd] => {\"changed\": false, \"msg\": \"\", \"rc\": 0, \"results\": [\"httpd-2.4.6-80.el7.centos.x86_64 providing httpd is already installed\"]}

TASK [httpd : httpd proxy to tomcat] *****
ok: [httpd] => {\"changed\": false, \"checksum\": \"e632f8c9e922dc34e55229f23bc3f224b129e\", \"dest\": \"/etc/httpd/conf.d/tomcat.conf\", \"gid\": 0, \"group\": \"root\", \"mode\": \"0644\", \"owner\": \"root\", \"path\": \"/etc/httpd/conf.d/tomcat.conf\", \"size\": 130, \"state\": \"file\", \"uid\": 0}

TASK [httpd : httpd service enable] *****
ok: [httpd] => {\"changed\": false, \"enabled\": true, \"name\": \"httpd\", \"state\": \"started\", \"status\": {\"ActiveEnterTimestamp\": \"Mon 2019-07-15 14:30:15 UTC\", \"ActiveEnterTimestampMonotonic\": \"4660561182\", \"ActiveExitTimestamp\": \"Mon 2019-07-15 14:30:13 UTC\", \"ActiveExitTimestampMonotonic\": \"4659172632\", \"ActiveState\": \"active\", \"After\": \"remote-fs.target system.slice nes_lookup.target mount systemd-journald.socket basic.target tmp.mount network.target \"AllowIsolate\": \"no\", \"AssertPathExists\": \"0\", \"AssertResult\": \"yes\", \"AssertTimestamp\": \"Mon 2019-07-15 14:30:15 UTC\", \"AssertTimestampMonotonic\": \"4660529789\", \"Before\": \"multi-user.target shutdown.target \"BlockIOAccounting\": \"no\", \"BlockIOWeight\": \"10446744073709551615\", \"CPUAccounting\": \"no\", \"CPUQuotaPerSecUSec\": \"infinity\", \"CPUWeight\": \"0\", \"CPUSchedulingPolicy\": \"SCHED_OTHER\", \"CPUSchedulingPriority\": \"0\", \"DevicePolicy\": \"default\", \"Environment\": \"\", \"ExecStart\": \"/usr/sbin/httpd -D -f -Y -P /run/httpd/run-httpd.pid\", \"ExecStartPost\": \"systemctl enable httpd\", \"Group\": \"root\", \"IgnoreUnwantedDependencies\": \"no\", \"JobTimeoutSec\": \"1min 30s\", \"KillMode\": \"process\", \"KillSignal\": \"SIGTERM\", \"LimitAS\": \"no\", \"LimitCORE\": \"infinity\", \"LimitDATA\": \"no\", \"LimitFS\": \"no\", \"LimitMEMLOCK\": \"infinity\", \"LimitNOFILE\": \"65536\", \"LimitNPROC\": \"no\", \"LimitRSS\": \"no\", \"LimitSTACK\": \"no\", \"LimitSUIDSGID\": \"no\", \"LimitSYSVSEM\": \"no\", \"LimitTIME_SLICE\": \"no\", \"LockFile\": \"/var/lock/subsys/httpd\", \"LockFilePreset\": \"disabled\", \"UnitFileState\": \"enabled\", \"WantedBy\": \"multi-user.target\", \"Wants\": \"system.slice\", \"WatchdogTimestamp\": \"Mon 2019-07-15 14:30:15 UTC\", \"WatchdogTimestampMonotonic\": \"4660561149\", \"WatchdogUseCgroup\": \"0\"}}

```

Picture 7.3 – User not changed

This is useful for, among other things, setting the hosts group or the user for the playbook. Difference only in the precedence.

Here is the order of precedence from least to greatest (the last listed variables winning prioritization):

1. command line values (eg “-u user”)
2. role defaults
3. inventory file or script group vars
4. inventory group\_vars/all
5. playbook group\_vars/all
6. inventory group\_vars/\*
7. playbook group\_vars/\*
8. inventory file or script host vars
9. inventory host\_vars/\*
10. playbook host\_vars/\*
11. host facts / cached set\_facts
12. play vars
13. play vars\_prompt
14. play vars\_files

15. role vars (defined in role/vars/main.yml)
16. block vars (only for tasks in block)
17. task vars (only for the task)
18. include\_vars
19. set\_facts / registered vars
20. role (and include\_role) params
21. include params
22. extra vars (always win precedence)