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# Red Hat Enterprise Linux Automation with Ansible

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VIDEO CLASSROOM

## Guided Exercise: Reusing Content with System Roles



In this exercise, you will use one of the Red Hat Enterprise Linux System Roles in conjunction with a normal task to configure time synchronization and the time zone on your managed hosts.

### Outcomes

You should be able to:

- Install the Red Hat Enterprise Linux System Roles.
- Find and use the RHEL System Roles documentation.
- Use the `rhel-system-roles.timesync` role in a playbook to configure time synchronization on remote hosts.

### Scenario Overview

Your organization maintains two data centers: one in the United States (Chicago) and one in Finland (Helsinki). To aid log analysis of database servers across data centers, ensure the system clock on each host is synchronized using Network Time Protocol. To aid time-of-day activity analysis across data centers, ensure each database server has a time zone set that corresponds to the host's data center location.

Time synchronization has the following requirements:

- Use the NTP server located at `classroom.example.com`. Enable the `iburst` option to accelerate initial time synchronization.
- Use the `chrony` package for time synchronization.

Log in to `workstation` as `student` using `student` as the password.

On `workstation`, run the `lab role-system start` command. This creates the working directory, `/home/student/role-system`, and populates it with an Ansible configuration file and host inventory.

```
[student@workstation ~]$ lab role-system start
```

### Procedure 7.1. Instructions

1. Change to the `/home/student/role-system` working directory.

```
[student@workstation ~]$ cd ~/role-system
[student@workstation role-system]$
```

2. Install the Red Hat Enterprise Linux system roles on the control node, `workstation.lab.example.com`. Verify the installed location of the roles on the control node.

2.1. Use the `ansible-galaxy` command to verify that no roles are initially available for use in the playbook project.

```
[student@workstation role-system]$ ansible-galaxy list
# /home/student/role-system/roles
# /usr/share/ansible/roles
# /etc/ansible/roles
```

The `ansible-galaxy` command searches three directories for roles, as indicated by the `roles_path` entry in the `ansible.cfg` file:

- `./roles`
- `/usr/share/ansible/roles`
- `/etc/ansible/roles`

The above output indicates there are no roles in any of these directories.

## 2.2. Install the `rhel-system-roles` package.

```
[student@workstation role-system]$ sudo yum install rhel-system-roles
```

Enter **y** when prompted to install the package.

## 2.3. Use the `ansible-galaxy` command to verify that the system roles are now available.

```
[student@workstation role-system]$ ansible-galaxy list
# /home/student/role-system/roles
# /usr/share/ansible/roles
...output omitted...
- rhel-system-roles.timesync, (unknown version)
- rhel-system-roles.tlog, (unknown version)
# /etc/ansible/roles
```

The roles are located in the `/usr/share/ansible/roles` directory. Any role beginning with `linux-system-roles` is actually a symlink to the corresponding `rhel-system-roles` role.

## 3. Create a playbook, `configure_time.yml`, with one play that targets the `database_servers` host group. Include the `rhel-system-roles.timesync` role in the `roles` section of the play.

```
---
- name: Time Synchronization
  hosts: database_servers

  roles:
    - rhel-system-roles.timesync
```

## 4. The role documentation contains a description of each role variable, including the default value for the variable. Determine the role variables to override to meet the requirements for time synchronization.

Place role variable values in a file named `timesync.yml`. Because these variable values apply to all hosts in the inventory, place the `timesync.yml` file in the `group_vars/all` subdirectory.

### 4.1. Review the *Role Variables* section of the `README.md` file for the `rhel-system-roles.timesync` role.

```
[student@workstation role-system]$ cat \
> /usr/share/doc/rhel-system-roles/timesync/README.md
...output omitted...
Role Variables
-----
...output omitted...
# List of NTP servers
timesync_ntp_servers:
  - hostname: foo.example.com # Hostname or address of the server
    minpoll: 4                # Minimum polling interval (default 6)
    maxpoll: 8                # Maximum polling interval (default 10)
    iburst: yes               # Flag enabling fast initial synchronization
                              # (default no)
    pool: no                  # Flag indicating that each resolved address
                              # of the hostname is a separate NTP server
                              # (default no)
...output omitted...
# Name of the package which should be installed and configured for NTP.
# Possible values are "chrony" and "ntp". If not defined, the currently active
# or enabled service will be configured. If no service is active or enabled, a
# package specific to the system and its version will be selected.
timesync_ntp_provider: chrony
...output omitted...
```

#### 4.2. Create the group\_vars/all subdirectory.

```
[student@workstation role-system]$ mkdir -pv group_vars/all
mkdir: created directory 'group_vars'
mkdir: created directory 'group_vars/all'
```

#### 4.3. Create a new file group\_vars/all/timesync.yml using a text editor. Add variable definitions to satisfy the time synchronization requirements. The file now contains:

```
---
#rhel-system-roles.timesync variables for all hosts

timesync_ntp_provider: chrony

timesync_ntp_servers:
  - hostname: classroom.example.com
    iburst: yes
```

#### 5. Add a task to configure\_time.yml, to set the time zone for each host. Ensure the task uses the timezone module and executes after the rhel-system-roles.timesync role.

Because hosts do not belong to the same time zone, use a variable (host\_timezone) for the time zone name.

##### 5.1. Review the *Examples* section of the timezone module documentation.

```
[student@workstation role-system]$ ansible-doc timezone | grep -A 4 "EXAMPLES"
EXAMPLES:

- name: set timezone to Asia/Tokyo
  timezone:
    name: Asia/Tokyo
```

##### 5.2. Add a task to the post\_tasks section of the play in the configure\_time.yml playbook. Model the task after the example from the documentation, but use the host\_timezone variable for the time zone name.

The documentation in `ansible-doc timezone` recommends a restart of the Cron service if the module changes the timezone, to make sure Cron jobs run at the right times. Since system logging and other services use the system time zone, reboot each host when the time zone is modified. Add a `notify` keyword to the task, with an associated value of `reboot host`. The `post_tasks` section of the play should read:

```

post_tasks:
  - name: Set timezone
    timezone:
      name: "{{ host_timezone }}"
    notify: reboot host

```

5.3. Add the reboot host handler to the Time Synchronization play. The complete playbook now contains:

```

---
- name: Time Synchronization
  hosts: database_servers

  roles:
    - rhel-system-roles.timesync

  post_tasks:
    - name: Set timezone
      timezone:
        name: "{{ host_timezone }}"
      notify: reboot host

  handlers:
    - name: reboot host
      reboot:

```

6. For each data center, create a file named `timezone.yml` that contains an appropriate value for the `host_timezone` variable. Use the `timedatectl list-timezones` command to find the valid time zone string for each data center.

6.1. Create the `group_vars` subdirectories for the `na_datacenter` and `europa_datacenter` host groups.

```

[student@workstation role-system]$ mkdir -pv \
> group_vars/{na_datacenter,europa_datacenter}
mkdir: created directory 'group_vars/na_datacenter'
mkdir: created directory 'group_vars/europa_datacenter'

```

6.2. Use the `timedatectl list-timezones` command to determine the time zone for both the US and European data centers:

```

[student@workstation role-system]$ timedatectl list-timezones | grep Chicago
America/Chicago
[student@workstation role-system]$ timedatectl list-timezones | grep Helsinki
Europe/Helsinki

```

6.3. Create the `timezone.yml` for both data centers:

```

[student@workstation role-system]$ echo "host_timezone: America/Chicago" > \
> group_vars/na_datacenter/timezone.yml
[student@workstation role-system]$ echo "host_timezone: Europe/Helsinki" > \
> group_vars/europa_datacenter/timezone.yml

```

7. Run the playbook.

```
[student@workstation role-system]$ ansible-playbook configure_time.yml

PLAY [Time Synchronization] *****

TASK [Gathering Facts] *****
ok: [serverb.lab.example.com]
ok: [servera.lab.example.com]

TASK [rhel-system-roles.timesync : Check if only NTP is needed] *****
ok: [servera.lab.example.com]
ok: [serverb.lab.example.com]

...output omitted...

TASK [rhel-system-roles.timesync : Enable timemaster] *****
skipping: [servera.lab.example.com]
skipping: [serverb.lab.example.com]

RUNNING HANDLER [rhel-system-roles.timesync : restart chronyd] *****
changed: [servera.lab.example.com]
changed: [serverb.lab.example.com]

TASK [Set timezone] *****
changed: [serverb.lab.example.com]
changed: [servera.lab.example.com]

RUNNING HANDLER [reboot host] *****
changed: [serverb.lab.example.com]
changed: [servera.lab.example.com]

servera.lab.example.com : ok=17  changed=6    unreachable=0    failed=0
skipped=20  rescued=0    ignored=6
serverb.lab.example.com : ok=17  changed=6    unreachable=0    failed=0
skipped=20  rescued=0    ignored=6
```

8. Verify the time zone settings of each server. Use an Ansible ad hoc command to see the output of the `date` command on all the database servers.

## NOTE

The actual timezones listed will vary depending on the time of year, and whether daylight savings is active.

```
[student@workstation role-system]$ ansible database_servers -m shell -a date
servera.lab.example.com | CHANGED | rc=0 >>
Fri Jul 16 17:38:40 CDT 2021
serverb.lab.example.com | CHANGED | rc=0 >>
Sat Jul 17 01:38:40 EEST 2021
```

Each server has a time zone setting based on its geographic location.

## Finish

Run the `lab role-system finish` command to cleanup the managed host.

```
[student@workstation ~]$ lab role-system finish
```

This concludes the guided exercise.

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