Ansible in depth: Error handling and Idempotence

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Standard Behaviour

- Error based on commands and modules return code
- Task error will stop the playbook for the host
  - Some modules could behave differently
- In some cases failures require different approaches

Stop the playbook

- In case of failure the playbook should fail
    - In case of connected services all the hosts must be configured at the same time
- In this case the option any_errors_fatal can be used

Example

```
- hosts: somehosts
  any_errors_fatal: True
  roles:
    - myrole
```

Ignore errors

- Some errors are not really relevant for the configuration
- It is possible to ignore errors with `ignore_errors`

Example

```
- name: this will not be counted as a failure
  command: /bin/false
  ignore_errors: yes
```

Override the results

- Changes are triggered by the module or the executed commands
- Status change can be controlled with changed_when

Example

```
tasks:

  - shell: /usr/bin/billybass --mode="take me to the river"
    register: bass_result
    changed_when: "bass_result.rc != 2"

  # this will never report ’changed’ status
  - shell: wall ’beep’
    changed_when: False
```

What is an error

- Error conditions are not always identifiable in the exit status of a command or a module
- Error can be visible in the output
- It is possible to rise the error if some condition is verified

Example

```
- name: this command prints FAILED when it fails
  command: /usr/bin/example-command -x -y -z
  register: command_result
  failed_when: "'FAILED' in command_result.stderr"
```

Force the handlers

- On error all the following tasks will not be executed
- Also notified task will not execute
- This can leave the host in an inconsistent state
- Notified handlers can execute if the `force_handlers` is specified
  - It can be specified in the playbook as `force_handlers: True`
  - It can be provided in the command line as `--force-handlers`
  - It can be specified in the configuration

What is it?

Definition of Idempotent (source Oxford Dictionary)

> *Denoting an element of a set which is unchanged in value when multiplied or otherwise operated on by itself*

- In Mathematics a function is idempotent if $f(x) = f(f(x))$
- What is idempotent in Ansible?
  - The ability to execute playbook multiple times without changes in the hosts

Ansible idempotent playbooks

- Ansible modules are idempotent
  - Unfortunately some exceptions are present
  - As an example mysql module was not idempotent
    - It was more a limitation than a future and it could be fixed
- Run multiple times a playbook should not generate any status change after the first execution

Idempotence test

- Playbook should be tested for the Idempotence
- It is enough to execute multiple run of the same playbook
  - It is possible to automatise with Jenkins and/or other continuous integration tools
- Idempotent playbook are more safe for the management of the inventory
  - It is easier to recognise inconsistent status requiring changes
- Tasks are not executed if the corresponding status is correct

Is everything idempotent

- Modules are idempotent but they are not the only actions Ansible can perform on remote hosts
- Shell script and remote command are not idempotent because they are always executed if the task is requested
- Playbook can always be idempotent

Make playbook idempotent

- Tasks can have conditions to trigger the execution
- It is possible to retrieve facts from remote hosts
- It is possible to execute command without status change but providing some output
- Combining conditions with facts and output it is possible to create idempotent tasks from non idempotent commands

Example of idempotent tasks

```
- name: Start ldap server
  service: name={{ ldap_service }} state=started enabled=yes
  sudo: yes
  tags:
    - LDAP

- name: Retrieve ldap server configuration
  command: ldapsearch -Y EXTERNAL -H ldapi:/// -b cn=config
  register: ldap_config
  changed_when: "False"
  sudo: yes
  tags:
    - LDAP

- name: Copy modules file LDIF
  copy: src=etc/openldap/slapd.d/{{ ldap_module_file }} dest=/tmp/
  sudo: yes
  when: '"memberof" not in ldap_config.stdout'
  tags:
    - LDAP
```

Thanks

Examples and other materials in these slides are from the following sources:

- Official Ansible documentation
- Tyler Turk's blog