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How to Write an Ansible Module

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DEVNET-2215

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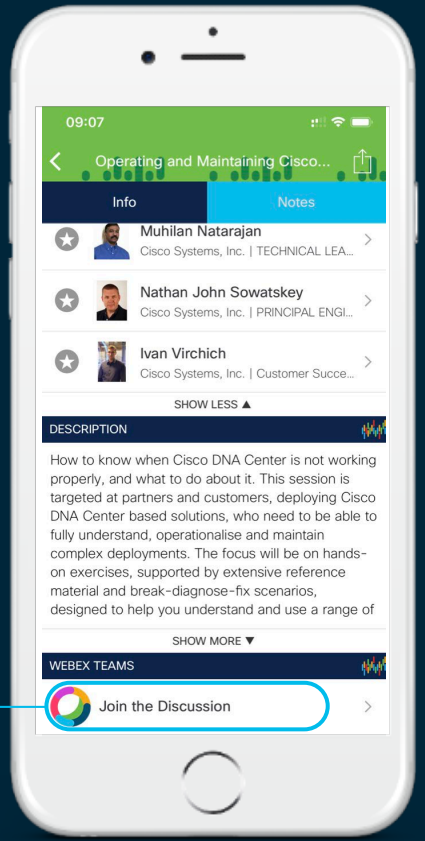

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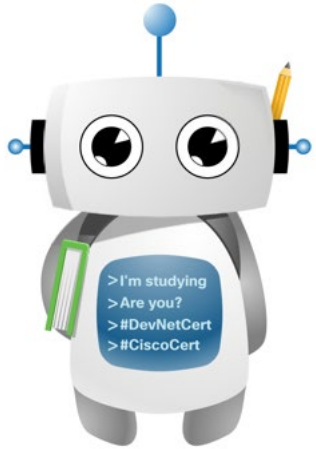

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Agenda

- DEVNET-2215 - How to Write an Ansible Module
- Ansible Module Basics
- The Parts
  - The Parts of an Ansible Module
- The Tests
  - Test the possibilities of an Ansible Module
- Conclusion

Introduction

Introduction – How to Write an Ansible Module

- My Environment
  - VS Code
    - Python Extension
  - Python 3
    - Virtual Environment
    - Activate
    - Install Ansible & UCS Python SDK
  - UCS Manager
- Code is at https://github.com/movinalot/DEVNET-2215

```
$ python3 -m venv venv
$ . venv/bin/activate
$ pip install ansible
$ pip install ucsmsdk

Or

$ pip install –r requirements.txt
```

Ansible Module Basics

- Single Logical Object operation
- Self-contained, Single file – Common elements can be shared
  - Common code in module_utils
  - Common documentation in doc_fragments
- AnsibleModule Python Class provides
  - Argument parsing and validation
  - JSON output formatting
- JSON in, JSON out

```
{ "ANSIBLE_MODULE_ARGS":
  {
    "name": "prod",
    ”descr": ”Production",
    "state": "present"
  }
}
```

The Parts

The Parts

1. import AnsibleModule
2. Get the parameters
3. Check the state based on the Parameters

   Does it exist? / Should it change? / Should it be deleted? - Idempotence
4. Check Mode

   Do it or Don't Do it
5. DOCUMENTATION / EXAMPLES / RETURN
6. doc_fragments & module_utils
7. Tests

The Smallest Ansible Module

```python
#!/usr/bin/python

from ansible.module_utils.basic import AnsibleModule

def run_module():
    module = AnsibleModule(
        argument_spec=dict(
        )
    )

    result = dict(changed=False)

    module.exit_json(**result)

if __name__ == '__main__':
    run_module()
```

The Ansible Module Parameters

```python
from ansible.module_utils.basic import AnsibleModule

def run_module():
    module = AnsibleModule(
        argument_spec=dict(
            name=dict(),
            descr=dict(),
            state=dict()
        )
    )

    result = dict(changed=False)

    module.exit_json(**result)

if __name__ == '__main__':
    run_module()
```

The Ansible Module Parameters – arguments

```python
from ansible.module_utils.basic import AnsibleModule

def run_module():
    module = AnsibleModule(
        argument_spec=dict(
            hostname=dict(type='str', required=True),
            username=dict(type='str', default='admin'),
            password=dict(type='str', required=True, no_log=True),
            name=dict(type='str'),
            descr=dict(type='str'),
            state=dict(type='str', default='present', choices=['present', 'absent'])
        )
    )

    result = dict(changed=False)

    module.exit_json(**result)

if __name__ == '__main__':
    run_module()
```

https://docs.ansible.com/ansible/latest/dev_guide/developing_program_flow_modules.html#argument-spec

Non-Idempotence

```
def run_module():
    module = AnsibleModule(
        argument_spec=dict(
            hostname=dict(type='str', required=True),
            username=dict(type='str', default='admin'),
            password=dict(type='str', required=True, no_log=True),
            name=dict(type='str'),
            descr=dict(type='str'),
            state=dict(type='str', default='present', choices=['present', 'absent'])
        )
    )

    from ucsmsdk.ucshandle import UcsHandle
    from ucsmsdk.mometa.org.OrgOrg import OrgOrg
    handle = UcsHandle(module.params['hostname'], module.params['username'], module.params['password'])
    handle.login()
    ucs_mo = OrgOrg(parent_mo_or_dn='org-root', name=module.params['name'], descr=module.params['descr'])
    handle.add_mo(ucs_mo, modify_present=True)
    handle.commit()
    handle.logout()

    # TODO: Add delete object code
```

create / update / delete the object without respect to its current state

This example shows create / update

Idempotence

```
handle.login()
ucs_mo = handle.query_dn('org-root/org-' + module.params['name'])

# Determine state change
if ucs_mo:
    # Object exists, should it exist? has anything changed?
    if module.params['state'] == 'present':
        # Any Object properties not match, that is a change
        if not ucs_mo.check_prop_match(**kwargs):
            changed = True

# Object does not exist but should, that is a change
else:
    if module.params['state'] == 'present':
        changed = True

# Object exists but should not, that is a change
if ucs_mo and module.params['state'] == 'absent':
    changed = True
```

```
# Apply state
if changed:
    if module.params['state'] == 'absent':
        handle.remove_mo(ucs_mo)
    else:
        kwargs['parent_mo_or_dn'] = 'org-root'
        kwargs['name'] = module.params['name']
        if module.params['descr'] is not None:
            kwargs['descr'] = module.params['descr']

        ucs_mo = OrgOrg(**kwargs)
        handle.add_mo(ucs_mo, modify_present=True)
    handle.commit()
```

Create if present specified or
Update only what is different
Delete if absent specified

Check Mode --check

```
module = AnsibleModule(
    argument_spec=dict(
        hostname=dict(type='str', required=True),
        username=dict(type='str', default='admin'),
        password=dict(type='str', required=True, no_log=True),
        name=dict(type='str'),
        descr=dict(type='str'),
        state=dict(type='str', default='present', choices=['present', 'absent'])
    ),
    required_if=[
        ['state', 'present', ['name']],
    ],
    supports_check_mode=True
)
```

```
# Apply state if not check_mode
if changed and not module.check_mode:
```

DOCUMENTATION / EXAMPLES / RETURN

```
DOCUMENTATION = r'''
---
module: ucs_org

short_description: Manages UCS Organizations for UCS Manager

description:
    - Manages UCS Organizations for UCS Manager.
    - Examples can be used with the UCS Platform Emulator U(https://cs.co/ucspe).

options:
    hostname:
        description:
        - IP address or hostname of Cisco UCS Manager.
        type: str
        required: yes
RETURN = r''' '''
```

```
EXAMPLES = r'''
- name: Add UCS Organization
  ucs_org_6:
    hostname: "{{ ucs_hostname }}"
    username: "{{ ucs_username }}"
    password: "{{ ucs_password }}"
    name: test
    description: testing org
    state: present

- name: Update UCS Organization
  ucs_org_6:
    hostname: "{{ ucs_hostname }}"
    username: "{{ ucs_username }}"
    password: "{{ ucs_password }}"
    name: test
    description: TESTING ORG
    state: present
```

doc_fragments / module_utils

```
class ModuleDocFragment(object):
    # Cisco UCS doc fragment
    DOCUMENTATION = '''
options:
  hostname:
    description:
    - IP address or hostname of Cisco UCS Manager.
    type: str
    required: yes
  username:
    description:
    - Username for Cisco UCS Manager authentication.
    type: str
    default: admin
  password:
    description:
    - Password for Cisco UCS Manager authentication.
    type: str
    required: yes
```

```
from ucsmsdk.ucshandle import UcsHandle
def ucs_login(hostname, username, password):
    """ Login to UCS """

    HANDLE = UcsHandle(hostname, username, password)
    HANDLE.login()
    return HANDLE
```

The Tests

Test the Module

- Test Creating
- Test Updating
- Test Deletion
- Test Check Mode
- Use Ansbile DSL
  - Asserts
  - Register
  - Comparisons

```yaml
# Setup (clean environment)
- name: org absent
  ucs_org_6: &org_absent
    <<: *login_info
    name: testorg
    state: absent


# Test present (check_mode)
- name: org present (check_mode)
  ucs_org_6: &org_present
    <<: *login_info
    name: testorg
  check_mode: yes
  register: cm_org_present


# Present (normal mode)
- name: org present (normal mode)
  ucs_org_6: *org_present
```

Conclusion

Got Questions? Come find me!

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