Simply Ansible: Best Practices

> Writing Ansible scripts that don't completely suck

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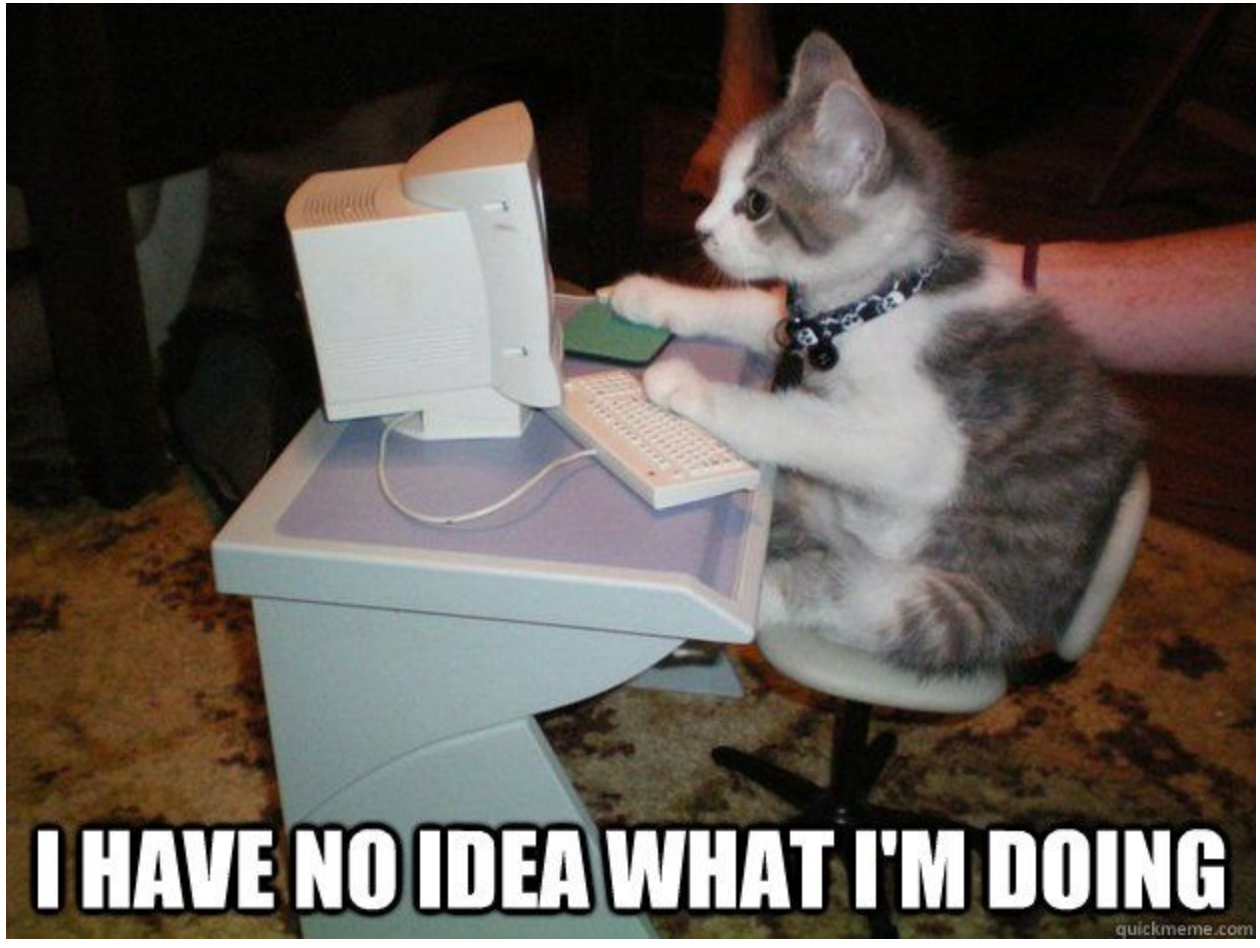
Fair warning: I might be wrong



Nothing better than an example

I have a cookiecutter template which sets up a good starting project demonstrating these practices.

```
$ pip install cookiecutter

$ cookiecutter gh:building5/simply-ansible
```

PROTIPS

Put tasks in roles, not the playbook

While you can list tasks directly in a play, you're usually better off putting the task in a role.

```
# ./site.yml
- name: Some play
  hosts: some-hosts
  pre_tasks:          # meh
   - name: some pre_task
  roles:
   - some-role
  tasks:              # really?
   - name: some task
  post_tasks:         # PLEASE STOP!
   - name: some post_task
```

Really, keep tasks in roles

Besides, content from Ansible Galaxy can only be brought in as a role, so trying to sort that into existing `{pre,post}_tasks` is a pain.

```
- name: Some play
  hosts: some-hosts
  pre_tasks:
   # but what if I wanted to call a galaxy role
   # before this?
   - name: some pre_task
  post_tasks:
   - name: some post_task
   # or maybe a role after this?
```

Keep roles small and single purpose

If the playbook is your 'program', then roles are your 'functions'.

- For example, `pip`, `firewall`, `nodejs`, `timezone`, `auton`
- Not things like `common`, `general`, `misc`, ...
- Keep them small; most will fit on the screen

Bending the rule: `debug-tools`

I usually have a rule with a bunch of one-line installers for things that are generally useful for debugging. But if you can't install it with a single `apt`, `pip`, `npm`, `gem`, etc., then it gets its own role.

```
# ./roles/debug-tools/tasks/main.yml
- when: ansible_distribution == 'Ubuntu'
  name: apt-get install <cool-stuff>
  apt: name={{ item }}
  with_items:
    - curl
    - htop
    - iotop
    - jq
    # ...
```

Avoid repeating roles...

Here both `foo` and `bar` need `zygon`. Since plays are sequential, `zygon` will be installed in sequence. Can really slow down the playbook.

```
- hosts: foo
  roles:
   - zygon # Bad!
   - foo

- hosts: bar
  roles:
   - zygon # Bad!
   - bar
```

i.e., consolidate roles to get parallelism

Since the `zygon` role is in a single play, it will execute in parallel on both `foo` and `bar`. You can't always do this, but when you can, it helps tremendously.

```
- hosts: foo,bar # both foo and bar groups
  roles:
   - zygon    # installs in parallel
              # across foo & bar nodes

- hosts: foo
  roles:
   - foo

- hosts: bar
  roles:
   - bar
```

Tag each role with the role's name

By keeping tag names consistent with role names, it's easier to keep track of what tags you have.

```
# ./roles/zygon/tasks/main.yml
---
- tags: zygon
  block: # Ansible 2.x syntax
   - name: First zygon invasion
     # ...
```

Since roles are small and single purpose, you're usually debugging individual roles.

```
$ ansible-playbook site.yml --tags zygon
```

Role tagging in Ansible 1.9

Before Ansible 2.x, the best way to tag an entire role was to put the tag in the playbook. Either way is fine.

```
roles:
 - { role: zygon, tags: zygon } # Ansible 1.9 syntax
```

Don't bother with `meta`

Meta declares dependencies between roles, which seems nice.

But...

- Dependencies are executed in every play they are refernced from
    - Which means they probably get executed multiple times
- Plays/roles execute in order, so you can just put the dependency earlier in the list

```
# ./role/rani/meta/main.yml
dependencies: [{ role: apt-get-update }] # Bad!
                # can cause apt-get-update to run
                # multiple times!

# ./site.yml
- roles:
   - apt-get-update # Much Better!
   - rani
```

Prefer `defaults` to `vars`

Roles give you two places to define variables. They only differ in precedence, and `defaults` (lowest precedence of any variable) is the least confusing.

```
roles/
   some-role/
     defaults/
       main.yml # Good play for role's variables
     vars/
       main.yml # Confusing place for role's variables
```

Don't put tons of tags on a task

If you find yourself putting lots of tags on a task, you're probably doing it wrong. A tag should be there for a reason.

```
tags:
 - provision # okay, but every task in the
             #   playbook is for provisioning
 - bamboo    # and everything is for bamboo
 - bamboo-agent
             # what are you doing?
 - bamboo-agent-ubuntu
             # wait...
 - bamboo-agent-ubuntu-precise
             # MAKE IT STOP
 - bamboo-agent-ubuntu-precise-provision
             # *sigh*
```

Put variable definitions in the right spot

```
site.yml          # in the occasional vars block
                  # for parameterized roles
group_vars/
  all/
    main.yml      #   default values
    ...           #   can break into multiple files
  staging/        # Have a group for each environment
    main.yml      #   override defaults for env
    vault.yml     #   safe place for secrets
roles/
   kandy-man/
     defaults/
       main.yml # specific vars for the role
                  # version numbers, SHA hashes, etc.
```

Vaults: too many vaults will kill you

- We tried having single-var per vault
  - PRO: Avoids merge conflicts w/ vaults
  - CON: No one follows the rules
    - Vars end up in random vaults
    - Or var was renamed and vault wasn't
    - Grep is either powerless, or really slow
- Use ansible-vault-tools and as few vaults as possible
  - Single vault per `group_vars`
  - `ansible-vault-merge` - magical vault merging
  - `ansible-vault-textconv` - magical vault diffing
    - And `git grep --textconv` can search in vaults!

!!!ENCRYPT YOUR VAULT PASSWORD!!!

The `ansible-vault-tools` project also provides `gpg-vault-password-file`, which can use your PGP key to encrypt your vault password.

- You do have a PGP key, right?
- And it's encrypted with a passphrase?
- And you use gpg-agent so you don't go insane typing the passphrase all the time?

Put common settings in `ansible.cfg`

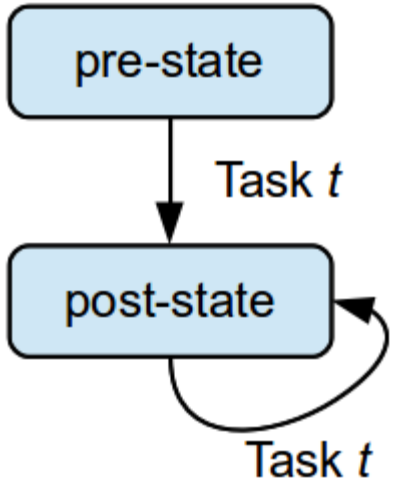
Defaults should be what's best for the humans that run the playbooks by hand the most (probably devs).

```
# ./ansible.cfg
[defaults]
# Why is the default not smart?
gathering = smart
# Default for most common params devs would use
inventory = ./inventory/vagrant.ini
# Consistent configuration for vault passwords
vault_password_file = $HOME/.ansible/some_project_vault

[privilege_escalation]
# Nearly everything requires sudo, so default to it
become = True

[ssh_connection]
# Speeds things up, but requires disabling
# requiretty in /etc/sudoers
pipelining = True
```

Make sure roles are idempotent



> The concept that change commands should only be applied when they need to be applied, and that it is better to describe the desired state of a system than the process of how to get to that state.

-- Ansible Glossary

Handlers are not idempotent!

...but often necessary. Just be aware of this when a playbook fails.

```
# ./site.yml
- # ...
  roles: [ master, cyberman ]

# ./roles/master/tasks/main.yml
- cp: src=missy.conf dest=/etc/master/
  notify: restart master
  # ^^ schedules restart of master if file is copied

# ./roles/cyberman/tasks/main.yml
- fail: msg="***HEAD EXPLODES***"
  # ^^ causes play to fail before restart master
  # even if you fix and re-run, file already copied
  # so it won't notify on re-run
```

Use a wrapper script so everyone runs the playbook consistently

- Setup virtualenv so everyone runs the same version
- Add some common/useful options (`-v` , `--diff`)
- Add domain specific options, useful for your team
  - `--env` to specify environment
  - `--service` to deploy a specific service
  - `--` to break for `ansible-playbook` options

```
$ ./deploy.sh --env staging -- --tags cyberman --check
+ exec ansible-playbook -v --diff \
+   --inventory-file ./inventory/staging.ini \
+   --tags cyberman \
+   --check \
+   -- site.yml
Using /Users/dlee/prj/doctor/ansible.cfg as config file

PLAY [pre-roles] ***************************************
```

Don't make a role portable until you have to

> There is no such thing as portable code. Only code that's been ported.

Avoid supporting multiple platforms as much as you can. It's better to standardize on a distro/version.

That said,

- You usually end up with one weird thing that needs to be on another distro
- Or you'll have a transition time as you upgrade major versions
- Don't port everything; only port what you need; one thing at a time.

Logic goes in roles; not in playbooks

Ansible allows you to split logic between playbooks and roles, but that just makes it harder to figure out what's going on.

```
# ./site.yml
- # ...
  roles:
   - role: epel
     when: ansible_distribution == 'CentOS' # Bad!

# ./roles/epel/tasks/main.yml
- name: yum install epel-...
  when: ansible_distribution == 'CentOS' # Good!
```

Test your playbooks

- A `make test` target is always useful
- `ansible-playbook --syntax-check` finds syntax errors
- `ansible-lint` finds common errors

```
test: virtualenv galaxy
        @$(MAKE) check-env # errors if we're
                           # not in virtualenv
        ansible-playbook site.yml --syntax-check
        ansible-lint --exclude build/ site.yml
.PHONY: test
```

Follow good programming principles

- Use descriptive names
- Keep playbooks in source control
- Peer review changes before going live
- Use continuous deployment/continous delivery/ChatOps
- Testing!

Questions

Thanks!

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