ANSIBLE

ANSIBLE

ANSIBLE BEST PRACTICES: THE ESSENTIALS
Ansible Automates: DC

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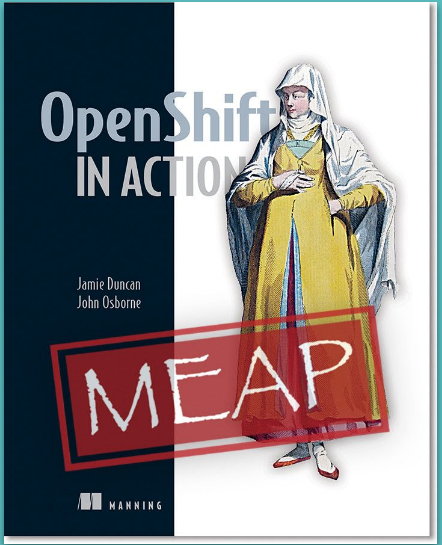
about jduncan

6+ years with Red Hat

My daughter Elizabeth
#cutestThingEver



Coming Soon
#shamelessPlug

THIS SESSION IS ABOUT NUTS AND BOLTS

Roadmaps are great. This is not one of them.

For this session, I’m making the assumption that you’re currently writing Ansible playbooks.

My goal is to help you make those playbooks more effective.

AUTOMATION == DOCUMENTATION

If done properly, the process of automating a process can **become** the documentation for the process.

Everything in Ansible revolves around this core concept.

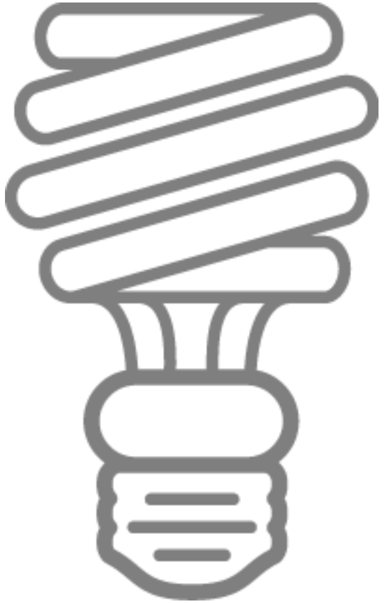
WORKFLOW

Treat Ansible content like application code

Version control is your best friend

Start as simple as possible and iterate

- Start with a basic playbook and static inventory
- Refactor and modularize progressively as you and your environment mature



Do It with Style

- Create a style guide for all contributors
- Consistency in:
    - Tagging
    - Whitespace
    - Naming of Tasks, Plays, Variables, and Roles
    - Directory Layouts
- Enforce the style

PROJECT LAYOUTS: BASIC

```
basic-project/
├── inventory
│   ├── group_vars
│   ├── host_vars
│   └── hosts
└── site.yml
```

PROJECT LAYOUTS: ORGANIZATIONAL ROLES

```
myapp/
├── roles
│   ├── myapp
│   │   ├── tasks
│   │   │   └── main.yml
│   │   └── etc.etc
│   ├── nginx
│   │   └── etc.etc
│   └── proxy
│       └── etc.etc
└── site.yml
```

PROJECT LAYOUTS: SHARED ROLES

```
myapp/
├── config.yml
├── provision.yml
├── roles
│   └── requirements.yml
└── site.yml
```

INVENTORY

Give inventory nodes human-meaningful names rather than IPs or DNS hostnames.

```
10.1.2.75
10.1.5.45
10.1.4.5
10.1.0.40

w14301.acme.com
w17802.acme.com
w19203.acme.com
w19304.acme.com
```

```
db1 ansible_host=10.1.2.75
db2 ansible_host=10.1.5.45
db3 ansible_host=10.1.4.5
db4 ansible_host=10.1.0.40

web1 ansible_host=w14301.acme.com
web2 ansible_host=w17802.acme.com
web3 ansible_host=w19203.acme.com
web4 ansible_host=w19203.acme.com
```

INVENTORY

Group hosts for easier inventory selection and less conditional tasks -- the more groups the better.

WHAT

```
[db]
db[1:4]

[web]
web[1:4]
```

WHERE

```
[east]
db1
web1
db3
web3

[west]
db2
web2
db4
web4
```

WHEN

```
[dev]
db1
web1

[test]
db3
web3

[prod]
db2
web2
db4
web4
```

INVENTORY

Use a single source of truth if you have it -- even if you have multiple sources, Ansible can unify them.

Stay in sync automatically

Reduce human error

Use your instance and provider metadata for more than pretty columns in your TPS reports

VARIABLES

Proper variable naming can make plays more readable and avoid variable name conflicts

Use descriptive, unique human-meaningful variable names

Prefix variables with it’s “owner” such as a role name, service, or package

```
apache_max_keepalive: 25
apache_port: 80
tomcat_port: 8080
```

VARIABLES

Make the most of variables

Find the appropriate place for your variables based on what, where and when they are set or modified

Separate logic (tasks) from variables to reduce repetitive patterns and provided added flexibility.

SEPARATE LOGIC FROM VARIABLES

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```
- name: Clone student lesson app for a user
  host: nodes
  tasks:
    - name: Create ssh dir
      file:
        state: directory
        path: /home/{{ username }}/.ssh

    - name: Set Deployment Key
      copy:
        src: files/deploy_key
        dest: /home/{{ username }}/.ssh/id_rsa

    - name: Clone repo
      git:
        accept_hostkey: yes
        clone: yes
        dest: /home/{{ username }}/lightbulb
        key_file: /home/{{ username }}/.ssh/id_rsa
        repo: git@github.com:example/apprepo.git
```

EXHIBIT A

Embedded parameter values and repetitive home directory value pattern in multiple places

Works but could be more clearer and setup to be more flexible and maintainable

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SEPARATE LOGIC FROM VARIABLES

ANSIBLE

```
- name: Clone student lesson app for a user
  host: nodes
  vars:
    user_home: /home/{{ username }}
    user_ssh: "{{ user_home }}/.ssh"
    deploy_key: "{{ user_ssh }}/id_rsa"
    app_dest: "{{ user_home }}/exampleapp"
  tasks:
    - name: Create ssh dir
      file:
        state: directory
        path: "{{ user_ssh }}"

    - name: Set Deployment Key
      copy:
        src: files/deploy_key
        dest: "{{ deploy_key }}"

    - name: Clone repo
      git:
        dest: "{{ app_dest }}"
        key_file: "{{ deploy_key }}"
        repo: git@github.com:example/exampleapp.git
```

EXHIBIT B

Parameters values are set thru values away from the task and can be overridden.

Human meaningful variables “document” what’s getting plugged into a task parameter

More easily refactored into a role

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Use native YAML syntax to maximize the readability of your plays

- Vertical reading is easier
- Supports complex parameter values
- Works better with editor syntax highlighting in editors

USE NATIVE YAML SYNTAX

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NO!

```
- name: install telegraf
  yum: name=telegraf-{{ telegraf_version }} state=present update_cache=yes disable_gpg_c
  notify: restart telegraf

- name: configure telegraf
  template: src=telegraf.conf.j2 dest=/etc/telegraf/telegraf.conf

- name: start telegraf
  service: name=telegraf state=started enabled=yes
```

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USE NATIVE YAML SYNTAX

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Better, but not quite all the way there...

```
- name: install telegraf
  yum: >
      name=telegraf-{{ telegraf_version }}
      state=present
      update_cache=yes
      disable_gpg_check=yes
      enablerepo=telegraf
  notify: restart telegraf

- name: configure telegraf
  template: src=telegraf.conf.j2 dest=/etc/telegraf/telegraf.conf

- name: start telegraf
  service: name=telegraf state=started enabled=yes
```

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USE NATIVE YAML SYNTAX

```
- name: install telegraf
  yum:
    name: telegraf-{{ telegraf_version }}
    state: present
    update_cache: yes
    disable_gpg_check: yes
    enablerepo: telegraf
  notify: restart telegraf

- name: configure telegraf
  template:
    src: telegraf.conf.j2
    dest: /etc/telegraf/telegraf.conf
  notify: restart telegraf

- name: start telegraf
  service:
    name: telegraf
    state: started
    enabled: yes
```

PLAYS & TASKS

Names improve readability and user feedback

Give all your playbooks, tasks and blocks brief, reasonably unique and human-meaningful names

`$myvar` is never a good thing, and typing isn’t that hard

PLAYS & TASKS

EXHIBIT A

```yaml
- hosts: web
  tasks:
  - yum:
      name: httpd
      state: latest


  - service:
      name: httpd
      state: started
      enabled: yes
```

```
PLAY [web]
********************************

TASK [setup]
********************************
ok: [web1]

TASK [yum]
********************************
ok: [web1]

TASK [service]
********************************
ok: [web1]
```

PLAYS & TASKS

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EXHIBIT B

```
- hosts: web
  name: installs and start apache
  tasks:
    - name: install apache packages
      yum:
        name: httpd
        state: latest

    - name: start apache service
      service:
        name: httpd
        state: started
        enabled: yes
```

```
PLAY [install and start apache]
********************************

TASK [setup]
********************************
ok: [web1]

TASK [install apache packages]
********************************
ok: [web1]

TASK [start apache service]
********************************
ok: [web1]
```

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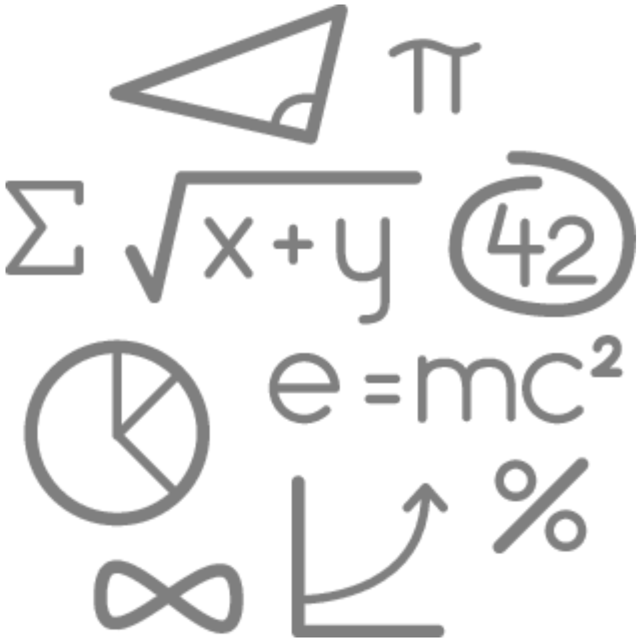
PLAYS & TASKS

Focus avoids complexity

Keep plays and playbooks focused. Multiple simple playbooks are better than having a single, overburdened playbook full of conditional logic.



Clean up your debugging tasks

Make them optional with the verbosity parameter so they’re only displayed when they are wanted.

```
- debug:
   msg: "This always displays"

- debug:
   msg: "This only displays with
 ansible-playbook -vv+"
   verbosity: 2
```

Don’t just start services -- use smoke tests

```
- name: check for proper response
  uri:
    url: http://localhost/myapp
    return_content: yes
  register: result
  until: '"Hello World" in result.content'
  retries: 10
  delay: 1
```

Use command modules sparingly

- Use the run command modules like `shell` and `command` as a last resort
- Use the `command` module unless you really need I/O redirection that `shell` permits -- but be very careful.

Always seek out a module first

```
- name: add user
  command: useradd appuser

- name: install apache
  command: yum install httpd

- name: start apache
  shell: |
    service httpd start && chkconfig httpd on
```

```
- name: add user
  user:
    name: appuser
    state: present

- name: install apache
  yum:
    name: httpd
    state: latest

- name: start apache
  service:
    name: httpd
    state: started
    enabled: yes
```

Still using command modules a lot?

```
- hosts: all
  vars:
    cert_store: /etc/mycerts
    cert_name: my cert
  tasks:
  - name: check cert
    shell: certify --list --name={{ cert_name }} --cert_store={{ cert_store }} | grep "{{ cert_name }}"
    register: output

  - name: create cert
    command: certify --create --user=chris --name={{ cert_name }} --cert_store={{ cert_store }}
    when: output.stdout.find(cert_name)" != -1
    register: output

  - name: sign cert
    command: certify --sign  --name={{ cert_name }} --cert_store={{ cert_store }}
    when: output.stdout.find("created")" != -1
```

Develop your own module! (seriously)

```
- hosts: all
 vars:
   cert_store: /etc/mycerts
   cert_name: my cert
 tasks:
 - name: create and sign cert
   certify:
     state: present
     sign: yes
     user: chris
     name: "{{ cert_name }}"
     cert_store: "{{ cert_store }}"
```

PLAYS & TASKS

Separate provisioning from deployment and configuration tasks

```
acme_corp/
├── configure.yml
├── provision.yml
└── site.yml

$ cat site.yml
---
- import_playbook: provision.yml
- import_playbook: configure.yml
```

TEMPLATES

Jinja2 is powerful but you needn't use all of it

Templates should be simple:

- Variable substitution
- Conditionals
- Simple control structures/iterations
- Design your templates for your use case, not the world's
-

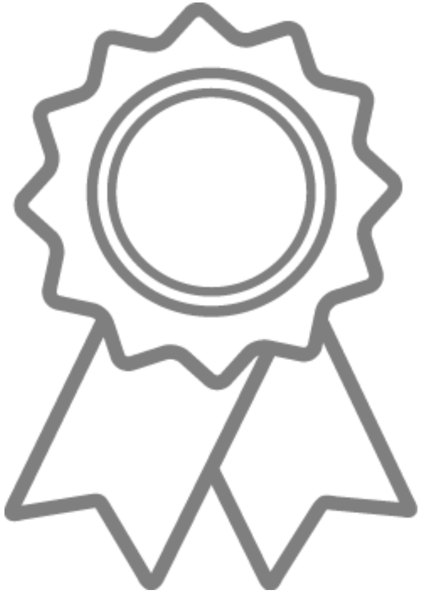
Things to avoid:

- Managing variables in a template
- Extensive and intricate conditionals
- Conditional logic based on embedded hostnames
- Complex nested iterations

Careful when mixing manual and automated configuration

Label template output files as being generated by Ansible

```
{{ ansible_managed | comment }}
```



ROLES

Roles are the shareable unit of work in Ansible

- Like playbooks -- keep roles purpose and function focused
- Use a `roles/` subdirectory for roles developed for organizational clarity in a single project
- Follow the Ansible Galaxy pattern for roles that are to be shared beyond a single project
- Limit role dependencies

ROLES

Sharing roles is paramount, and easy

- Use `ansible-galaxy init` to start your roles...
- ...then remove unneeded directories and stub files
- Use `ansible-galaxy` to install your roles -- even private ones
- Use a roles files (i.e. `requirements.yml`) to manifest any external roles your project is using
- Always specify a specific version such using a tag or commit for your roles

SCALING YOUR ANSIBLE WORKFLOW

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Command line tools have their limitations

- Coordination across a distributed teams & organization…
- Controlling access to credentials...
- Track, audit and report automation and management activity...
- Provide self-service or delegation…
- Integrate automation with enterprise systems...

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Applications and Infrastructure are continuously evolving.

Ansible is designed to do the same.

Thanks!

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