How to Teach Old Apps New Tricks with Ansible-based Operators: Part 1

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2019-05-08
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PART ONE

- What is Kubernetes?
- Containers and State
- What’s an Operator?
- Ansible-based Operators

WHAT IS KUBERNETES?

WHAT IS KUBERNETES?

“Kubernetes (k8s) is an open-source system for automating deployment, scaling, and management of containerized applications.”
https://kubernetes.io/

ENTERPRISE KUBERNETES

Red Hat® OpenShift® Container Platform offers enterprises full control over their Kubernetes environments, whether they're on-premise or in the public cloud.
https://www.openshift.com/

CONTAINERS AND STATE

STATELESS IS EASY

ORGANIZATIONS RUN ON STATE

STATELESS IS EASY, STATEFUL IS HARD

WHAT'S AN OPERATOR?

KUBERNETES OPERATORS

Kubernetes Operators encode the human knowledge required to install, upgrade / patch, recover from failure, and tune applications and services.

https://github.com/operator-framework/operator-sdk

OPERATORS MANAGE STATE

Declare operational knowledge from experts as code

Operator SDK

Deployments
StatefulSets
Autoscalers
Secrets
Config maps

ANSIBLE-BASED OPERATORS

YAML: YEAH YOU KNOW ME!

k8s-deployment.yaml

```
---
apiVersion: apps/v1
kind: Deployment
metadata:
  name: motd-operator
spec:
  replicas: 1
  selector:
    matchLabels:
      name: motd-operator
  template:
    metadata:
...
```

ansible-task.yml

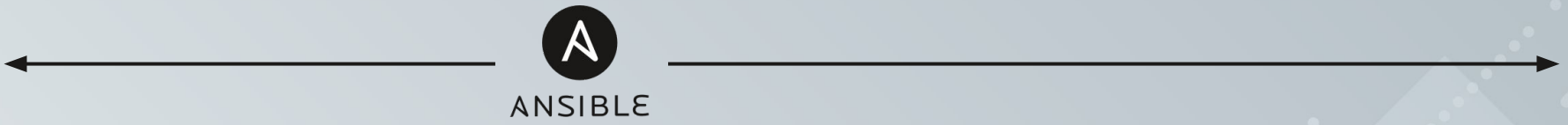
```
---
- name: Save the STATE
  copy:
    dest: /motd.timestamp
    src: /etc/motd
    owner: root
    group: root
    mode: 0644
    remote_src: true

...
```

OPERATOR SDK ♡ ANSIBLE

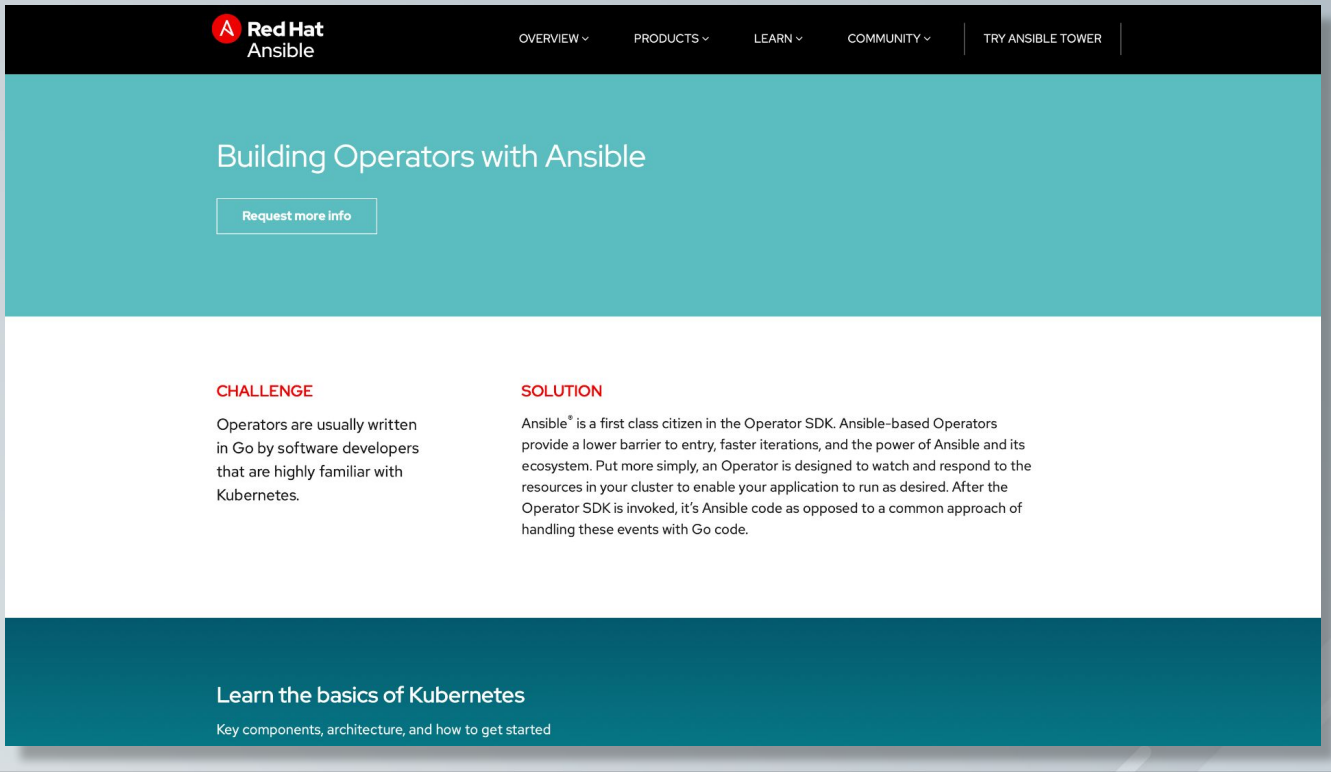
The Ansible Kubernetes module enables the Operator SDK to utilize Ansible and its ecosystem to manage applications inside Kubernetes and OpenShift

OPERATOR CAPABILITY LEVEL

Phase I	Phase II	Phase III	Phase IV	Phase V
Basic Install	Seamless Upgrades	Full Lifecycle	Deep Insights	Auto Pilot
Automated application provisioning and configuration management	Patch and minor version upgrades supported	App lifecycle, storage lifecycle (backup, failure recovery)	Metrics, alerts, log processing and workload analysis	Horizontal/vertical scaling, auto config tuning, abnormal detection, scheduling tuning



ansible.com/operators



BUT WAIT THERE'S MORE IN PART TWO

THANK YOU

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How to Teach Old Apps New Tricks with Ansible-based Operators: Part 2

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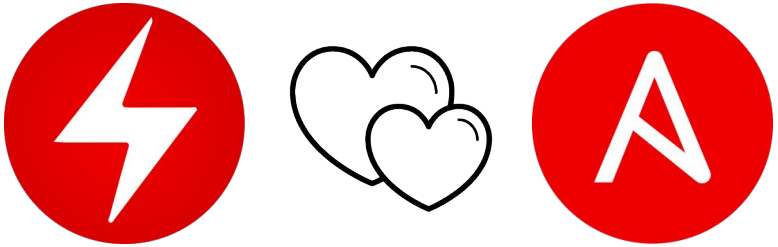
PART TWO

- Part One Recap
- Ansible-based Operators in Kubernetes
- How Can Ansible-based Operators Bring Apps To Openshift
- Resources

PART ONE RECAP

STATELESS IS EASY, STATEFUL IS HARD

OPERATOR
SDK



ANSIBLE-BASED OPERATORS IN KUBERNETES

ANSIBLE-BASED OPERATORS

OPERATOR
SDK

```
operator-sdk new
motd-operator --type ansible
--api-version
motd.example.com/v1 --kind
MOTD
```

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Automation

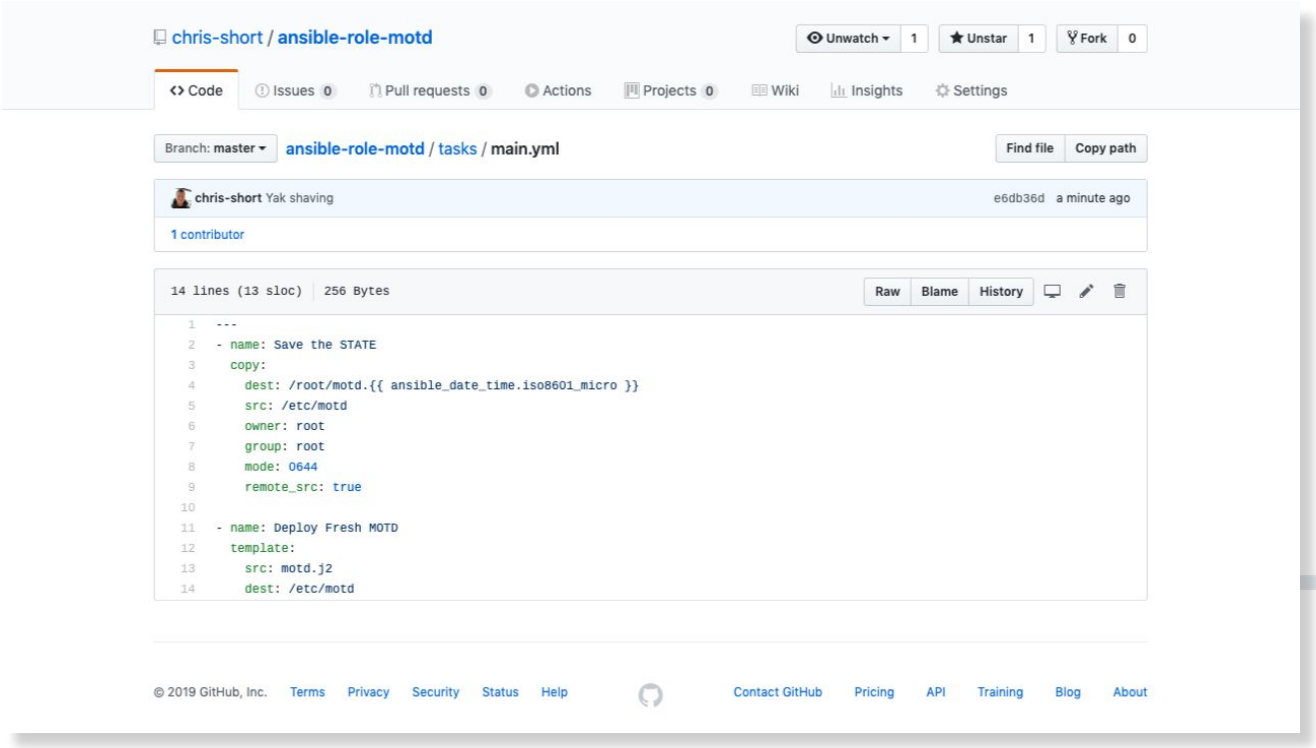
```
cd motd-operator/roles/motd
```

watches.yaml

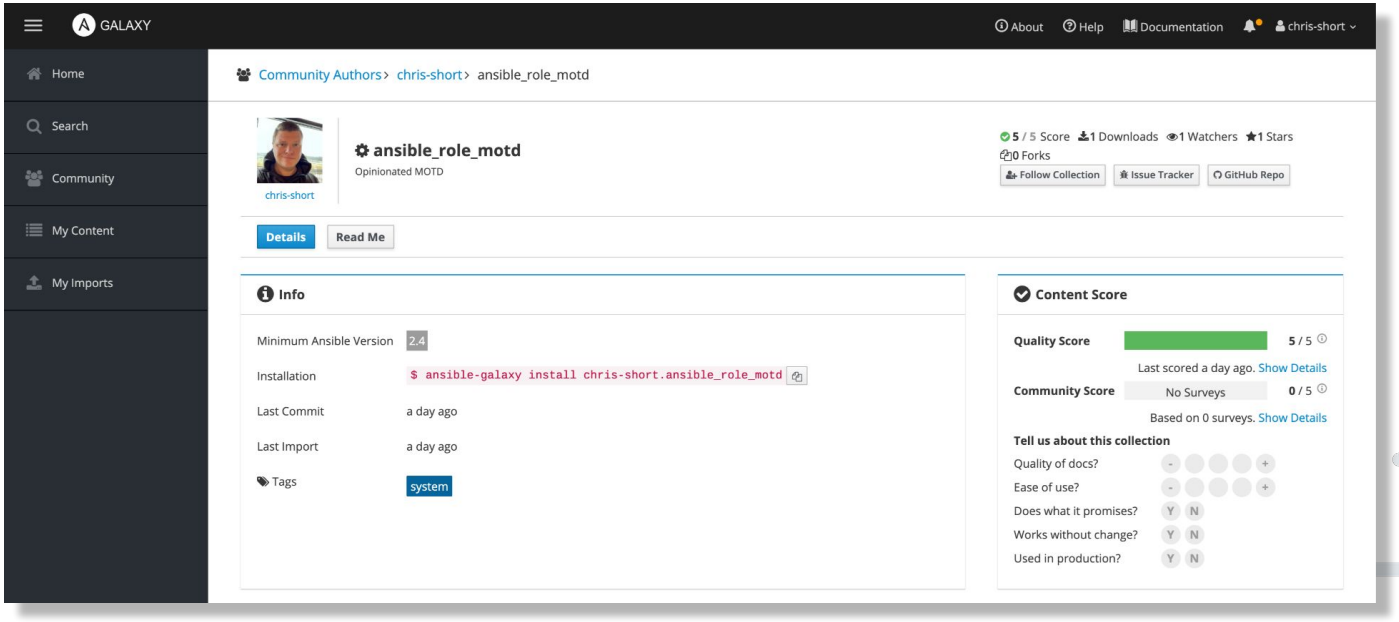
```
---
- version: v1
  group: motd.example.com
  kind: MOTD
  role: /opt/ansible/roles/motd
```

HOW CAN ANSIBLE-BASED OPERATORS BRING APPS TO KUBERNETES

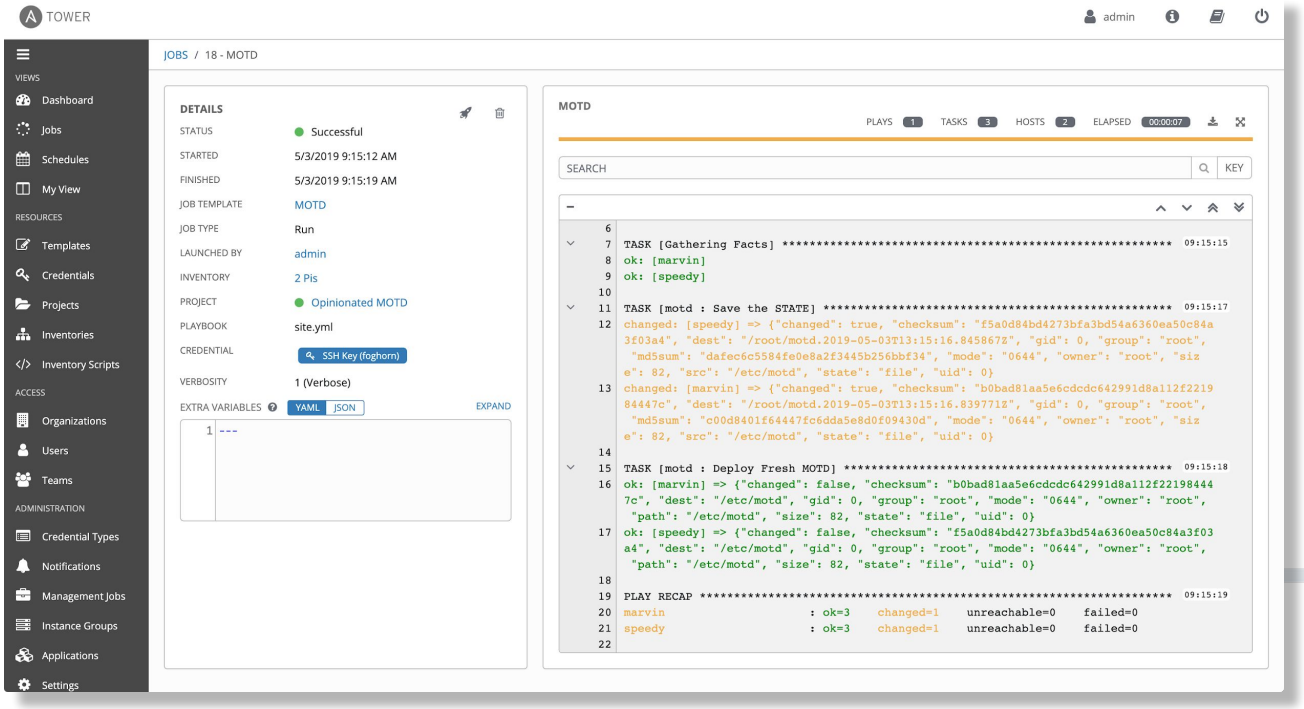
ANSIBLE MANAGING STATE



ANSIBLE GALAXY MANAGING STATE



RED HAT ANSIBLE TOWER MANAGING STATE



BUILD ANSIBLE-BASED OPERATOR

```
# operator-sdk new motd-operator --type ansible
--api-version motd.example.com/v1 --kind MOTD

# cd motd-operator

# oc create -f deploy/crds/motd_v1_motd_crd.yaml
```

BUILD ANSIBLE-BASED OPERATOR

```
# vi build/Dockerfile

RUN ansible-galaxy install
chris-short.ansible_role_motd

# operator-sdk build
quay.io/chrisshort/motd-operator:v0.0.1

# podman push
quay.io/chrisshort/motd-operator:v0.0.1
```

DEPLOY ANSIBLE-BASED OPERATOR

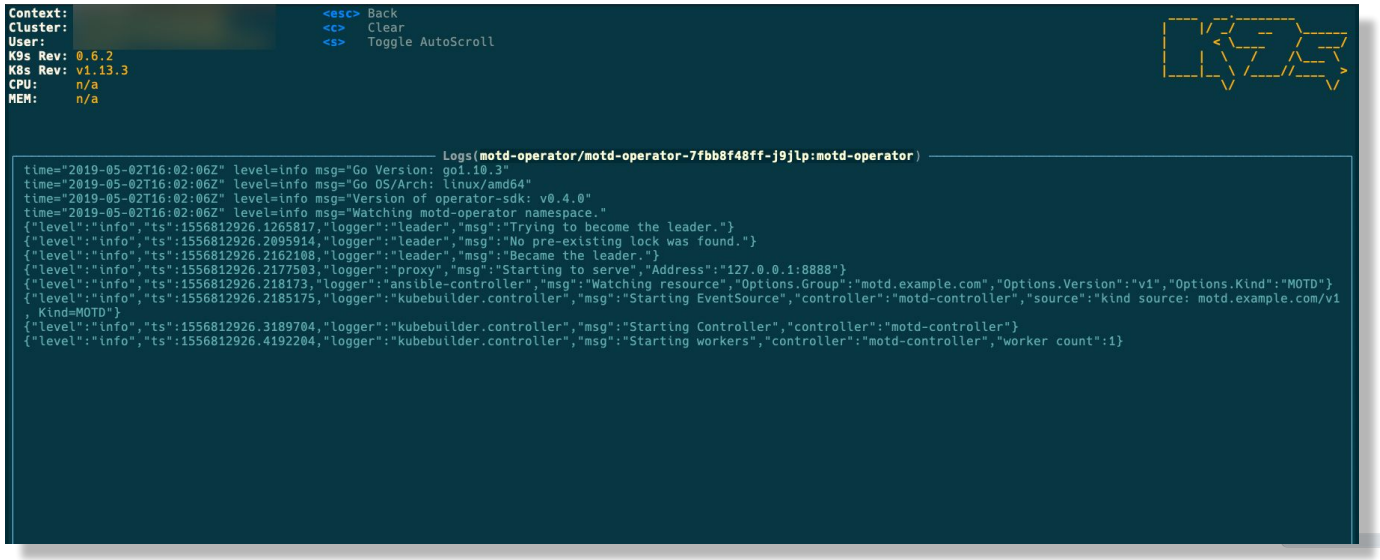
```
# oc create -f deploy/service_account.yaml

# oc create -f deploy/role.yaml

# oc create -f deploy/role_binding.yaml

# oc create -f deploy/operator.yaml
```

ANSIBLE MANAGING STATE IN K8S



https://github.com/derailed/k9s

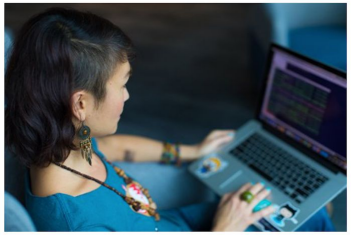
RESOURCES

ansible.com/operators

Why Build Operators with Ansible?

Ansible Fits naturally into a Kubernetes Environment. Both use YAML to describe the desired state of the world. Both Ansible and OpenShift have vibrant communities working to solve common problems. Combining Ansible and Kubernetes frees up application engineers to minimize the new skill sets required to maximize time to delivery.

The same tried and trusted Ansible tooling lets you Automate and Orchestrate your applications across both new and existing platforms allowing teams to transition without having to learn new skills. With the k8s module, an Ansible user can manage applications on Kubernetes, on existing IT or across both with one simple language.



FEATURED WEBINAR

Operators for Ansible people

In this webinar Red Hat provides an overview of Ansible Operators. Highlights include:

- Why use Ansible with Kubernetes
- Extending Kubernetes API
- Advanced patterns

Watch video

SPEAKERS

Michael Hrivnak
Principal Software Engineer, Red Hat

ANSIBLE ECOSYSTEM

Red Hat
Ansible
Automation

Red Hat® Ansible® Automation is a universal language, unraveling the mystery of how work gets done. Turn tough tasks into repeatable playbooks.

ANSIBLE

Ansible is an open source community project sponsored by Red Hat, it's the simplest way to automate IT. Ansible is the only automation language that can be used across entire IT teams from systems and network administrators to developers and managers.

OPERATOR ECOSYSTEM

OperatorHub.io: OperatorHub.io is a new home for the Kubernetes community to share Operators. Find an existing Operator or list your own today.

learn.openshift.com: Our Interactive Learning Scenarios provide you with a pre-configured OpenShift® instance, accessible from your browser without any downloads or configuration.

Operator Framework: An open source toolkit to manage Kubernetes native applications, called operators, in an effective, automated, and scalable way.

ARTIFACTS

https://github.com/chris-short/ansible-role-motd: Ansible Role to manage `/etc/motd` to simulate managing state

https://galaxy.ansible.com/chris-short/ansible_role_motd: Above Ansible Role available from Ansible Galaxy

https://github.com/chris-short/motd-operator: Ansible-based Kubernetes Operator Using ansible_role_motd from Ansible Galaxy as an example from managing state in a Kubernetes cluster

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