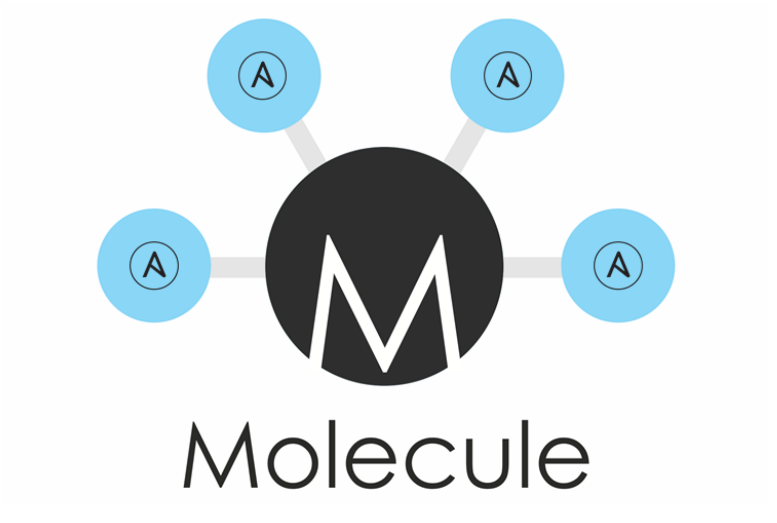
OpenAFS development and testing with Ansible Molecule

Michael Meffie, Sine Nomine Associates

June 15, 2022


Molecule

Ansible Molecule

- Ansible is an open source IT automation engine that automates provisioning, configuration management
- Molecule is the standard framework for testing Ansible roles and playbooks
- Easily spinup local “infrastructures” for testing roles and playbooks
- How can we make it easier for people to get OpenAFS up and running by leveraging Ansible and Molecule?

Molecule Test Cycle

- Create one or more instances (containers or virtual machines)
- Run an Ansible playbook to setup an infrastructure
- Verify
- Cleanup and destroy instances

SINE NOMINE
ASSOCIATES

Drivers

VAGRANT

docker

podman

openstack.

PROXMOX

vmware®

amazon web services™ EC2

DigitalOcean

Google Cloud Platform

Microsoft Azure

HETZNER

Verification plugins

ANSIBLE

ROBOT FRAMEWORK

test infra

pytest

INSPEC BY CHEF

goss

Molecule Scenario

- Key concept in molecule
- Defines the number and type of platforms and how to create them
- Defines the Ansible inventory (groups and variables)
- Specifies the Ansible playbook to setup the instances
- Defines the verification method

Scenario configuration

- Each scenario consists of a `molecule.yml` file and a set of playbooks
- The `molecule.yml` specifies everything needed to create the infrastructure and to verify
- Instances are created/destroyed by driver plugins or by custom scripts
- Verification is performed by verifier plugins or a custom playbook

Molecule Configuration

```
dependency:
  name: galaxy
  enabled: yes
  requirements-file: collections.yml
```

Molecule Configuration

```
driver:
  name: vagrant
  provider:
    name: libvirt
```

Molecule Configuration

```
platforms:
  - name: "myhost01"
    box: "generic/debian11"
    memory: 2048
    groups:
      - afs_fileservers
  - name: "myhost02"
    box: "generic/alma8"
    groups:
      - afs_clients
  ...
```

Molecule Configuration

```
provisioner:
  name: ansible
  playbooks:
    prepare: "/path/to/my/prepare.yml"
    converge: "/path/to/my/converge.yml"
  inventory:
    group_vars:
      all:
        afs_realm: "EXAMPLE.COM"
      afs_fileservers:
        afs_cell: "example.com"
        afs_install_method: "source"
        ...
```

Molecule Configuration

```
verifier:
  name: robotframework
  enabled: true
  group: afs_test
  libraries:
    - robotframework-openafslibrary
  ...
```

Molecule Configuration

```
scenario:
  create_sequence:
    - dependency
    - create
    - prepare
  converge_sequence:
    - dependency
    - create
    - prepare
    - converge
  ...
```

OpenAFS Ansible Collection

A set of Ansible Roles and Modules to deploy OpenAFS.

- Platforms: RHEL (and derviatives), Debian, openSUSE, Solaris
- MIT Kerberos KDC and workstation Roles
- OpenAFS Client and Server Roles
- OpenAFS Modules (tasks)
- Example Playbooks
- Distributed via github and Ansible Galaxy
- Automatically installed by molecule

OpenAFS Installation Methods

OpenAFS Ansible Collection supports a variety of installation methods.

- Install with package manager
- Upload prebuilt packages
- Checkout source code, build, and install
    - git checkout
    - gerrit checkout
    - source tarball
- Installed versions and methods my vary by instance

Molecule Converge Playbook

- Import OpenAFS Collection
- Install and configure Kerberos, generate keys
- Install and configure OpenAFS clients, db servers, fileservers
- Create and mount top-level volumes
- Create initial users and groups

Robot Framework Verification

On instances in the test group:

- Install Robot Framework
- Install required test libraries
- Download Robot Framework test cases (robot files)
- Run specified test cases
- Download report and logs

Running Molecule

```
$ molecule <command> [options]

test         Run full create/verify/destroy cycle

list         List status of instances
create       Start the instances
converge     Configure instances
login        Log in to one instance with ssh
verify       Run automated tests against instances
destroy      Destroy the instances
```

See molecule –help for the complete list.

Debugging Tips

- Check syslog on instances
- Increase verbosity and enable debug output

Example:

```
export ANSIBLE_VERBOSITY=1
export ANSIBLE_STDOUT_CALLBACK=debug
```

Debugging Tips

Dump Ansible variables to files:

```
- run_once: true
  delegate_to: localhost
  copy:
    content: "{{ molecule_yml.driver | to_nice_json }}"
    dest: "/path/to/driver.json"
- run_once: true
  delegate_to: localhost
  copy:
    content: "{{ hostvars | to_nice_json }}"
    dest: "/path/to/hostvars.json"
```

Molecule Challenges

- Molecule documentation is limited.
  - Offset by lots of online material.
- Duplication of yaml in `molecule.yml` files
  - Base configuration files can help
  - Possible to generate files with templates (e.g. Jinja2)
- Only one driver type per scenario
- Driver/Platforms coupling makes it harder to create reusable scenarios
- login command is currently broken (Molecule version 3.6.1)

Getting started

- Install Vagrant and a virtualization provider (e.g., Virtualbox)
- Install Python3, pip3, virtualenv, cookiecutter
- Create a molecule scenario with cookiecutter
- Install molecule and ansible packages with pip3
- Run molecule

Demo: Prereqs

Install Vagrant and provider.

Install Pytyon prereqs:

```
$ sudo apt-get install python3 python3-venv python3-pip
$ python3 -m pip install --user cookiecutter
```

Demo: Create scenario

Create a scenario:

```
$ cookiecutter \
    --directory cookiecutter/testcell-scenario \
    https://github.com/openafs-contrib/openafs-robotest
scenario_name [Untitled]: my-first-scenario
...
```

Demo: Install Molecule

Install Ansible and Molecule in the scenario:

```
$ cd my-first-scenario
$ python3 -m venv venv
$ . venv/bin/activate
(venv) $ pip3 install -r requirements.txt
```

Demo: Spin up a cell

Create a Kerberos Realm and OpenAFS cell:

```
(venv) $ molecule test
```

Acknowledgements

Many thanks

- Ralf Brunckhorst
- Cheyenne Wills
- Mark Vitale
- Marc Schmitt, aka risson

More Info

Ansible Molecule

https://molecule.readthedocs.io/en/latest/

OpenAFS Ansible Collection

https://openafs-ansible-collection.readthedocs.io/en/latest/

OpenAFS RobotTest

https://openafs-robotest.readthedocs.io/en/latest/index.html

Questions?

Thank you