# Managing VMware VMs with Ansible

Jiri Tyr

# About me

- Using Ansible since 2014
- Ansible contributor
  - Modules: `yum_repository`, `jenkins_plugin`, `ldap_attr`, `ldap_entry`
  - Jinja2 filter: `comment`
  - Bug fixing (`mount` module)
  - Code reviews
- Author of more than 100 publicly available Ansible roles
  - https://github.com/jtyr
  - https://galaxy.ansible.com/jtyr

# Why not to use Terraform to manage VMware?

# Why not to use Terraform to manage VMware?

- Terraform is useful but
  - It's not perfect - sometimes rebuilds VMs without any reason
  - It's stateful - infra must be built with it to be able to change it (`import` is not optimal)
  - HCL sucks
    - Too many workarounds to solve simple problems like loops, conditions, variables
    - Leading to inefficiencies and data redundancy
- Ansible is not great either
  - Doesn't support (yet) all features
  - It's not stateful - cannot show what will change (`plan`)
- But ansible can
  - Modify existing VMs (built manually or by another tool)
  - Can build VMs and configure applications using single tool (share metadata)

# What's supported by Ansible?

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- More than 100 VMware modules to manage
  - Guest (VM - disk, NIC, customization, snapshot, vMotion, import/export OVF, ...)
  - Host (ESXi - FW, SSL, NTP, ...)
  - Distributed vSwitch (rules, port groups, ...)
  - Cluster (DRS, HA, ...)
  - Datastore
  - Content library
  - ...

# Explored topics

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- Building VMware templates
- Building VMs from templates

# Building VMware templates

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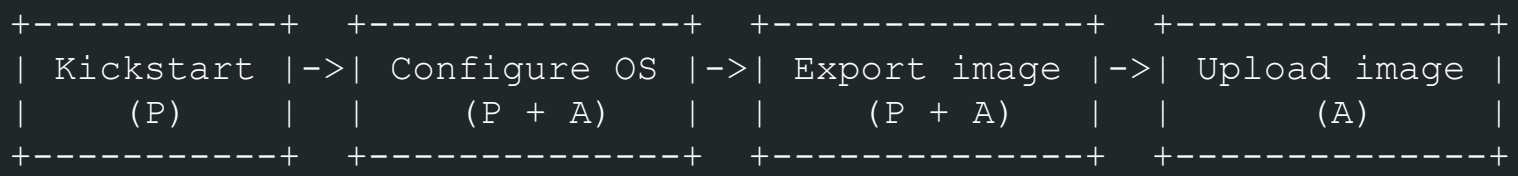
- Using Packer and Ansible glued together with Shell scripts
- Images for VMware (CentOS/RHEL 7/8) and Vagrant (CentOS 7/8)
- Jenkins pipeline per OS version (JJB, Delivery Pipeline Plugin)




- Ansible role vmware_image_upload

# Building VMs from templates

# Building VMs from templates

- Desired actions
  - Build new VM (integration with phpIPAM)
  - Change params (e.g. CPU, RAM) of an existing VM
  - Rebuild VM (keep data disks, MAC)
  - Delete VM
- Challenges
  - Inventory
    - Official Ansible VMware inventory is not very useful
      - No custom groups - groups only for power state and guest ID
      - Inventory not in Git (only in local cache)
  - Automate all the desired actions
    - Ansible role `vmware_vm_provisioning`
    - Contains patched modules
      - `vmware_guest_disk` - PR #63740
      - `vmware_guest` - PR #63741

# Building VMs from templates - inventory

- Custom Python script (`vcenter_dump.py`)
  - To dump vCenter VMs into a YAML file
  - One YAML file per vCenter
  - Files in Git for auditability
  - Updates existing inventory records using name and UUID
  - Reverse lookup for VM's IP
- Custom Ansible Inventory Plugin (`yaml_list_inventory`)
  - To read the data YAML files
  - One plugin instance per vCenter
  - Can be used not only for vCenter
  - Tool to manipulate the inventory (`yamllistctl.py`)
  - Works in conjunction with `yaml_inventory` (custom Ansible Inventory Script)
    - `yaml_inventory` - creates group tree (inheritance)
    - `yaml_list_inventory` - places hosts into the the tree

# Building VMs from templates - inventory

```
# inventory_data/data1.yaml
---
- guest: centos64Guest
  ip: 192.168.1.102
  name: vc1-host01
  state: poweredOn
  uuid: 3ef61642-a703-7b25-d28a-d445487bc19a
- guest: windows8Server64Guest
  ip: 192.168.1.12
  name: vc1-host02
  state: poweredOff
  uuid: 321460b2-2750-52a7-3bc4-0f12526960b7
```

# Building VMs from templates - inventory

```
# inventory_data/data1.yaml
---
- guest: centos64Guest
  ip: 192.168.1.102
  ip_info: manual
  name: vc1-host01
  state: poweredOn
  type: 3rdparty
  uuid: 3ef61642-a703-7b25-d28a-d445487bc19a
- ansible_group: group1
  guest: windows8Server64Guest
  ip: 192.168.1.12
  name: vc1-host02
  state: poweredOff
  uuid: 321460b2-2750-52a7-3bc4-0f12526960b7
```

# Building VMs from templates - inventory

```
# inventory_sources/vcenter1.yaml
---
plugin: yaml_list
data_file: inventory_data/data1.yaml
ungrouped_name: group1
accept:
  - guest: ~^(win|centos|rhel).*
ignore:
  - state: poweredOff
  - ip: null
  - _type: 3rdparty
grouping:
  windows:
    - guest: ~^win

$ ansible-inventory --graph -i  inventory_sources
$ ansible-playbook -l vc1-host01 -i  inventory_sources  site.yaml
```

# Demo

Thank you for your attention!

Questions?