

# Ansible Introduction



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# Ondrej Sika

I'm a freelance DevOps Architect,  
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I'm boosting effectivity & productivity of software development teams by using tools which lead to faster development and reliable operation of software products.



# Open Source DevOps Stack I Do

- Git, Gitlab - Versioning & Collaboration
- Gitlab CI - Continuous Integration, Continuous Deployment
- Docker, Kubernetes - Containers & Orchestration
- Rancher - Kubernetes provisioning
- Terraform - Infrastructure management
- **Ansible** - Config Management
- Prometheus, Alertmanager, Grafana - Monitoring Stack
- EFK (ELK) - Log Management
- DigitalOcean, AWS, Proxmox - Public or Private Cloud
- Ceph - On Premise Storage



# What is Ansible

Ansible is an open-source software provisioning, configuration management, and application-deployment tool.



# Ansible Use Cases

- Server configuration
- Installation of software
- Application Deployment
- Batch Tasks



# Main Ansible Features

- Declarative configuration language
- Git versioned configuration, Collaboration
- Parallel execution / deployment on many servers
- No Agents (just SSH connection)
- Written in Python (not Ruby)
- Absence of state
- Encrypted storage for sensitive data
- Large Community, Ansible Galaxy



# Declarative configuration language

Ansible has own YAML based declarative language.

You can apply configuration as many times as you want and Ansible find and modify actual state of your infrastructure to match your desired state.

You don't have to care about what if it's exist, Ansible do it for you out of the box.



# Git Versioned Configuration

You have all yours configuration on one place in Git repository.

That's easiest way how to collaborate on it. You can make pull request & reviews as well as you know from your code on your configuration.

Ansible supports encryption (Ansible Vault) for your secret data to protect them inside a Git repository.





# Parallel Execution

Ansible run task in parallel on many servers which saves your time and make all updates & deployments faster.

You can execute Ansible manifest as well as own shell scripts.



# No Agent is Required

Ansible don't need an agent running on computer which you want manage.

Ansible requires only SSH connection to that server and Python (3) installed.

Some Ansible modules requires specific Python packages on servers which can be also installed by Ansible. For example Docker module requires "docker" python package, Consul requires "python-consul".



# Written in Python

Written in Python (not Ruby as Puppet, Chef, ...), requires only Python (which is on many Linux distributions by default). Python 3 is preferred.



# Absence of state

Ansible doesn't store state (like Terraform) which resources has been created by Ansible.

If you remove resource from Ansible manifest, Ansible stops taking care of it, keep it in latest version. If you want to remove some resource, you have to say it explicitly.

Absence of state is not only disadvantage. You don't need store & sync critical part of your deployment. Ansible check all requirement on every run.



# Ansible Vault

Ansible Vault is a storage for sensitive data.

You can encrypt any value in any YAML . Also you can encrypt whole file.

You can commit secret data into repository (even public) and be safe no one has access to your secrets.



# Large Community

Ansible is easy to use and widely spread. Ansible has a large community, you can find answer for almost any question.

You can find prepared roles (reusable packages) for many cases like Docker installation or set up of Kubernetes cluster.

You can also create a public role and publish it using Ansible Galaxy.



# Install Ansible

We can install Ansible using Python package manager:

```
pip3 install ansible
```

or

```
pipenv install ansible
```



# Ansible Directory Structure

```
ansible.cfg      # main ansible config
hosts.yml        # inventory (host config)

group_vars/      # group specific variables
host_vars/       # host specific variables

roles/           # your roles

site.yml         # master playbook
web.yml          # playbook for web servers
proxy.yml        # playbook for proxy servers
```





# Inventory

Inventory store all hosts (servers) we want to manage.

You can create groups (eg.: web servers, DB servers) and apply some configuration per group.

Inside the inventory you can set host & groups variables which can be used in playbooks.



# Host & Group Vars

You can store your variables configuration in own YAML files inside ``group_vars`` and ``host_vars`` directories. One file per group or host.



# Playbooks

In you store configuration in playbooks. Playbooks are sets of Ansible task, roles, variables, ... which contains your desired configuration.

You can apply playbook using:

```
ansible-playbook site.yml
```

Default playbook should be ``site.yml``.



# Tasks

Tasks are simple calls of ansible modules executed inside of playbooks.

Tasks are minimal executable units in Ansible.

There task for install package, copy file, crete file from template, start systemd, run a Docker container, ...



# Handlers

Handlers are very similar to tasks, but they are executed only on updates of specific tasks.

If you for example update Nginx configuration, you want to restart it. If not, you want to keep it running.



# Roles

Ansible role is an independent component which allows reuse of common configuration steps. You can write own roles (store in `roles/`` directory) or you can use roles from Ansible Galaxy.



# Role Directory Structure

```
common/      # role directory
  tasks/     # ansible tasks
  handlers/  # ansible handlers
  templates/ # jinja2 Templates
  files/     # role files
  vars/      # role variables
  defaults/  # default variables
  meta/      # dependencies & Galaxy config
```



# sika.link/ansible





# Thank you & Questions

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