# Ansible

- **Installing Ansible on Ubuntu machine (Depends on O.S that you are using):**

  https://docs.ansible.com/ansible/latest/installation_guide/installation_distros.html#installing-ansible-on-debian

  **To check whether ansible has installed or not** :

  => ansible --version (Output would be):

ansible [core 2.17.13]

config file = /etc/ansible/ansible.cfg

configured module search path = ['/home/ambikac/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']

ansible python module location = /usr/lib/python3/dist-packages/ansible

ansible collection location = /home/ambikac/.ansible/collections:/usr/share/ansible/collections

executable location = /usr/bin/ansible

python version = 3.11.2 (main, Apr 28 2025, 14:11:48) [GCC 12.2.0] (/usr/bin/python3)

jinja version = 3.1.2

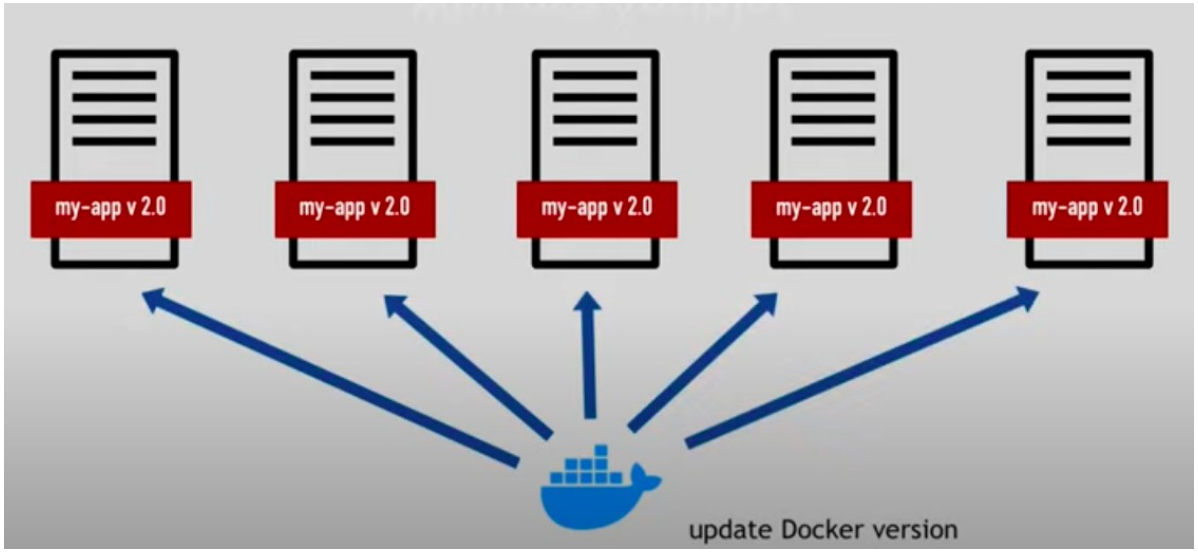
libyaml = True

- **What is Ansible ?**

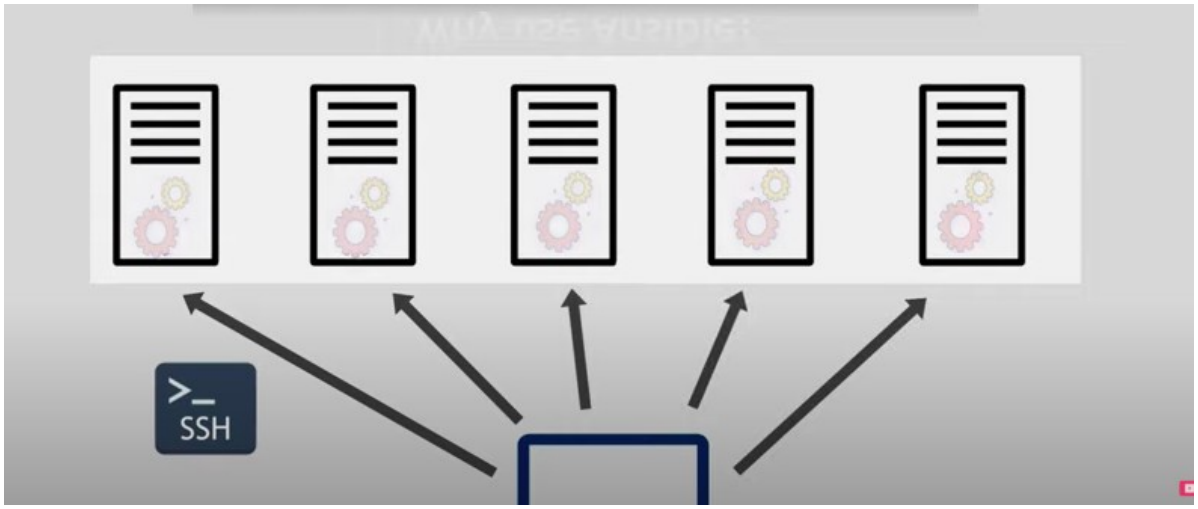
  Ansible is an open-source automation tool that reduces complexity, using playbooks to automate tasks and ensures a desired system state. It uses SSH for remote access.

- **Why use Ansible?**

  - Let us consider , we have 5 servers and need to update docker version on each of the servers .




- If we perform this task without using Ansible , we need to do repeatative tasks like updates, create user, system reboots, backups, and etc on each of the servers which is very time consuming.




- Now Ansible comes and makes these different scenarios much more efficient and less time consuming by :

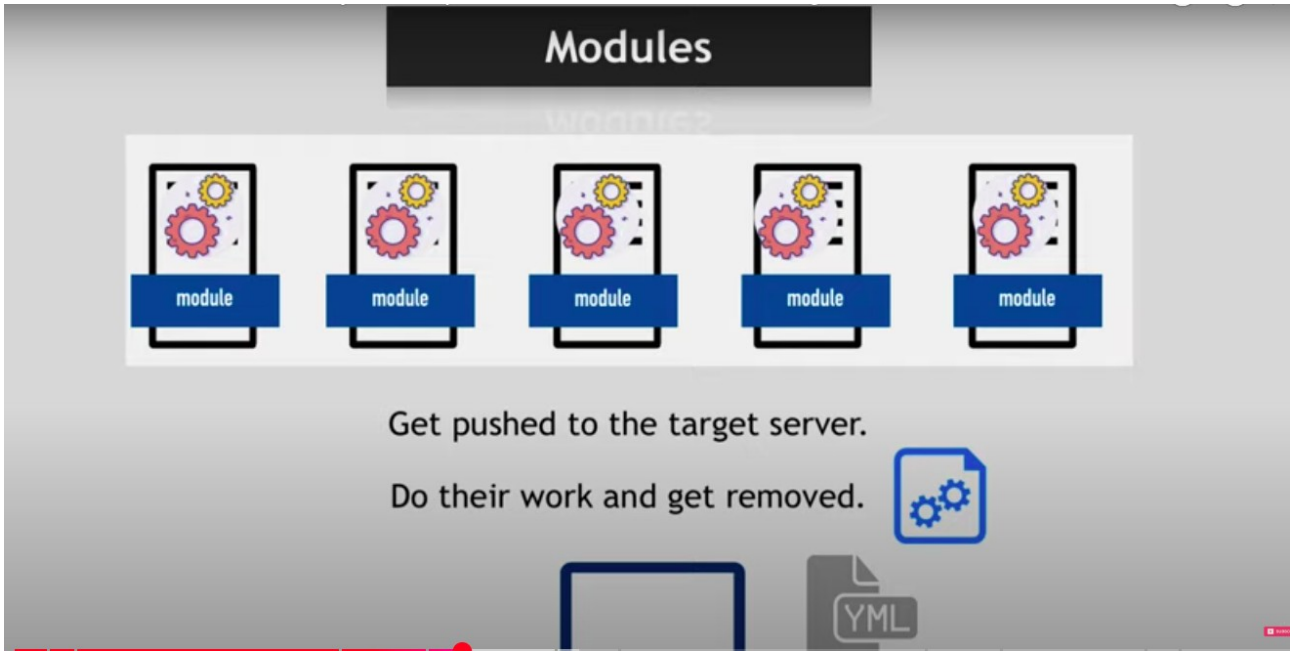
    1. Execute tasks from your own machine (Instead of SSH into all remote servers).
    2. Confighuration/Installation/Deployment steps in a singleYAML file.
    3. Re- use same file multiple times on different environments.
    4. More reliable and less likely for errors.
    5. It supports all infrastructures from O.S to different cloud providers.

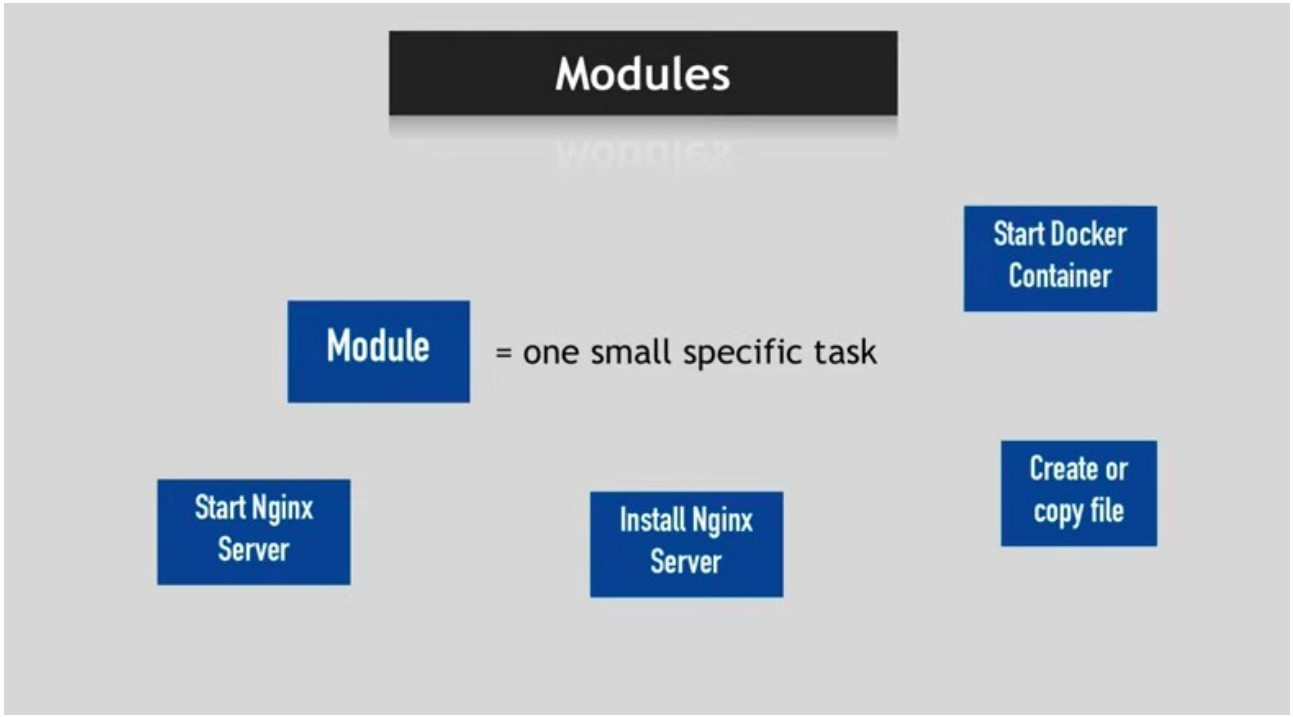
**Note:** Ansible is agentless i.e no deployment effort in beginning and no upgrade effort.

- **Modules:**

Ansible works with modules. Module is a small programs that do the actual tasks.

They get pushed from **control machine** to t**arget servers ,** perform specific work and get removed.



- **What is Ansible Playbook?**

  An Ansible Playbook is a file, written in YAML (Yet Another Markup Language), that serves as a blueprint for automation tasks in Ansible. It defines a series of instructions that Ansible will execute on remote hosts or managed nodes.

  Example:

```
- name: Install and start nginx on webservers
  hosts: webservers
  become: yes  # run with sudo
  tasks:
    - name: Install nginx
      apt:
        name: nginx
        state: present
        update_cache: yes
    - name: Ensure nginx is running
      service:
        name: nginx
        state: started
        enabled: yes
```

  **Explainatons:**

  **hosts:** Defines which machines to run this play on (from inventory).

  **tasks:** Each step (like "install nginx", "start nginx").

  **modules:** (`apt`, `service`) are used to perform actual work.

  **become:** Runs with root privileges if needed.

- **What is inventory file ?**

  An Ansible inventory file is a core component of Ansible, serving as a centralized list or catalog of the hosts (servers, devices, etc.) that Ansible will manage. It defines where Ansible should connect and execute its automation tasks.

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**Key characteristics of an Ansible inventory file:**

- Host Definition: It lists the individual hosts by their hostname or IP address.
- Grouping: It allows for organizing hosts into logical groups based on shared characteristics (e.g.,webservers, databases, development, production). This enables targeting specific subsets of hosts for automation.
- Variables:It can include variables specific to hosts or groups, such as connection parameters (e.g., ansible_user, ansible_ssh_private_key_file), or other configuration details.
- Formats: It is commonly written in INI or YAML format.

**Types of inventory file:**

- Static Inventory: A manually created file with a fixed list of hosts and groups, suitable for stable environments.
- Dynamic Inventory: A script or plugin that dynamically generates the inventory by querying external sources like cloud providers (AWS, GCP), configuration management databases, or other APIs.This is useful in dynamic environments where hosts are frequently added or removed.

**Location:**

- By default, Ansible looks for the inventory file at /etc/ansible/hosts, but a custom location can be specified using the -i flag or in the ansible.cfg configuration file.