**What is the Ansible Inventory?**

* The **Ansible Inventory** is a core component of Ansible that acts as a **centralized catalog** of all the hosts, servers, and devices managed within an IT infrastructure.
* Typically written in **INI or YAML format**, it includes essential details like IP addresses, domain names, and connection settings.

**Primary Terminologies in Ansible Inventory**

1. **Inventory**: A file listing all the hosts (servers/devices) Ansible can manage. It defines the infrastructure for automation.
2. **Hosts**: These are individual systems that Ansible connect and controls using its modules.
3. **Groups**: Logical collections of hosts sharing similar traits (e.g., webservers, databases). A host can belong to multiple groups, enabling efficient task targeting and organization.
4. **Variables**: Custom values used to control behavior and configuration. They can be defined globally, at group level, or per host, and support various data types.

**Terminologies:**

1. **Control Node:** A system on which the tool is installed
2. **Managed Node:** A system that is controlled by a control node using Ansible
3. **Playbook:** A file written in YAML which is used to automate configuration
4. **Inventory:** A file where the managed nodes are grouped according to need and are important so that Ansible can essentially differentiate between the various systems.

**1. Inventory Files in Ansible**

* In Ansible, inventory files are fundamental components used to define the hosts (nodes) on which Ansible will run tasks or playbooks.
* They act as the source of truth for the infrastructure under management, specifying groups of hosts, IP addresses, hostnames, and even custom variables related to each host or group.
* Without an inventory file, Ansible wouldn't know *where* to run the automation tasks.

**2. Key Purposes of Inventory Files**

* **List of Managed Nodes**: Defines the servers you want to automate.
* **Group Hosts**: Hosts can be grouped (e.g., webservers, dbservers) for targeted automation.
* **Host Variables**: You can define specific variables per host (e.g., ansible\_user, ansible\_port).
* **Group Variables**: Variables can be defined at the group level for shared configurations.
* **Scalability**: Easily manage hundreds or thousands of hosts using dynamic inventory sources.

**3. Types of Inventory files:**

**1. Static Inventory:** A manually created file that lists all the hosts and groups of hosts in a fixed format (INI or YAML). It does not change unless updated by the user.

**2. Dynamic Inventory:** An automatically generated inventory that fetches the list of hosts from external sources like cloud providers or databases using scripts or plugins at runtime.

**4. Structure of a Static Inventory File (INI Format):**

[webservers]

web1.example.com

web2.example.com

**[dbservers]**

db1.example.com ansible\_user=admin ansible\_port=2222

**[all:vars]**

ansible\_python\_interpreter=/usr/bin/python3

**Explanation:**

* [webservers]: A group of web server hosts.
* web1.example.com, web2.example.com: Hostnames or IPs of web servers.
* [dbservers]: A group of database servers with specific user and port.
* [all:vars]: Global variables applied to all hosts.

**5. Running an Ansible Command Using Inventory**

**ansible all -i inventory.ini -m ping**

* all: Target all groups/hosts in inventory.
* -i inventory.ini: Specifies the inventory file.
* -m ping: Uses the ping module to check connectivity.

**6. YAML Format Inventory (host.yml)**

**all:**

**children:**

**webservers:**

**hosts:**

web1.example.com:

web2.example.com:

**dbservers:**

**hosts:**

db1.example.com:

ansible\_user: admin

ansible\_port: 2222

**vars:**

ansible\_python\_interpreter: /usr/bin/python3

Ansible supports YAML format as it's more readable and structured.

**7. Creating and Using an Inventory File – Step-by-Step Example**

**Step 1: Create inventory.ini**

[web]

192.168.1.10

192.168.1.11

**[db]**

192.168.1.20 ansible\_user=postgres ansible\_port=5433

**Step 2: Write a Simple Playbook (e.g., install\_nginx.yml)**

**- name: Install Nginx on Web Servers**

**hosts: web**

**become: yes**

**tasks:**

**-** name: Install nginx

**apt:**

name: nginx

state: present

**Step 3: Run the Playbook**

**ansible-playbook -i inventory.ini install\_nginx.yml**

**This command will:**

* Read hosts from inventory.ini
* Connect to web group
* Install nginx using apt module

**8. Advantages of Using Inventory Files**

* **Modular and Reusable:** Easily modify and reuse across projects.
* **Custom Configurations:** Assign different settings to different hosts.
* **Group Management:** Simplifies running tasks on a subset of machines.
* **Automation at Scale:** Easily manage complex infrastructure using inventory groups.