🧪Lab 1 & Lab 2 — Install & Configure Ansible on a 3-Node Ubuntu/Amazon Linux Cluster

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🕐Learning Objectives

By the end of this lab, you will be able to: - Understand what Ansible is and why it is used - Set up a 3-node Ansible cluster (1 Master + 2 Managed Nodes) - Install Ansible on Ubuntu and Amazon Linux 2 - Configure inventory, ansible.cfg, passwordless SSH, and sudo access - Validate end-to-end connectivity using Ansible ad-hoc commands

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🗜️Learning Outcomes

After completing this lab, you will confidently: - Install and verify Ansible - Manage hosts using static inventory - Configure a non-root automation user (ansible) - Enable SSH-based trust authentication between master and nodes - Run your first Ansible command successfully

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🧰1. What Is Ansible?

Ansible is an **IT automation tool** used for: - Configuration Management - Application Deployment - Orchestration - Multi-node execution/automation

It is **agentless**, meaning no software needs to be installed on target servers—only SSH access is required.

🕯️ Why Do We Need Ansible?

- Reduce manual server configuration
- Maintain consistent environments
- Automate deployments
- Manage 100s/1000s of servers easily
- Improve reliability and reduce human errors

🖥️ Environment Setup

We will use a **3-node cluster**: - **Master Node (Control Node)** – where Ansible runs - **Node 1 & Node 2** – managed hosts

All nodes are: - Ubuntu or Amazon Linux 2 - Same network/subnet - SSH reachable

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🪙SECTION A — Install Ansible on Amazon Linux 2 (Master Node)

Perform these steps **ONLY on the Master node**.

🛠️Step 1 — Update System

```
sudo yum update -y
```

🛠️Step 2 — Enable EPEL Repository

```
sudo amazon-linux-extras install epel -y
sudo yum update -y
```

🛠️Step 3 — Install Required Packages

```
sudo yum install git python python-libs python-pip -y
sudo yum install ansible -y
sudo yum install openssl -y
sudo yum update -y
clear
```

🛠️Step 4 — Verify Installation

```
ansible --version
```

🏛️SECTION B — Configure Ansible Inventory on Amazon Linux (Master Node)

Edit inventory file:

```
sudo vi /etc/ansible/hosts
```

Add:

```
[dev]
172.31.44.103 ansible_python_interpreter=/usr/bin/python3
172.31.38.223 ansible_python_interpreter=/usr/bin/python3
```

🛠️Step 5 — Update ansible.cfg

```
sudo vi /etc/ansible/ansible.cfg
```

Uncomment: - inventory - sudo_user

SECTION C — Create Ansible User on All 3 Machines

Run this on **Master + Node1 + Node2**:

```
sudo adduser ansible
sudo passwd ansible
```

Switch user:

```
su - ansible
```

Try installing a package (optional test):

```
sudo yum install tree -y
```

Exit user:

```
exit
```

🔐SECTION D — Give Passwordless Sudo to ansible User (ALL Machines)

Run:

```
sudo visudo
```

Add line:

```
ansible ALL=(ALL) NOPASSWD: ALL
```

🔑SECTION E — Enable SSH Password Authentication (All Machines)

```
sudo vi /etc/ssh/sshd_config
```

Enable:

```
PermitRootLogin yes
PasswordAuthentication yes
#PermitEmptyPasswords no
#PasswordAuthentication no
```

Restart SSH:

```
sudo service sshd restart
```

🔦SECTION F — Configure Passwordless SSH (Master → Nodes)

Login as ansible user on Master:

```
su - ansible
```

Generate SSH key:

```
ssh-keygen
```

Copy keys to both nodes:

```
ssh-copy-id ansible@172.31.38.223
ssh-copy-id ansible@172.31.44.103
```

Test:

```
ssh ansible@172.31.38.223
ssh ansible@172.31.44.103
```

🪠SECTION G — Install Ansible on Ubuntu (Alternative Setup)

Perform these steps ONLY on Master node if running Ubuntu.

🛠️Step 1 — Update System

```
sudo apt update -y && sudo apt upgrade -y
```

🛠️Step 2 — Install Required Packages

```
sudo apt install software-properties-common -y
sudo add-apt-repository --yes --update ppa:ansible/ansible
```

```
sudo apt install ansible -y
sudo apt install python3 python3-pip git openssl -y
```

🛠️Step 3 — Verify

```
ansible --version
```

🛠️Step 4 — Create `ansible` User on All Machines

```
sudo adduser ansible
sudo passwd ansible
```

Grant sudo:

```
sudo visudo
```

Add:

```
ansible ALL=(ALL) NOPASSWD: ALL
```

🛠️Step 5 — Enable SSH Password Login

```
sudo nano /etc/ssh/sshd_config
```

Modify:

```
PasswordAuthentication yes
PermitRootLogin yes
```

Restart service:

```
sudo systemctl restart ssh
```

🛠️Step 6 — Setup Passwordless SSH (Master Only)

```
su - ansible
ssh-keygen
ssh-copy-id ansible@NODE1_PRIVATE_IP
ssh-copy-id ansible@NODE2_PRIVATE_IP
```

👙 Lab Verification

Run this from master:

```
ansible dev -m ping
```

Expected:

```
172.31.44.103 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
```

🔗Congratulations!

You have successfully: - Installed Ansible - Configured inventory - Created automation user - Enabled passwordless SSH - Validated cluster communication

You are now ready for **Lab 3: Ad-hoc commands & gathering facts** 🚀