
1. Introduction to Ansible

- **What is Ansible?**

- Overview of Ansible and its role in automation
- Configuration management vs orchestration vs provisioning
- Benefits of using Ansible for automation

- **Ansible Architecture**

- Ansible's agentless architecture (SSH-based communication)
- Inventory (static and dynamic)
- Control Node vs Managed Nodes
- How Ansible works (Modules, Playbooks, Tasks, Variables, etc.)

- **Setting Up Ansible**

- Installing Ansible on various platforms (Linux, macOS, Windows)
- Verifying installation (`ansible --version`)
- Configuring Ansible (ansible.cfg, inventory)
- Understanding the inventory structure (INI format, YAML format)

2. Ansible Basics

- **Understanding Inventory Files**

- Static inventory file format (INI-style)
- Dynamic inventory and writing custom scripts
- Organizing hosts in groups and variables

- **Ad-Hoc Commands**

- Running ad-hoc commands using `ansible` command
- Common ad-hoc command examples: `ping` , `shell` , `copy` , `service`

- Debugging with `ansible -m debug`
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3. Ansible Playbooks

- **Introduction to Playbooks**

- What is a Playbook? (YAML format)
- Understanding Plays, Tasks, and Hosts
- Writing and Running Playbooks (`ansible-playbook`)
- Basic structure of a Playbook (hosts, tasks, vars, handlers)

- **Tasks and Modules**

- Using Ansible modules in Playbooks
- Common modules: `command` , `shell` , `copy` , `template` , `file` , `package` , `service`
- Task execution flow (serial, parallel, retries)

- **Variables and Facts**

- Defining variables in Playbooks (`vars` , `vars_files`)
- Using built-in facts and custom facts
- Accessing variables within Playbooks (`{{ variable_name }}`)
- Registering variables from tasks and using them later

- **Conditionals and Loops**

- Using `when` for conditional execution of tasks
 - Using loops (`with_items` , `loop` , `with_dict`)
 - Handling loops with `loop_control` (e.g., `index` , `item`)
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4. Ansible Templates and Files

- **Using Jinja2 Templates**

- What is Jinja2 and how it integrates with Ansible
- Creating and using template files (`.j2` files)

- Substituting variables and logic in templates
 - **File Management**
 - Managing files with the `copy`, `template`, and `fetch` modules
 - Working with directories and permissions (`file`, `stat`, `acl`)
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5. Ansible Handlers and Notifications

- **Handlers**
 - What are Handlers? (Special tasks that only run when notified)
 - Creating Handlers in Playbooks
 - Notifying Handlers (`notify`, `triggered`)
 - Use cases for handlers (e.g., restarting a service after a configuration change)
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6. Ansible Vault and Security

- **Using Ansible Vault**
 - Introduction to Ansible Vault for encrypting sensitive data
 - Creating and editing encrypted files with `ansible-vault`
 - Encrypting and decrypting Playbooks and variable files
 - Using Vault variables in Playbooks
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7. Ansible Advanced Features

- **Ansible Facts and Dynamic Variables**
 - Using system facts to gather information from managed nodes
 - Writing custom dynamic facts and using them
 - Using `gather_facts` in Playbooks

- **Ansible Lookup Plugins**

- Introduction to Lookup Plugins
- Common Lookup Plugins: `file`, `env`, `password`, `pipe`, `query`
- Using Lookups in Playbooks to fetch data or files

- **Ansible Filters**

- Introduction to Filters in Ansible (Jinja2 Filters)
 - Common Filters: `default`, `selectattr`, `map`, `json_query`
 - Using filters to modify and format data in Playbooks
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8. Ansible Error Handling and Debugging

- **Error Handling in Ansible**

- Conditional execution with `when` and `when not`

- **Debugging Playbooks**

- Debugging tasks with the `debug` module
 - Verbose output (`v`, `vv`, `vvv`)
 - Checking Playbook syntax using `ansible-playbook --syntax-check`
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