# \*\*Study Material: Day 6 - Ansible Variables and Variable Precedence\*\*

---

## \*\*Table of Contents\*\*

1. \*\*Introduction to Ansible Variables\*\*

- What are Ansible Variables?

- Why Use Variables?

2. \*\*Types of Variables in Ansible\*\*

- Playbook Variables

- Inventory Variables

- Role Variables

- Host Variables

- Group Variables

- Extra Variables

3. \*\*Variable Precedence\*\*

- Understanding Variable Precedence

- Precedence Hierarchy

4. \*\*Using Variables in Playbooks\*\*

- Example: Using Variables in a Playbook

- Best Practices for Using Variables

5. \*\*Conclusion and Next Steps\*\*

---

## \*\*1. Introduction to Ansible Variables\*\*

### \*\*What are Ansible Variables?\*\*

Variables in Ansible are used to store values that can be reused throughout your playbooks, roles, and inventory. They make your playbooks more flexible and reusable.

### \*\*Why Use Variables?\*\*

- \*\*Reusability\*\*: Variables allow you to reuse values across multiple playbooks and roles.

- \*\*Flexibility\*\*: Variables make it easy to customize playbooks for different environments.

- \*\*Maintainability\*\*: Using variables makes your playbooks easier to maintain and update.

---

## \*\*2. Types of Variables in Ansible\*\*

### \*\*Playbook Variables\*\*

- Defined within a playbook using the `vars` keyword.

- Example:

```yaml

- hosts: all

vars:

http\_port: 80

tasks:

- name: Ensure Apache is installed

apt:

name: apache2

state: present

```

### \*\*Inventory Variables\*\*

- Defined in the inventory file for specific hosts or groups.

- Example:

```ini

[webservers]

web1.example.com http\_port=80

web2.example.com http\_port=8080

```

### \*\*Role Variables\*\*

- Defined within a role in the `vars` directory.

- Example:

```yaml

# roles/web\_server/vars/main.yml

http\_port: 80

```

### \*\*Host Variables\*\*

- Defined for specific hosts in the inventory file.

- Example:

```ini

[webservers]

web1.example.com http\_port=80

web2.example.com http\_port=8080

```

### \*\*Group Variables\*\*

- Defined for groups of hosts in the inventory file.

- Example:

```ini

[webservers:vars]

http\_port=80

```

### \*\*Extra Variables\*\*

- Defined at runtime using the `--extra-vars` option.

- Example:

```bash

ansible-playbook -i inventory.ini playbook.yml --extra-vars "http\_port=8080"

```

---

## \*\*3. Variable Precedence\*\*

### \*\*Understanding Variable Precedence\*\*

Variable precedence determines which value is used when the same variable is defined in multiple places. Ansible follows a specific hierarchy to resolve variable precedence.

### \*\*Precedence Hierarchy\*\*

1. \*\*Extra Variables\*\*: Highest precedence.

2. \*\*Playbook Variables\*\*: Defined in the playbook using `vars`.

3. \*\*Role Variables\*\*: Defined in the `vars` directory of a role.

4. \*\*Inventory Variables\*\*: Defined in the inventory file.

5. \*\*Host Variables\*\*: Defined for specific hosts in the inventory file.

6. \*\*Group Variables\*\*: Defined for groups of hosts in the inventory file.

7. \*\*Role Defaults\*\*: Defined in the `defaults` directory of a role. Lowest precedence.

---

## \*\*4. Using Variables in Playbooks\*\*

### \*\*Example: Using Variables in a Playbook\*\*

```yaml

---

- name: Configure Web Server

hosts: webservers

vars:

http\_port: 80

tasks:

- name: Ensure Apache is installed

apt:

name: apache2

state: present

- name: Configure Apache to listen on the specified port

lineinfile:

path: /etc/apache2/ports.conf

regexp: '^Listen '

line: 'Listen {{ http\_port }}'

state: present

notify: Restart Apache

handlers:

- name: Restart Apache

service:

name: apache2

state: restarted

```

### \*\*Best Practices for Using Variables\*\*

- \*\*Use Descriptive Names\*\*: Use meaningful names for variables to make your playbooks easier to understand.

- \*\*Avoid Hardcoding\*\*: Use variables instead of hardcoding values in your playbooks.

- \*\*Use Defaults\*\*: Define default values for variables in the `defaults` directory of a role.

- \*\*Document Variables\*\*: Document the purpose and usage of variables in the `README.md` file of your role.

---

## \*\*5. Conclusion and Next Steps\*\*

### \*\*What We Learned\*\*

- \*\*Ansible Variables\*\*: Used to store values that can be reused throughout your playbooks, roles, and inventory.

- \*\*Types of Variables\*\*: Playbook variables, inventory variables, role variables, host variables, group variables, and extra variables.

- \*\*Variable Precedence\*\*: Determines which value is used when the same variable is defined in multiple places.

- \*\*Using Variables in Playbooks\*\*: Example of using variables to configure a web server.

### \*\*Next Steps\*\*

- \*\*Day 7\*\*: Advanced variable techniques, including using `set\_fact` and `register`.

- \*\*Day 8\*\*: Using Ansible for configuration management and deployment.

---

## \*\*Images and Tables\*\*

### \*\*Variable Precedence Hierarchy\*\*

1. \*\*Extra Variables\*\*

2. \*\*Playbook Variables\*\*

3. \*\*Role Variables\*\*

4. \*\*Inventory Variables\*\*

5. \*\*Host Variables\*\*

6. \*\*Group Variables\*\*

7. \*\*Role Defaults\*\*

### \*\*Example Playbook Using Variables\*\*

```yaml

---

- name: Configure Web Server

hosts: webservers

vars:

http\_port: 80

tasks:

- name: Ensure Apache is installed

apt:

name: apache2

state: present

- name: Configure Apache to listen on the specified port

lineinfile:

path: /etc/apache2/ports.conf

regexp: '^Listen '

line: 'Listen {{ http\_port }}'

state: present

notify: Restart Apache

handlers:

- name: Restart Apache

service:

name: apache2

state: restarted

```

---

## \*\*References\*\*

- [Ansible Documentation](https://docs.ansible.com/)

- [Ansible Variables Guide](https://docs.ansible.com/ansible/latest/user\_guide/playbooks\_variables.html)

- [Ansible Variable Precedence](https://docs.ansible.com/ansible/latest/user\_guide/playbooks\_variables.html#variable-precedence)

---

This study material provides a comprehensive guide to Ansible variables, including types of variables, variable precedence, and best practices. It is designed to help you understand the core concepts and apply them in real-world scenarios.  
  
  
  
  
**Study Material: Day 6 - Ansible Variables and Variable Precedence**

**Table of Contents**

1. **Introduction to Ansible Variables**
   * What are Ansible Variables?
   * Why Use Variables?
2. **Types of Variables in Ansible**
   * Playbook Variables
   * Inventory Variables
   * Role Variables
   * Host Variables
   * Group Variables
   * Extra Variables
3. **Variable Precedence**
   * Understanding Variable Precedence
   * Precedence Hierarchy
4. **Using Variables in Playbooks**
   * Example: Using Variables in a Playbook
   * Best Practices for Using Variables
5. **Conclusion and Next Steps**

**1. Introduction to Ansible Variables**

**What are Ansible Variables?**

Variables in Ansible are used to store values that can be reused throughout your playbooks, roles, and inventory. They make your playbooks more flexible and reusable.

**Why Use Variables?**

* **Reusability**: Variables allow you to reuse values across multiple playbooks and roles.
* **Flexibility**: Variables make it easy to customize playbooks for different environments.
* **Maintainability**: Using variables makes your playbooks easier to maintain and update.

**2. Types of Variables in Ansible**

**Playbook Variables**

* Defined within a playbook using the vars keyword.
* Example:
* - hosts: all
* vars:
* http\_port: 80
* tasks:
* - name: Ensure Apache is installed
* apt:
* name: apache2
* state: present

**Inventory Variables**

* Defined in the inventory file for specific hosts or groups.
* Example:
* [webservers]
* web1.example.com http\_port=80
* web2.example.com http\_port=8080

**Role Variables**

* Defined within a role in the vars directory.
* Example:
* # roles/web\_server/vars/main.yml
* http\_port: 80

**Host Variables**

* Defined for specific hosts in the inventory file.
* Example:
* [webservers]
* web1.example.com http\_port=80
* web2.example.com http\_port=8080

**Group Variables**

* Defined for groups of hosts in the inventory file.
* Example:
* [webservers:vars]
* http\_port=80

**Extra Variables**

* Defined at runtime using the --extra-vars option.
* Example:
* ansible-playbook -i inventory.ini playbook.yml --extra-vars "http\_port=8080"

**3. Variable Precedence**

**Understanding Variable Precedence**

Variable precedence determines which value is used when the same variable is defined in multiple places. Ansible follows a specific hierarchy to resolve variable precedence.

**Precedence Hierarchy**

1. **Extra Variables**: Highest precedence.
2. **Playbook Variables**: Defined in the playbook using vars.
3. **Role Variables**: Defined in the vars directory of a role.
4. **Inventory Variables**: Defined in the inventory file.
5. **Host Variables**: Defined for specific hosts in the inventory file.
6. **Group Variables**: Defined for groups of hosts in the inventory file.
7. **Role Defaults**: Defined in the defaults directory of a role. Lowest precedence.

**4. Using Variables in Playbooks**

**Example: Using Variables in a Playbook**

---

- name: Configure Web Server

hosts: webservers

vars:

http\_port: 80

tasks:

- name: Ensure Apache is installed

apt:

name: apache2

state: present

- name: Configure Apache to listen on the specified port

lineinfile:

path: /etc/apache2/ports.conf

regexp: '^Listen '

line: 'Listen {{ http\_port }}'

state: present

notify: Restart Apache

handlers:

- name: Restart Apache

service:

name: apache2

state: restarted

**Best Practices for Using Variables**

* **Use Descriptive Names**: Use meaningful names for variables to make your playbooks easier to understand.
* **Avoid Hardcoding**: Use variables instead of hardcoding values in your playbooks.
* **Use Defaults**: Define default values for variables in the defaults directory of a role.
* **Document Variables**: Document the purpose and usage of variables in the README.md file of your role.

**5. Conclusion and Next Steps**

**What We Learned**

* **Ansible Variables**: Used to store values that can be reused throughout your playbooks, roles, and inventory.
* **Types of Variables**: Playbook variables, inventory variables, role variables, host variables, group variables, and extra variables.
* **Variable Precedence**: Determines which value is used when the same variable is defined in multiple places.
* **Using Variables in Playbooks**: Example of using variables to configure a web server.

**Next Steps**

* **Day 7**: Advanced variable techniques, including using set\_fact and register.
* **Day 8**: Using Ansible for configuration management and deployment.

**Images and Tables**

**Variable Precedence Hierarchy**

1. **Extra Variables**
2. **Playbook Variables**
3. **Role Variables**
4. **Inventory Variables**
5. **Host Variables**
6. **Group Variables**
7. **Role Defaults**

**Example Playbook Using Variables**

---

- name: Configure Web Server

hosts: webservers

vars:

http\_port: 80

tasks:

- name: Ensure Apache is installed

apt:

name: apache2

state: present

- name: Configure Apache to listen on the specified port

lineinfile:

path: /etc/apache2/ports.conf

regexp: '^Listen '

line: 'Listen {{ http\_port }}'

state: present

notify: Restart Apache

handlers:

- name: Restart Apache

service:

name: apache2

state: restarted

**References**

* [Ansible Documentation](https://docs.ansible.com/)
* [Ansible Variables Guide](https://docs.ansible.com/ansible/latest/user_guide/playbooks_variables.html)
* [Ansible Variable Precedence](https://docs.ansible.com/ansible/latest/user_guide/playbooks_variables.html#variable-precedence)

This study material provides a comprehensive guide to Ansible variables, including types of variables, variable precedence, and best practices. It is designed to help you understand the core concepts and apply them in real-world scenarios.