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ansible by red hat

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Introduction

In today's fast moving IT landscape, automation is no longer a luxury—it's a necessity. From provisioning servers to configuring applications, the speed and consistency that automation brings can dramatically reduce manual errors and accelerate delivery cycles. Among the many automation frameworks available, **ansible by red hat**stands out as a powerful, open source tool that has evolved into a full featured automation platform. This article dives deep into what makes Ansible by Red Hat a game changer, explores its architecture, showcases real world use cases, and provides practical guidance for getting started.

What is Ansible by Red /Hat?

Ansible, originally created by Michael DeHaan in 2012, was acquired by Red /Hat in 2015. Since then, Red /Hat has expanded the project into the **Ansible Automation Platform**, a commercial offering that adds enterprise grade features such as role based access control, workflow orchestration, and a web UI. At its core, Ansible is a **configuration management** and **IT automation** tool that uses simple, human readable YAML files called **playbooks** to describe desired system states.

Core Concepts and Architecture

Inventory

The inventory is the first point of contact between Ansible and the target machines. It can be a static INI file, a dynamic script that pulls hosts from cloud APIs, or an external inventory source like Red Hat Satellite. The inventory defines groups, variables, and host relationships.

Playbooks

Playbooks are YAML documents that map **plays** to **tasks**. Each play targets a group of hosts and specifies a set of actions to perform. Playbooks are idempotent—running them multiple times results in the same state, which is essential for reliable automation.

Modules

Modules are the building blocks that perform the actual work. Ansible ships with hundreds of modules for Linux, Windows, cloud providers, networking devices, and more. Custom modules can be written in any language that returns JSON.

Roles

Roles encapsulate reusable configurations. They separate variables, tasks, handlers, templates, and files into a consistent directory structure, enabling modular, shareable code.

Handlers

Handlers are special tasks that run only when notified by another task. They're typically used for service restarts or reloading configuration files.

Variables

Variables in Ansible can come from inventory, playbooks, role defaults, or external sources like Vault. They allow dynamic customization of playbooks across environments.

Facts

Facts are automatically collected system information (e.g., OS version, memory size). They can be leveraged in conditional logic within playbooks.

Red /Hat Ansible Automation Platform

While the open source Ansible engine remains powerful, the **Ansible Automation Platform** brings additional enterprise features:

- Ansible Tower – a web UI, REST API, and RBAC system for managing playbooks, inventories, and job templates.
- Workflow Editor – visual orchestration of complex, multi step automation pipelines.
- Smart Inventory – dynamic inventories that automatically sync with cloud providers.
- Role Based Access Control – granular permissions for users and teams.
- Insights and Analytics – real time monitoring of job execution and compliance reporting.
- Integration with Red /Hat Satellite, OpenShift, and other Red /Hat products.

Why Choose Ansible by Red /Hat?

Human Readable Syntax

YAML is intuitive and requires no special programming knowledge. This lowers the learning curve for operations teams and encourages collaboration across DevOps and IT.

Agentless Architecture

Ansible uses SSH (or WinRM for Windows) to communicate with target hosts, eliminating the need to install agents on every machine.

Extensibility

With a rich ecosystem of modules, roles, and collections, Ansible can manage anything from bare metal servers to cloud resources, containers, and network devices.

Idempotency

Playbooks ensure that running a configuration multiple times produces the same outcome, which is critical for repeatable deployments.

Strong Community and Commercial Support

Red Hat's backing guarantees long term stability, regular updates, and professional support, while the open source community contributes thousands of roles and best practice playbooks.

Common Use Cases

Infrastructure Provisioning

Automate the creation of virtual machines across AWS, Azure, or GCP using Ansible modules like ec2 or azure_rm_virtualmachine. Combine with Terraform for infrastructure as code, then use Ansible for post provisioning configuration.

Application Deployment

Deploy web applications, microservices, or containerized workloads. Ansible can pull code from Git, build Docker images, push them to registries, and orchestrate Kubernetes deployments.

Configuration Management

Enforce system settings, manage packages, and maintain consistent configuration across fleets of servers.

Compliance and Security Hardening

Use Ansible to apply security baselines, patch systems, and enforce compliance frameworks such as CIS or HIPAA.

Network Automation

Configure switches, routers, and firewalls using vendor specific modules (e.g., Cisco, Juniper, Arista). Automate firmware upgrades and policy updates.

Hybrid Cloud Orchestration

Integrate on premise infrastructure with cloud resources, enabling seamless scaling and cost optimization.

Getting Started: A Step by Step Guide

Prerequisites

1. Python 3.8+ installed on the control node.
2. SSH access to target hosts.
3. Optional: Red /Hat Satellite or Ansible Tower for enterprise features.

Installation

For the open source version, run:

- sudo dnf install ansible on RHEL/CentOS.
- sudo apt install ansible on Debian/Ubuntu.

For the Automation Platform, follow Red Hat’s official installation guide, which includes installing Ansible Tower and configuring the web UI.

Creating Your First Inventory

Create /etc/ansible/hosts:

- Define a group: [webservers].
- Add hosts: web1.example.com, web2.example.com.

Writing a Simple Playbook

Save the following to site.yml:

- ---
- - hosts: webservers
- become: true
- tasks:
- - name: Install Nginx
- yum: name=nginx state=latest
- - name: Start Nginx
- service: name=nginx state=started enabled=yes

Run with ansible-playbook site.yml.

Using Roles for Reusability

Create a role roles/nginx with the following structure:

- tasks/main.yml
- handlers/main.yml
- templates/nginx.conf.j2

Invoke the role in a playbook:

- - hosts: webservers
- roles: - nginx

Managing Secrets with Ansible Vault

Encrypt sensitive data:

- ansible-vault create secrets.yml
- Store passwords, API keys, or certificates.
- Run playbooks with --ask-vault-pass or --vault-password-file.

Deploying with Ansible Tower

1. Log in to the Tower UI.
2. Create an inventory, add hosts, and configure variables.
3. Upload playbooks as job templates.
4. Set up schedules or webhook triggers.
5. Use the workflow editor to chain multiple jobs.

Best Practices for Ansible Automation

- Keep Playbooks Simple – One playbook per environment or major component.
- Use Roles – Encapsulate reusable logic.
- Version Control – Store all playbooks and roles in Git.
- Test Locally – Use Molecule for role testing.
- Implement Idempotence – Ensure tasks do not produce side effects.
- Secure Vault Secrets – Rotate keys regularly.
- Leverage Ansible Lint – Detect syntax and style issues.
- Document Variables – Use vars/main.yml and comments.
- Use Ansible Tower for Governance – Apply RBAC and audit trails.
- Monitor Jobs – Set up alerts for failures.

Integration with Red /Hat Ecosystem

Red /Hat Satellite

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