



Red Hat Training and Certification

DO467

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Version 1.0

Table of Contents

1. Installing Red Hat Ansible Automation Platform	1
1.1. Explaining the Red Hat Ansible Automation Platform Architecture	1
1.1.1. Red Hat Ansible Automation Platform	1
1.1.2. Red Hat Ansible Automation Platform Components	1
1.1.2.1. Ansible Core	1
1.1.2.2. Ansible Content Collections	1
1.1.2.3. Automation Content Navigator	1
1.1.2.4. Automation Execution Environments	1
1.1.2.5. Automation Controller	1
1.1.2.6. Automation Hub and Private Automation Hub	1
1.1.2.7. Red Hat Insights for Red Hat Ansible Automation Platform	1
1.1.3. Why Use Ansible Automation Platform?	1
1.2. Installing Automation Controller and Private Automation Hub	1
1.2.1. Planning the Installation	1
1.2.1.1. Standalone Automation Controller with a Database on the Same Node	1
1.2.1.2. Standalone Private Automation Hub with a Database on the Same Node	1
1.2.1.3. Automation Controller and Private Automation Hub with External Database Servers	1
1.2.1.4. Advanced Deployment Scenarios	2
1.2.2. Installation Requirements	2
1.2.2.1. Database Storage	2
1.2.3. Subscription and Support	2
1.2.4. Installing Red Hat Ansible Automation Platform	2
1.2.4.1. Installing Automation Controller	2
1.2.4.2. Installing Private Automation Hub	2
1.2.5. Replacing the CA Certificate	2
1.2.5.1. Gathering Certificates and Private Keys	2
1.2.5.2. Preparing the Systems	2
1.2.5.3. Trusting Custom CA Certificates	2
1.2.6. DEMO: Installing Automation Controller and Private Automation Hub	2
1.3. Initial Configuration of Automation Controller and Private Automation Hub	8
1.3.1. Configuration Overview	8
1.3.2. Making Automation Execution Environments Available from Private Automation Hub	8
1.3.2.1. Synchronizing Automation Execution Environments	8
1.3.2.2. Manually Adding Container Images	8
1.3.2.3. Managing Container Repositories, Images, and Tags	8
1.3.3. Synchronizing Ansible Content Collections	8

1.3.3.1. Synchronizing Red Hat Certified Ansible Content Collections	8
1.3.3.2. Synchronizing Ansible Content Collections from Ansible Galaxy	8
1.3.3.3. Manually Adding Ansible Content Collections	8
1.3.4. Testing Basic Automation Controller Functionality	8
1.3.4.1. The Demo Project	8
1.3.4.2. Default Execution Environment Registry Credential	8
1.3.4.3. The Demo Credential	8
1.3.4.4. The Demo Inventory	8
1.3.4.5. The Demo Job Template	8
1.3.5. DEMO: Initial Configuration of Automation Controller and Private Automation Hub	8
2. Managing User Access	10
2.1. Creating and Managing Automation Controller Users	10
2.1.1. Role-based Access Controls	10
2.1.2. Automation Controller Organizations	10
2.1.3. Types of Users	10
2.1.4. Creating Users	10
2.1.5. Editing Users	10
2.1.6. Organization Roles	10
2.1.7. Managing User Organization Roles	10
2.2. Managing Automation Controller Access with Teams	10
2.2.1. Teams in Automation Controller	10
2.2.2. Creating Teams	10
2.2.3. Team Roles	10
2.2.4. Adding Users to a Team and Assigning Team Roles	10
2.2.5. Organization Roles	10
2.2.6. Managing Organization Roles	10
2.3. Creating and Managing Users and Groups for Private Automation Hub	10
2.3.1. User Access	11
2.3.1.1. Creating Groups	11
2.3.1.2. Creating Users	11
2.3.1.3. Creating Groups to Manage Content	11
3. Managing Inventories and Machine Credentials	12
3.1. Creating a Static Inventory	12
3.1.1. Red Hat Ansible Inventory	12
3.1.2. Creating an Inventory Using the Automation Controller Web UI	12
3.1.2.1. Creating a New Inventory	12
3.1.2.2. Creating a Host Group in an Inventory	12
3.1.2.3. Creating Hosts in an Inventory	12

3.1.3. Inventory Roles	12
3.1.3.1. Assigning Roles	12
3.1.4. Inventory Variables	12
3.2. Creating Machine Credentials for Access to Inventory Hosts	12
3.2.1. Storing Secrets in Credentials	12
3.2.2. Credential Types	12
3.2.3. Creating Machine Credentials	12
3.2.4. Editing Machine Credentials	12
3.2.5. Credential Roles	12
3.2.6. Managing Credential Access	12
3.2.7. Common Credential Scenarios	13
3.2.7.1. Credentials Protected by Automation Controller, Not Known to Users	13
3.2.7.2. Credential Prompts for Sensitive Password, Not Stored in Automation Controller	13
4. Managing Projects and Launching Ansible Jobs	14
4.1. Creating a Project for Ansible Playbooks	14
4.1.1. Automation Controller Projects	14
4.1.2. Creating a Project	14
4.1.3. Project Roles	14
4.1.4. Managing Project Access	14
4.1.5. Creating SCM Credentials	14
4.1.6. SCM Credential Roles	14
4.1.7. Managing Access to SCM Credentials	14
4.1.8. Updating Projects	14
4.1.8.1. Update Revision on Launch	14
4.1.8.2. Manual Updates	14
4.1.9. Support for Ansible Content Collections and Roles	14
4.2. Creating Job Templates and Launching Jobs	14
4.2.1. Job Templates	14
4.2.2. Creating Job Templates	14
4.2.3. Modifying Job Execution	14
4.2.4. Prompting for Job Parameters	14
4.2.5. Job Template Roles	15
4.2.6. Managing Job Template Access	15
4.2.7. Launching Jobs	15
4.2.8. Evaluating the Results of a Job	15
5. Advanced Job Configuration	16
5.1. Improving Performance with Fact Caching	16
5.1.1. Fact Caching	16

5.1.1.1. Enabling Fact Caching in Automation Controller	16
5.2. Creating Job Template Surveys to Set Variables for Jobs	16
5.2.1. Managing Variables	16
5.2.2. Defining Extra Variables	16
5.2.3. Job Template Surveys	16
5.2.3.1. Managing Answers to Survey Questions	16
5.2.3.2. Creating a Job Template Survey	16
5.3. Scheduling Jobs and Configuring Notifications	16
5.3.1. Scheduling Job Execution	16
5.3.1.1. Temporarily Disabling a Schedule	16
5.3.1.2. Scheduled Management Jobs	16
5.3.2. Reporting Job Execution Results	16
5.3.2.1. Notification Templates	16
5.3.2.2. Creating Notification Templates	16
5.3.2.3. Enabling Job Result Notification	16
6. Constructing Job Workflows	17
6.1. Creating Workflow Job Templates and Launching Workflow Jobs	17
6.1.1. Workflow Job Templates	17
6.1.2. Creating Workflow Job Templates	17
6.1.2.1. Using the Workflow Visualizer	17
6.1.2.2. Adding Multiple Nodes with the Same Relationship	17
6.1.2.3. Creating Convergent Nodes	17
6.1.2.4. Workflow Job Template Surveys	17
6.1.3. Launching Workflow Jobs	17
6.1.3.1. Evaluating Workflow Job Execution	17
6.2. Requiring Approvals in Workflow Jobs	17
6.2.1. Approval Nodes	17
6.2.2. Adding Approval Nodes to Workflows	17
6.2.3. Approving and Denying Workflow Approval Requests	17
6.2.4. Approval Time-outs	17
6.2.5. Approval Notifications	17
7. Managing Advanced Inventories	18
7.1. Importing External Static Inventories	18
7.1.1. Importing Existing Static Inventories	18
7.1.2. Storing an Inventory in a Project	18
7.2. Configuring Dynamic Inventory Plug-ins	18
7.2.1. Dynamic Inventories	18
7.2.2. OpenStack Dynamic Inventories	18

7.2.3. Red Hat Satellite 6 Dynamic Inventories	18
7.3. Filtering Hosts with Smart Inventories	18
7.3.1. Defining Smart Inventories	18
7.3.2. Using Ansible Facts in Smart Inventory Filters	18
7.3.2.1. Creating a Smart Inventory Based on Ansible Facts	18
7.3.3. Other Smart Inventory Filters	18
8. Automating Configuration of Ansible Automation Platform	19
8.1. Configuring Red Hat Ansible Automation Platform with Collections	19
8.1.1. Automating Red Hat Ansible Automation Platform Configuration	19
8.1.2. Getting the Supported Ansible Content Collection	19
8.1.3. Exploring the Supported Ansible Content Collection	19
8.1.3.1. Reading Documentation with Ansible Content Navigator	19
8.1.3.2. Reading Documentation on Automation Hub	19
8.1.4. Examples of Automation with ansible.controller	19
8.1.4.1. Creating Automation Controller Users	19
8.1.4.2. Creating Automation Controller Teams	19
8.1.4.3. Adding Users to Organizations and Teams	19
8.1.5. Community-supported Ansible Content Collections	19
8.2. Automating Configuration Updates with Git Webhooks	19
8.2.1. Introducing Red Hat Ansible Automation Platform Webhooks	19
8.2.1.1. What Are the Benefits of Webhooks	19
8.2.2. Configuring Webhooks	19
8.2.2.1. Configuring a Webhook for a Job Template	19
8.2.2.2. Creating the Webhook for the Repository in GitLab	20
8.2.3. Use Cases for Using Webhooks	20
8.2.3.1. Triggering Different Job Templates Using Branches	20
8.2.3.2. Configuration as Code for Automation Controller	20
8.3. Launching Jobs with the Automation Controller API	20
8.3.1. The Automation Controller REST API	20
8.3.1.1. Using the REST API	20
8.3.1.2. JSON Pagination	20
8.3.1.3. Accessing the REST API From a Graphical Web Browser	20
8.3.2. Launching a Job Template Using the API	20
8.3.3. Launching a Job Using the API from an Ansible Playbook	20
8.3.3.1. Vault Credentials	20
8.3.4. Token-based Authentication	20
9. Maintaining Red Hat Ansible Automation Platform	21
9.1. Performing Basic Troubleshooting of Automation Controller	21

9.1.1. Automation Controller Components	21
9.1.1.1. Starting, Stopping, and Restarting Automation Controller	21
9.1.1.2. Supervisor Components	21
9.1.2. Automation Controller Configuration and Log Files	21
9.1.2.1. Configuration Files	21
9.1.2.2. Log Files	21
9.1.2.3. Other Automation Controller Files	21
9.1.3. Common Troubleshooting Scenarios	21
9.1.3.1. Problems Running Playbooks	21
9.1.3.2. Problems Connecting to Your Host	21
9.1.3.3. Playbooks Do Not Appear in the List of Job Templates	21
9.1.3.4. Playbook Stays in Pending State	21
9.1.3.5. Error: Provided Hosts List Is Empty	21
9.1.4. Performing Command-Line Management	21
9.1.4.1. Changing the Automation Controller Admin Password	21
9.2. Backing Up and Restoring Red Hat Ansible Automation Platform	21
9.2.1. Backing Up Red Hat Ansible Automation Platform	22
9.2.1.1. Backup Procedure	22
9.2.2. Restoring Ansible Automation Platform From Backup	22
9.2.2.1. Restoration Procedure	22
10. Getting Insights into Automation Performance	23
10.1. Gathering Data for Cloud-based Analysis	23
10.1.1. Introducing Red Hat Hybrid Cloud Console Services	23
10.1.2. Collecting Data for Cloud Services	23
10.1.3. Registering Managed Hosts with Insights for Ansible Automation Platform	23
10.1.4. Accessing the Red Hat Hybrid Cloud Console	23
10.2. Getting Insights into Automation Performance	23
10.2.1. Insights for Ansible Automation Platform	23
10.2.2. Generating Remediation Playbooks with Advisor	23
10.2.2.1. Automating Remediation of an Issue for Multiple Systems	23
10.2.2.2. Automating Remediation of Multiple Issues for One System	23
10.2.3. Comparing Systems with Drift	23
10.2.3.1. Finding Differences Between Systems	23
10.2.3.2. Comparing the State of One System at Different Times	23
10.2.3.3. Comparing Systems to a Standard Baseline	23
10.2.4. Sending Alerts Based on Ansible Facts with Policies	23
10.3. Evaluating Performance with Automation Analytics	24
10.3.1. Automation Analytics	24

10.3.2. Reporting Playbook Execution Status	24
10.3.3. Examining Job History	24
10.3.4. Monitoring Notifications	24
10.4. Producing Reports from Automation Analytics	24
10.4.1. Producing Reports from Automation Analytics	24
10.4.1.1. Choosing an Appropriate Report	24
10.4.1.2. Using Automation Calculator to Compute Savings	24
10.4.1.3. Exporting a Report	24
10.4.2. Predicting the Cost Savings of Automation	24
10.4.2.1. Creating a Savings Plan	24
10.4.2.2. Reviewing the Cost Savings Calculations	24
11. Building a Large Scale Red Hat Ansible Automation Platform Deployment	25
11.1. Designing a Clustered Ansible Automation Platform Implementation	25
11.1.1. Running Red Hat Ansible Automation Platform at Scale	25
11.1.2. Automation Mesh	25
11.1.2.1. Benefits of Automation Mesh	25
11.1.2.2. Types of Nodes on Automation Mesh	25
11.1.2.3. What Are Instance Groups?	25
11.1.3. Planning Network Communication and Firewalls	25
11.1.3.1. Requirements for Control Nodes and Hybrid Nodes	25
11.1.3.2. Requirements for Hop Nodes	25
11.1.3.3. Requirements for Execution Nodes	25
11.1.4. Planning for Automation Mesh	25
11.1.4.1. Providing Resilient Services	25
11.2. Deploying Distributed Execution with Automation Mesh	25
11.2.1. Configuring Automation Mesh	25
11.2.1.1. Creating Instance Groups	25
11.2.1.2. Adding Nodes to the Automation Mesh	25
11.2.1.3. Removing Nodes from the Automation Mesh	25
11.2.2. Visualizing Automation Mesh Topology	25
11.2.3. Automation Mesh Design Patterns	26
11.2.4. Validation Checks	26
11.3. Managing Distributed Execution with Automation Mesh	26
11.3.1. Managing Instance Groups in Automation Controller	26
11.3.1.1. Creating Instance Groups	26
11.3.1.2. Assigning Execution Nodes to an Instance Group	26
11.3.1.3. Running a Health Check on the Nodes	26
11.3.1.4. Disassociating a Node from an Instance Group	26

11.3.2. Assigning Default Instance Groups to Inventories and Job Templates	26
11.3.2.1. Configuring an Inventory to Use Instance Groups	26
11.3.2.2. Configure a Job Template to Use Instance Groups	26
11.3.2.3. Running a Job Template with Instance Groups	26
11.3.3. Testing the Resilience of Automation Mesh	26
11.3.3.1. Testing Control Plane Resilience	26
11.3.3.2. Testing Execution Plane Resilience	26
11.3.4. Monitoring Automation Mesh from the Web UI	26
11.3.5. Monitoring Automation Mesh from the Command Line	26
11.3.5.1. Listing Nodes and Instance Groups	26
11.3.5.2. Monitoring Automation Mesh Using the receptorctl Command	26
Appendix A: References and Additional Information	27

1. Installing Red Hat Ansible Automation Platform

1.1. Explaining the Red Hat Ansible Automation Platform Architecture

Section Info Here

1.1.1. Red Hat Ansible Automation Platform

1.1.2. Red Hat Ansible Automation Platform Components

1.1.2.1. Ansible Core

1.1.2.2. Ansible Content Collections

1.1.2.3. Automation Content Navigator

1.1.2.4. Automation Execution Environments

1.1.2.5. Automation Controller

1.1.2.6. Automation Hub and Private Automation Hub

1.1.2.7. Red Hat Insights for Red Hat Ansible Automation Platform

1.1.3. Why Use Ansible Automation Platform?

1.2. Installing Automation Controller and Private Automation Hub

Section Info Here

1.2.1. Planning the Installation

1.2.1.1. Standalone Automation Controller with a Database on the Same Node

1.2.1.2. Standalone Private Automation Hub with a Database on the Same Node

1.2.1.3. Automation Controller and Private Automation Hub with External Database Servers

1.2.1.4. Advanced Deployment Scenarios

1.2.2. Installation Requirements

1.2.2.1. Database Storage

1.2.3. Subscription and Support

1.2.4. Installing Red Hat Ansible Automation Platform

1.2.4.1. Installing Automation Controller

1.2.4.2. Installing Private Automation Hub

1.2.5. Replacing the CA Certificate

1.2.5.1. Gathering Certificates and Private Keys

1.2.5.2. Preparing the Systems

1.2.5.3. Trusting Custom CA Certificates

1.2.6. DEMO: Installing Automation Controller and Private Automation Hub

Automation Controller and Private Automation Hub can both be installed from the **same** machine provided that they are both specified in the inventory file and that the installation user and installation machine has access to all systems specified in the **inventory** file and that the user has the ability to SSH/SUDO without passwords.



Automation Hub and Controller Placement

Ansible Controller and Ansible Private Automation Hub must be installed on separate systems and cannot be installed on the same system.

Example 1. DEMO: Installing Automation Hub and Controller

1. Obtain the bundled installer and untar the file

```
[student@workstation ~]$ tar xvf ansible-automation-platform-setup-bundle-2.2.0-6.1.tar.gz

[student@workstation ~]$ mv ansible-automation-platform-setup-bundle-2.2.0-6.1 AAP2

[student@workstation ~]$ cd AAP2/
```

2. Update the inventory file with the system FQDNs or IP Addresses

Listing 1. Update the Inventory File

```
[student@workstation AAP2]$ vim inventory
```

```
[automationcontroller] ①
controller.lab.example.com

[execution_nodes]

[automationhub] ②
hub.lab.example.com

[automationcatalog]

[database] ③
db.lab.example.com

[all:vars]
admin_password='redhat' ④

pg_host='db.lab.example.com' ⑤
pg_port=5432 ⑥

pg_database='awx'
pg_username='awx'
pg_password='redhat' ⑦

registry_url='hub.lab.example.com' ⑧
```

```
registry_username='admin' ⑨
registry_password='redhat' ⑩

# Automation Hub Configuration ⑪
#

automationhub_admin_password='redhat'

automationhub_pg_host='db.lab.example.com'
automationhub_pg_port=5432

automationhub_pg_database='automationhub'
automationhub_pg_username='automationhub'
automationhub_pg_password='redhat'
automationhub_pg_sslmode='prefer'

# SSL Settings ⑫

custom_ca_cert=/home/student/certs/classroom-ca.pem
web_server_ssl_cert=/home/student/certs/controller.lab.example.com.crt
web_server_ssl_key=/home/student/certs/controller.lab.example.com.key
automationhub_ssl_cert=/home/student/certs/hub.lab.example.com.crt
automationhub_ssl_key=/home/student/certs/hub.lab.example.com.key
postgres_use_ssl=True
postgres_ssl_cert=/home/student/certs/db.lab.example.com.crt
postgres_ssl_key=/home/student/certs/db.lab.example.com.key
```

- ① Specify the Controller Node
- ② Specify the Private Automation Hub Node
- ③ Specify the Database Node
- ④ Specify the **admin** password for Controller
- ⑤ Specify the Database FQDN
- ⑥ Specify the Database Port
- ⑦ Specify the Database Password
- ⑧ URL and Registry for Container Images/Execution Environments
- ⑨ Username for Registry
- ⑩ Password for Registry
- ⑪ Ansible Automation Hub Configuration Settings
- ⑫ SSL Settings



Database

If you are running the database locally and not as a separate installation, you can leave the database section blank and the **pg_host** and **pg_port** blank. This will cause the installer to setup the database locally with the deployed AAP application.



Registry

Setting the registry for **hub.example.com** will allow the installer to link and configure Ansible Automation Hub to Ansible Controller. It will also ensure that the execution environments container in the bundled installer will be loaded properly into Ansible Automation Hub.

SSL

The classroom and lab environment has been configured to run with SSL enabled. In order for the certificates to work properly, the SSL certificates have been supplied in the **/home/student/certs** directory. These certificates must be specified in the **inventory** file. In the default inventory file, the certificates and SSL settings are generally commented out, so it is possible to just place the certificate information at the bottom of the inventory file to prevent searching for each line.



Listing 2. Default SSL Certificate

```
# SSL-related variables

# If set, this will install a custom CA certificate to the system
trust store.
# custom_ca_cert=/home/student/certs/classroom-ca.pem

# Certificate and key to install in nginx for the web UI and API
# web_server_ssl_cert=/path/to/tower.cert
# web_server_ssl_key=/path/to/tower.key
```

3. View final inventory file

```
[student@workstation AAP2]$ grep -Ev "^#|^$" inventory
[automationcontroller]
controller.lab.example.com
[automationcontroller:vars]
peers=execution_nodes
[execution_nodes]
[automationhub]
hub.lab.example.com
[automationcatalog]
[database]
db.lab.example.com
[sso]
[all:vars]
admin_password='redhat'
pg_host='db.lab.example.com'
pg_port=5432
pg_database='awx'
pg_username='awx'
pg_password='redhat'
pg_sslmode='prefer' # set to 'verify-full' for client-side enforced SSL
registry_url='hub.lab.example.com'
registry_username='admin'
registry_password='redhat'
receptor_listener_port=27199
automationhub_admin_password='redhat'
automationhub_pg_host='db.lab.example.com'
automationhub_pg_port=5432
automationhub_pg_database='automationhub'
automationhub_pg_username='automationhub'
automationhub_pg_password='redhat'
automationhub_pg_sslmode='prefer'
automationcatalog_pg_host=''
automationcatalog_pg_port=5432
automationcatalog_pg_database='automationcatalog'
automationcatalog_pg_username='automationcatalog'
automationcatalog_pg_password=''
sso_keystore_password=''
sso_console_admin_password=''
custom_ca_cert=/home/student/certs/classroom-ca.pem
web_server_ssl_cert=/home/student/certs/controller.lab.example.com.crt
web_server_ssl_key=/home/student/certs/controller.lab.example.com.key
automationhub_ssl_cert=/home/student/certs/hub.lab.example.com.crt
automationhub_ssl_key=/home/student/certs/hub.lab.example.com.key
postgres_use_ssl=True
postgres_ssl_cert=/home/student/certs/db.lab.example.com.crt
postgres_ssl_key=/home/student/certs/db.lab.example.com.key
```



Using **grep** to remove comments and blank lines

Listing 3. Source Description

```
grep -Ev "^#|^$" <FILENAME>
```

4. Run the installation **setup.sh** script as the root user with **ignore_preflight_errors=true** as the systems in this course don't meet the minimum hardware requirements.

```
[student@workstation AAP2]$ sudo -i
[sudo] password for student:

[root@workstation ~]# cd ~student/AAP2/

[root@workstation AAP2]# ./setup.sh -e ignore_preflight_errors=true
```



Bundled Software Installer

It is important to at least save the bundled software installer archive **TGZ** file or to save the entire bundled installation directory. In addition, you will also want to save the **Inventory** file that was created so that adding additional components later, performing system backups/restores, and other administrative and maintenance tasks can be performed easily.

5. Install the licenses for Controller by providing the **manifest.zip** file to controller in the WebUI.

The screenshot shows the Red Hat Ansible Automation Platform WebUI. On the left is a sidebar with three steps: 1. Ansible Automation Platform Subscription (active), 2. User and Automation Analytics, and 3. End user license agreement. The main content area has a header 'Welcome to Red Hat Ansible Automation Platform! Please complete the steps below to activate your subscription.' Below this is a 'Request subscription' button. Then, it says 'Select your Ansible Automation Platform subscription to use.' with a 'Subscription manifest' button and a 'Username / password' input field. Below that, it says 'Upload a Red Hat Subscription Manifest containing your subscription. To generate your subscription manifest, go to [subscription allocations](#) on the Red Hat Customer Portal.' Then, there is a section 'Red Hat subscription manifest' with a 'Browse' button and a 'Clear' button. An orange arrow points to the 'Browse' button. At the bottom are 'Next' and 'Back' buttons.

Figure 1. Ansible Controller License

1. Verify **Automation Hub** is installed

1.3. Initial Configuration of Automation Controller and Private Automation Hub

Section Info Here

1.3.1. Configuration Overview

1.3.2. Making Automation Execution Environments Available from Private Automation Hub

1.3.2.1. Synchronizing Automation Execution Environments

1.3.2.2. Manually Adding Container Images

1.3.2.3. Managing Container Repositories, Images, and Tags

1.3.3. Synchronizing Ansible Content Collections

1.3.3.1. Synchronizing Red Hat Certified Ansible Content Collections

1.3.3.2. Synchronizing Ansible Content Collections from Ansible Galaxy

1.3.3.3. Manually Adding Ansible Content Collections

1.3.4. Testing Basic Automation Controller Functionality

1.3.4.1. The Demo Project

1.3.4.2. Default Execution Environment Registry Credential

1.3.4.3. The Demo Credential

1.3.4.4. The Demo Inventory

1.3.4.5. The Demo Job Template

1.3.5. DEMO: Initial Configuration of Automation Controller and Private Automation Hub

Example 2. DEMO: Initial Configuration of Automation Controller and Private Automation Hub

Working with Execution Environments

Manually uploading and adding container images (EEs) to Ansible Private Automation Hub.

1. Login to Registries to both Push/Pull and Copy container images

```
[student@workstation Add_EEs]$ skopeo login hub.lab.example.com
```

2. Inspect available containers and tags

```
[student@workstation Add_EEs]$ skopeo inspect docker://hub.lab.example.com/ee-29-rhel8
```

Grabbing Tags and Release Information from the CLI

Listing 4. **skopeo inspect** to get release and **skopeo tags** to get tags

```
[student@workstation Add_EEs]$ skopeo inspect
docker://hub.lab.example.com/ee-29-rhel8 --format "{{
.Labels.version }}-{{ .Labels.release }}"
1.0.0-119

[student@workstation Add_EEs]$ skopeo list-tags
docker://hub.lab.example.com/ee-29-rhel8
```



It is also possible to use **podman** to search and list tags, but that is generally considered less reliable. It should also be noted that only **skopeo** has the ability to inspect and act with images remotely. As such, this course will leverage **skopeo** over Podman for many of the exercises.

Listing 5. **podman Tag Listing**

```
[student@workstation Add_EEs]$ podman search --list-tags
docker://hub.lab.example.com/ee-29-rhel8
```

The **skopeo** Command



Skopeo is another command that can be used with containers and was introduced as part of the **container-tools** suite with RHEL8. The **container-tools** suite installs the RHEL 8 toolchain to work with containers which includes: **podman**, **buildah**, and **skopeo**.

2. Managing User Access

2.1. Creating and Managing Automation Controller Users

Section Info Here

2.1.1. Role-based Access Controls

2.1.2. Automation Controller Organizations

2.1.3. Types of Users

2.1.4. Creating Users

2.1.5. Editing Users

2.1.6. Organization Roles

2.1.7. Managing User Organization Roles

2.2. Managing Automation Controller Access with Teams

Section Info Here

2.2.1. Teams in Automation Controller

2.2.2. Creating Teams

2.2.3. Team Roles

2.2.4. Adding Users to a Team and Assigning Team Roles

2.2.5. Organization Roles

2.2.6. Managing Organization Roles

2.3. Creating and Managing Users and Groups for Private Automation Hub

Section Info Here

2.3.1. User Access

2.3.1.1. Creating Groups

2.3.1.2. Creating Users

2.3.1.3. Creating Groups to Manage Content

3. Managing Inventories and Machine Credentials

3.1. Creating a Static Inventory

Section Info Here

3.1.1. Red Hat Ansible Inventory

3.1.2. Creating an Inventory Using the Automation Controller Web UI

3.1.2.1. Creating a New Inventory

3.1.2.2. Creating a Host Group in an Inventory

3.1.2.3. Creating Hosts in an Inventory

3.1.3. Inventory Roles

3.1.3.1. Assigning Roles

3.1.4. Inventory Variables

3.2. Creating Machine Credentials for Access to Inventory Hosts

Section Info Here

3.2.1. Storing Secrets in Credentials

3.2.2. Credential Types

3.2.3. Creating Machine Credentials

3.2.4. Editing Machine Credentials

3.2.5. Credential Roles

3.2.6. Managing Credential Access

3.2.7. Common Credential Scenarios

3.2.7.1. Credentials Protected by Automation Controller, Not Known to Users

3.2.7.2. Credential Prompts for Sensitive Password, Not Stored in Automation Controller

4. Managing Projects and Launching Ansible Jobs

4.1. Creating a Project for Ansible Playbooks

Section Info Here

4.1.1. Automation Controller Projects

4.1.2. Creating a Project

4.1.3. Project Roles

4.1.4. Managing Project Access

4.1.5. Creating SCM Credentials

4.1.6. SCM Credential Roles

4.1.7. Managing Access to SCM Credentials

4.1.8. Updating Projects

4.1.8.1. Update Revision on Launch

4.1.8.2. Manual Updates

4.1.9. Support for Ansible Content Collections and Roles

4.2. Creating Job Templates and Launching Jobs

Section Info Here

4.2.1. Job Templates

4.2.2. Creating Job Templates

4.2.3. Modifying Job Execution

4.2.4. Prompting for Job Parameters

4.2.5. Job Template Roles

4.2.6. Managing Job Template Access

4.2.7. Launching Jobs

4.2.8. Evaluating the Results of a Job

5. Advanced Job Configuration

5.1. Improving Performance with Fact Caching

Section Info Here

5.1.1. Fact Caching

5.1.1.1. Enabling Fact Caching in Automation Controller

5.2. Creating Job Template Surveys to Set Variables for Jobs

Section Info Here

5.2.1. Managing Variables

5.2.2. Defining Extra Variables

5.2.3. Job Template Surveys

5.2.3.1. Managing Answers to Survey Questions

5.2.3.2. Creating a Job Template Survey

5.3. Scheduling Jobs and Configuring Notifications

Section Info Here

5.3.1. Scheduling Job Execution

5.3.1.1. Temporarily Disabling a Schedule

5.3.1.2. Scheduled Management Jobs

5.3.2. Reporting Job Execution Results

5.3.2.1. Notification Templates

5.3.2.2. Creating Notification Templates

5.3.2.3. Enabling Job Result Notification

6. Constructing Job Workflows

6.1. Creating Workflow Job Templates and Launching Workflow Jobs

Section Info Here

6.1.1. Workflow Job Templates

6.1.2. Creating Workflow Job Templates

6.1.2.1. Using the Workflow Visualizer

6.1.2.2. Adding Multiple Nodes with the Same Relationship

6.1.2.3. Creating Convergent Nodes

6.1.2.4. Workflow Job Template Surveys

6.1.3. Launching Workflow Jobs

6.1.3.1. Evaluating Workflow Job Execution

6.2. Requiring Approvals in Workflow Jobs

Section Info Here

6.2.1. Approval Nodes

6.2.2. Adding Approval Nodes to Workflows

6.2.3. Approving and Denying Workflow Approval Requests

6.2.4. Approval Time-outs

6.2.5. Approval Notifications

7. Managing Advanced Inventories

7.1. Importing External Static Inventories

Section Info Here

7.1.1. Importing Existing Static Inventories

7.1.2. Storing an Inventory in a Project

7.2. Configuring Dynamic Inventory Plug-ins

Section Info Here

7.2.1. Dynamic Inventories

7.2.2. OpenStack Dynamic Inventories

7.2.3. Red Hat Satellite 6 Dynamic Inventories

7.3. Filtering Hosts with Smart Inventories

Section Info Here

7.3.1. Defining Smart Inventories

7.3.2. Using Ansible Facts in Smart Inventory Filters

7.3.2.1. Creating a Smart Inventory Based on Ansible Facts

7.3.3. Other Smart Inventory Filters

8. Automating Configuration of Ansible Automation Platform

8.1. Configuring Red Hat Ansible Automation Platform with Collections

Section Info Here

8.1.1. Automating Red Hat Ansible Automation Platform Configuration

8.1.2. Getting the Supported Ansible Content Collection

8.1.3. Exploring the Supported Ansible Content Collection

8.1.3.1. Reading Documentation with Ansible Content Navigator

8.1.3.2. Reading Documentation on Automation Hub

8.1.4. Examples of Automation with `ansible.controller`

8.1.4.1. Creating Automation Controller Users

8.1.4.2. Creating Automation Controller Teams

8.1.4.3. Adding Users to Organizations and Teams

8.1.5. Community-supported Ansible Content Collections

8.2. Automating Configuration Updates with Git Webhooks

Section Info Here

8.2.1. Introducing Red Hat Ansible Automation Platform Webhooks

8.2.1.1. What Are the Benefits of Webhooks

8.2.2. Configuring Webhooks

8.2.2.1. Configuring a Webhook for a Job Template

8.2.2.2. Creating the Webhook for the Repository in GitLab

8.2.3. Use Cases for Using Webhooks

8.2.3.1. Triggering Different Job Templates Using Branches

8.2.3.2. Configuration as Code for Automation Controller

8.3. Launching Jobs with the Automation Controller API

Section Info Here

8.3.1. The Automation Controller REST API

8.3.1.1. Using the REST API

8.3.1.2. JSON Pagination

8.3.1.3. Accessing the REST API From a Graphical Web Browser

8.3.2. Launching a Job Template Using the API

8.3.3. Launching a Job Using the API from an Ansible Playbook

8.3.3.1. Vault Credentials

8.3.4. Token-based Authentication

9. Maintaining Red Hat Ansible Automation Platform

9.1. Performing Basic Troubleshooting of Automation Controller

Section Info Here

9.1.1. Automation Controller Components

9.1.1.1. Starting, Stopping, and Restarting Automation Controller

9.1.1.2. Supervisord Components

9.1.2. Automation Controller Configuration and Log Files

9.1.2.1. Configuration Files

9.1.2.2. Log Files

9.1.2.3. Other Automation Controller Files

9.1.3. Common Troubleshooting Scenarios

9.1.3.1. Problems Running Playbooks

9.1.3.2. Problems Connecting to Your Host

9.1.3.3. Playbooks Do Not Appear in the List of Job Templates

9.1.3.4. Playbook Stays in Pending State

9.1.3.5. Error: Provided Hosts List Is Empty

9.1.4. Performing Command-Line Management

9.1.4.1. Changing the Automation Controller Admin Password

9.2. Backing Up and Restoring Red Hat Ansible Automation Platform

Section Info Here

9.2.1. Backing Up Red Hat Ansible Automation Platform

9.2.1.1. Backup Procedure

9.2.2. Restoring Ansible Automation Platform From Backup

9.2.2.1. Restoration Procedure

10. Getting Insights into Automation Performance

10.1. Gathering Data for Cloud-based Analysis

Section Info Here

10.1.1. Introducing Red Hat Hybrid Cloud Console Services

10.1.2. Collecting Data for Cloud Services

10.1.3. Registering Managed Hosts with Insights for Ansible Automation Platform

10.1.4. Accessing the Red Hat Hybrid Cloud Console

10.2. Getting Insights into Automation Performance

Section Info Here

10.2.1. Insights for Ansible Automation Platform

10.2.2. Generating Remediation Playbooks with Advisor

10.2.2.1. Automating Remediation of an Issue for Multiple Systems

10.2.2.2. Automating Remediation of Multiple Issues for One System

10.2.3. Comparing Systems with Drift

10.2.3.1. Finding Differences Between Systems

10.2.3.2. Comparing the State of One System at Different Times

10.2.3.3. Comparing Systems to a Standard Baseline

10.2.4. Sending Alerts Based on Ansible Facts with Policies

10.3. Evaluating Performance with Automation Analytics

Section Info Here

10.3.1. Automation Analytics

10.3.2. Reporting Playbook Execution Status

10.3.3. Examining Job History

10.3.4. Monitoring Notifications

10.4. Producing Reports from Automation Analytics

Section Info Here

10.4.1. Producing Reports from Automation Analytics

10.4.1.1. Choosing an Appropriate Report

10.4.1.2. Using Automation Calculator to Compute Savings

10.4.1.3. Exporting a Report

10.4.2. Predicting the Cost Savings of Automation

10.4.2.1. Creating a Savings Plan

10.4.2.2. Reviewing the Cost Savings Calculations

11. Building a Large Scale Red Hat Ansible Automation Platform Deployment

11.1. Designing a Clustered Ansible Automation Platform Implementation

11.1.1. Running Red Hat Ansible Automation Platform at Scale

11.1.2. Automation Mesh

11.1.2.1. Benefits of Automation Mesh

11.1.2.2. Types of Nodes on Automation Mesh

11.1.2.3. What Are Instance Groups?

11.1.3. Planning Network Communication and Firewalls

11.1.3.1. Requirements for Control Nodes and Hybrid Nodes

11.1.3.2. Requirements for Hop Nodes

11.1.3.3. Requirements for Execution Nodes

11.1.4. Planning for Automation Mesh

11.1.4.1. Providing Resilient Services

11.2. Deploying Distributed Execution with Automation Mesh

11.2.1. Configuring Automation Mesh

11.2.1.1. Creating Instance Groups

11.2.1.2. Adding Nodes to the Automation Mesh

11.2.1.3. Removing Nodes from the Automation Mesh

11.2.2. Visualizing Automation Mesh Topology

11.2.3. Automation Mesh Design Patterns

11.2.4. Validation Checks

11.3. Managing Distributed Execution with Automation Mesh

11.3.1. Managing Instance Groups in Automation Controller

11.3.1.1. Creating Instance Groups

11.3.1.2. Assigning Execution Nodes to an Instance Group

11.3.1.3. Running a Health Check on the Nodes

11.3.1.4. Disassociating a Node from an Instance Group

11.3.2. Assigning Default Instance Groups to Inventories and Job Templates

11.3.2.1. Configuring an Inventory to Use Instance Groups

11.3.2.2. Configure a Job Template to Use Instance Groups

11.3.2.3. Running a Job Template with Instance Groups

11.3.3. Testing the Resilience of Automation Mesh

11.3.3.1. Testing Control Plane Resilience

11.3.3.2. Testing Execution Plane Resilience

11.3.4. Monitoring Automation Mesh from the Web UI

11.3.5. Monitoring Automation Mesh from the Command Line

11.3.5.1. Listing Nodes and Instance Groups

11.3.5.2. Monitoring Automation Mesh Using the `receptorctl` Command

Appendix A: References and Additional Information

Ansible Docs/Tips and Tricks

- **Installing Software and other Packages:** https://ansible-tips-and-tricks.readthedocs.io/en/latest/os-dependent-tasks/installing_packages/
- **Ansible Tips and Tricks (Examples):** <https://github.com/nfaction/ansible-tips-and-tricks/wiki>
- **Ansible Product Demos:** <https://github.com/ansible/product-demos>
- **Ansible Workshops:** <https://github.com/ansible/workshops/tree/devel/provisioner>
- **Red Hat CoP - Automation Good Practices:**
 - <https://redhat-cop.github.io/automation-good-practices/>
 - <https://github.com/redhat-cop/automation-good-practices/>
- **Ansible Controller Collection:** <https://console.redhat.com/ansible/automation-hub/repo/published/ansible/controller/docs?keywords=>

Ansible KB Articles and Solutions

- **How Do I Perform Security Patching / OS Package Upgrades On Ansible Tower/Automation Controller Nodes Without Breaking Any Ansible Tower/Automation Controller Functionality ?:** <https://access.redhat.com/solutions/4566711>

Ansible Filters and Collections

- **Using filters to manipulate data (Jinja2 Templating):** https://docs.ansible.com/ansible/latest/user_guide/playbooks_filters.html
- **Community General:** <https://docs.ansible.com/ansible/latest/collections/community/general/index.html>

Ansible Blogs and Articles

- **When localhost isn't what it seems in Red Hat Ansible Automation Platform 2:** <https://www.ansible.com/blog/when-localhost-isnt-what-it-seems-in-red-hat-ansible-automation-platform-2>

Ansible Execution Environments

- **Execution Environments:** https://docs.ansible.com/automation-controller/4.2.0/html/userguide/execution_environments.html#ee-mount-options