



Red Hat Training and Certification

DO274

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Introduction



Repositories for this Course

Main Repository

- **DO274_Notes**: https://github.com/tmichett/DO274_Notes
 - Contains book components and demos and builds on Jenkins server. This is a private repository.
- **DO274_Demo**: https://github.com/tmichett/DO274_Demo
 - Contains PDF copy of book, demo source, and reference materials. This is a public repository and shared as part of the course delivery.

Demo Repositories

- **Controller Playbooks**: https://github.com/tmichett/AAP2_Demos
- **EDA Controller Rulebooks**: https://github.com/tmichett/do274_eda_rulebooks
- **Main Demo Repository**: https://github.com/tmichett/DO274_Demo

URLs and Login Information for the Course

- **EDA Controller**: <https://eda-controller.lab.example.com>
- **Ansible Automation Controller**: <https://controller.lab.example.com>
- **Private Automation Hub**: <https://hub.lab.example.com>
 - a. **Username**: admin
 - b. **Password**: redhat
- **Mattermost**: <http://mattermost.lab.example.com:8065>

- a. **Username:** student
- b. **Password:** Stud3nt123



The Mattermost DNS entry is not in the DNS server. It is only available from the Workstation VM as it is an entry in **/etc/hosts**.

```
172.25.250.220 mattermost.lab.example.com
```

1. Getting Started with Event-Driven Ansible

1.1. Introduction to Event-Driven Ansible

1.1.1. Event-Driven Ansible

1.1.2. Event-Driven Ansible Components

1.1.3. Running Ansible Rulebooks

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1.1.5.2. High Occurrence of Low-complexity Issues

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1.2. Creating and Testing Ansible Rulebooks

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1.2.4. Testing Ansible Rulebooks

1.3. DEMO - Acting on Webhook Events

Section Info Here

Listing 1. Example Code box for CLI

```
[student@workstation ~]$ sudo yum module install container-tools
```

Listing 2. Example Code box for YAML

```
---
- name: Deploy HTTPD Server Demo
  hosts: server
  collections:

  tasks:

## Start and Run the HTTPD Container
- name: Start the Apache Container
  podman_container:
```

Example 1. LAB/Exercise: Hands-On Activity Example

1. Download a container image.
 - a. Registry: **registry.access.redhat.com**
 - b. Image: **ubi7**
2. Run the container

1.3.1. <Section_Sub_Intro_Here>

1.4. DEMO - Acting on System Journal Events

Section Info Here

Listing 3. Example Code box for CLI

```
[student@workstation ~]$ sudo yum module install container-tools
```

Listing 4. Example Code box for YAML

```
---
- name: Deploy HTTPD Server Demo
  hosts: server
  collections:

  tasks:

  ## Start and Run the HTTPD Container
  - name: Start the Apache Container
    podman_container:
```

Example 2. LAB/Exercise: Hands-On Activity Example

1. Download a container image.
 - a. Registry: **registry.access.redhat.com**
 - b. Image: **ubi7**
2. Run the container

1.4.1. <Section_Sub_Intro_Here>

1.5. DEMO - Acting on Results from the URL Check Plug-in

Section Info Here

Listing 5. Example Code box for CLI

```
[student@workstation ~]$ sudo yum module install container-tools
```

Listing 6. Example Code box for YAML

```
---
- name: Deploy HTTPD Server Demo
  hosts: server
  collections:

  tasks:

## Start and Run the HTTPD Container
- name: Start the Apache Container
  podman_container:
```

Example 3. LAB/Exercise: Hands-On Activity Example

1. Download a container image.
 - a. Registry: **registry.access.redhat.com**
 - b. Image: **ubi7**
2. Run the container

1.5.1. <Section_Sub_Intro_Here>

1.6. DEMO - Watching the Sudoers File

Section Info Here

Example 4. Creating Events Based on Sudoers File Changes

1. Download a container image.
 - a. Registry: **registry.access.redhat.com**
 - b. Image: **ubi7**
2. Run the container

2. Getting Started with Event- Driven Ansible Controller

2.1. Installing Event-Driven Ansible Controller

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2.1.1. Planning the Installation

2.1.1.1. Automation Controller, Private Automation Hub, and Event- Driven Ansible Controller with External Database Servers

2.1.2. Event-Driven Ansible Controller Installation Options

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2.2. Configuring Event-Driven Ansible Controller to Run Ansible Rulebooks

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2.3. DEMO - Configuring Event-Driven Ansible Controller to Run Ansible Rulebooks

Section Info Here

Listing 7. Example Code box for CLI

```
[student@workstation ~]$ sudo yum module install container-tools
```

Listing 8. Example Code box for YAML

```
---
- name: Deploy HTTPD Server Demo
  hosts: server
  collections:

  tasks:

## Start and Run the HTTPD Container
  - name: Start the Apache Container
    podman_container:
```

Example 5. LAB/Exercise: Hands-On Activity Example

1. Download a container image.
 - a. Registry: **registry.access.redhat.com**
 - b. Image: **ubi7**
2. Run the container

2.3.1. <Section_Sub_Intro_Here>

3. Example Use Cases for Event- Driven Ansible

3.1. GitOps with Event-Driven Ansible

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3.1.1. Using Webhooks in Event-Driven Ansible

3.1.2. Configuring Webhooks in the Git Repository Server

3.1.2.1. Configuring GitLab to use Webhooks

3.1.2.2. Configuring Projects in GitLab to use Webhooks

3.1.2.3. Testing a Webhook in GitLab

3.1.3. Using Tests from GitLab to Create Rules in Rulebooks

3.2. DEMO - GitOps with Event-Driven Ansible

A demo using Gitlab with EDA Webhook Events

Listing 9. Preparing the Exercise

```
[student@workstation ~]$ cd /home/student/Github/DO274_Demo/Demos/CH3/GitOPS_Demo/  
[student@workstation ~]$ ./Setup_Demo.sh ①
```

- ① This script runs the **lab start** command to create resources, configures a Git Prompt for BASH and clones down the initial repository

Example 6. Exercise: Hands-On Activity Example

- Show EDA Components
- Show Controller Components
- Show Gitlab Repository and Components
 1. Show Rulebooks and playbooks in project
 - `git.lab.example.com`
 - UN: student
 - PW: Stud3nt123
 - **Project Name:** gitops_automation
 2. Create Webhooks
 - `git.lab.example.com`
 - UN: student
 - PW: Stud3nt123
 - **Project Name:** gitops_application
 - a. Webhook - Trigger on Push
 - b. Webhook - Trigger on Merge
 - **URL:** <http://eda-controller.lab.example.com:5000>
 3. Test Webhooks
 - Show push event (works)
 - Show merge event (fails - no merge pending)
 - Go to EDA Controller and show the Gitops Ruleset and Trigger
 - Show the payload and describe the **Print Events** and **Pretty** settings
 4. Copy `~/Github/DO274_Notes/Demos/CH3/GitOPS_Demo/git_actions_demo_complete.yml` in `~/git-repos/gitops_application/` the file to the repository and commit/push it.
 5. Open EDA and Sync Project and Restart the **Rulebook Activation**
 6. Open the Gitlab project and modify the `Index.html` file in the `DEVEL` branch

```
cd ~/git-repos/gitops_application/  
git checkout -b devel
```

- Change the background color to **Black**

7. Git commit/push changes for the application
8. Open Github and perform a Merge request and approve the request
9. Show that the EDA Controller Triggered events
10. Show Automation Controller ran playbooks
11. Show the webserver results in browser

3.3. Event-Driven Ansible and NetOps

Section Info Here

3.3.1. Reacting to Network Events

3.3.2. Managing Network Devices

3.3.3. Running Playbooks that Include Networking Modules

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3.3.4.2. Configuring gNMI on Network Switches

3.3.4.3. Configuring Telegraf

3.3.4.4. Managing and Querying Apache Kafka Topics

3.3.4.5. Using EDA to Query Apache Kafka

3.3.5. Integrating EDA with Chat Services

3.3.5.1. Configuring an Incoming Webhook

3.3.5.2. Configuring an Outgoing Webhook

3.4. DEMO - Event-Driven Ansible using Rulebooks, EDA Controller, and Mattermost

The demo for URL Check Mattermost will launch a rulebook locally on workstation which is similar to Chapter 1. However, this rulebook will notify Mattermost with an error message for the website being down because the service is stopped or because the `index.html` file is missing.

The demo also utilizes EDA controller as a listener that will listen for events from MatterMost and kick off another set of tasks which integrate with Ansible Automation Controller to run a playbook based on the given events. The playbook will then trigger another notification to Mattermost that the event has been resolved.

Webhook and Mattermost Trigger Phrases

- **website-index-fix**: Used to trigger EDA controller which calls a job on Automation Controller to repair the `index.html` file and notify Mattermost that job is fixed.
- **website-service-fix**: Used to trigger EDA controller which calls a job on Automation Controller to repair the services (`systemctl restart httpd`) and notify Mattermost that job is fixed.

You must first run the **Setup_Demo.sh** script to ensure all pieces are available. Then you can run the rulebook command. To demonstrate both conditions and fixes, you will need to have a separate window open and delete the **index.html** file and **systemctl stop httpd**.

It is also necessary to configure the WebHooks for Mattermost and ensure they are correct in the playbooks.

Incoming Webhooks

Incoming webhooks are needed so that Mattermost can receive events and notifications from EDA Controller and rulebooks. This webhook needs to be updated in the playbooks to ensure that they are triggered correctly.



Incoming Webhook Playbooks

- **website_notify_down.yml**
- **website_notify_missing_index.yml**

System Console ⇒ **Environment** ⇒ **Developer** ⇒ **Allow Untrusted connections** and enter in EDA controller and the `172.25.250.0/24` subnet.

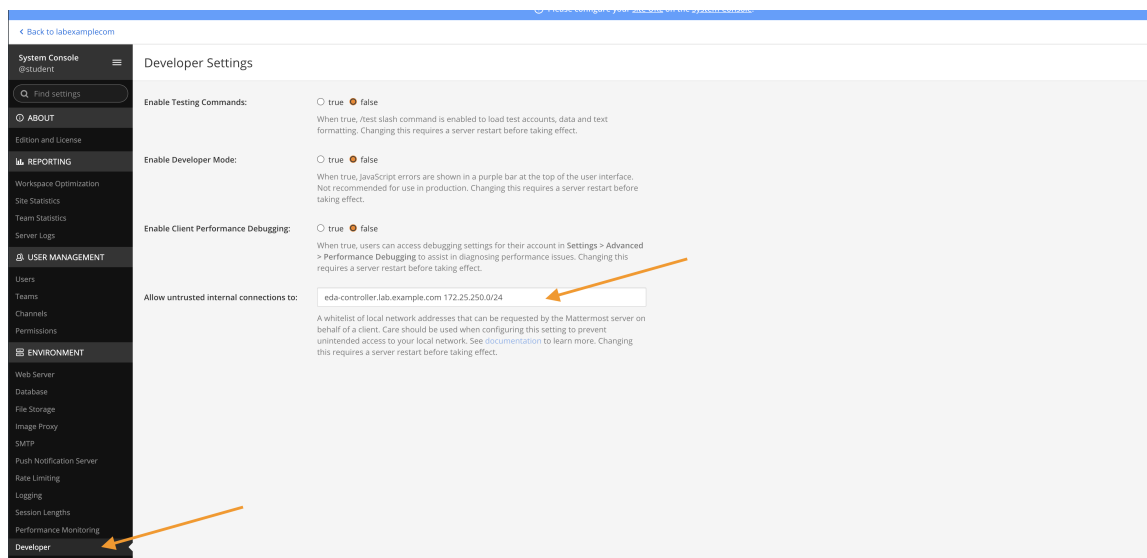


Figure 1. Allowing Webhooks (System Console - Untrusted Connections)

You also need to setup the WebHook **Integrations** ⇒ **Incoming Webhooks**

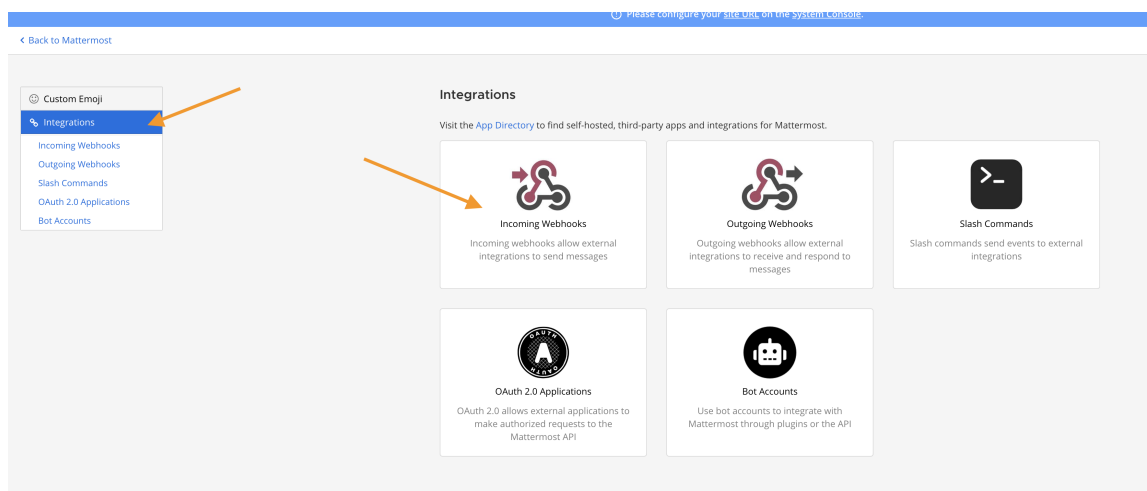


Figure 2. Allowing Incoming Webhooks (Integrations)

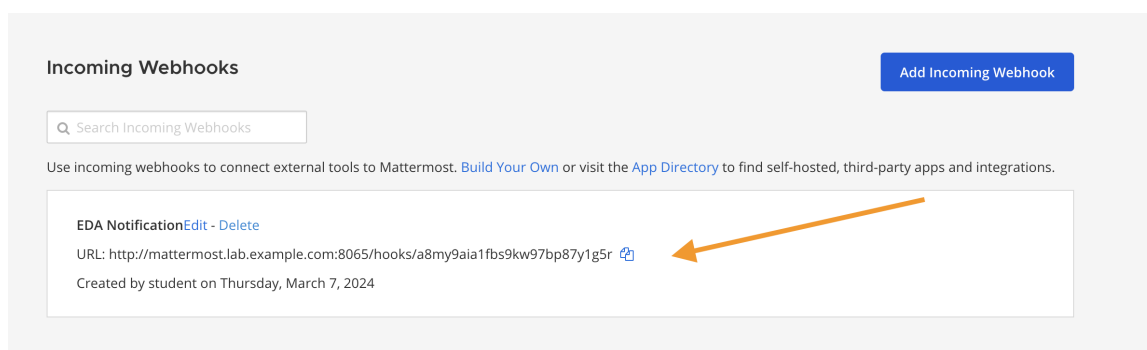


Figure 3. Webhook URL

The **incoming webhook** gets created by the start and setup script, just copy the webhook and place in the playbooks above.

Outgoing Webhooks

The outgoing webhooks must be configured so that Mattermost can connect and contact the EDA Controller based on the service needed.

Outgoing Webhook Playbooks

- `website_notify_down.yml`
- `website_notify_missing_index.yml`

← Back to Mattermost

Custom Emoji

Integrations

Incoming Webhooks

Outgoing Webhooks

Slash Commands

OAuth 2.0 Applications

Bot Accounts

Outgoing Webhooks > Edit

Title: EDA controller

Description: Describe your outgoing webhook.

Content Type: application/json

Channel: Town Square

Trigger Words (One Per Line): website-index-fix, website-service-fix

Trigger When: First word matches a trigger word exactly

Callback URLs (One Per Line): http://eda-controller.lab.example.com:5000

Figure 4. Outgoing Webhook URL

It is very important that if you are using Rulebooks with the **run_playbook** command that the inventory/host specified in the ruleset is the same host as specified in the playbooks, otherwise, there are issues with **no hosts matched**.



```
PLAY [Send a message to the chat group - Index Missing]
*****
skipping: no hosts matched
```

3.4.1. Demo Instructions - Mattermost URL Check and Fix Demo

3.4.1.1. Setup for the Demo

1. Run the setup script to prepare the environment.

```
[student@workstation ~]$ cd
/home/student/Github/DO274_Demo/Demos/CH3/URL_Check_MM_Demo
```

```
[student@workstation URL_Check_MM_Demo]$ ./Setup_Demo.sh
```

```
*****
**** Copying Collections *****
```

```
... OUTPUT OMITTED ...
```

```
PLAY RECAP *****
```

```
servera      : ok=6    changed=4    unreachable=0    failed=0
skipped=0    rescued=0    ignored=0
```

```
SUCCESS Checking lab systems
SUCCESS Installing required software
SUCCESS Performing common exercise tasks
SUCCESS Creating the exercise directory
SUCCESS Preparing the exercise
```

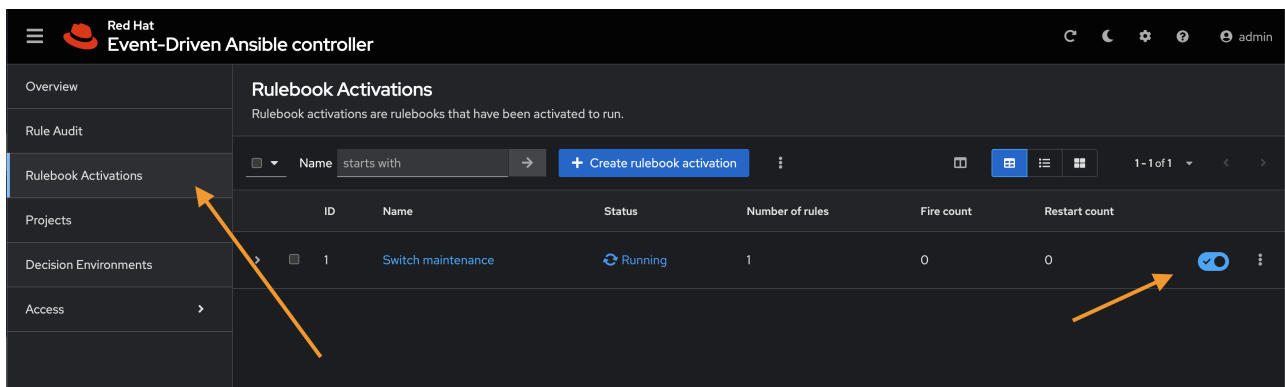
The **Setup_Demo.sh** script prepares the lab environment and also calls the *lab start example-chat* script to setup and pre-configure MatterMost and some of the server configuration settings there.



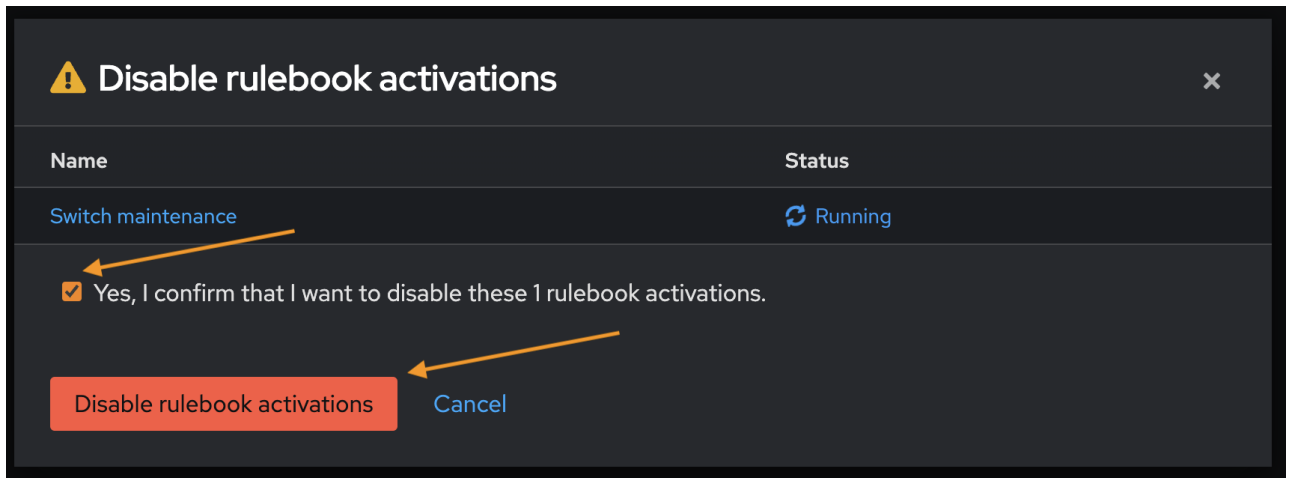
The **Setup_Demo.sh** script takes about five (5) minutes to run to completion.

2. Disable the **Switch Maintenance Rulebook** in EDA Controller

- a. Login to EDA Controller
- b. Click **Rulebook Activations** then click the switch to **Disable** the activation



- c. Confirm **Disable** rulebook activations



3. Login to Mattermost (<http://mattermost.lab.example.com:8065/>)
 - a. UN/PW: student/Stud3nt123
4. Go to the **System Console** ⇒ **Environment** ⇒ **Developer** ⇒ **Allow Untrusted connections** menu and add the EDA Controller and the classroom subnet.
 - eda-controller.lab.example.com
 - 172.25.250.0/24
 - a. Click **Save**
 - b. Click **Back to labexamplecom**
5. Select **Integrations** from the System Menu
6. Select Incoming Webhooks
 - <http://mattermost.lab.example.com:8065/hooks/a8my9aia1fbs9kw97bp87y1g5r>
 - a. Copy the webhook for the playbooks



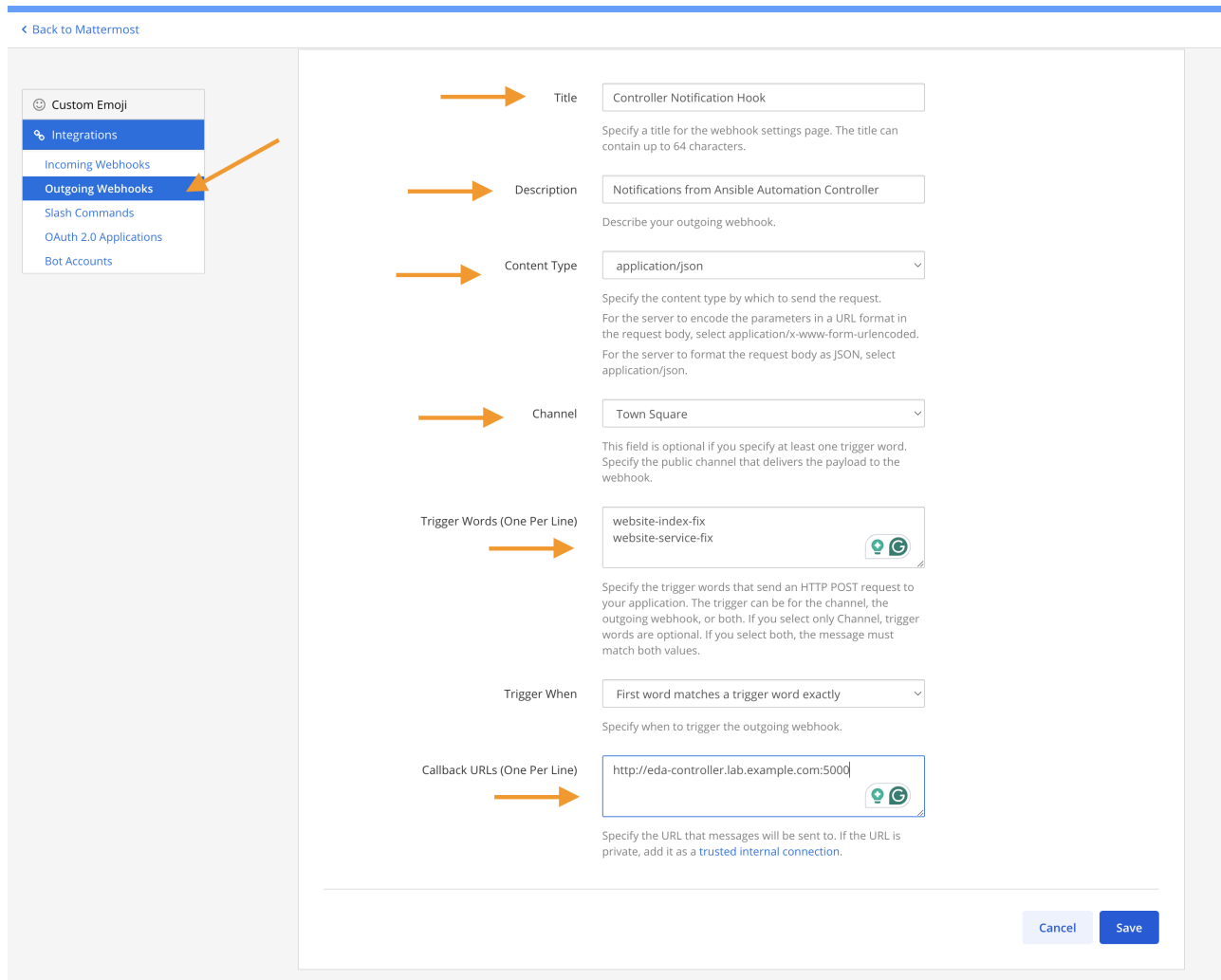
This webhook will hopefully be the same and no change would need to be made to the playbooks. If that is the case, we are just verifying. However, if a change needs to be made to the webhook, it should be copied and applied to the playbook.

The playbooks that would need to be modified are located in the DO274_Demo project and would not need to be updated in Github.

- `/home/student/Github/DO274_Demo/Demos/CH3/URL_Check_MM_Demo/website_notify_index_missing.yml`
- `/home/student/Github/DO274_Demo/Demos/CH3/URL_Check_MM_Demo/website_notify_down.yml`

7. Return to the **Integrations** from the System Menu and select **Outgoing Webhooks**
8. Click **Add Outgoing Webhook**

- **TITLE:** Controller Notification Hook
- **Description:** Notifications from Ansible Automation Controller
- **Content Type:** application/json
- **Channel:** Town Square
- **Trigger Words**
 - website-index-fix
 - website-service-fix
- **Callback URL:** <http://eda-controller.lab.example.com:5000>



< Back to Mattermost

Custom Emoji

Integrations

Incoming Webhooks

Outgoing Webhooks

Slash Commands

OAuth 2.0 Applications

Bot Accounts

Title: Controller Notification Hook

Specify a title for the webhook settings page. The title can contain up to 64 characters.

Description: Notifications from Ansible Automation Controller

Describe your outgoing webhook.

Content Type: application/json

Specify the content type by which to send the request. For the server to encode the parameters in a URL format in the request body, select application/x-www-form-urlencoded. For the server to format the request body as JSON, select application/json.

Channel: Town Square

This field is optional if you specify at least one trigger word. Specify the public channel that delivers the payload to the webhook.

Trigger Words (One Per Line): website-index-fix, website-service-fix

Specify the trigger words that send an HTTP POST request to your application. The trigger can be for the channel, the outgoing webhook, or both. If you select only Channel, trigger words are optional. If you select both, the message must match both values.

Trigger When: First word matches a trigger word exactly

Specify when to trigger the outgoing webhook.

Callback URLs (One Per Line): http://eda-controller.lab.example.com:5000

Specify the URL that messages will be sent to. If the URL is private, add it as a [trusted internal connection](#).

Cancel Save

a. Click **Save**

b. Click **Done**

3.4.1.2. Running the Demo

1. Create the **EDA Controller** Rulebook Activation
 - a. Navigate to **Rulebook Activations**

b. Click **Create Rulebook Activation**

- <https://eda-controller.lab.example.com/overview>

c. Complete the Web Form

- **Name:** DEMO EDA MatterMost
- **Project:** Weebsite Maintenance Demo
- **Rulebook:** web_mattermost_demo.yml
- **Decision Environment:** Automation Hub Default Decision Environment
- **Controller Token:** controller.lab.example.com

2. Launch the **url_check.yml** Rulebook

Listing 10. Running the Rulebook on Workstation

```
[student@workstation URL_Check_MM_Demo]$ ansible-rulebook -r url_check.yml -i inventory
```

3. In another window or frame, SSH to ServerA as root so that you can stop the services or delete the **index.html** file.

```
[student@workstation ~]$ ssh root@servera
```

4. Delete the **/var/www/index.html** file and observe the Rulebook and Mattermost notifications.

```
[root@servera ~]# rm /var/www/html/index.html
rm: remove regular file '/var/www/html/index.html'? y
```

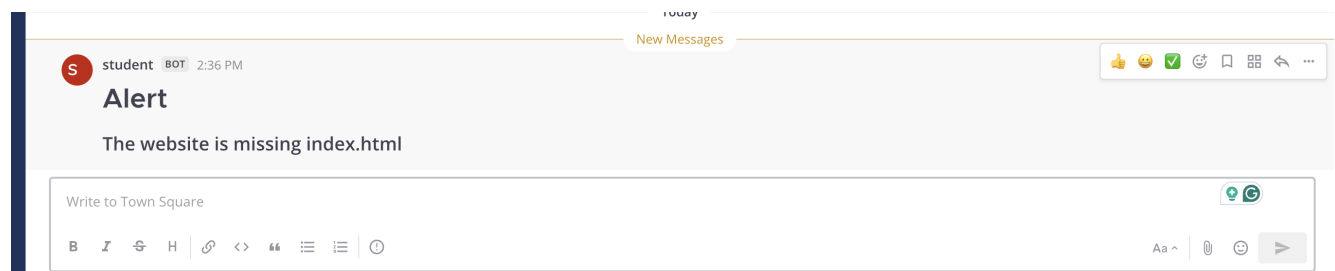


Figure 5. Mattermost Notification

```
PLAY [Send a message to the chat group - Index Missing] *****

TASK [Send the message] *****
ok: [workstation.lab.example.com]

PLAY RECAP *****
workstation.lab.example.com : ok=1    changed=0    unreachable=0    failed=0    skippe
d=0    rescued=0    ignored=0
```

Figure 6. Rulebook Notification - Workstation

5. Type **website-index-fix** in the MatterMost **Town Square** channel.



Figure 7. Mattermost Notification - Trigger Fix

6. Verify that the website is up and running via the MatterMost alert and the running rulebook

student **BOT** 2:45 PM
Alert
 The website index.html has been restored!!

Figure 8. Mattermost Notification - Website Fixed

```
** 2024-05-16 18:47:18.178931 [debug] *****
The website is up and running
*****
```

Figure 9. Rulebook Notification - Workstation - Website Fixed

The process can be repeated for the **httpd** service. In order to test the service triggers, run **systemctl stop httpd** on serverA and to fix the service, type **website-service-fix** in Mattermost.

It is also important that again, the URLs might need changed for the incoming webhooks. If this is the case, please submit an issue as I can turn this into a variable for Ansible Automation Controller as there is no direct "commit" access for my main branch. Another solution would be to "fork" the repository and make it your own.



Playbooks that need to be modified for the Ansible Automation Controller are in the **DO274 Demo Project** which belong to the https://github.com/tmichett/AAP2_Demos.git repository.

Playbooks to modify the URL for MatterMost Incoming Webhook

- `website_notify_index_restored.yml`
- `website_notify_service_restored.yml`

The Webhook being used should be part of the course, but it may change with course updates.

3.4.1.3. Repositories and Items in Demo

There are several public repositories used in this demo. The reason these needed to be used is based on the project structure, file locations, and because they are also shared resources in other courses.

- **Controller Playbooks:** https://github.com/tmichett/AAP2_Demos
- **EDA Controller Rulebooks:** https://github.com/tmichett/do274_eda_rulebooks
- **Main Demo Repository:** https://github.com/tmichett/DO274_Demo

Appendix A: References and Tutorials

Ansible Automation Platform - Documentation

- https://access.redhat.com/documentation/en-us/red_hat_ansible_automation_platform

A.1. VS Code Development Environment

- **Create an efficient Ansible development environment in VS Code IDE:** <https://developers.redhat.com/articles/2024/03/05/create-efficient-ansible-development-environment-vs-code-ide>
- **Ansible VS Code Extension by Red Hat:** <https://marketplace.visualstudio.com/items?itemName=redhat.ansible>
- **Deep dive on Ansible VScode extension:** <https://www.ansible.com/blog/deep-dive-on-ansible-vscode-extension/>

A.2. Ansible Rulebooks and EDA

- **Getting Started with Event-Driven Ansible:** <https://www.ansible.com/blog/getting-started-with-event-driven-ansible/>
- **What is Event-Driven Ansible?:** <https://ansible.readthedocs.io/projects/rulebook/en/stable/introduction.html>
- **What is an Ansible Rulebook?:** <https://www.redhat.com/en/topics/automation/what-is-an-ansible-rulebook>
- **Ansible-Rulebook Github:** <https://github.com/ansible/ansible-rulebook>
- **Welcome to Ansible Rulebook documentation:** <https://ansible.readthedocs.io/projects/rulebook/en/stable/>
- **Utilizing Ansible Rulebooks with Event Driven Ansible:** <https://medium.com/@julialiu08/writing-ansible-rulebooks-with-event-driven-ansible-69c17d3d7657>
- **What is an Ansible Rulebook?:** <https://www.redhat.com/en/topics/automation/what-is-an-ansible-rulebook>
- **<https://www.redhat.com/en/topics/automation/what-is-an-ansible-module>:** What is an Ansible module—and how does it work?

A.3. Decision Environments

- **Using your own rulebooks and projects with the decision environment:** https://ansible.readthedocs.io/projects/rulebook/en/stable/decision_environment.html
- **Event-Driven Ansible with a minimal example:** <https://dev.to/atixag/event-driven-ansible-2en0>

A.4. Event-Driven Ansible (EDA) Collections

- **Ansible-EDA Github:** <https://github.com/ansible/event-driven-ansible>

A.5. Event Driven Ansible

- **Event-Driven Ansible: The Simple Way to Automate Your IT Processes:** <https://medium.com/@miteshget/event-driven-ansible-the-simple-way-to-automate-your-it-processes-3f7bfa57cb9e>
- **Creating custom Event-Driven Ansible source plugins:** <https://www.ansible.com/blog/creating-custom-event-driven-ansible-source-plugins/>
- **Event-Driven Ansible is Here:** <https://www.ansible.com/blog/event-driven-ansible-is-here/>
- **10 ways to integrate event-driven automation into IT operations:** <https://www.redhat.com/sysadmin/event-driven-ansible-automation>

A.6. EDA Videos

- **Event Driven Ansible:** <https://www.youtube.com/watch?v=9K-0Dsnz84g>
- **EDA Rulebooks:** <https://www.youtube.com/watch?v=aqQq5vD8-n0>
- **EDA Getting Started:** https://www.youtube.com/watch?v=_6KX5XXicSc

A.7. Red Hat Interactive Labs

- **Interactive labs for Red Hat Ansible Automation Platform:** <https://www.redhat.com/en/interactive-labs/ansible>