Discovery 15: Create a Compliance Report

Introduction

In this activity, you will create a compliance report.

After completing this activity, you will be able to meet these objectives:

- Create compliance report.
- Export the created report to HTML format.

Job Aid

The following job aid is available to help you complete the lab activities:

- This Lab Guide

The following table contains passwords that you might need.

Device	Username	Password
student-vm	student	1234QWer
nso-server	student	1234QWer

Required Resources

The following resources and equipment are required for completing the activities in this lab guide:

- PC or laptop with a web browser
- Access to the internet

Command List

The following are the most common commands that you will need:

Linux Shell:

Command	Comment
source /opt/ncs/ncs-6.1/ncsrc	Source NSO environmental variable in Docker container.
ls|ll	Display contents of the current directory.
cd	Move directly to user home directory.
cd ..	Exit out of current directory.
cd test	Move into the "test" folder which is a subfolder of the current directory.
cd /home/student	Move into the "nso300" folder by specifying the direct path to it starting from the root of the directory system.

Command	Comment
ncs_cli -C	Log in to NSO CLI directly from local server.

NSO CLI:

Command	Comment
switch cli	Change CLI style.
show ?	Display all command options for current mode.
configure	Enter configuration mode.
commit	Commit new configuration (configuration mode only command).
show configuration	Display new configuration that has not yet been committed (configuration mode only command).

Makefile commands for Docker environment:

Command	Comment
make build	Builds the main NSO Docker image.
make testenv-start	Starts the NSO Docker environment.
make testenv-stop	Stops the NSO Docker environment.
make testenv-build	Recompiles and reloads the NSO packages.
make testenv-cli	Enters the NSO CLI of the NSO Docker container.
make testenv-shell	Enters the Linux shell of the NSO Docker container.
make dev-shell	Enters the Linux shell of the NSO Docker development container.

Command Syntax Reference

This lab guide uses the following conventions for **command syntax**:

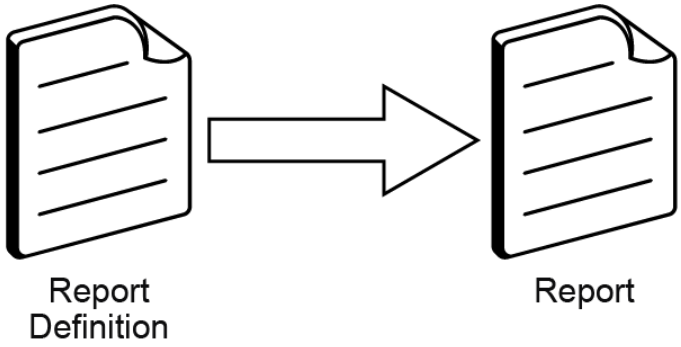
Formatting	Description and Examples
show running config	Commands in steps use this formatting.
Example	Type **show running config**
Example	Use the **name** command.
`show running config`	Commands in CLI outputs and configurations use this formatting.
highlight	CLI output that is important is highlighted.

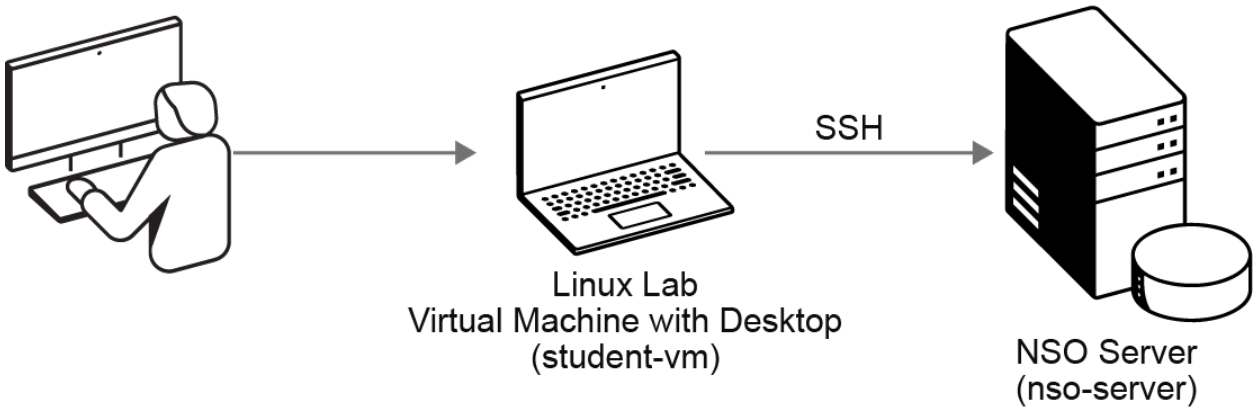
Formatting	Description and Examples
Example	`student@student-vm:~$ ncs --version` `6.1`
Example	Save your current configuration as the default **startup config**. `Router Name# copy running startup`
brackets ([ ])	Indicates optional element. You can choose one of the options.
Example:	`(config-if)# frame-relay lmi-type {ansi|cisco|q933a}`
italics font	Arguments for which you supply values.
Example	Open file **ip tcp window-size** *bytes*
angle brackets (<>)	In contexts that do not allow italics, arguments for which you supply values are enclosed in angle brackets [<>]. Do not type the brackets when entering the command.
Example	If the command syntax is **ping** <*ip_address*>, you enter ping *10.0.0.102*
string	A non-quoted set of characters. Type the characters as-is.
Example	(config)# **hostname MyRouter**
vertical line (|)	Indicates that you enter one of the choices. The vertical line separates choices. Do not type the vertical line when entering the command.
Example	If the command syntax is **show ip route|arp**, you enter either **show ip route** or **show ip arp**, but not both.

Lab Topology Information

Your lab session is your own personal sandbox. Whatever you do in your session will not be reflected in anyone else's session. Your lab environment is a Linux server (Student-VM) acting as a jumphost and a Linux server (NSO-server) acting as a NSO server. NSO server includes NetSIM routers. This will be the network that you will orchestrate with your NSO.

Topology





Task 1: Create and Run a Compliance Report

In this task, you will create a compliance report template and run a report.

Activity

Complete these steps:

Step 1

Connect to the Student-VM.

You can connect to the server either by choosing the **Student-VM** from the device list or by clicking the **Student-VM** icon in the topology map.

Step 2

Open the terminal window.

Open the terminal window by clicking the **Terminal** icon in the bottom bar.

```
student@student-vm:~$
```

Step 3

Connect to the **nso-server** NSO server.

Connect to the **nso-server** NSO server with the **student** user using the SSH client.

The authentication is already preconfigured with the public key authentication, therefore the password is not needed. The prompt will change, stating that you are now connected to the nso-server.

```
student@student-vm:~$ ssh student@nso-server
Last login: Tue Oct  3 09:14:42 2023 from 10.0.0.102
student@nso-server:~$
```

Step 4

Connect to the NSO CLI.

Use the **ncs_cli -C** command.

```
student@nso-server:~$ ncs_cli -C

User student last logged in 2024-02-05T09:52:53.80762+00:00, to nso-
server, from 100.64.0.11 using cli-ssh
student connected from 100.64.0.11 using ssh on nso-server
student@ncs#
```

Step 5

Create a compliance report definition that reports on device and service status.

Create a compliance report, commit the changes, and exit the configuration mode.

- Report for device group **PE_Routers**
- **Device checks:** Current and historic out-of-sync checks
- **Service checks:** Current and historic out-of-sync check for all services

```
student@ncs# config
Entering configuration mode terminal
student@ncs(config)# devices device-group PE_Routers
student@ncs(config-device-group-PE_Routers)# device-name [ PE11 PE22 ]
student@ncs(config-device-group-PE_Routers)# top
student@ncs(config)# compliance reports report System_Report
student@ncs(config-report-System_Report)# device-check device-group
PE_Routers
student@ncs(config-report-System_Report)# device-check current-out-of-
sync true
student@ncs(config-report-System_Report)# device-check historic-changes
true
student@ncs(config-report-System_Report)# device-check historic-out-of-
sync true
student@ncs(config-report-System_Report)# service-check all-services
student@ncs(config-report-System_Report)# service-check current-out-of-
sync true
student@ncs(config-report-System_Report)# service-check historic-out-
of-sync true
student@ncs(config-report-System_Report)# commit
Commit complete.
```

```
student@ncs(config-report-System_Report)# top
student@ncs(config)# exit
student@ncs#
```

Step 6

Run the compliance report by generating HTML output.

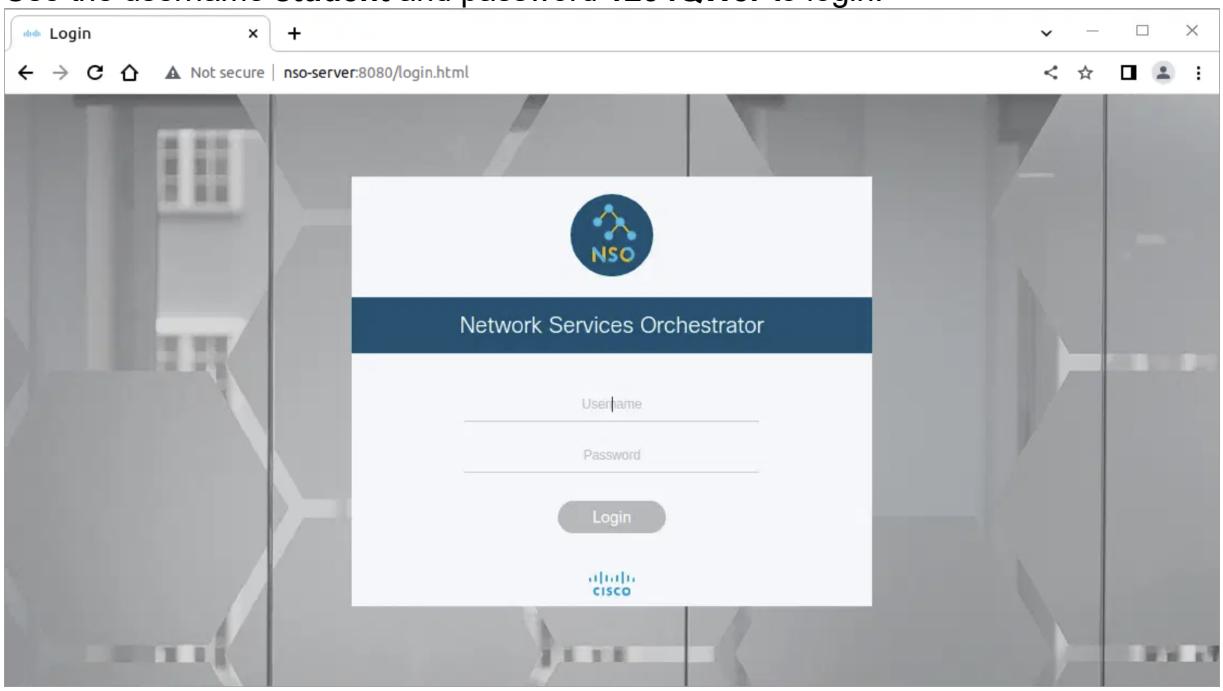
Execution of report might take several minutes. Note the location of the report provided in the output.

```
student@ncs# compliance reports report System_Report run outformat html
time 2024-02-06T21:57:35.426935+00:00
compliance-status violations
info Checking 2 devices and no services
location http://localhost:8080/compliance-reports/
report_2024-02-06T21:57:35.426935+00:00.html
student@ncs#
```

Step 7

Open a browser window and go to the NSO WebUI on **http://nso-server**.

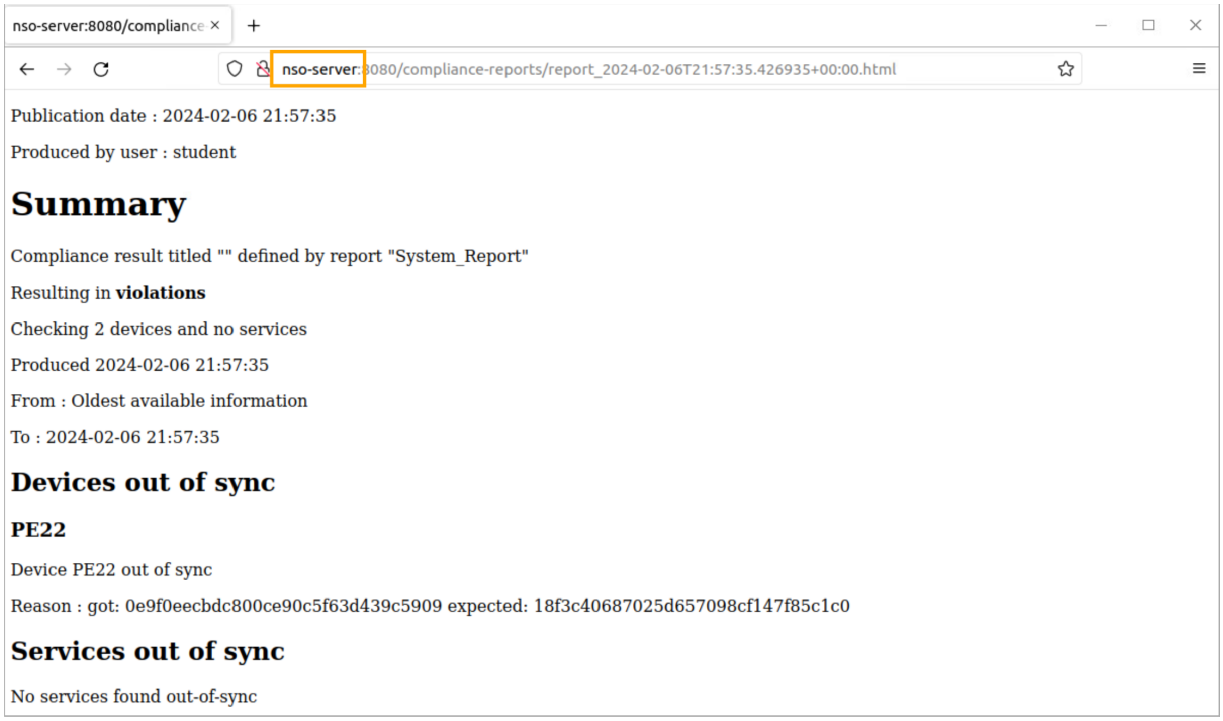
Use the username **student** and password **1234QWer** to login.



Step 8

Open the provided link to the report in a browser window and check the results.

Make sure to replace **localhost** in the generated link with a server name **nso-server**, because you are accessing the report from the Student VM.



Activity Verification

You have completed this task when you attain these results:

- You created a compliance report.
- You ran and opened a status report.

Task 2: Check Device Configuration Compliance

In this task, you will create a device configuration template, device configuration compliance report template, and run a report against a group of PE devices.

Activity

Complete these steps:

Step 1

Open a new terminal window.

Open a new terminal window by clicking the **Terminal** icon in the bottom bar.

```
student@student-vm:~$
```

Step 2

Connect to the **nso-server** NSO server.

Connect to the **nso-server** NSO server with the **student** user using the SSH client. The authentication is already preconfigured with public key authentication, therefore the password is not needed. The prompt will change, stating that you are now connected to the nso-server.

```
student@student-vm:~$ ssh student@nso-server
Last login: Tue Oct  3 09:14:42 2023 from 10.0.0.102
student@nso-server:~$
```

Step 3

Connect to the NSO CLI.

Use the **ncs_cli -C** command.

```
student@nso-server:~$ ncs_cli -C

User student last logged in 2024-02-05T09:52:53.80762+00:00, to nso-
server, from 100.64.0.11 using cli-ssh
student connected from 100.64.0.11 using ssh on nso-server
student@ncs#
```

Step 4

Create a device template that you will use to check the configuration existence against the devices.

You will configure DNS configuration common to all PE Cisco IOS XR devices with these specifications:

- Template name: **DNS_Config**
- Report for device group **PE_Routers**

```
student@ncs# config
Entering configuration mode terminal
student@ncs(config)# devices template DNS_Config
student@ncs(config-template-DNS_Config)# ned-id cisco-iosxr-cli-7.41
student@ncs(config-ned-id-cisco-iosxr-cli-7.41)# config
student@ncs(config-config)# domain name-server 10.0.0.50
student@ncs(config-name-server-10.0.0.50)# exit
student@ncs(config-config)# domain name-server 10.0.0.51
student@ncs(config-name-server-10.0.0.51)# top
student@ncs(config)# commit
Commit complete.
student@ncs(config-report-System_Report)# top
```

Step 5

Create a compliance report that you will use to check the configuration existence against the devices, commit the changes, and then exit the configuration mode.

Use these specifications:

- Report name: **DNS_Configuration**
- Template name: **DNS_Config**

- Report for device group **PE_Routers**

```
student@ncs(config)# compliance reports report DNS_Configuration
student@ncs(config-report-DNS_Configuration)# compare-template
DNS_Config PE_Routers
student@ncs(config-compare-template-DNS_Config/PE_Routers)# top
student@ncs(config)# commit
Commit complete.
student@ncs(config)# exit
student@ncs#
```

Step 6

Run the compliance report by generating HTML output.

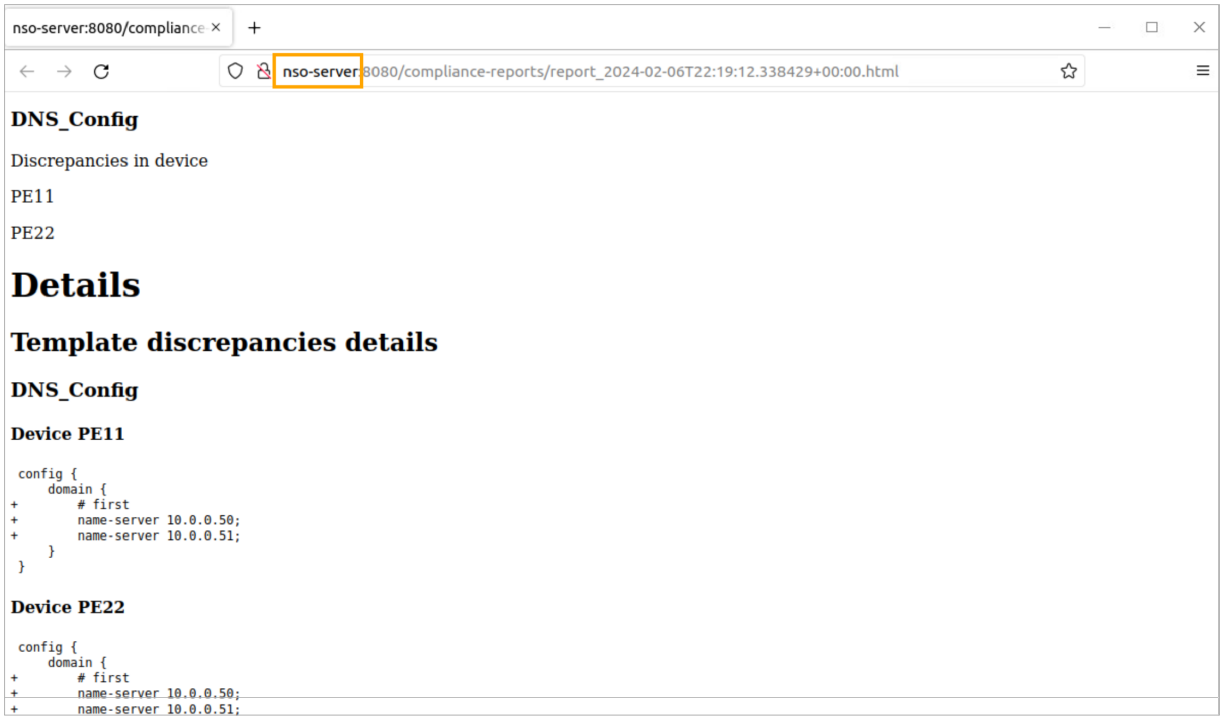
Execution of the report might take several minutes. Note the location of the report provided in the output.

```
student@ncs# compliance reports report DNS_Configuration run outformat
html
time 2024-02-06T22:19:12.338429+00:00
compliance-status violations
info Checking no devices and no services
location http://localhost:8080/compliance-reports/
report_2024-02-06T22:19:12.338429+00:00.html
student@ncs#
```

Step 7

Open the provided link to the report in a browser window and check the results.

Make sure to replace **localhost** in the generated link with the **nso-server** server name, because you are accessing the report from the Student VM. From the report, you can conclude that the DNS configuration is missing on both PE devices. This can be corrected by applying a device template to these two devices.



Activity Verification

You have completed this task when you attain these results:

- You created a device template with DNS configuration.
- You created a report template.
- You ran and opened a status report.

Which command in the report definition is used to configure which device template will be used for comparison with the actual device configuration?

- **compare template <template-name>**
- **compare-template <template-name>**
- **device-check compare-template <template-name>**
- **device-check devices compare-template <template-name>**