

Creating and Publishing Ansible Roles

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1. Ansible Roles

Ansible roles ... blah blah blah

1.1. Creating an Ansible Role

1.2. Publishing Ansible Roles

2. System Security Policy and Compliance

System security and compliance is a primary concern for people when thinking about the protection of systems and integrity of data. This set of hands-on procedures will focus on obtaining the content and necessary packages to perform a basic scan and remediate the system based on scan results. As part of the lab, you will be customizing your own SCAP content for a scan, view the results, and generate an Ansible playbook based on the failed results.

2.1. Customizing SCAP Content

Red Hat includes the SCAP Workbench application as a GUI application which allows scanning, customizing, and saving SCAP scans and results. The SCAP Workbench can be used to perform scans of remote systems over an SSH connection or it can be utilized to scan the local system. Since the SCAP Workbench is a GUI application, it must run on a system with X-Windows installed.

Servers to Configure

- workstation

Packages to Install

- scap-workbench



Since we are using an application on a VM that requires a GUI, we can use X11 forwarding with the SSH connection by specifying a **-X** on the command line.

Step 1 - SSH to Workstation

The first step is to connect to the workstation and forward X11 traffic back to the local system.

Example 1. Connecting to the Workstation VM

Listing 1. Connecting to Workstation Using SSH

```
# ssh root@workstation -X
```

Step 2 - Install Packages

After connecting to the Workstation VM, you will need to install the SCAP Workbench and its dependencies.

*Example 2. Installing SCAP Workbench**Listing 2. Using Yum to Install SCAP Workbench*

```
# yum install scap-workbench

Loaded plugins: langpacks, search-disabled-repos
Resolving Dependencies
--> Running transaction check
--> Package scap-workbench.x86_64 0:1.1.6-1.el7 will be installed
--> Processing Dependency: openscap-utils >= 1.2.0 for package: scap-workbench-1.1.6-1.el7.x86_64
--> Processing Dependency: scap-security-guide for package: scap-workbench-1.1.6-1.el7.x86_64
--> Running transaction check
--> Package openscap-utils.x86_64 0:1.2.16-8.el7_5 will be installed
--> Processing Dependency: openscap-containers = 1.2.16-8.el7_5 for package: openscap-utils-1.2.16-8.el7_5.x86_64
--> Package scap-security-guide.noarch 0:0.1.36-9.el7_5 will be installed
--> Processing Dependency: openscap-scanner >= 1.2.5 for package: scap-security-guide-0.1.36-9.el7_5.noarch
--> Running transaction check
--> Package openscap-containers.noarch 0:1.2.16-8.el7_5 will be installed
--> Package openscap-scanner.x86_64 0:1.2.16-8.el7_5 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package           Arch    Version        Repository      Size
=====
Installing:
scap-workbench   x86_64  1.1.6-1.el7   rhel-server-dvd  1.8 M
Installing for dependencies:
openscap-containers noarch 1.2.16-8.el7_5  rhel_updates    27 k
openscap-scanner   x86_64  1.2.16-8.el7_5  rhel_updates    61 k
openscap-utils     x86_64  1.2.16-8.el7_5  rhel_updates    27 k
scap-security-guide noarch 0:0.1.36-9.el7_5  rhel_updates    2.6 M

Transaction Summary
=====
Install 1 Package (+4 Dependent packages)

Total download size: 4.5 M
Installed size: 64 M
Is this ok [y/d/N]:
```



Some things might already be installed for you, if SCAP Workbench is already installed, please move on to the next step. Also note the dependencies for SCAP Workbench as they are automatically installed.

Step 3 - Launching SCAP Workbench

In order to run a scan or customize SCAP content, you will need to launch the SCAP Workbench application.



You **must** use SCAP Workbench from a GUI, so it will need to run either locally or through an SSH connection with X11 forwarded.

Example 3. Launching SCAP Workbench

Listing 3. Using SCAP Workbench

```
# scap-workbench
```

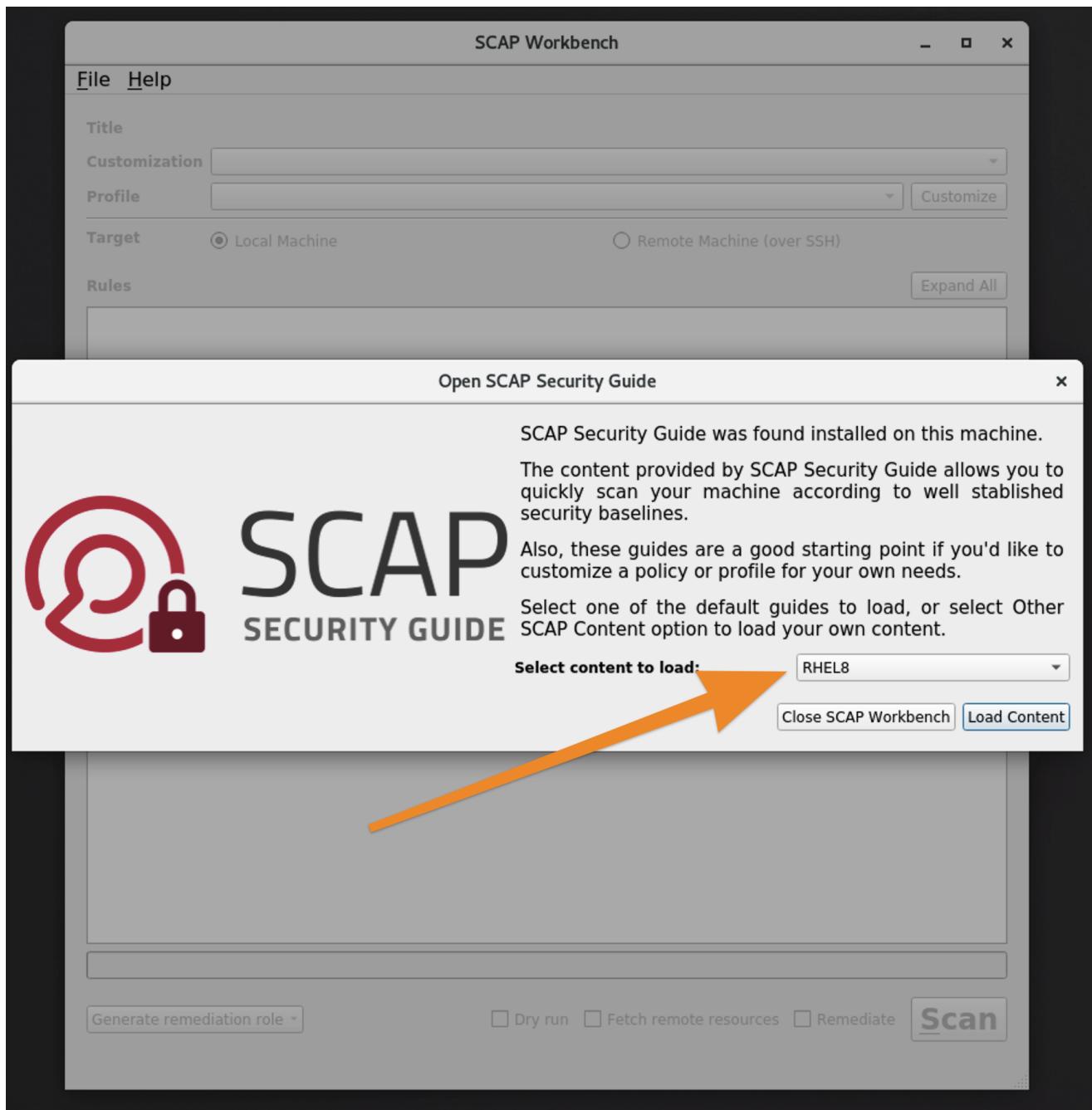


Figure 1. SCAP Workbench Startup

Step 4 - Creating Custom Content

Once SCAP Workbench has been launched, select the content to load. For this lab, we will be using the RHEL7 content.

Example 4. Creating Custom Content

1. For **Select content to load:** select "RHEL8", then click "**Load Content**"
2. Select the **Profile** you want to use to start customization



For this example, we will use the **OSPP - Protection Profile for General Purpose Operating Systems Baseline**

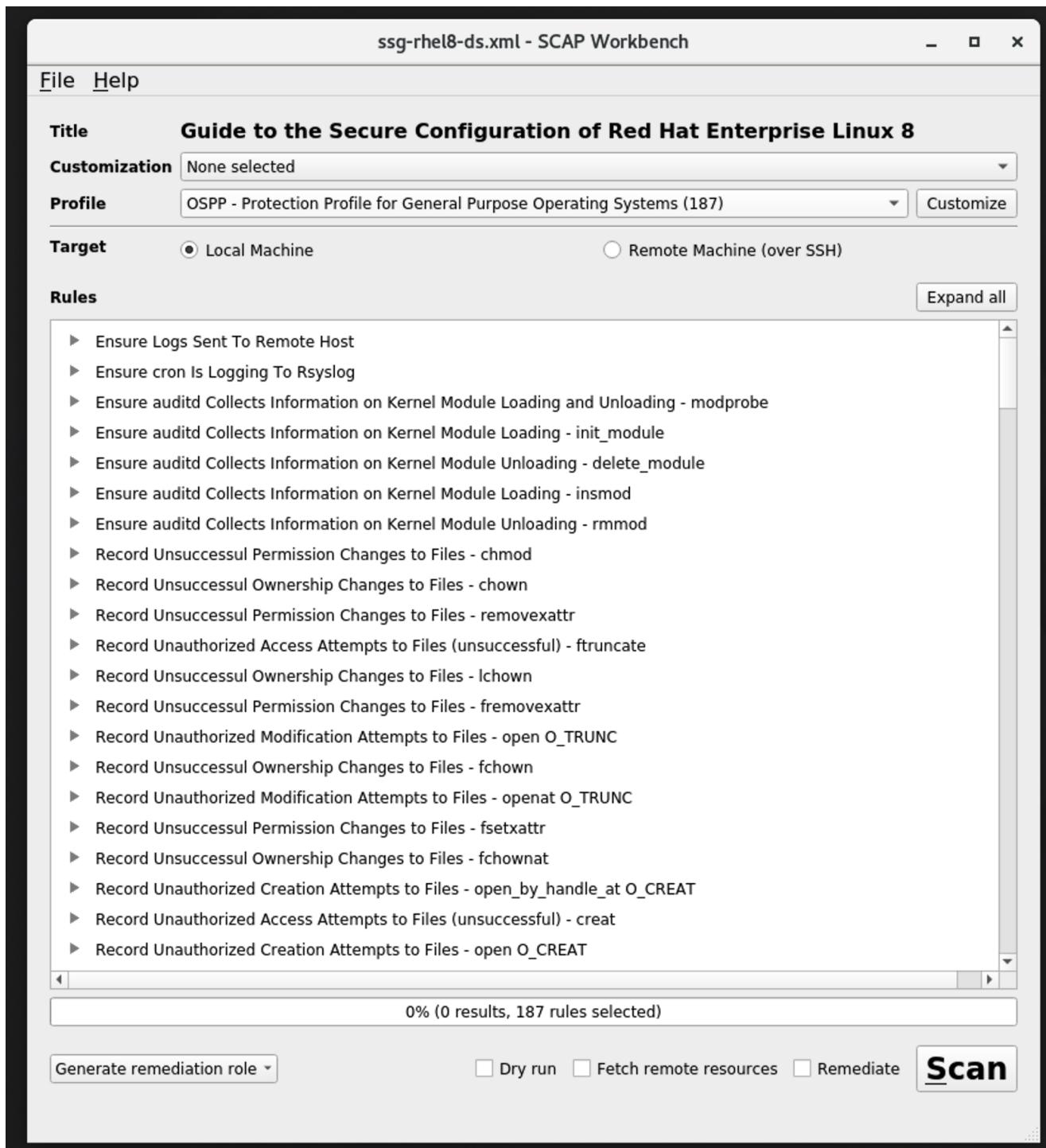


Figure 2. SCAP Workbench OSPP Profile

3. Click "Customize" to create custom SCAP content based on the chosen profile, and give it a name.

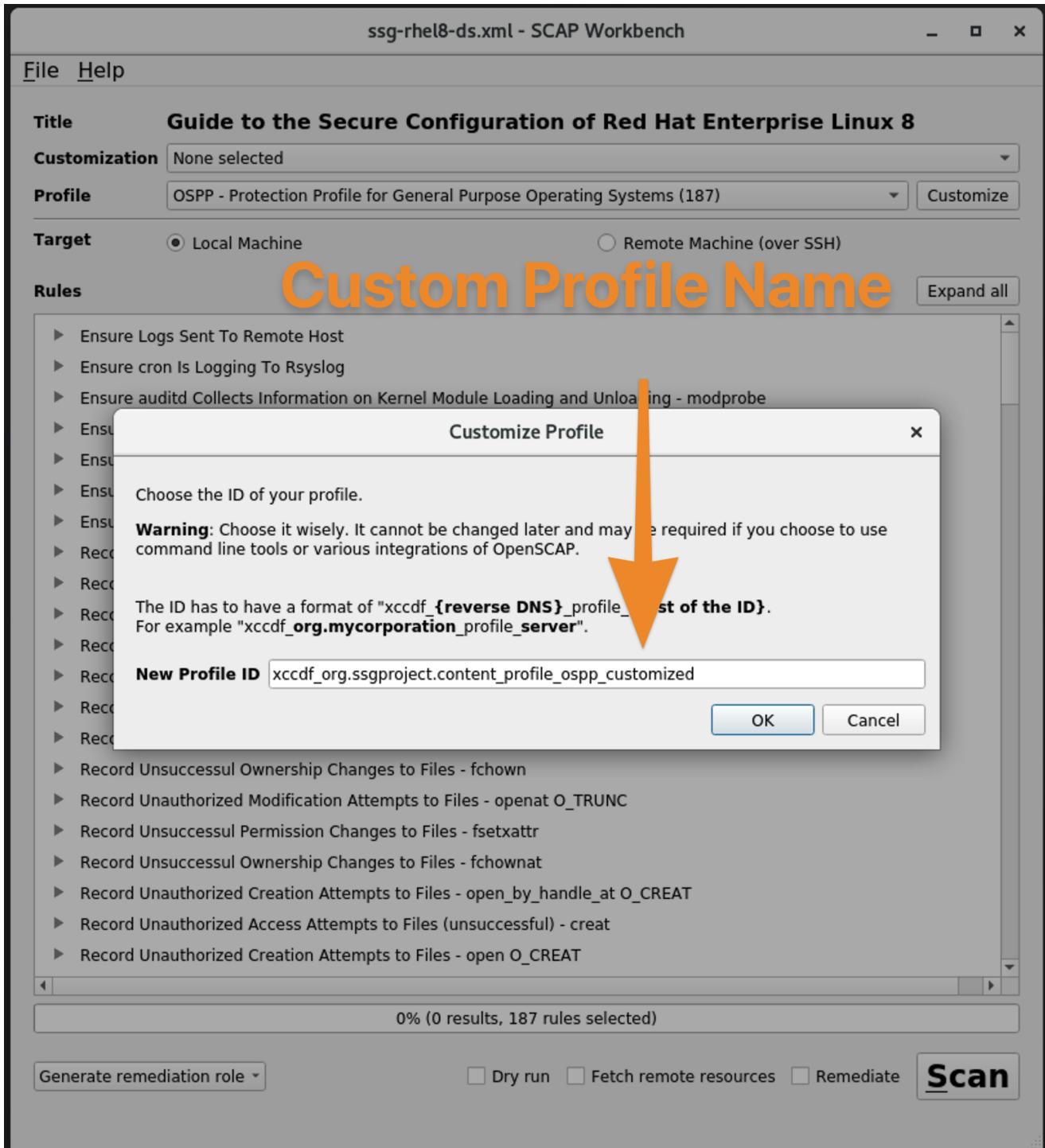


Figure 3. SCAP Custom OSPP Profile Creation



The name for this is: `xccdf_org.ssgproject.content_profile_ospp_customized`

4. Click "Deselect All" so that you can select the items you wish to include in your custom scan profile. **NOTE:** we are doing this to also limit it to a few checks for the example.

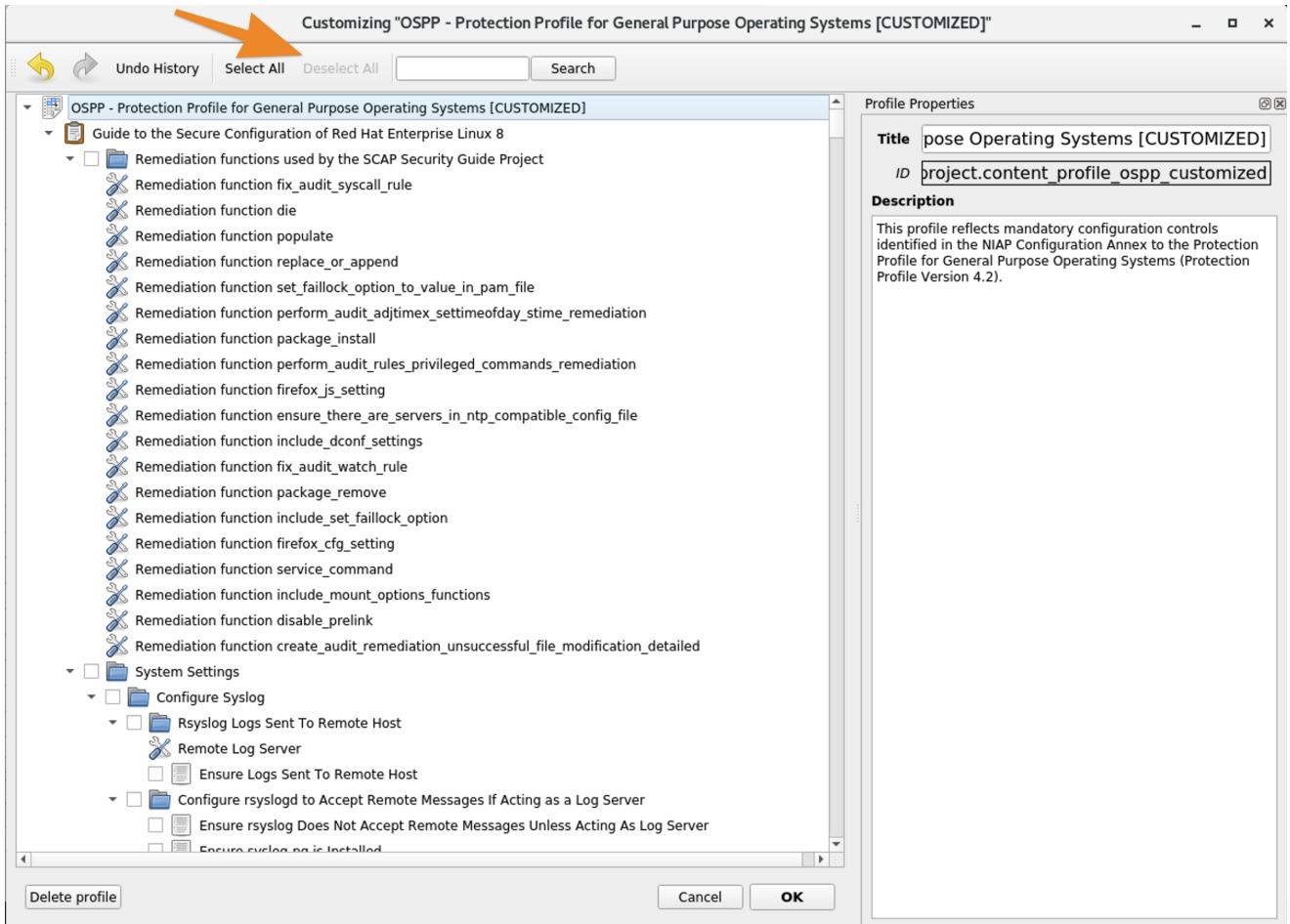


Figure 4. SCAP Custom Profile Selections



For this lab, we will be setting the minimum password length and PAM Password quality settings

5. Search for Password to set **minimum password length** and set the values in **login.defs**. Check **Set Password Minimum Length** in **login.defs** and click on the **minimum password length** and set the value to **18**

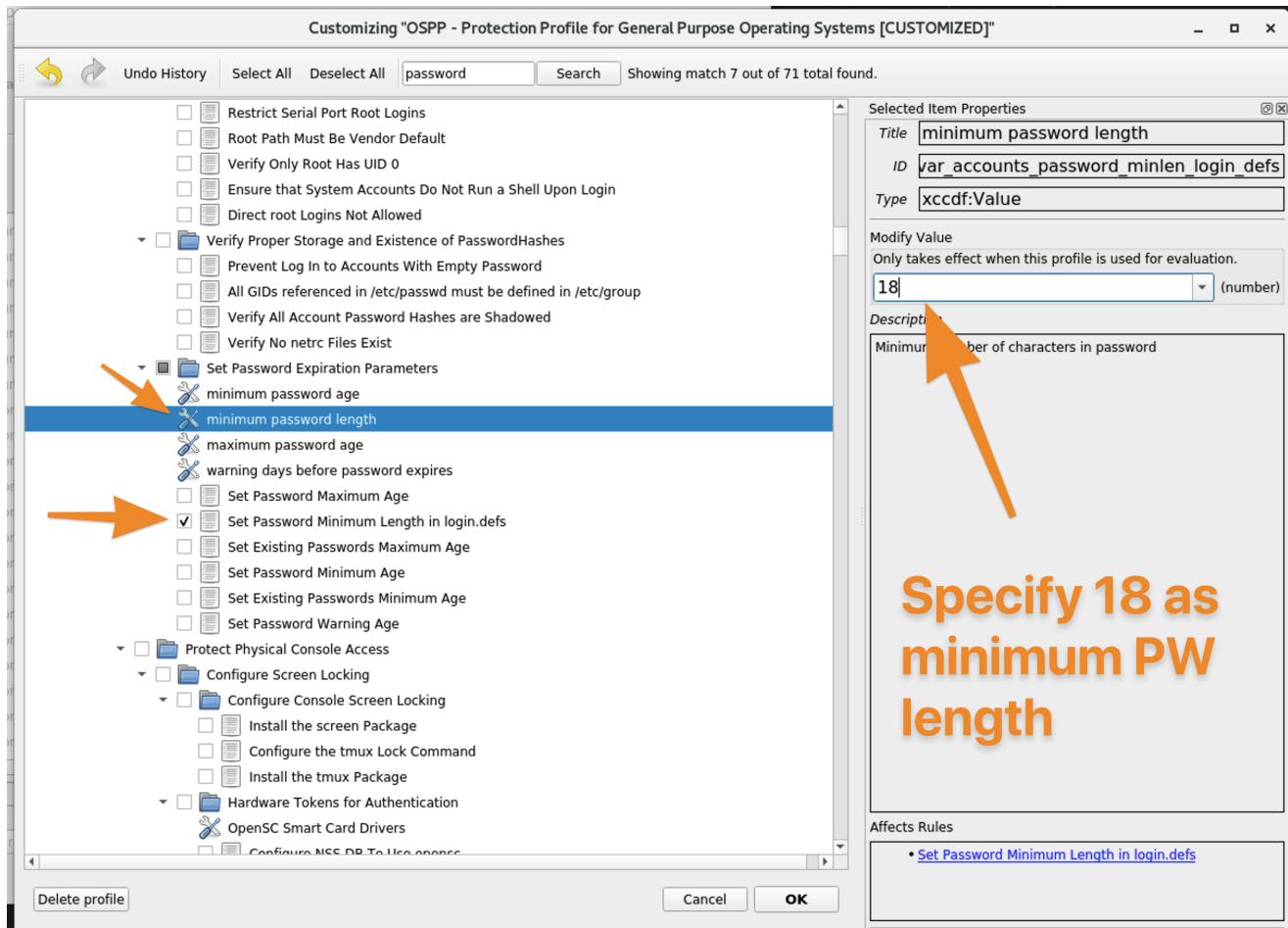


Figure 5. SCAP Custom Profile Password Settings for Login.Defs

6. Set password quality requirements with PAM. Search for the minlen and set it to **18**. Also, place a checkbox in **Set Password Quality Requirements with pam_quality**. Then click "OK"

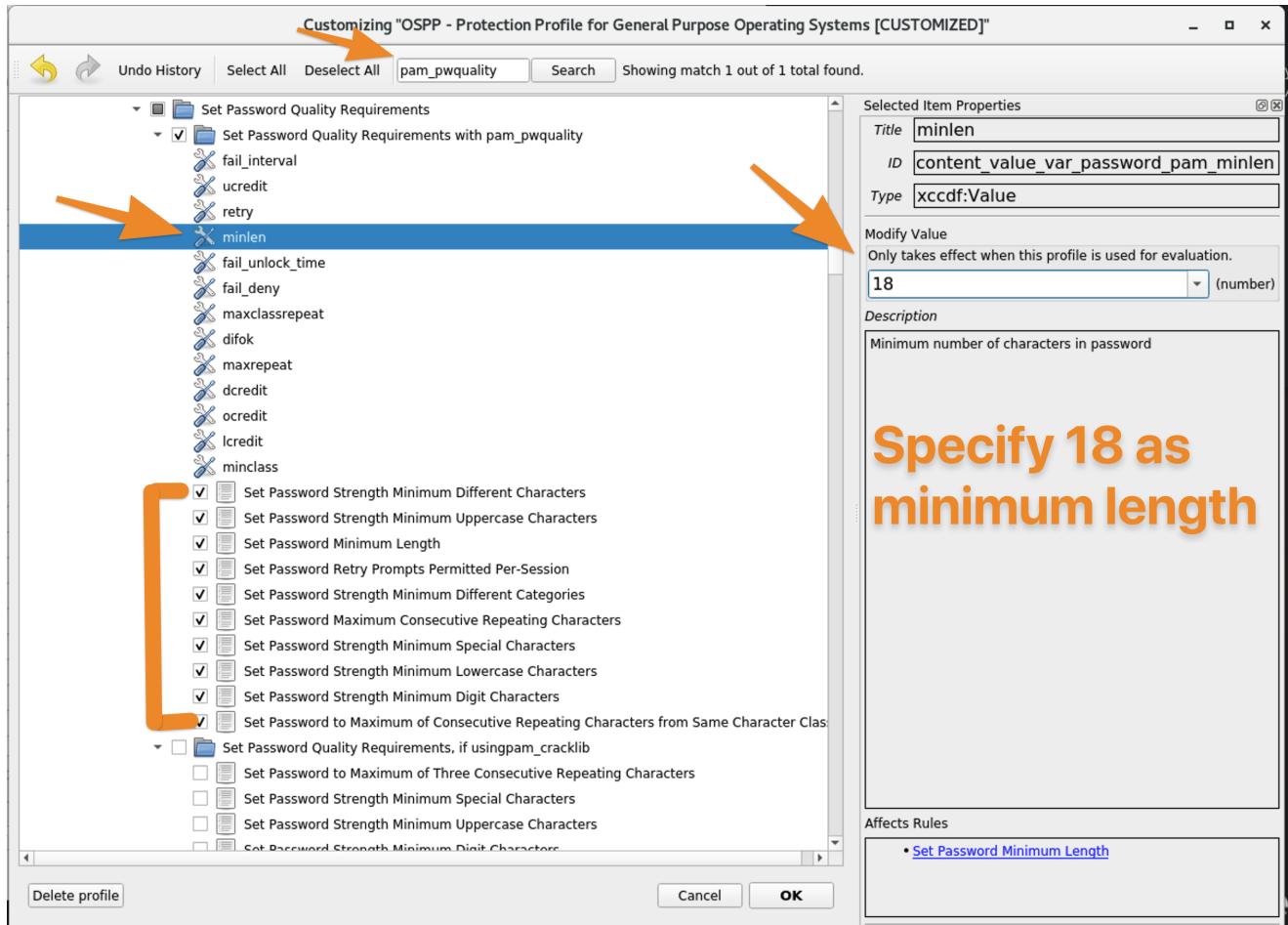


Figure 6. SCAP Custom Profile PAM Quality Requirements

- At this point, we have taken the default settings from the OSPP profile with only the tailored pieces that we selected.
- The next step is to click "File ⇒ Save Customization Only" to save the custom content

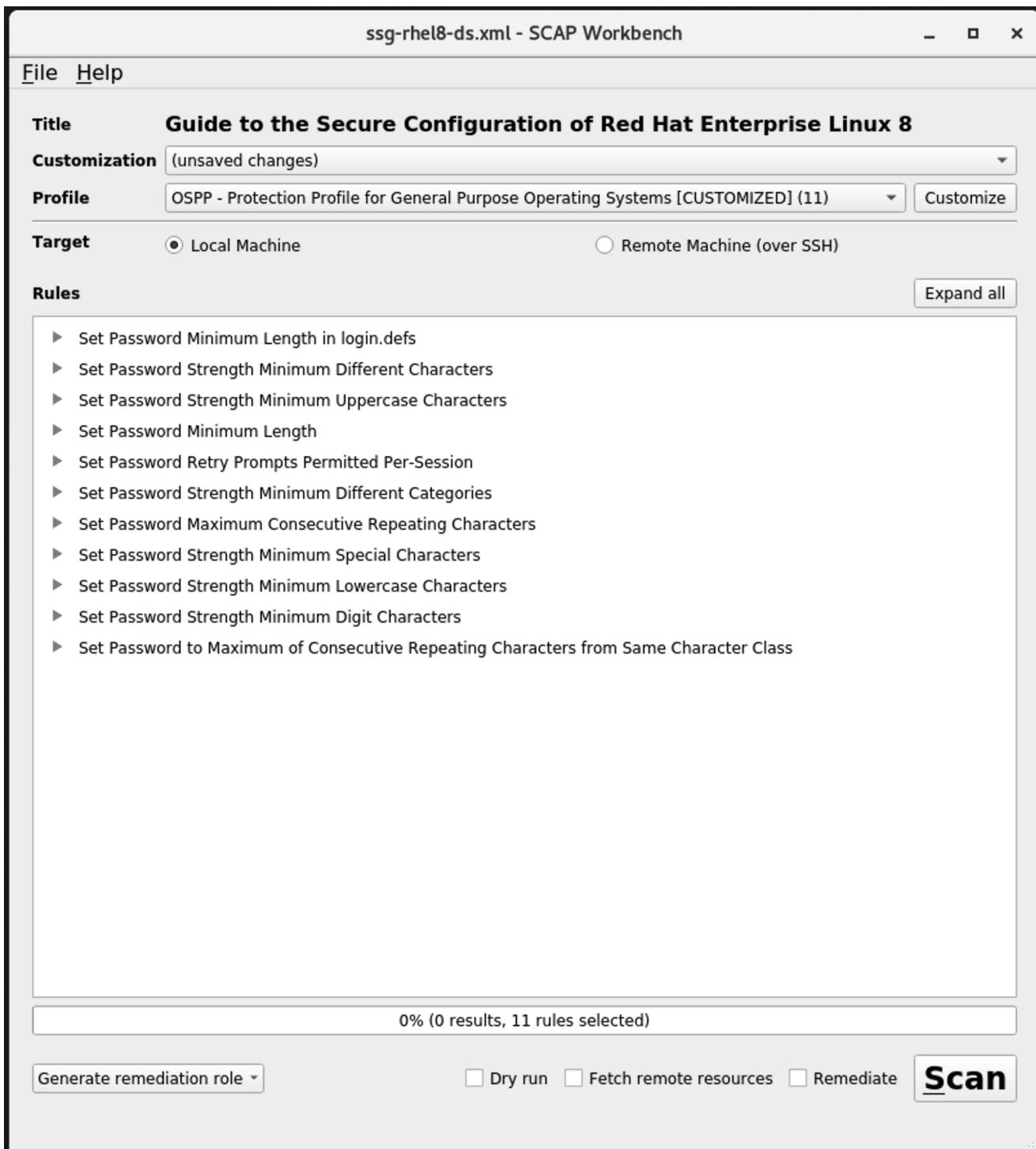


Figure 7. SCAP Custom Profile Selected Settings View

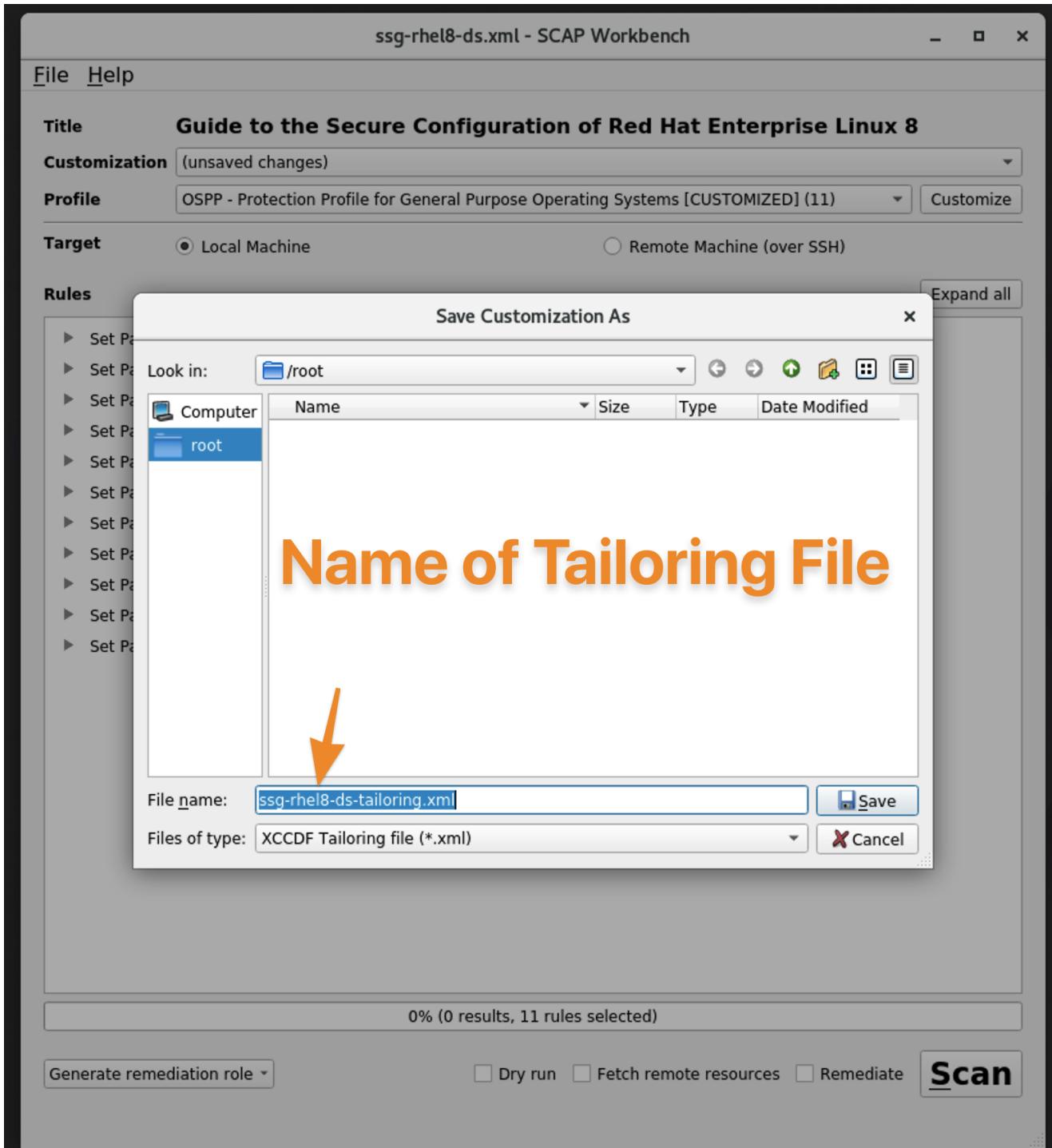


Figure 8. SCAP Custom Profile Creation Saving

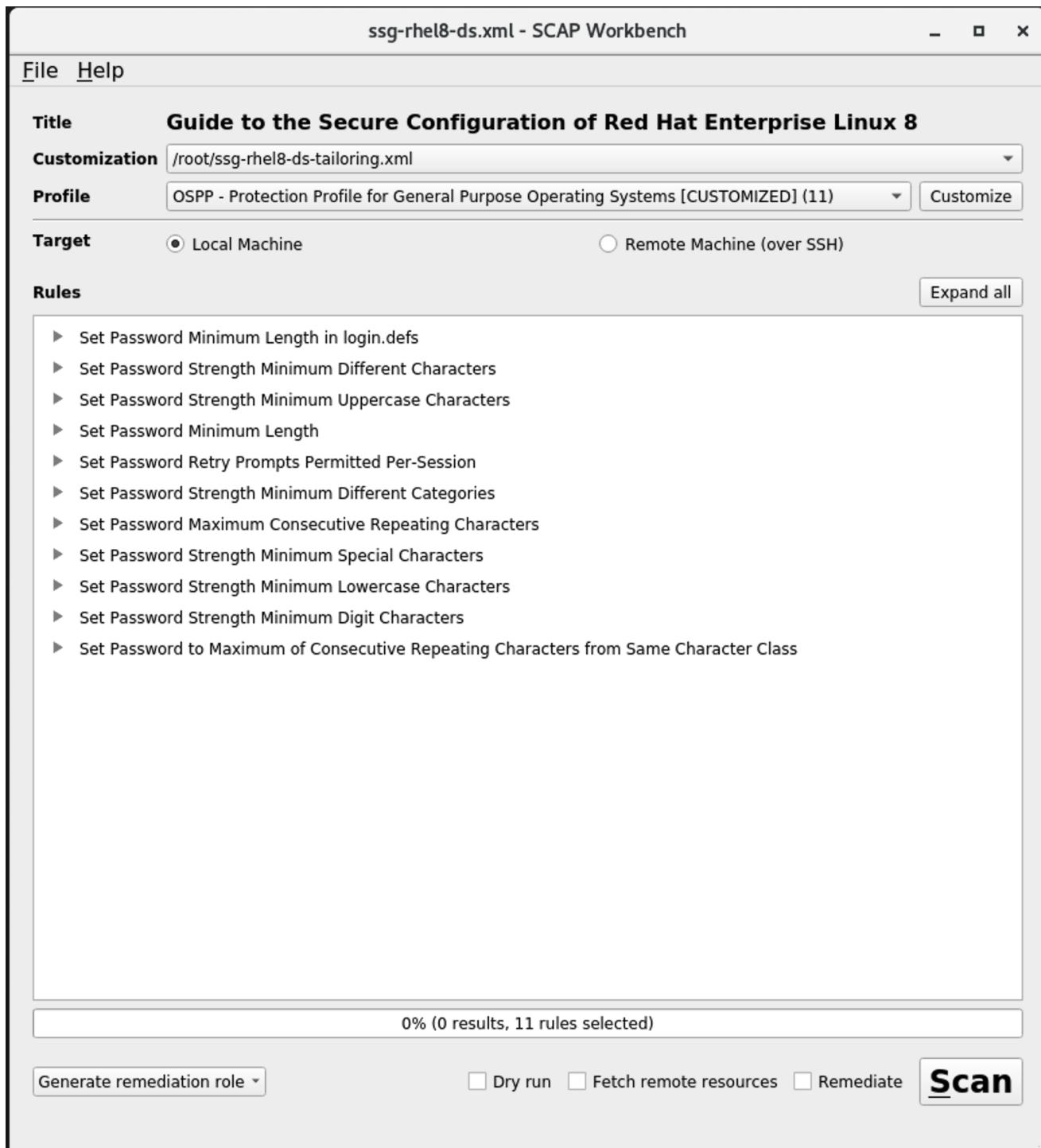


Figure 9. SCAP Custom Profile Final View

8. Copy the custom tailoring file to the server(s) being scanned. In this case, we will want to copy the file to **servera**

Listing 4. Copy custom content

```
[root@workstation ~]# scp ssg-rhel8-ds-tailoring.xml root@servera:  
ssg-rhel8-ds-tailoring.xml          100%   28KB  10.7MB/s  00:00  
[root@workstation ~]#
```

2.2. Running a SCAP Scan with Custom Content

Servers to Configure

- servera

Packages to Install

- openscap-scanner
- scap-security-guide

Step 1 - SSH to servera

The first step is to connect to the server.

*Example 5. Connecting to the **servera** VM**Listing 5. Connecting to **servera** Using SSH*

```
# ssh root@servera
```

Step 2 - Install packages on servera

The second step is to install software on the server.

*Example 6. Install software on servera**Listing 6. Installing Software on servera*

```
[root@servera ~]# yum install scap-security-guide
Last metadata expiration check: 0:47:44 ago on Thu 16 Apr 2020 08:26:15 AM EDT.
Dependencies resolved.

=====
Package      Arch    Version       Repository      Size
=====
Installing:
scap-security-guide      noarch  0.1.42-11.el8   rhel-8.0-for-x86_64-appstream-rpms 3.4 M
Installing dependencies:
openscap      x86_64  1.3.0-7.el8   rhel-8.0-for-x86_64-appstream-rpms 3.3 M
openscap-scanner x86_64  1.3.0-7.el8   rhel-8.0-for-x86_64-appstream-rpms 66 k
xml-common     noarch  0.6.3-50.el8   rhel-8.0-for-x86_64-baseos-rpms 39 k

Transaction Summary
=====
Install 4 Packages

Total download size: 6.9 M
Installed size: 132 M
Is this ok [y/N]: y

... output omitted ...

Verifying : openscap-1.3.0-7.el8.x86_64          1/4
Verifying : openscap-scanner-1.3.0-7.el8.x86_64  2/4
Verifying : scap-security-guide-0.1.42-11.el8.noarch 3/4
Verifying : xml-common-0.6.3-50.el8.noarch        4/4

Installed:
scap-security-guide-0.1.42-11.el8.noarch      openscap-1.3.0-7.el8.x86_64
openscap-scanner-1.3.0-7.el8.x86_64           xml-common-0.6.3-50.el8.noarch

Complete!
```

Learning about SCAP Commands

The SSG man page is a very good source of information for usage of the **oscap** tool as well as provides examples of how to use the SCAP SSG Guide profiles itself.

Listing 7. Looking at SCAP Security Guide (SSG) Man Page

```
# man scap-security-guide
scap-security-guide(8)      System Manager's Manual      scap-security-guide(8)

NAME
SCAP Security Guide - Delivers security guidance, baselines, and associated validation mechanisms utilizing the Security Content Automation Protocol (SCAP).

...
... output omitted ...

EXAMPLES
To scan your system utilizing the OpenSCAP utility against the ospp-rhel7 profile:

oscap xccdf eval --profile ospp-rhel7 --results /tmp/'hostname'-ssg-results.xml --report /tmp/'hostname'-ssg-results.html --oval-results /usr/share/xml/scap/ssg/content/ssg-rhel7-xccdf.xml
```

Listing 8. Looking at oscap Man Page

```
# man oscap
OSCAP(8)          System Administration Utilities          OSCAP(8)

NAME
oscap - OpenSCAP command line tool

SYNOPSIS
oscap [general-options] module operation [operation-options-and-arguments]

DESCRIPTION
oscap is Security Content Automation Protocol (SCAP) toolkit based on OpenSCAP library. It provides various functions for different SCAP specifications (modules).

OpenSCAP tool claims to provide capabilities of Authenticated Configuration Scanner and Authenticated Vulnerability Scanner as defined by The National Institute of Standards and Technology.

...
... output omitted ...

EXAMPLES
Evaluate XCCDF content using CPE dictionary and produce html report. In this case we use United States Government Configuration Baseline (USGCB) for Red Hat Enterprise Linux 5 Desktop.

oscap xccdf eval --fetch-remote-resources --oval-results \
           --profile united_states_government_configuration_baseline \
           \
           --report usgcb-rhel5desktop.report.html \
           --results usgcb-rhel5desktop-xccdf.xml.result.xml \
           --cpe usgcb-rhel5desktop-cpe-dictionary.xml \
           usgcb-rhel5desktop-xccdf.xml
```

Step 3 - Running oscap scan

We will run the **oscap** utility to generate a report and a results file that can be sent back to the **workstation** system so that we can create an Ansible playbook for remediation and view the results of the report.



Be very careful about the name of the profile as this was selected during the creation of the custom profile/tailoring file portion when doing SCAP Workbench customizations.

Example 7. Scanning servera



Listing 9. Using oscap and the tailoring profile to scan servera

```
# [root@servera ~]# oscap xccdf eval \
--profile xccdf_org.ssgproject.content_profile_ospp_customized \
--tailoring-file ssg-rhel8-ds-tailoring.xml \
--results custom_scan_results.xml \
/usr/share/xml/scap/ssg/content/ssg-rhel8-ds.xml

Title Set Password Minimum Length in login.defs
Rule xccdf_org.ssgproject.content_rule_accounts_password_minlen_login_defs
Ident CCE-80652-1
Result fail

Title Set Password Strength Minimum Different Characters
Rule xccdf_org.ssgproject.content_rule_accounts_password_pam_difok
Ident CCE-80654-7
Result fail

Title Set Password Strength Minimum Uppercase Characters
Rule xccdf_org.ssgproject.content_rule_accounts_password_pam_ucredit
Ident CCE-80665-3
Result fail

Title Set Password Minimum Length
Rule xccdf_org.ssgproject.content_rule_accounts_password_pam_minlen
Ident CCE-80656-2
Result fail

Title Set Password Retry Prompts Permitted Per-Session
Rule xccdf_org.ssgproject.content_rule_accounts_password_pam_retry
Ident CCE-80664-6
Result fail

Title Set Password Strength Minimum Different Categories
Rule xccdf_org.ssgproject.content_rule_accounts_password_pam_minclass
Result fail

Title Set Password Maximum Consecutive Repeating Characters
Rule xccdf_org.ssgproject.content_rule_accounts_password_pam_maxrepeat
Result fail

Title Set Password Strength Minimum Special Characters
Rule xccdf_org.ssgproject.content_rule_accounts_password_pam_ocredit
Ident CCE-80663-8
Result fail

Title Set Password Strength Minimum Lowercase Characters
Rule xccdf_org.ssgproject.content_rule_accounts_password_pam_lccredit
Ident CCE-80655-4
Result fail

Title Set Password Strength Minimum Digit Characters
Rule xccdf_org.ssgproject.content_rule_accounts_password_pam_dccredit
Ident CCE-80653-9
Result fail

Title Set Password to Maximum of Consecutive Repeating Characters from Same Character Class
Rule xccdf_org.ssgproject.content_rule_accounts_password_pam_maxclassrepeat
Result fail
```

Getting Custom Profile Name from Tailoring File



If you need to locate the profile used for the custom scanning content from the tailoring file, you can search for it with **grep**.

```
[root@servera ~]# grep "Profile id" ssg-rhel8-ds-tailoring.xml
  <xccdf:Profile id="xccdf_org.ssgproject.content_profile_ospp_customized" extends
 ="xccdf_org.ssgproject.content_profile_ospp">
```

Step 4 - Creating a Results Report

You can create a results report file from the results file so you have a nice HTML file that is easy to ready with the results from the SCAP scan.

Example 8. Creating a SCAP Report from a Results File

Listing 10. Generating a Report

```
[root@servera ~]# oscap xccdf generate report \
custom_scan_results.xml > Custom_Scan_Report.html
```

Combining Steps 3 & 4

It is possible to perform a custom content scan which will generate the results file and the report for transfer back to the workstation for review.

Need to Specify

- **--results**
- **--report**

Listing 11. Creating a Results File and Report During Custom Content Scan

```
[root@servera ~]# oscap xccdf eval \
--profile xccdf_org.ssgproject.content_profile_ospp_customized \
--tailoring-file ssg-rhel8-ds-tailoring.xml \
--results custom_scan_results_2.xml \
--report Custom_Scan_Report_2.html \
/usr/share/xml/scap/ssg/content/ssg-rhel8-ds.xml

Title  Set Password Minimum Length in login.defs
Rule   xccdf_org.ssgproject.content_rule_accounts_password_minlen_login_defs
Ident  CCE-80652-1
Result fail

Title  Set Password Strength Minimum Different Characters
Rule   xccdf_org.ssgproject.content_rule_accounts_password_pam_difok
Ident  CCE-80654-7
Result fail

Title  Set Password Strength Minimum Uppercase Characters
Rule   xccdf_org.ssgproject.content_rule_accounts_password_pam_ucredit
Ident  CCE-80665-3
Result fail

Title  Set Password Minimum Length
Rule   xccdf_org.ssgproject.content_rule_accounts_password_pam_minlen
Ident  CCE-80656-2
Result fail

Title  Set Password Retry Prompts Per-Session
Rule   xccdf_org.ssgproject.content_rule_accounts_password_pam_retry
Ident  CCE-80664-6
Result fail

Title  Set Password Strength Minimum Different Categories
Rule   xccdf_org.ssgproject.content_rule_accounts_password_pam_minclass
Result fail

Title  Set Password Maximum Consecutive Repeating Characters
Rule   xccdf_org.ssgproject.content_rule_accounts_password_pam_maxrepeat
Result fail

Title  Set Password Strength Minimum Special Characters
Rule   xccdf_org.ssgproject.content_rule_accounts_password_pam_ocredit
Ident  CCE-80663-8
Result fail

Title  Set Password Strength Minimum Lowercase Characters
Rule   xccdf_org.ssgproject.content_rule_accounts_password_pam_lccredit
Ident  CCE-80655-4
Result fail

Title  Set Password Strength Minimum Digit Characters
Rule   xccdf_org.ssgproject.content_rule_accounts_password_pam_dccredit
Ident  CCE-80653-9
Result fail

Title  Set Password to Maximum of Consecutive Repeating Characters from Same Character Class
Rule   xccdf_org.ssgproject.content_rule_accounts_password_pam_maxclassrepeat
Result fail
```

Step 5 - Transferring Results File and Report to Workstation

After you have the results files and the report, you should transfer it to your graphical workstation (**workstation**) for further analysis.

Example 9. Transferring Results

Listing 12. Transferring the Results and Report Files

```
[root@servera ~]# scp *.xml *.html root@workstation:  
The authenticity of host 'workstation (<no hostip for proxy command>)' can't be established.  
ECDSA key fingerprint is SHA256:p0Q10JmyF2PFI+jxyFoOSCfi+1oWNsUruy2DZNjg+N0.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added 'workstation' (ECDSA) to the list of known hosts.  
root@workstation's password:  
custom_scan_results_2.xml          100% 4086KB  32.4MB/s  00:00  
custom_scan_results.xml            100% 4086KB  60.0MB/s  00:00  
ssg-rhel8-ds-tailoring.xml        100%   28KB   16.2MB/s  00:00  
Custom_Scan_Report_2.html         100%  332KB   44.3MB/s  00:00  
Custom_Scan_Report.html           100%  332KB   37.6MB/s  00:00  
[root@servera ~]#
```

Step 6 - Viewing the SCAP scan report

After you have transferred the results file to **workstation** you can open the HTML report in a web browser. In this case we will use **firefox** to open the file.

*Example 10. Viewing the SCAP Report**Listing 13. Opening the SCAP HTML Report with Firefox*

```
[root@workstation ~]# firefox Custom_Scan_Report.html
```

**Evaluation Characteristics**

Evaluation target	servera.lab.example.com
Benchmark URL	/usr/share/xml/scap/ssg/content/ssg-rhel8-ds.xml
Benchmark ID	xccdf_org.ssgproject.content_benchmark_RHEL-8
Benchmark version	0.1.42
Profile ID	xccdf_org.ssgproject.content_profile_ospp_customized
Started at	2020-04-16T09:21:32
Finished at	2020-04-16T09:21:33
Performed by	root
Test system	cpe:/a:redhat:openscap:1.3.0

CPE Platforms

- cpe:/o:redhat:enterprise_linux:8

Addresses

- IPv4 127.0.0.1
- IPv4 172.25.250.10
- IPv6 0:0:0:0:0:0:1
- IPv6 fe80::0:0:0:e6c5:468e:edb6:9b52
- MAC 00:00:00:00:00:00
- MAC 52:54:00:00:FA:0A

Compliance and Scoring

The target system did not satisfy the conditions of 11 rules! Please review rule results and consider applying remediation.

Rule results

11 failed

Severity of failed rules

11 medium

Score

Scoring system	Score	Maximum	Percent
urn:xccdf:scoring:default	0.000000	100.000000	0%

Figure 10. SCAP Scan Results Report in Firefox



Firefox may not open the file based on SELinux context triggers. In order to get around this you can use the command prompt and do **setenforce 0** to allow you to open the report.

2.3. Creating an Ansible Remediation Playbook Based on SCAP Scan Results

The OpenSCAP project and content created by Red Hat can automatically remediate findings from OpenSCAP scans. The findings can be remediated in many ways (**BASH**, **Ansible**, etc.). While things are mostly complete, there are some automated remediations that have not yet been developed.



There are multiple automatic remediation methods developed, but at this time, there isn't a script to fix everything.

Servers to Configure

- severa



We will continue to use **workstation** as our master SCAP system as it should have Ansible and SCAP Workbench installed.

Step 1 - Creating an Ansible Playbook from Results

The first step will be to generate an Ansible playbook from the SCAP scan results for system remediation.

Example 11. Generating Ansible Playbook

Listing 14. Ansible Playbook Generation

```
[root@workstation ~]# oscap xccdf generate fix \
--profile xccdf_org.ssgproject.content_profile_ospp_customized \
--tailoring-file ssg-rhel8-ds-tailoring.xml \
--fix-type ansible \
--result-id "" \
custom_scan_results.xml > Custom_Scan_Fix.yml
```

Viewing Remediation Playbook

It is also a good idea to view the created playbook for the system prior to running it.

```
[root@workstation ~]# cat Custom_Scan_Fix.yml
---
#####
#
# Ansible remediation role for the results of evaluation of profile
xccdf_org.ssgproject.content_profile_ospp_customized
# XCCDF Version: unknown
#
# Evaluation Start Time: 2020-04-16T09:21:32
# Evaluation End Time: 2020-04-16T09:21:33
#
# This file was generated by OpenSCAP 1.3.0 using:
# $ oscap xccdf generate fix --result-id xccdf_org.openscap_testresult_xccdf_org.ssgproject.content_profile_ospp_customized --template urn:xccdf:fix:script:ansible
xccdf-results.xml
#
# This script is generated from the results of a profile evaluation.
```

```

# It attempts to remediate all issues from the selected rules that failed the test.
#
# How to apply this remediation role:
# $ ansible-playbook -i "localhost," -c local playbook.yml
# $ ansible-playbook -i "192.168.1.155," playbook.yml
# $ ansible-playbook -i inventory.ini playbook.yml
#
#####
#####

- hosts: all
  vars:
    var_accounts_password_minlen_login_defs: !!str 18
    var_password_pam_difok: !!str 8
    var_password_pam_ucredit: !!str -1
    var_password_pam_minlen: !!str 18
    var_password_pam_retry: !!str 3
    var_password_pam_minclass: !!str 3
    var_password_pam_maxrepeat: !!str 3
    var_password_pam_ocredit: !!str -1
    var_password_pam_lcredit: !!str -1
    var_password_pam_dcredit: !!str -1
    var_password_pam_maxclassrepeat: !!str 4
  tasks:

    - name: "Set Password Minimum Length in login.defs"
      lineinfile:
        dest: /etc/login.defs
        regexp: "^\$PASS_MIN_LEN *[0-9]*$"
        state: present
        line: "PASS_MIN_LEN      {{ var_accounts_password_minlen_login_defs }}"
      tags:
        - accounts_password_minlen_login_defs
        - medium_severity
        - restrict_strategy
        - low_complexity
        - low_disruption
        - CCE-80652-1
        - NIST-800-53-IA-5(f)
        - NIST-800-53-IA-5(1)(a)
        - NIST-800-171-3.5.7
        - CJIS-5.6.2.1

    ...
    ... Output Omitted ...
    ...

    - name: Ensure PAM variable maxclassrepeat is set accordingly
      lineinfile:
        create: yes
        dest: "/etc/security/pwquality.conf"
        regexp: '^\#\?\\s*maxclassrepeat'
        line: "maxclassrepeat = {{ var_password_pam_maxclassrepeat }}"
      tags:
        - accounts_password_pam_maxclassrepeat
        - medium_severity
        - restrict_strategy
        - low_complexity
        - low_disruption
        - NIST-800-53-IA-5
        - NIST-800-53-IA-5(c)

```

Ansible is not setup for the lab

Before we can do the next steps, we will download an Ansible config file and an inventory file so we can properly run the playbook.

Listing 15. Error Output Message

```
[root@workstation ~]# ansible-playbook Custom_Scan_Fix.yml
[WARNING]: provided hosts list is empty, only localhost is available. Note
that the implicit localhost does not match 'all'

PLAY [all] ****
skipping: no hosts matched

PLAY RECAP ****
[root@workstation ~]#
```

Step 2 - Downloading Ansible Config and Ansible Inventory Files

This step is needed so that our Ansible system can be configured with various configuration options and the inventory files so we can run the given playbook.

*Example 12. Downloading Ansible Files**Listing 16. Downloading Ansible Files*

```
[root@workstation ~]# wget http://people.redhat.com/~tmichett/rh354/inventory
--2020-04-16 09:38:50-- http://people.redhat.com/~tmichett/rh354/inventory
Resolving people.redhat.com (people.redhat.com)... 209.132.183.19
Connecting to people.redhat.com (people.redhat.com)|209.132.183.19|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 24
Saving to: 'inventory'

inventory      100%[=====]>      24  --.-KB/s   in 0s

2020-04-16 09:38:50 (2.69 MB/s) - 'inventory' saved [24/24]

[root@workstation ~]# wget http://people.redhat.com/~tmichett/rh354/ansible.cfg
--2020-04-16 09:39:34-- http://people.redhat.com/~tmichett/rh354/ansible.cfg
Resolving people.redhat.com (people.redhat.com)... 209.132.183.19
Connecting to people.redhat.com (people.redhat.com)|209.132.183.19|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 159
Saving to: 'ansible.cfg'

ansible.cfg      100%[=====]>      159  --.-KB/s   in 0s

2020-04-16 09:39:35 (13.8 MB/s) - 'ansible.cfg' saved [159/159]
```

Reviewing Ansible Configurations

The **inventory** file provided only has a single host **servera** in there. On real systems, you must be very cautious of running remediation playbooks against an inventory file as it could apply to unintended systems. Additionally the **ansible.cfg** file provided was created for use in this lab environment. Both of these items should be taken into account when doing going through the process on production systems.



```
[root@workstation ~]# cat inventory
servera.lab.example.com

[root@workstation ~]# cat ansible.cfg
[defaults]
roles_path = /etc/ansible/roles:/usr/share/ansible/roles
log_path   = /tmp/ansible.log
inventory  = ./inventory

[privilegeEscalation]
become=True
[root@workstation ~]#
```

Step 3 - Run the Ansible Playbook

This step will utilize the **workstation** system which is configured as your Ansible management node and will run the playbook to remediate the results on the **servera** system.

*Example 13. Remediation of serverc with Ansible Playbook**Listing 17. Running the Ansible Playbook*

```
[root@workstation ~]# ansible-playbook Custom_Scan_Fix.yml

PLAY [all] ****
TASK [Gathering Facts] ****
ok: [servera.lab.example.com]

TASK [Set Password Minimum Length in login.defs] ****
changed: [servera.lab.example.com]

TASK [Ensure PAM variable difok is set accordingly] ****
changed: [servera.lab.example.com]

TASK [Ensure PAM variable uccredit is set accordingly] ****
changed: [servera.lab.example.com]

TASK [Ensure PAM variable minlen is set accordingly] ****
changed: [servera.lab.example.com]

TASK [Set Password Retry Prompts Per-Session - system-auth (change)] ***
ok: [servera.lab.example.com]

TASK [Set Password Retry Prompts Per-Session - system-auth (add)] ****
changed: [servera.lab.example.com]

TASK [Ensure PAM variable minclass is set accordingly] ****
changed: [servera.lab.example.com]

TASK [Ensure PAM variable maxrepeat is set accordingly] ****
changed: [servera.lab.example.com]

TASK [Ensure PAM variable ocrediet is set accordingly] ****
changed: [servera.lab.example.com]

TASK [Ensure PAM variable lccredit is set accordingly] ****
changed: [servera.lab.example.com]

TASK [Ensure PAM variable dcredit is set accordingly] ****
changed: [servera.lab.example.com]

TASK [Ensure PAM variable maxclassrepeat is set accordingly] ****
changed: [servera.lab.example.com]

PLAY RECAP ****
servera.lab.example.com    : ok=13   changed=11   unreachable=0   failed=0   skipped=0   rescued=0   ignored=0
```



After running the playbook, you can see that there were 10 changes that were made to the system and exactly which parameters were changed. The next thing to do is perform another scan of the system to ensure that it is now fully compliant.

Step 4 - Rescan System and Review Results*Example 14. Scanning System after Fixes and Verifying Results*

Listing 18. Performing SCAP Verification Scan

```
[root@servera ~]# oscap xccdf eval \
--profile xccdf_org.ssgproject.content_profile_ospp_customized \
--tailoring-file ssg-rhel8-ds-tailoring.xml \
--results custom_scan_results_fixed.xml \
--report Custom_Scan_Report_Fixed.html \
/usr/share/xml/scap/ssg/content/ssg-rhel8-ds.xml
```

Listing 19. Copying Results to Workstation

```
[root@servera ~]# scp custom_scan_results_fixed.xml Custom_Scan_Report_Fixed.html workstation:
root@workstation's password:
custom_scan_results_fixed.xml          100% 4086KB  60.3MB/s  00:00
Custom_Scan_Report_Fixed.html          100%  282KB  48.4MB/s  00:00
```

Listing 20. Viewing Results on Workstation

```
[root@workstation ~]# firefox Custom_Scan_Report_Fixed.html
```

Performed by	root
Test system	cpe:/a:redhat:openscap:1.3.0

Compliance and Scoring

There were no failed or uncertain rules. It seems that no action is necessary.

Rule results

11 passed

Severity of failed rules

Score

Scoring system	Score	Maximum	Percent
urn:xccdf:scoring:default	100.000000	100.000000	100%

Rule Overview

Title	Severity	Result
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Figure 11. Fixed SCAP Scan Results Report in Firefox