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HPE Workload Aware Security Version 1.3.0 for Linux User Guide

Abstract

This document describes the user operations available on the version 1.3.0 of Workload Aware Security for Linux (WASL) product. This document is targeted for IT administrator, Users and Support personnel who provide security service. It provides steps on how to work with WASL product.

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Contents

Workload Aware Security for Linux Overview.....5
Deployment and architecture.....5
SMS Login.....7
User Roles.....7

WASL Configuration and Operations.....9
Workload Management.....9
Add or Register Workload.....9
Edit Workload.....15
Deploy Security Policy.....16
Undeploy or Remove security policy from workload.....17
Disable workload.....17
Workloads Operations.....18
View Workload Details.....18
Evaluate Workload.....21
Remediate Workload.....24
Rollback last Remediation operation on Workload.....31
Reset Workload.....32
User Management.....33
View Users.....33
Add User.....34
Edit User.....36
Reset Password.....36
Activate/De-activate Users.....37
Delete User.....37
Policy Operations.....38
View policies.....38
Disable/Enable security policy.....40
Policy customization.....40
Policy update.....49

Session operation and Help.....55

Websites.....56

Support and other resources.....57
Accessing Hewlett Packard Enterprise Support.....57
Accessing updates.....57
Customer self repair.....58
Remote support.....58
Warranty information.....58
Regulatory information.....59
Documentation feedback.....59

Sample JSON file used to import policy..... 60

Sample profile_apis.py optionally used in importing policy..... 61

Hardened WASL SMS Appliance..... 66
Evaluate the appliance.....69
Remediate the appliance..... 72

Acronyms.....76

Workload Aware Security for Linux Overview

Workload Aware Security for Linux (WASL) provides a way to secure the operating system instance and the associated application running together by a single-click from centralized system (called Security Management Station). WASL can evaluate a workload (operating system or operating system with associated application) to access the current security level, do remediation to increase the security level of the workload. It also offers rich reports and shows the details of specific evaluations and remediations. WASL also offers a feature to roll back any remediation done and gets back the workload configuration to a previously known configuration state.

WASL is shipped with basic and advanced licensing. Basic license offers SUSE Linux Enterprise Server (SLES) and Red Hat Enterprise Linux (RHEL) OS hardening profiles whereas advanced licensing offers SAP HANA profiles and basic licensing.

WASL uses a profile based on the global benchmark standards Extensible Configuration Checklist Description Format (XCCDF) and currently provides the following standard profiles:

- OS Security for SLES 12 (SP1, SP2, SP3, and SP4)
- Draft OS Security for SLES 15
- OS Security for SLES SAP HANA 12 (SP1, SP2, SP3, and SP4) (OS Security tailored for SAP HANA database)
- Draft OS Security for SLES SAP HANA 15 (OS Security tailored for SAP HANA database)
- OS Security for RHEL 7 (7.2, 7.3, 7.4, 7.5, and 7.6)
- SAP HANA 1.0 Database
- SAP HANA 2.0 Database
- OS extended profile for SLES 12 SAP HANA (SP1, SP2, SP3, and SP4) and SLES SAP HANA 15 (extra OS protection for securing SAP HANA database)

Deployment and architecture

A typical deployment of WASL consists of a SMS and a set of workloads. A workload can be just an instance of operating system or it can be an instance of operating system with associated application installed on it. WASL can secure the following workloads:

- Operating System only
- Operating System and associated application
- Associated application only

The SMS is a web-based application accessible on HTTPS default port (443). It offers a rich set of GUI that is accessible through Chrome and supports a varied set of roles for users to log in and perform activities.

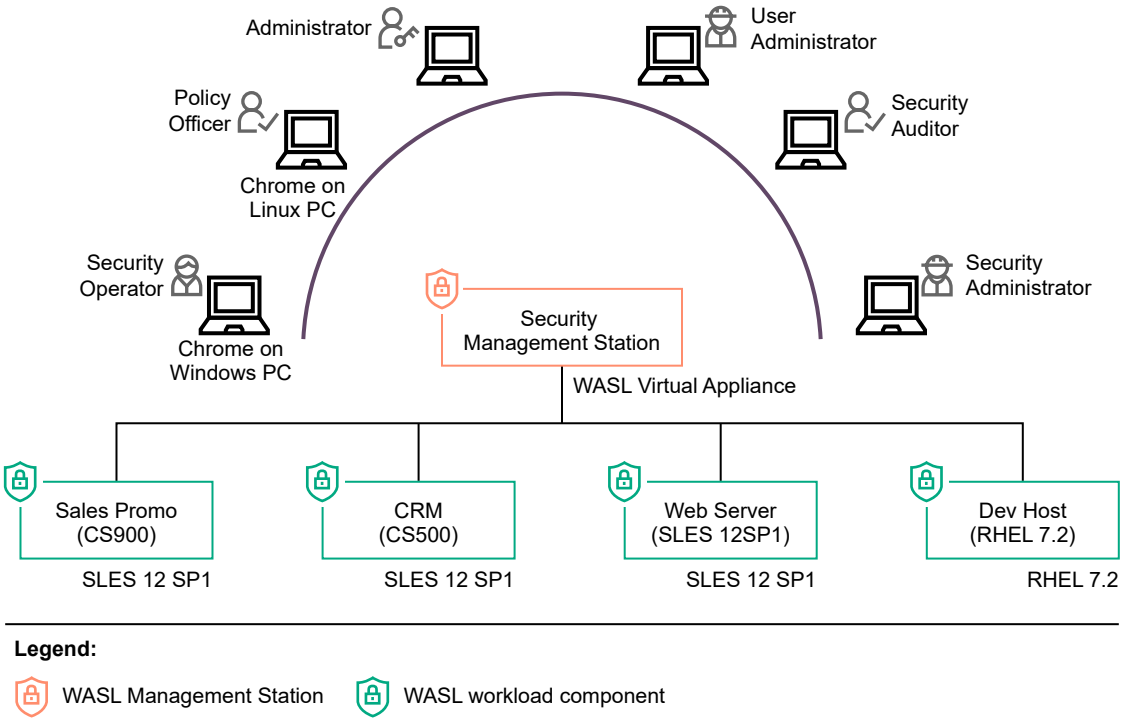


Figure 1: WASL Deployment Scenario

Users can register multiple workloads in SMS. It captures the workload access credentials as a part of registration process. SMS interacts with these workloads establishing a secure shell session between the SMS node and the target node. It can also automatically push the Node packages to target node and install remotely. It invokes the security tool to secure the workload element. A workload element can either be an OS or OS and the application running on the OS or only the application.

SMS stores information related to workloads in Couchbase Server NoSQL database (accessible through default port 8091). Critical data like user passwords, workload credentials is encrypted and stored in the Couchbase Server database using public/private keys protected by a master password. This master password is to be supplied during SMS startup. Some of the data like the reports of a workload evaluation/remediation, logs are stored as flat files.

SMS exposes an HTTPS-based web interface using Express.js and Node.js based technologies and Grommet UX framework.

On the Node, WASL uses OpenSCAP product to perform evaluation and remediation of workload using security policies that are based on XCCDF specification. This specification is provided as a part of Security Content Automation Protocol (SCAP) standard maintained by National Institute of Standards and Technology (NIST). The use of this format allows WASL to import and work with many policies that are based on these standards.

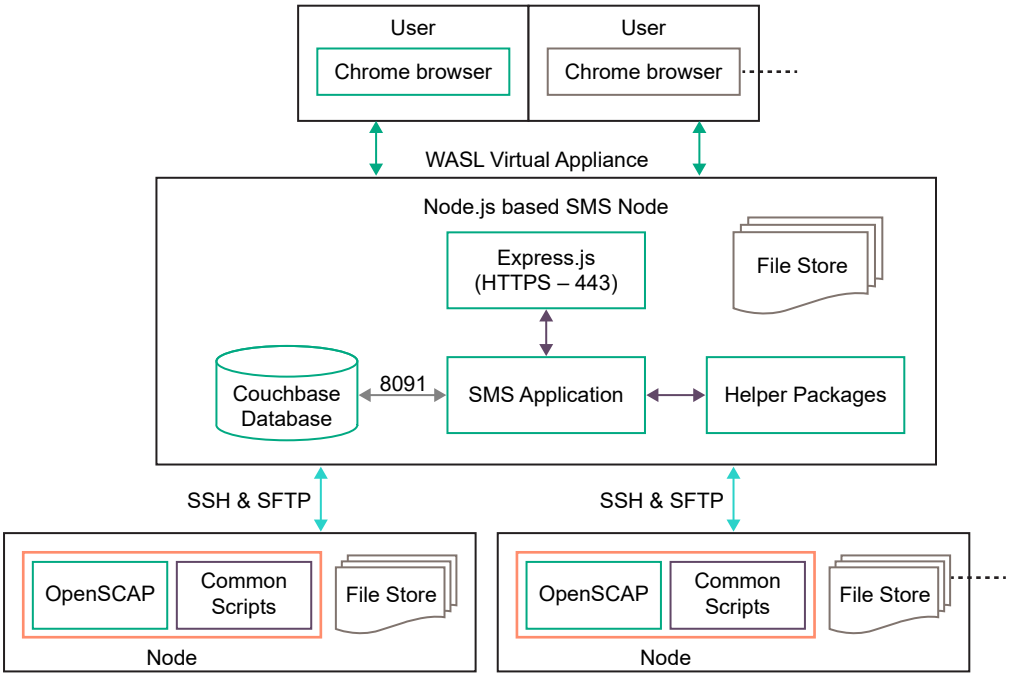


Figure 2: WASL Architecture flow

SMS Login

Prerequisites
Install the WASL product. For more information, see the *WASL Install and Setup guide*.

Procedure

1. Access SMS using Chrome browser.
2. Enter the URL `https://<IPAddress of SMS host>`.
   443 is the default port used by WASL to expose the web interface.
3. Authenticate to SMS using the default administrator account username="admin" and password="admin".
4. You are prompted to change the password on first login.
5. Use this account for admin purposes only.

To perform operations in SMS, add other SMS user with different roles.

User Roles

To connect to SMS, create users with appropriate role and access credentials.

The type of user role limits the kind of operations that can be performed by the user.

For information on different operations that is possible in WASL, see **WASL Configuration and Operations**.

The following table lists the role-based operations allowed to each user role:

Table 1: Role-based operations

Role Name	Operation Name	Operations Permitted
User Administrator	User Management	View, Create, Edit, Delete, Activate, De-activate, and Search users
		Reset Password of user
		Assign role to user.
Policy Officer	Policy Management	View, Enable, Disable, Search Policies
		Policy Customization (Add, Copy, Edit, Reload Policy, Import, or Delete Policy) and Policy Update
Security Operator	Workload Operations	View, Evaluate, Remediate, Rollback, and Search Workload
	View Details	View and Search SMS Activities
		View Dashboard
Security Administrator	Workload Management	Add, Edit, Disable Workload.
		Deploy, Undeploy policies on a Workload.
	Workload Operations	View, Evaluate, Remediate, Rollback, Reset, and Search Workload
	View Details	View and Search SMS Activities
		View Dashboard
Security Auditor	Workload Operations	Only View, Evaluate, and Search Workload
	View Details	View and Search SMS Activities
		View Dashboard
Administrator	All Operations	Capability to perform operations related to all roles.
		More capability to edit SMS settings.
		This role is provided to only "admin" user

WASL Configuration and Operations

Workload Management

Workload Management involves the following:

- Add or register a Workload in SMS
  - automatic Installation of WASL packages on end node during registration
- Deploy and Undeploy the security policies on the Workload
- Edit Workload
- Disable Workload

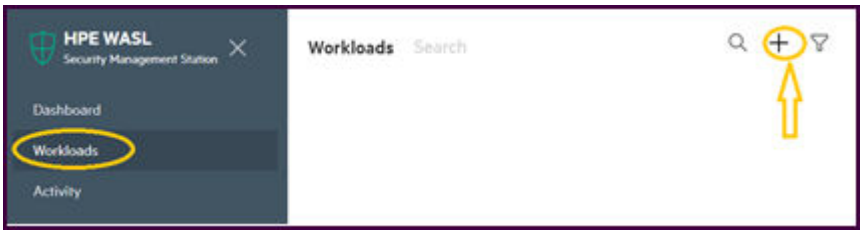
Add or Register Workload

Prerequisites
This option is visible to users with 'Administrator' or 'Security Administrator' roles.

Procedure

To add or register a workload from the Workloads tab:

1. Click **+** icon.



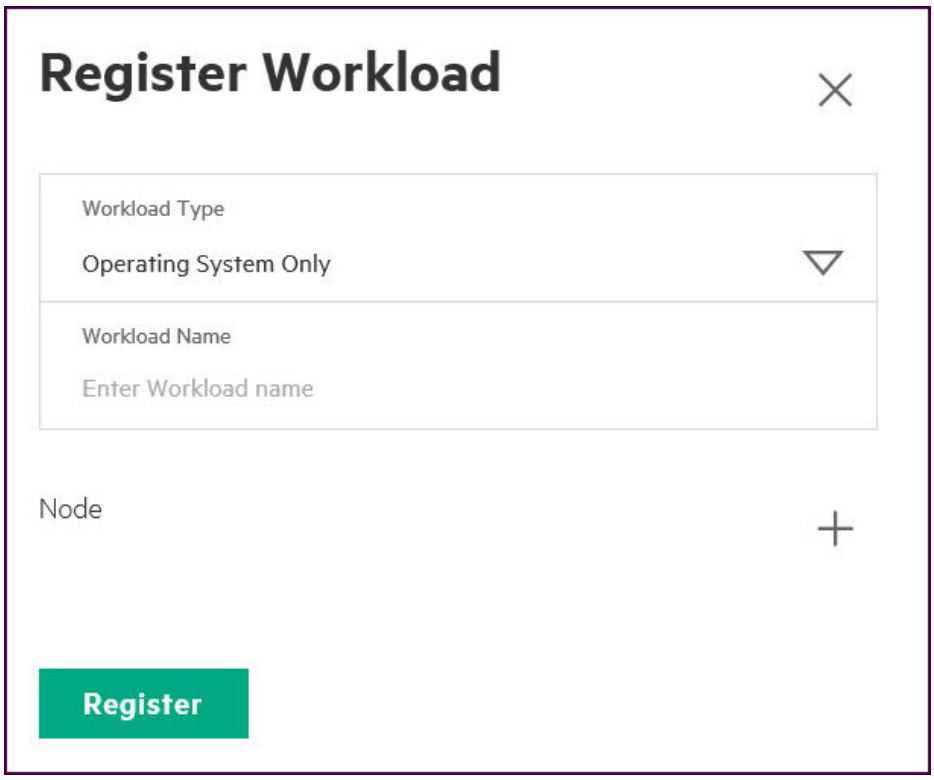
2. Enter the **Workload Name**.

   The Workload name is used to reference the workload on SMS screen and should be unique for different workload.

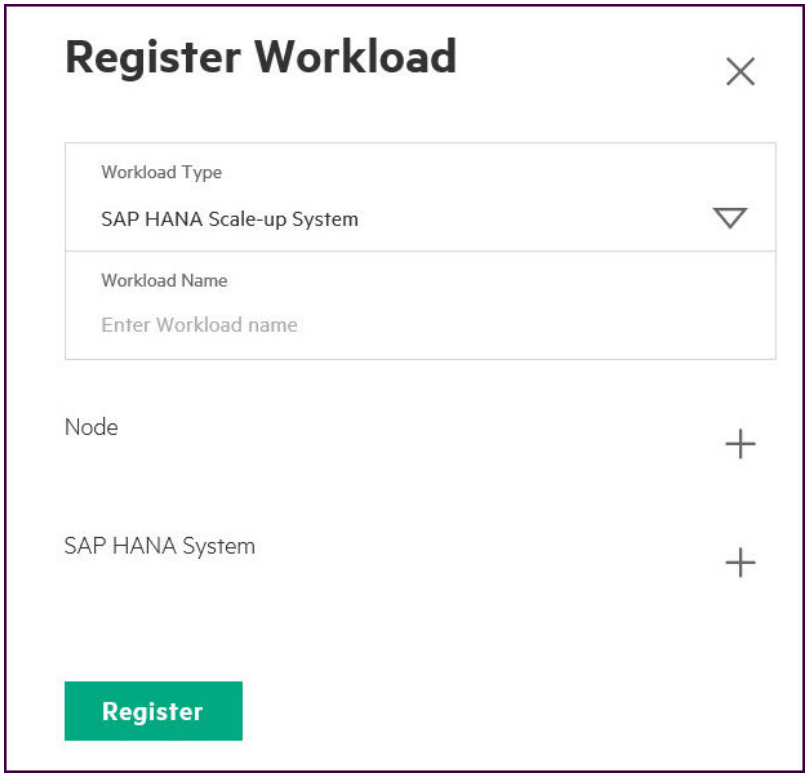
3. Enter the **Workload Type**.

   The **Workload Type** can be **Operating System Only** or **SAP HANA Scale-up System**.

   a. If you select **Operating System Only** type, then only **Add Node** element is displayed.



b. If you select **SAP HANA Scale-up System** type, then both **Add Node** and **SAP HANA System** elements are displayed.



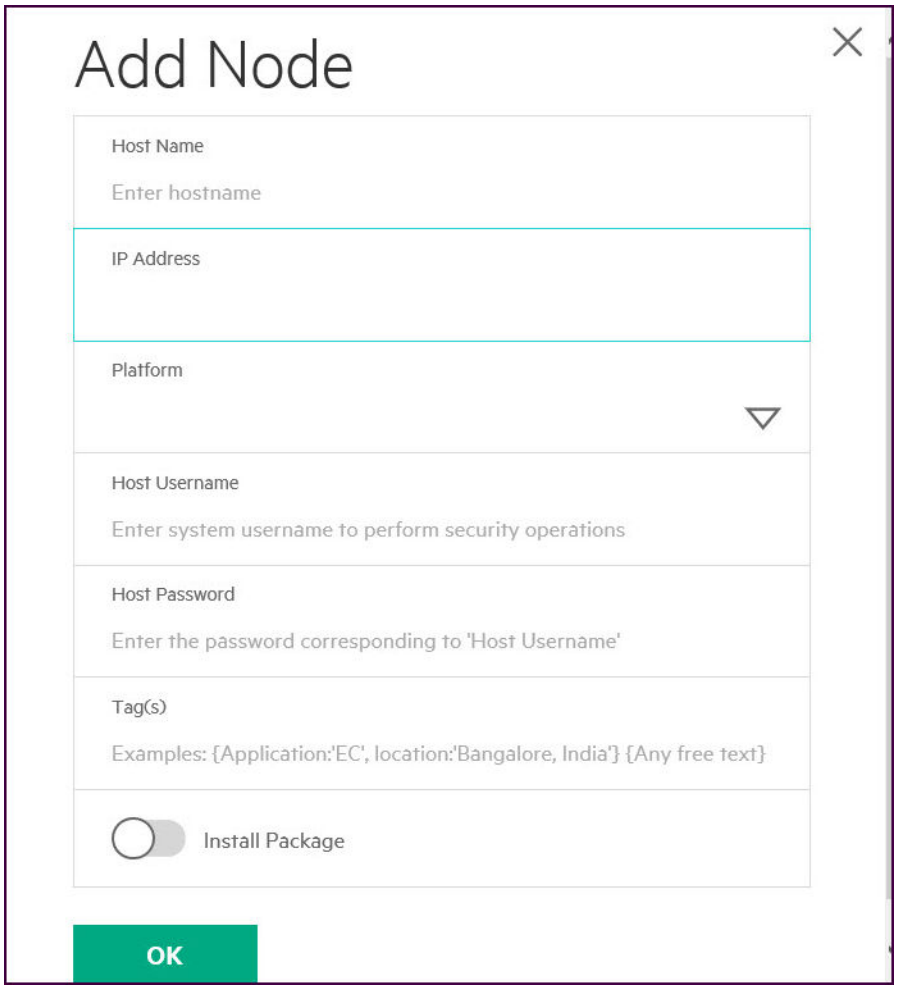
4. Click the **Register** button to register a new workload on SMS.

Workload once added cannot be deleted. The Workload record is maintained for auditing purposes. It can only be disabled.

NOTE: The workload can be reconfigured in future using **Edit** workload option after it is registered to SMS.

Add Node.

To register the node associated with the workload, enter the following details:



Procedure

1. **Host Name** Enter the Host name of the Node.
2. **IP address**: Enter the IP address of the Node. Only IPV4 address is supported. WASL uses this IP address to SSH to install and set up Node Package.
3. **Platform**: Select the Operating System version running on the Node. WASL uses the Platform information to display the security policies that can be deployed on the workload during Deploy Policy operation.
4. **Host Username**: Enter the Operating system user name on the Node.
   The **Host Username** is used by WASL to connect to Node through SSH for the following:
   - Install and set up Node Package if **Install Package** option is turned on.
   - Perform workload operations like evaluation, remediation, rollback, reset on this node element.

If **Install Package** is turned on, then you can perform the workload operations like evaluation, remediation, rollback, reset on this node.

5. **Host Password**: The password for the **Host Username**.
6. **Tag(s)**: You can optionally provide some extra Tag's to for identifying this Node.
7. **Install Package**: If turned on, the WASL Node Packages are automatically installed and setup on the Node.
   If you have turned on the **Install Package** and **Host Username** is not "root" user, then you must provide capability to the **Host Username** to sudo as "root" for performing WASL Node package installation and setup command. For the steps to update sudo user information in **`/etc/sudoers.d/waslcore_install`** file on Node, see the *Automatic Node Package installation and setup from SMS* section in *WASL Install and Setup guide*. The installation and setup of WASL Node Packages automatically adds the capability for **Host Username** to sudo as "root" and perform Workload Operation (like Evaluate, Remediate, Rollback, and Reset) on this Node.

   If you have not turned on the **Install Package**, you must explicitly install and Set up the WASL Node Packages on the Node before registering the Workload. You also must provide capability for **Host Username** to sudo as "root"and perform Workload Operation (like Evaluate, Remediate, Rollback, and Reset) on this Node. For more information, see the *Manual Node Package installation and setup from Node* section in *WASL Install and Setup guide*.
8. Click **OK** and register the workload to SMS.

   On Clicking **OK** in the **Register Workload** page:

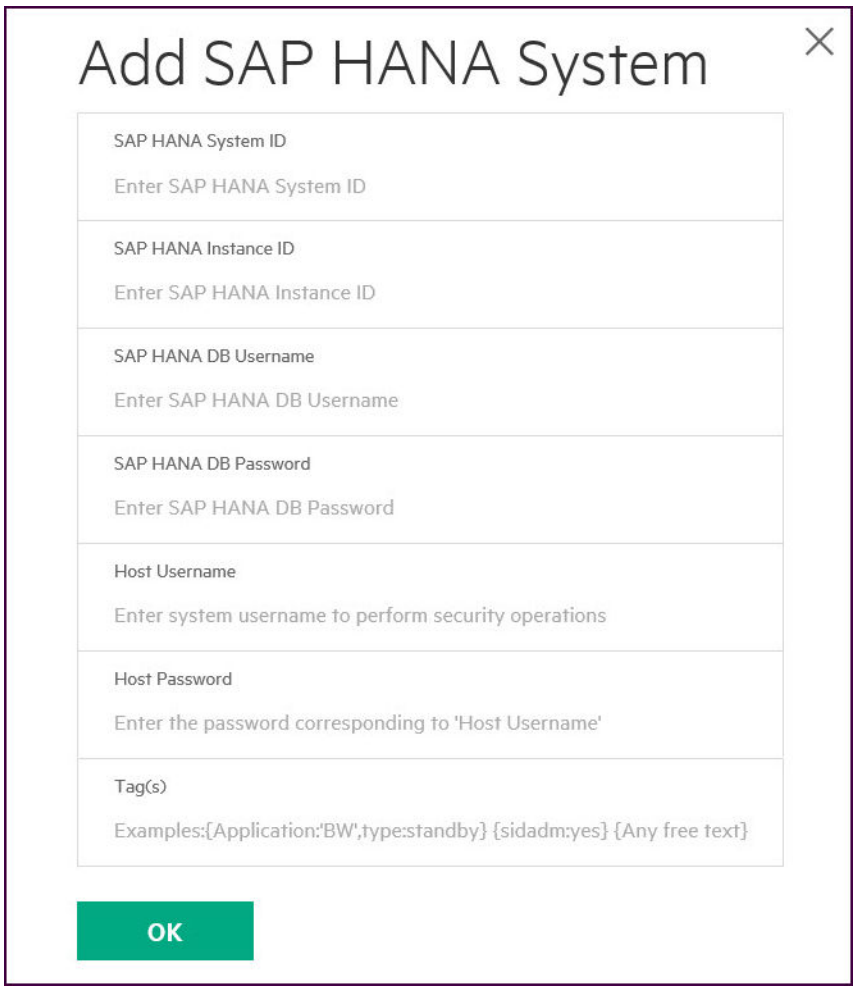
   a. WASL adds workload entry (Identified by the **Workload Name**) in the **Workload** page.
   b. If the **Install Package** in the **Add Node** screen is turned on, then WASL tries to Install and Set up the Node Packages.
   c. WASL also does an SSH to the end node and validate if the details provided in **Add Node** screen are correct.

Click on the new workload entry in Workload page to know the status of editing this workload. The status is updated at following places:

- The Taskbar at the top of the workload entry page if there is error.
- The **Recent Activity** at the bottom of the workload entry page.
- The **Activity** page of WASL.

Add SAP HANA System

Enter the following details of SAP HANA System Database:



Procedure

1. **SAP HANA System ID**: Enter the **SAP HANA System ID** (SID) of SAP HANA database. Example: HDB, SEQ, etc.
2. **SAP HANA Instance ID**: Enter the **SAP HANA Instance ID** of the SAP HANA system. Example: 00, 01
3. **SAP HANA DB Username**: Enter the **SAP HANA DB Username**. WASL uses this user name to connect to SAP HANA Database for Workload Operation on SAP HANA System Database. The **SAP HANA DB Username** can be the database user "SYSTEM" or any SAP HANA database user who is granted the following privileges:

```
GRANT DATA ADMIN TO <SAP HANA DB Username> WITH ADMIN OPTION
GRANT RESOURCE ADMIN TO <SAP HANA DB Username> WITH ADMIN OPTION
GRANT INIFILE ADMIN TO <SAP HANA DB Username> WITH ADMIN OPTION
GRANT SERVICE ADMIN TO <SAP HANA DB Username> WITH ADMIN OPTION
GRANT AUDIT ADMIN TO <SAP HANA DB Username> WITH ADMIN OPTION
GRANT SELECT,INSERT,DELETE ON "_SYS_SECURITY" . "_SYS_PASSWORD_BLACKLIST" TO <SAP HANA DB Username>
GRANT ENCRYPTION ROOT KEY ADMIN TO <SAP HANA DB Username> WITH ADMIN OPTION
(The ENCRYPTION ROOT KEY ADMIN privilege is required in case SAP HANA database version is 2.0 or higher)
```

   Use SAP HANA SQL command to grant these privileges. Replace the **<SAP HANA DB Username>** with the user name provided in **SAP HANA DB Username** field.
4. **SAP HANA DB Password**: The password for the **SAP HANA DB Username**.
5. **Host Username**: This can be any non-privileged OS users on the Node where SAP HANA is installed.

WASL performs all Workload Operations on the SAP HANA System Database by logging into the Node using this Host Username via SSH. It then does a sudo to **waslhanauser** user on the Node. The **waslhanauser** in turn connects to the SAP HANA System Database or runs specific scripts with higher privileges (using sudo) to perform operation like deploy, evaluation, remediation, rollback and reset.

WASL product uses **SAP HANA Client - HDB_CLIENT** tool provided along with SAP HANA database to connect with the SAP HANA database. The default path looked by WASL for this tool is either `/usr/sap/hdbclient` or `/home/waslhanauser/sap/hdbclient`.

If HDB_CLIENT tool is not installed in these locations, then **Host Username** provided here can be made to sudo to **<SID>adm** OS user instead of **waslhanauser** user and run all the WASL operations. Running the WASL operations as**<SID>adm** OS user allows WASL to lookup more paths like `/usr/sap/<SID>/HDB<INSTANCE_NUMBER>/exe/python_support/hdbcli` or `/usr/sap/<SID>/home/sap/hdbclient/` for locating and using **HDB_CLIENT** tool. To use **<SID>adm** OS user instead of **waslhanauser** add {sidadm=yes} tag in the Tags field of this Add System DB screen.

NOTE:

a. **<SID>adm** OS user is created by SAP HANA for administration operation on SAP HANA database. **<SID>** is the SAP HANA System ID.

b. The **waslhanauser** is a non-privileged user created as a part of WASL Node Package installation.

c. Specific setup like creating SAP HANA client certificates, enabling to run some scripts with higher privileges is required for **waslhanauser** or **<sid>adm** user.

This setup is automatically done if Install Package option is turned on in the Add Node screen.

For more information or if you are doing manual Node package installation and setup, see WASL Install and Setup guide.

The SAP HANA client certificates setup during this phase is valid for one year. The certificate gets automatically regenerated, if you Edit Workload and select Install Package option in the Add Node screen once again and save the Workload.

d. Do not change the Tags file to add or remove the {sidadm=yes} tag from time to time as this might lead to file permission issues on end Node.

---

6. **Host Password**: The password for **Host Username**.
7. **Tag(s)**: You can optionally provide extra Tag's to for identifying this Node.
8. Click **OK** and register the workload to SMS after updating all entries.
9. On Clicking **OK** in the **Register Workload** page:

a. WASL adds a new workload entry (Identified by the **Workload Name**) in the **Workload** page.

b. WASL also does a SSH to the end node and validate if the details provided in **Add Node** screen is correct.

c. If the **Install Package** in the **Add Node** screen is turned on, then WASL tries to Install and Setup the Node Packages.

d. WASL also does a SSH to the end node (using the credentials provided in **Add SAP HANA System** screen). It validates if the details provided in **Add SAP HANA System** screen is correct. Details like database connectivity, privileges provided to **SAP HANA DB Username** is checked.

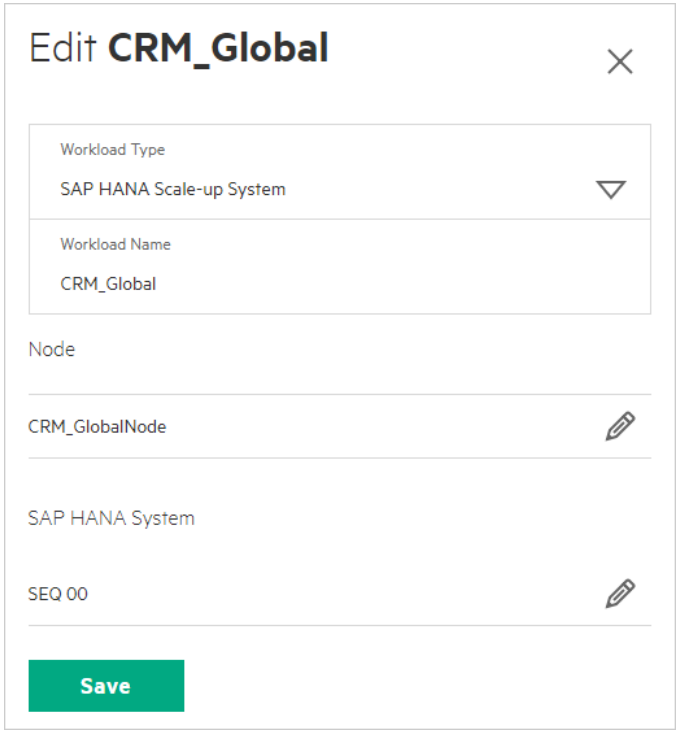
e. You can click on the new workload entry added to know the status

The status is updated at the following:

- The Taskbar at the top of the workload entry page in case of error.
- The **Recent Activity** at the bottom of the workload entry page.
- The status also gets updated in the **Activity** page of WASL.

Edit Workload.

Prerequisites
This option is visible to users with "Administrator" or 'Security Administrator' roles.

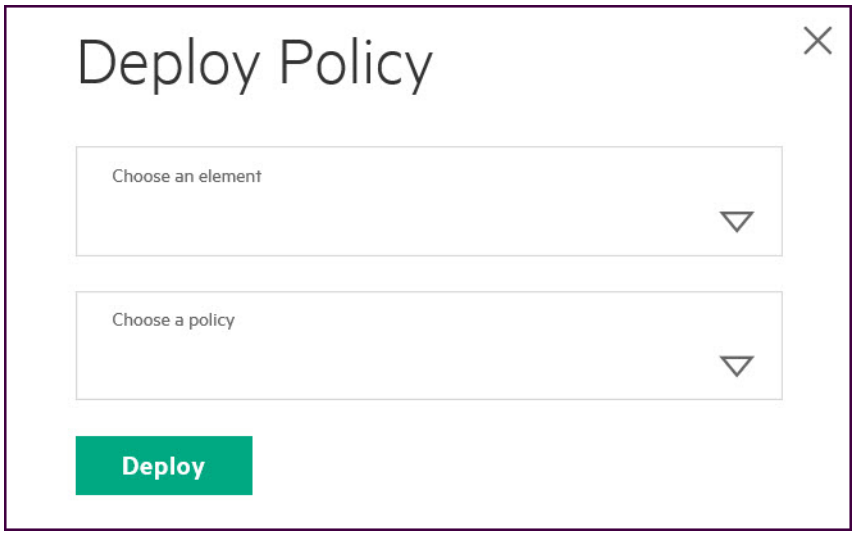


Procedure

1. Click the workload in the **Workload** page.
2. Select the **Edit** button.
3. The screens, options, and parameters provided are similar to details provided in the **Add or Register Workload**. All the workload parameters except few parameters like **Workload Name**, **Platform** can be updated.
4. If the **Install Package** in the **Edit Node** screen is turned on, then WASL tries to Install and Set up the Node Packages.
5. WASL connects to the Node and validates the workload as done during **Add or Register Workload**

Deploy Security Policy

Prerequisites
This option is visible to users with "Administrator" or 'Security Administrator' roles.



Procedure

To deploy security policies on a workload,

1. Click the workload in the **Workload** page.
2. Select the **Deploy Policy** button.
3. Select from the drop-down of **Choose an element** option.
   This option displays the Workload elements that are configured during *Add or Register Workload* operation. The drop-down options can be one of the following:
   a. Node (Shown as MasterNode)
      Or
   b. SAP HANA System (Shown as SystemDB)
4. Select from the drop-down of **Choose a policy** option.
   This option lists the Policies that are applicable on the Workload element selected through **Choose an element**.
   Policies that are already deployed on the Workload elements are not displayed in the drop-down.
5. Click the **Deploy** button.
   WASL transfers the policy-related files to the Node having the workload and validate the workload settings.

Deploy multiple policies on Workload.

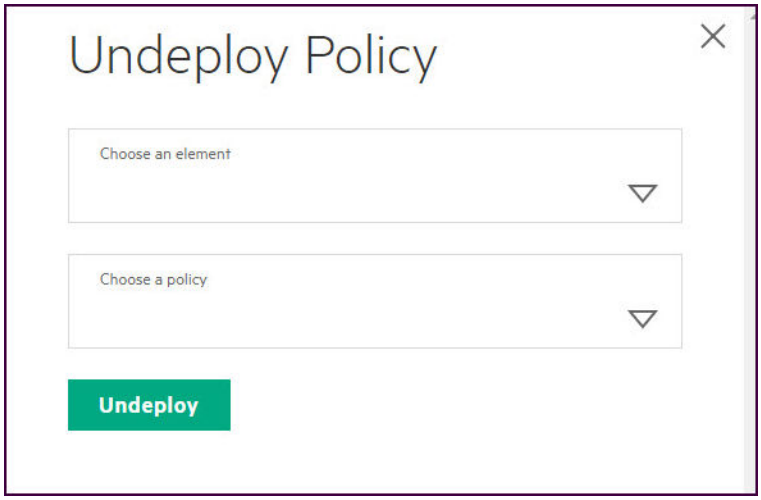
To deploy multiple policies on workload, follow the same process defined in **Deploy Security Policy**

Procedure

1. To view the details, click the workload name from the Workload tab.
2. Click the arrow next to **Deployed Policies** option on the screen.
3. A list of all the policies deployed on the workload is displayed.

Undeploy or Remove security policy from workload.

Prerequisites
This option is visible to users with "Administrator" or 'Security Administrator' roles.



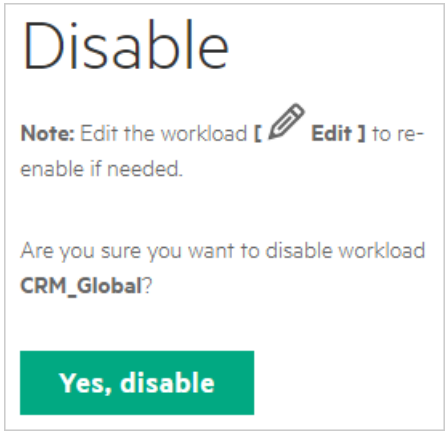
Procedure

To Undeploy security policy that is deployed on a workload:

1. Click the workload in the **Workload** page.
2. Select the **Undeploy Policy** button.
3. Select from the drop-down of **Choose an element** option.
   This option displays the Workload elements that are configured during *Add or Register Workload* operation. The drop-down options can be one of the following:
   a. Node (Shown as MasterNode)
      Or
   b. SAP HANA System (Shown as SystemDB)
4. Select from the drop-down of **Choose a policy** option.
   This option lists the Policies that are applicable on the Workload element selected through **Choose an element**.
5. Click the **Undeploy** button.
6. WASL removes the policy-related files on the Node.

Disable workload.

Prerequisites
This option is visible to users with "Administrator" or 'Security Administrator' roles.



Procedure

To disable a workload,

1. Click the workload in the **Workload** page.
2. Click the **Disable** button.

Once a Workload is disabled, no other operation apart from **Edit Workload** is allowed on this workload.

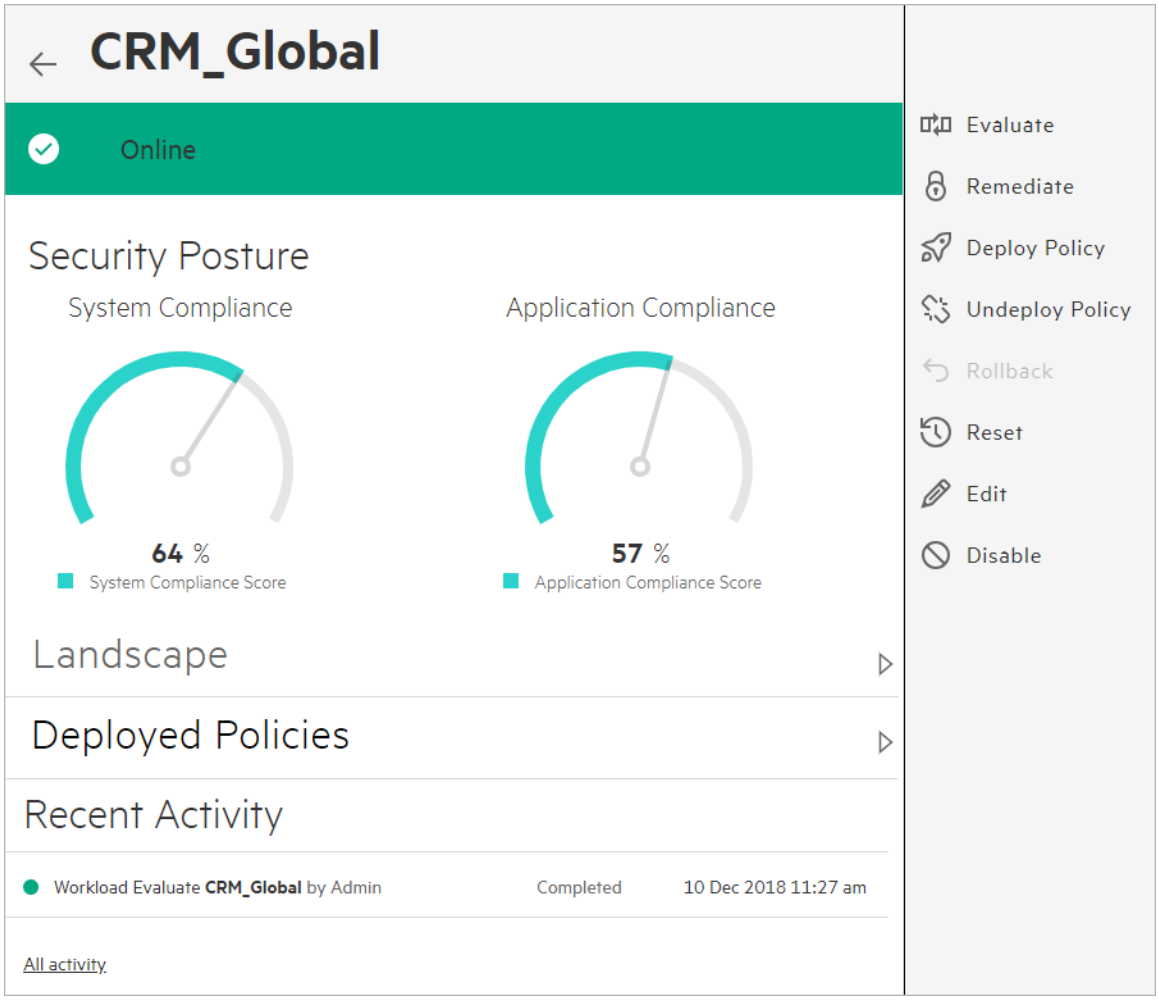
The workload gets re-enabled on editing the workload.

Edit of the workload tries to validate the workload before re-enabling it.

Workloads Operations

View Workload Details

Prerequisites
This option is visible to users with "Administrator', 'Security Administrator', 'Security Operator' and 'Security Auditor' roles.



Procedure

To view details of the Workloads.

1. Click the Workload entry in the **Workload** page. Following details are visible:

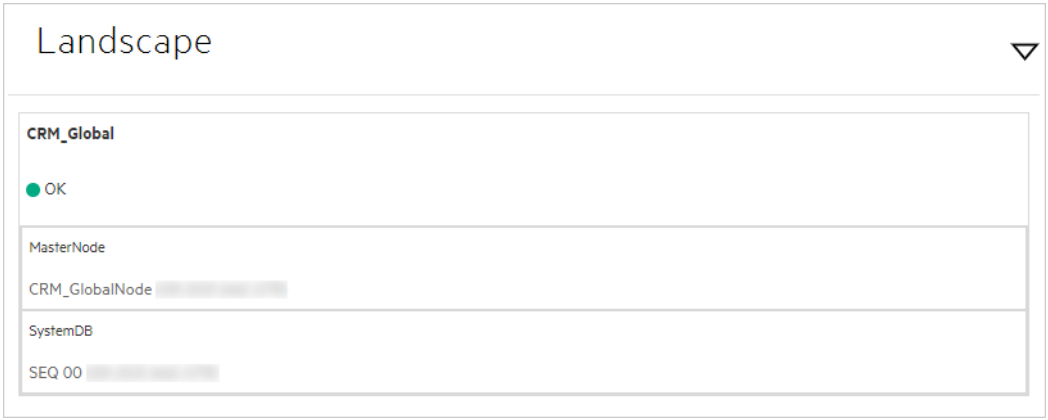
   a. **Workload Name**: The name of the workload entered during "Add or Register Workload".

   b. **Status** of the workload.

   c. **Security Posture**: It displays the current system and application compliance score from the last evaluation/remediation operation.
   The current system compliance score is the score of the Node element of Workload.
   The application compliance score is the score of SAP HANA System element of Workload.
   This score is calculated by cumulative rules evaluated/remediated successfully as defined in all the policies deployed on the workload.

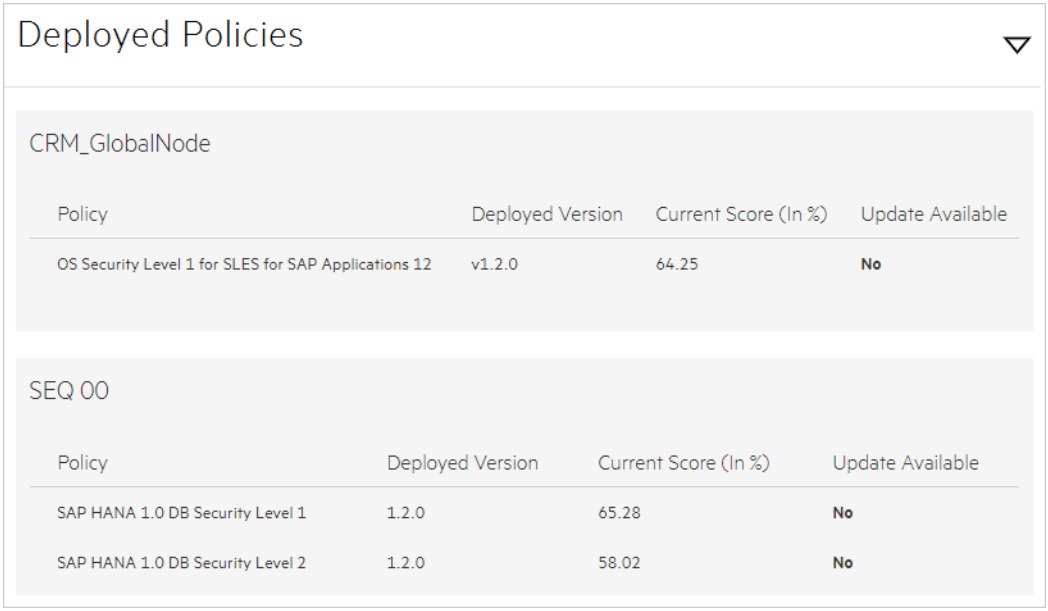
   d. **Operation**: The right side of the screen displays various operations like Evaluate, Remediate, Deploy Policy and more. These operations can be performed on the workload by clicking them. The Operations will vary for different role.
   For example: A Security Operator will see an Evaluate, Remediate, and Rollback operations.

   e. **Landscape**: Displays the workload synopsis such as the underlying Node and the SAP HANA System details. To see the complete details, use the Edit operation in this screen.



Edit operation is visible only to users with ‘Administrator’ or ‘Security Administrator’ roles.

f. **Deployed Policies**: Displays a list of all the policies deployed on the workload.

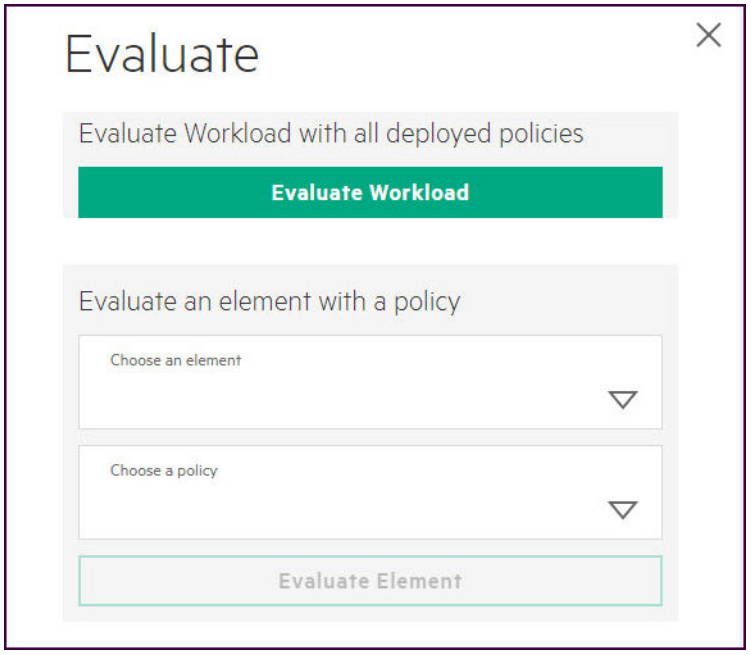


g. **Recent Activity**: Displays the most recent activities performed on the workload.

h. **All activity**: The screen is redirected to Activity Page of WASL and you will see a filtered list of activity performed on this workload.

Evaluate Workload.

Prerequisites
This option is visible to users with "Administrator', 'Security Administrator', 'Security Operator' and 'Security Auditor' roles.



Procedure

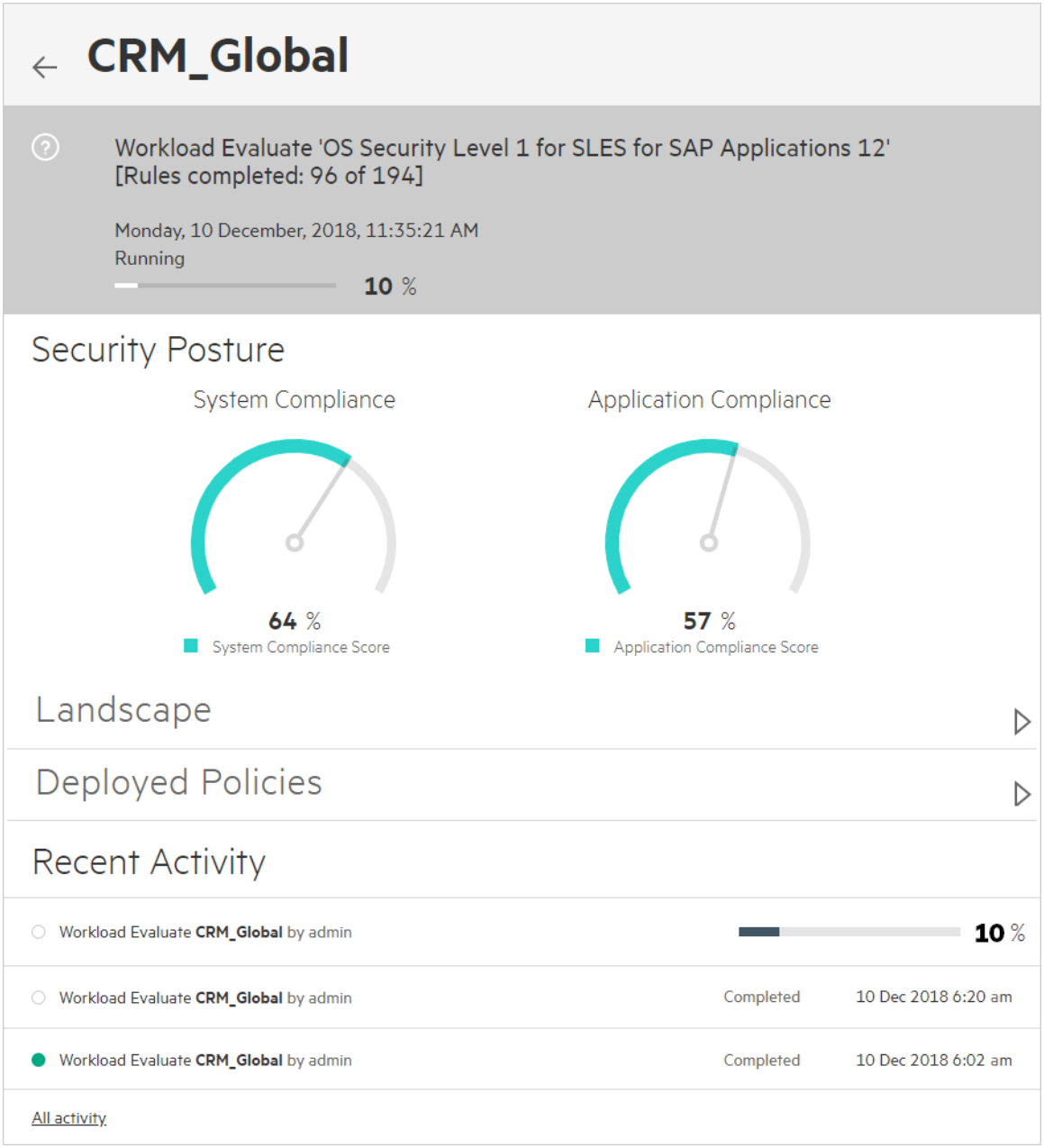
You can evaluate a workload against policies that are deployed on the Workload.

1. Click the workload in the **Workload** page.
2. You can evaluate a workload in the following two ways:

   a. Click the **Evaluate** button.
   All the Security Policies that are deployed on the all Workload elements are evaluated on the workload.

   b. Select from the drop-down of **Choose an element** option. The **Choose a policy** displays the applicable policies that are deployed on the workload element. Select one of the policies. Click **Evaluate Element**.

3. When the evaluation starts, the Workload View displays different evaluations that are in progress.



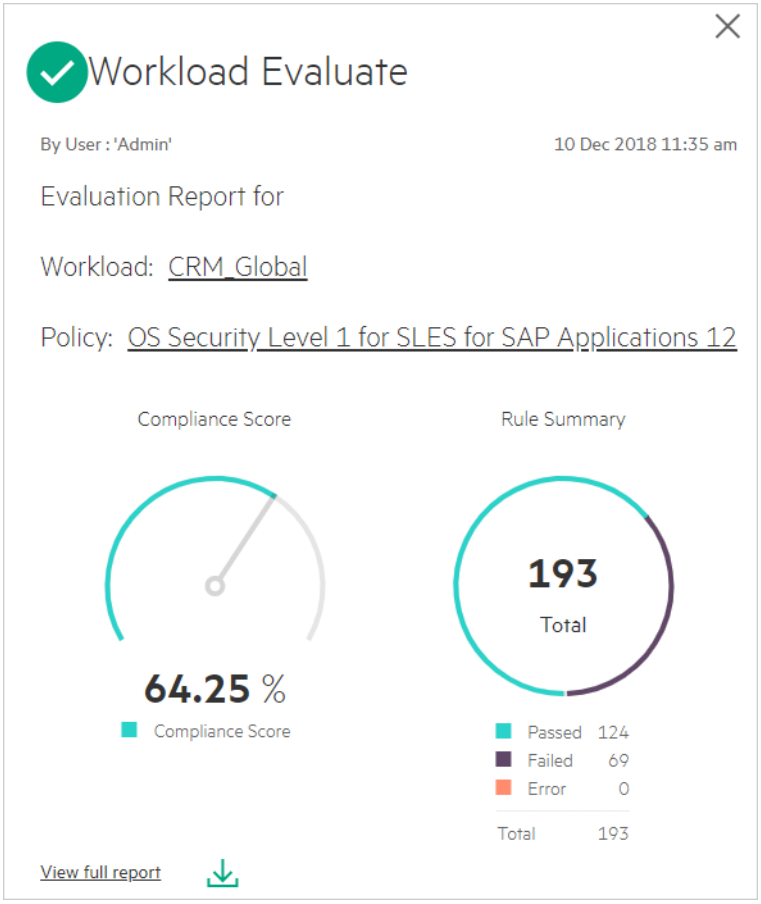
WASL ensures that only one evaluation or operation is active on the End Node.

4. After the evaluation is complete, the Workload Meters indicates the current score of the Workload against the policies deployed.

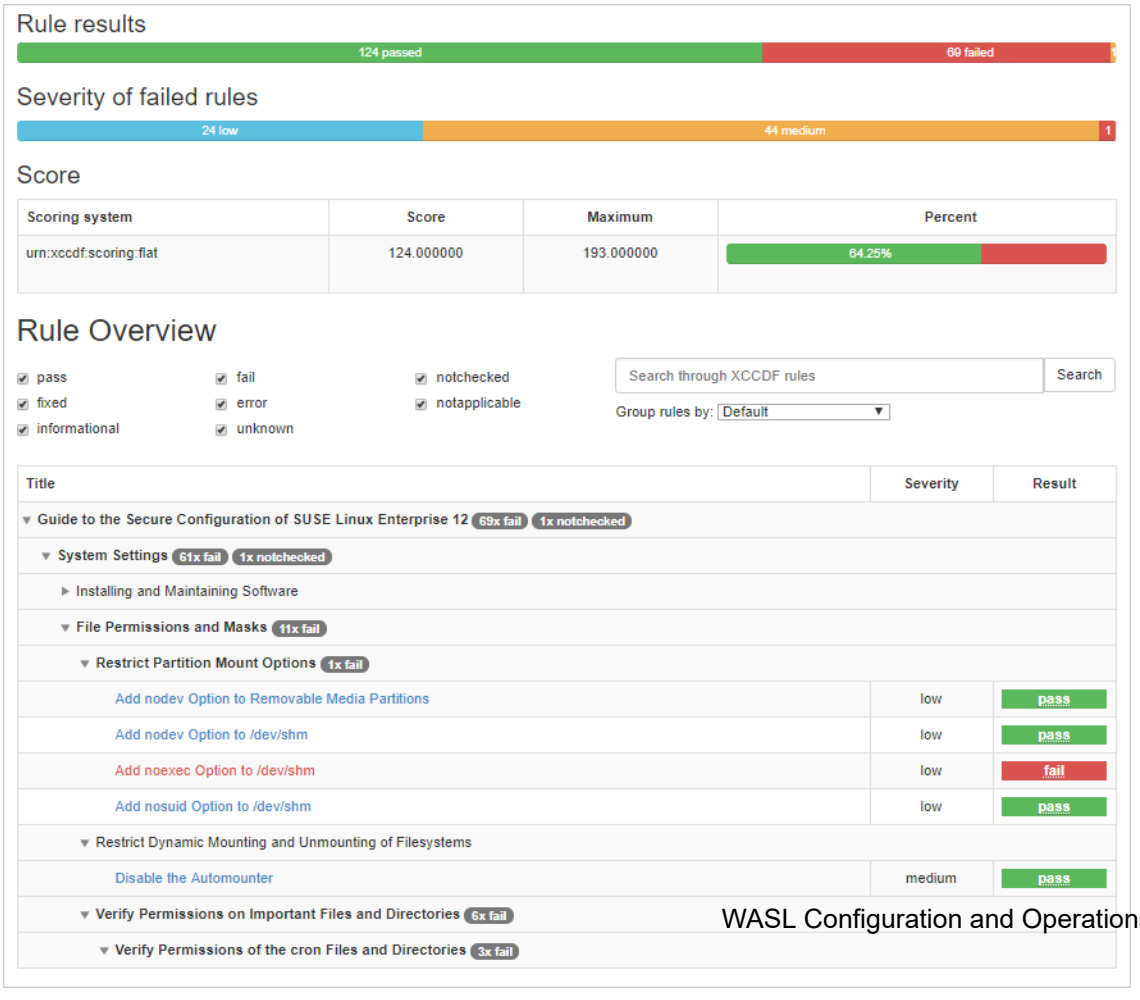
   The Individual scores of each Policy can be viewed under "Deployed Policies" views.

5. The "Recent Activity" lists all the Policies that are evaluated individually per policy.

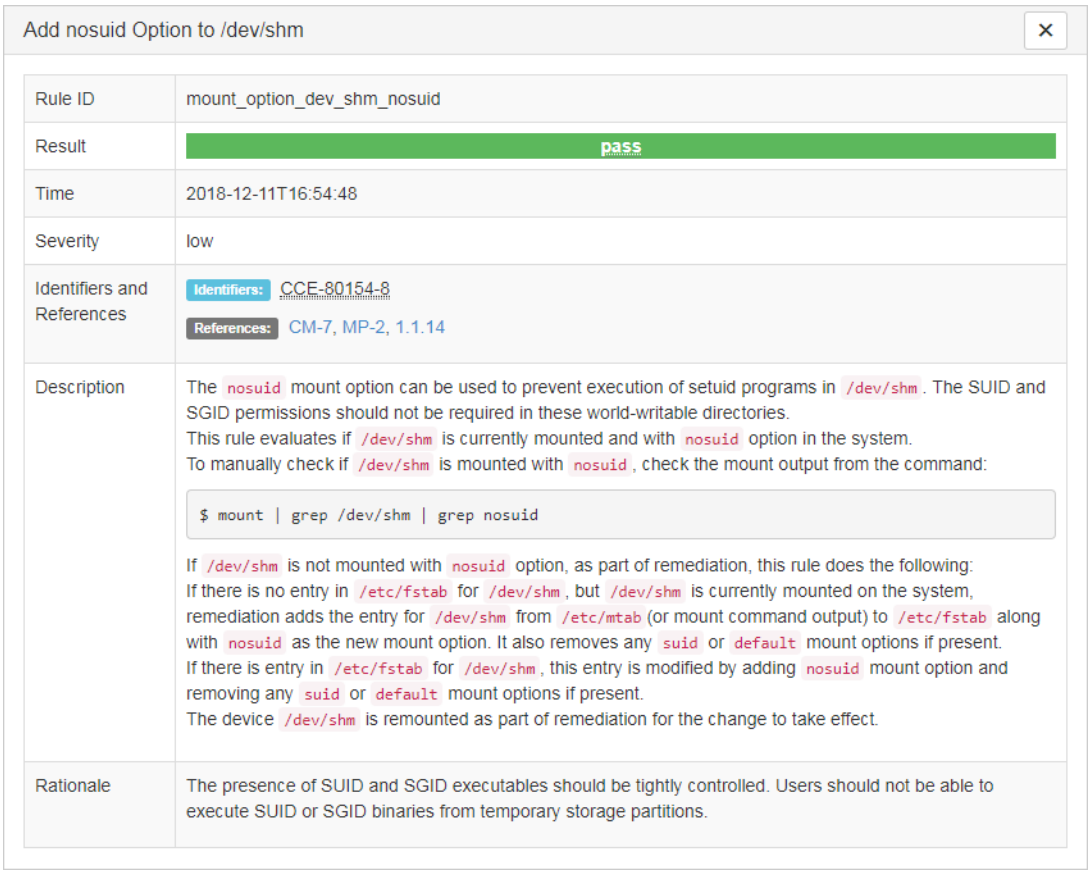
6. To view more details on Evaluate Workload activity like the number of Passed, Failed rules or Rules with Error in Policy, click each activity.



7. In the **Workload Evaluated** window, click the **View Full Report** to see a complete HTML Report. You can also download it by clicking the download icon.



You can click the individual rule and view the **Rule Summary**.



Remediate Workload

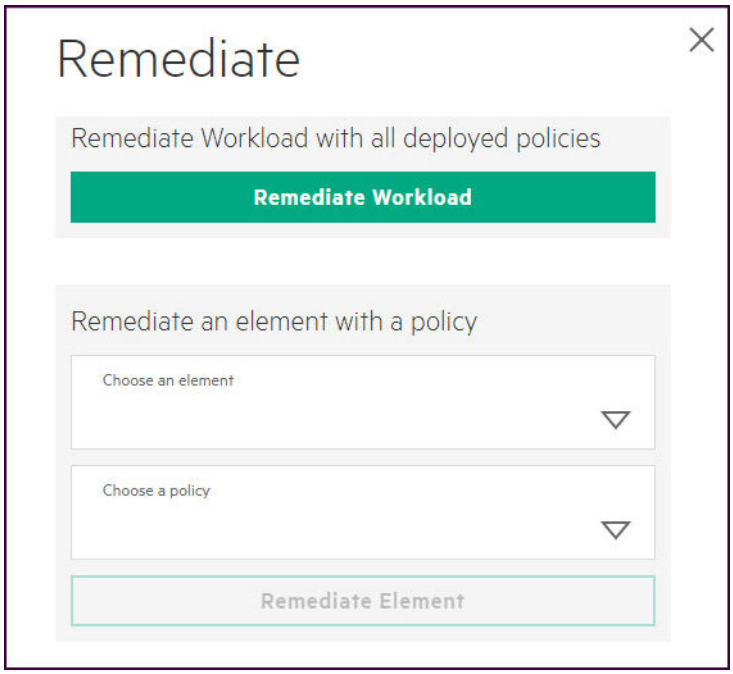
Prerequisites
This option is visible to users with "Administrator', 'Security Administrator', and 'Security Operator' roles.

Procedure

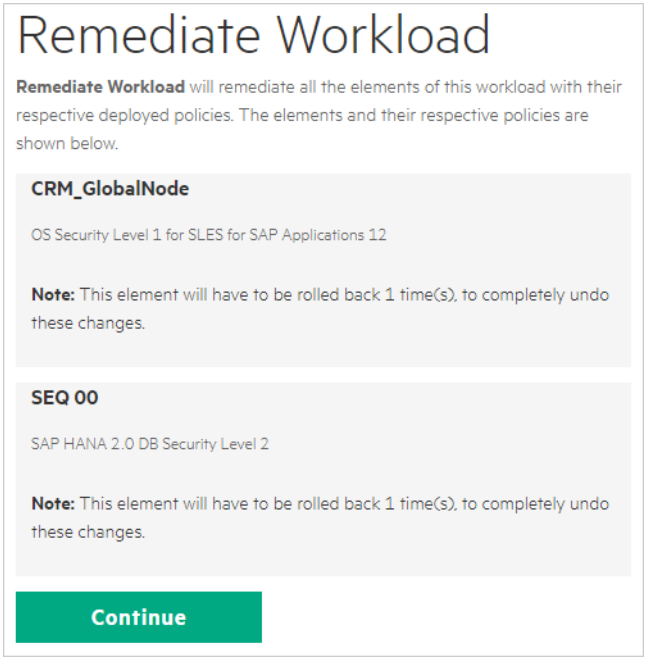
You can remediate a workload against policies that are deployed on the Workload.

1. Click the workload in the **Workload** page.
2. You can remediate a workload in the following two ways:

a. Click the **Remediate Worklaod** button.



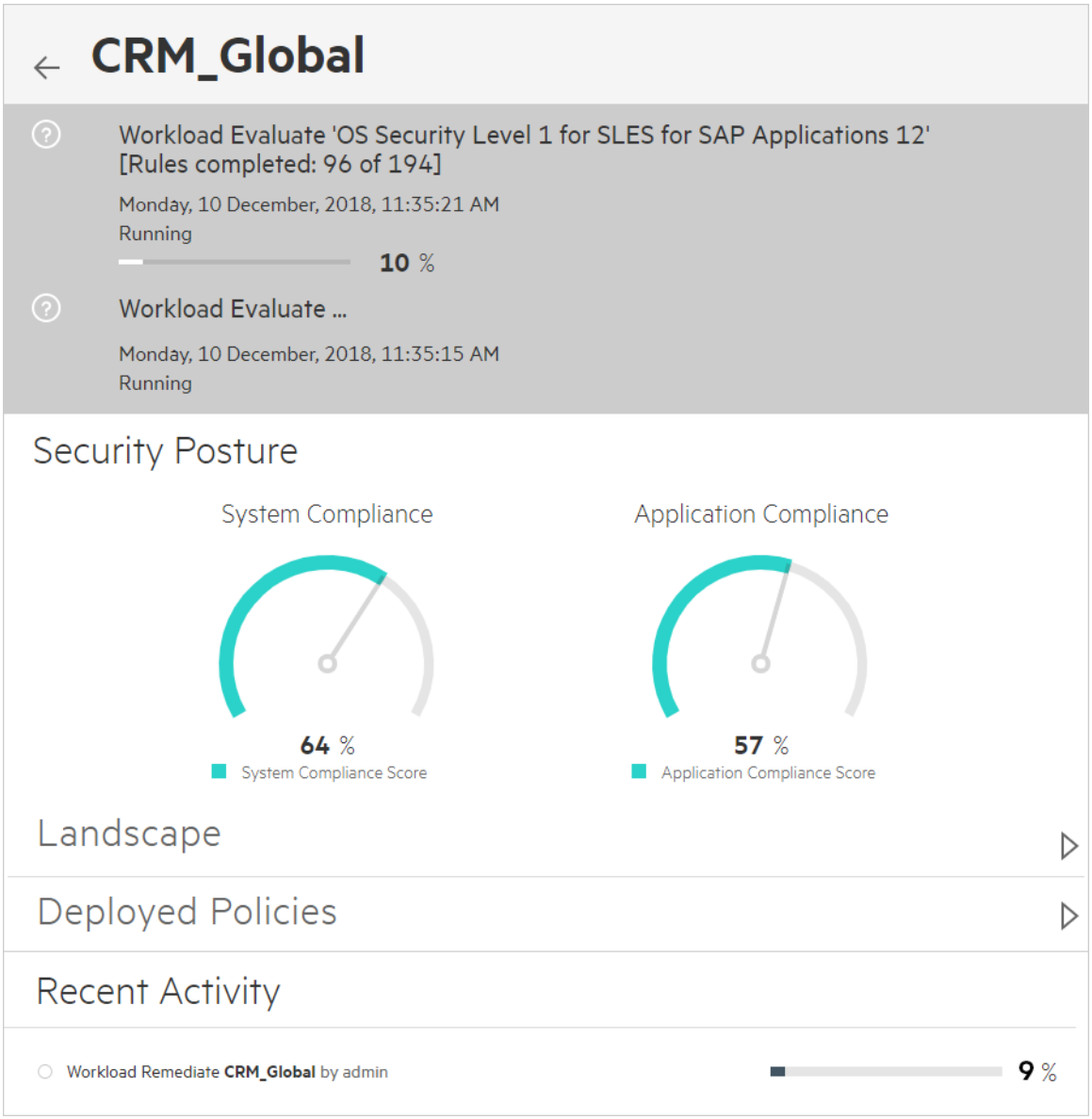
All the Security Policies that are deployed on the all Workload elements are remediated on the end node.



b. Select from the drop-down of **Choose an element** option. The **Choose a policy** displays the applicable policies that are deployed on the workload element. Select one of the policies. Click **Remediate Workload**.

3. When the remediation starts, the Workload View displays different remediation that are in progress.

WASL ensures that only one remediation or operation is active on the End Node.

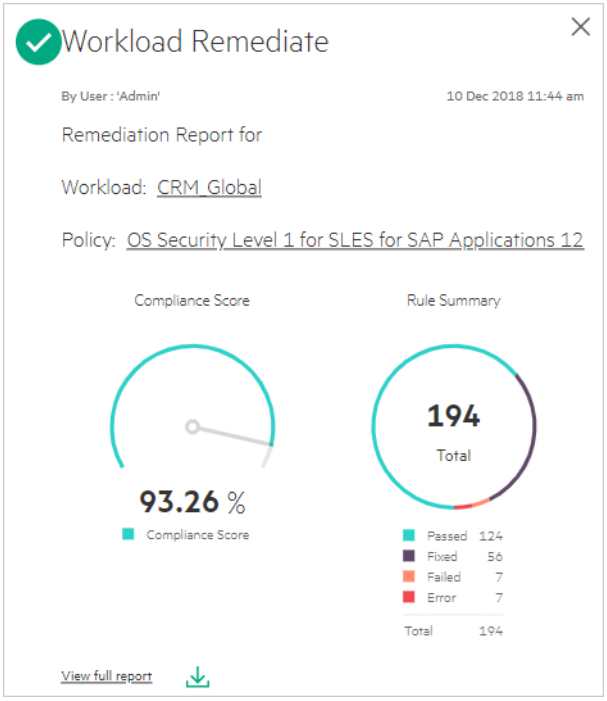


4. After the remediation is complete, the Workload Meters indicates the current score of the Workload against the policies deployed.

   The Individual scores of each Policy can be viewed under "Deployed Policies" views.

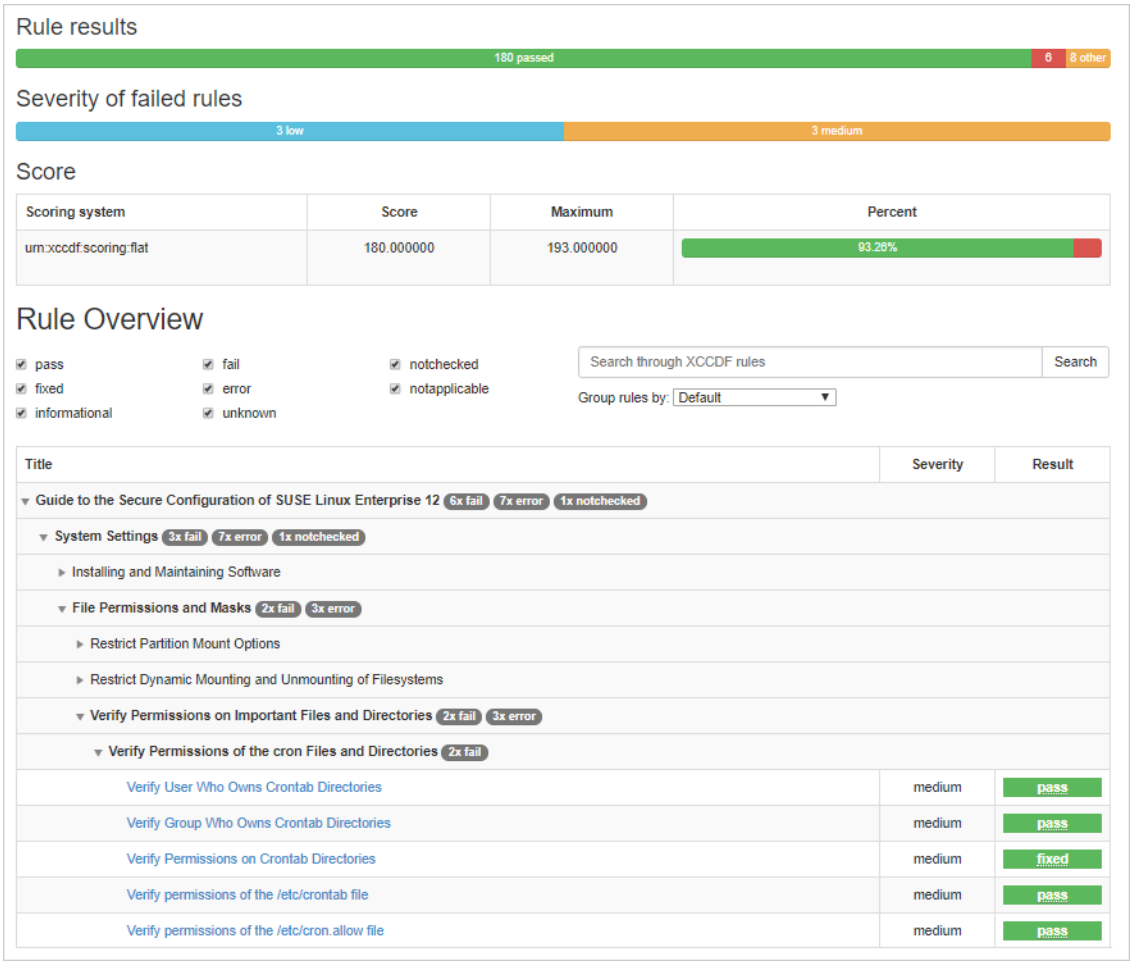
5. The "Recent Activity" lists all the Policies that are Remediated individually per policy.

6. To view more details on Workload Remediate activity like the number of Fixed, Passed, Failed rules or Rules with Error in Policy, click each activity.



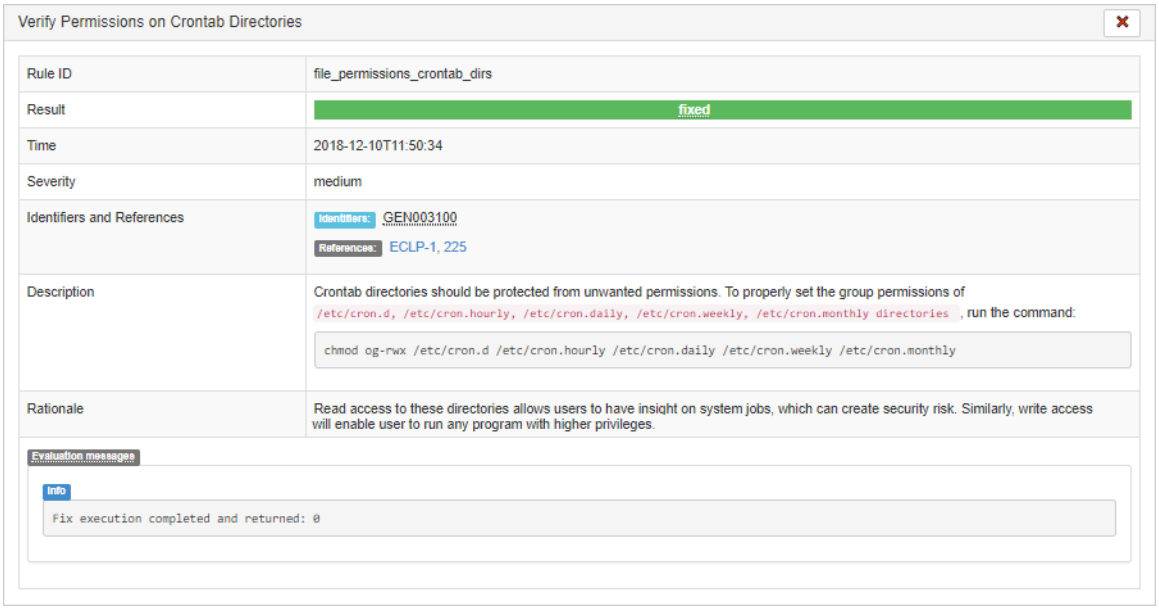
7. In the **Workload Remediate** window, click the **View Full Report** to see a complete HTML Report. You can also download it by clicking the download icon. You can click the individual rule and view the **Rule**

Summary.



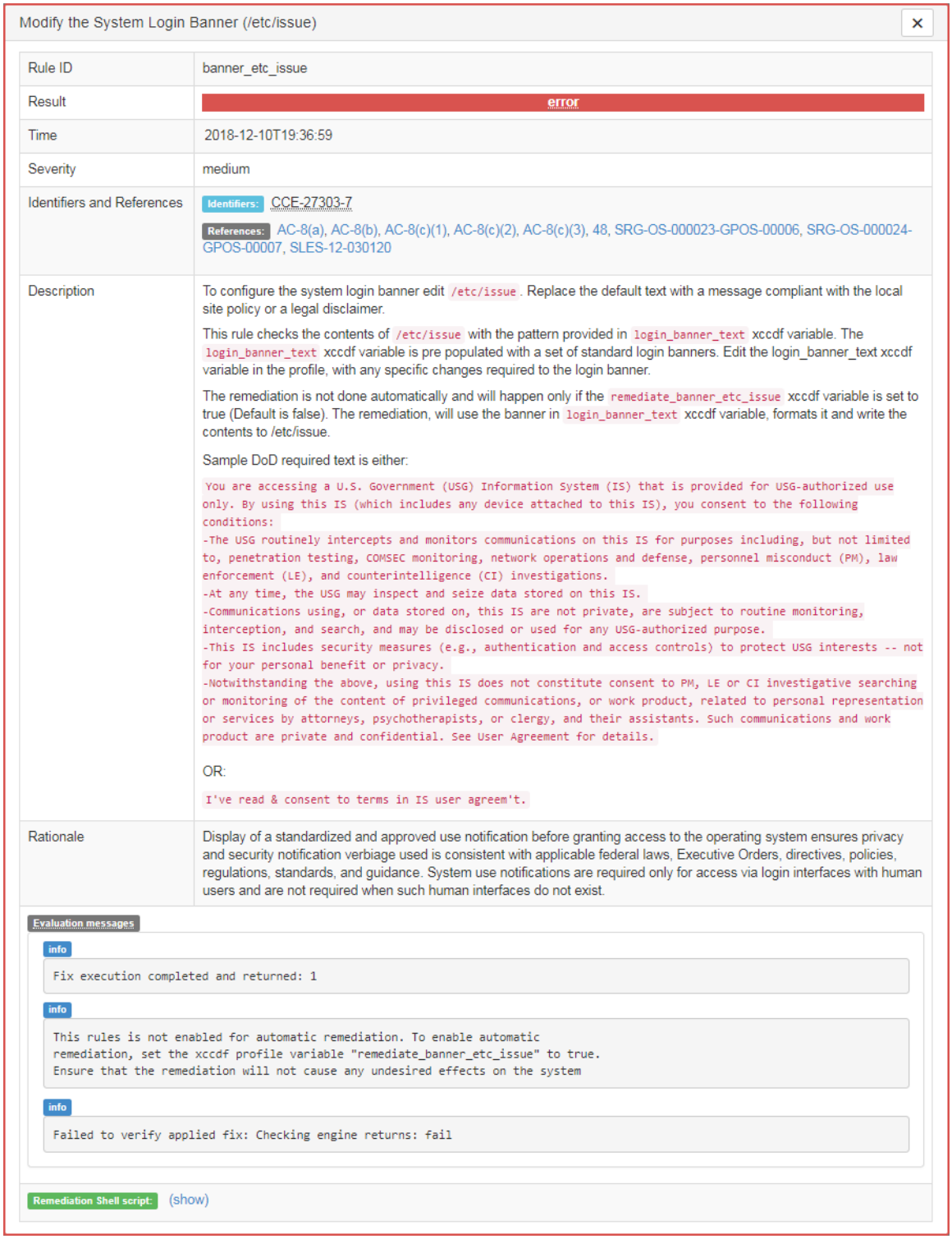
8. The Default Policies displays "Error" for some rules during remediation. The Error occurs when remediation script is present for the rules in the policies but not run due to the following reasons:

Rule Summary



a. These rules are sometimes intentionally not remediated, as they might disrupt the environment on the workload. If required, you can look at the rule description and enable remediation on them, by tailoring the Security Policy. For more information, see **Policy customization**.
For example: WASL can check for **`/etc/issues`** banner file for specific banner messages, But will not do remediation of this rule automatically as banner messages might differ from one organization to another.

The Policy can be however customized to allow remediation to happen and change the banner to an appropriate text.



Modify the System Login Banner (/etc/issue)

Rule ID	banner_etc_issue
Result	error
Time	2018-12-10T19:36:59
Severity	medium
Identifiers and References	Identifiers: CCE-27303-7 References: AC-8(a), AC-8(b), AC-8(c)(1), AC-8(c)(2), AC-8(c)(3), 48, SRG-OS-000023-GPOS-00006, SRG-OS-000024-GPOS-00007, SLES-12-030120
Description	To configure the system login banner edit /etc/issue. Replace the default text with a message compliant with the local site policy or a legal disclaimer. This rule checks the contents of /etc/issue with the pattern provided in login_banner_text xccdf variable. The login_banner_text xccdf variable is pre populated with a set of standard login banners. Edit the login_banner_text xccdf variable in the profile, with any specific changes required to the login banner. The remediation is not done automatically and will happen only if the remediate_banner_etc_issue xccdf variable is set to true (Default is false). The remediation, will use the banner in login_banner_text xccdf variable, formats it and write the contents to /etc/issue. Sample DoD required text is either: You are accessing a U.S. Government (USG) Information System (IS) that is provided for USG-authorized use only. By using this IS (which includes any device attached to this IS), you consent to the following conditions: -The USG routinely intercepts and monitors communications on this IS for purposes including, but not limited to, penetration testing, COMSEC monitoring, network operations and defense, personnel misconduct (PM), law enforcement (LE), and counterintelligence (CI) investigations. -At any time, the USG may inspect and seize data stored on this IS. -Communications using, or data stored on, this IS are not private, are subject to routine monitoring, interception, and search, and may be disclosed or used for any USG-authorized purpose. -This IS includes security measures (e.g., authentication and access controls) to protect USG interests -- not for your personal benefit or privacy. -Notwithstanding the above, using this IS does not constitute consent to PM, LE or CI investigative searching or monitoring of the content of privileged communications, or work product, related to personal representation or services by attorneys, psychotherapists, or clergy, and their assistants. Such communications and work product are private and confidential. See User Agreement for details. OR: I've read & consent to terms in IS user agreem't.
Rationale	Display of a standardized and approved use notification before granting access to the operating system ensures privacy and security notification verbiage used is consistent with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance. System use notifications are required only for access via login interfaces with human users and are not required when such human interfaces do not exist.

Evaluation messages

info
```
Fix execution completed and returned: 1
```

info
```
This rules is not enabled for automatic remediation. To enable automatic
remediation, set the xccdf profile variable "remediate_banner_etc_issue" to true.
Ensure that the remediation will not cause any undesired effects on the system
```

info
```
Failed to verify applied fix: Checking engine returns: fail
```

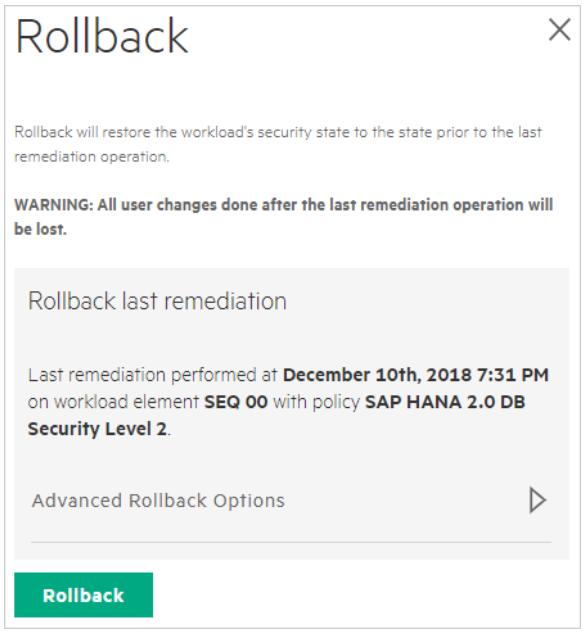
Remediation Shell script: (show)

b. Some of the preconditions for the rules to remediate might not present.
For example: A rule to add node to **`/tmp`** partition might not remediate and give error, as **`/tmp`** might not be a separate partition on the Node.

Rollback last Remediation operation on Workload

Prerequisites

This option is visible to users with "Administrator', 'Security Administrator', and 'Security Operator' roles.



Procedure

You can roll back a remediation that is previously done on a workload.

1. Click the workload in the **Workload** page.
2. Click the **Rollback** button.
   Rollback moves the configuration of the workload to a stage that was present before the remediation.
3. By Default Rollback is done on the last Policy remediated on any of the elements in the Workload. If required, you can select the Workload element on which rollback is performed by selecting "Advanced Rollback Options". Rollback will then happen on the last Policy remediation on that Workload element.

Contrary to Remediation, rollback is allowed only on one policy that has been recently remediated on the Workload. Whereas remediation can be done on all the policies that are deployed on a workload by just clicking one button. If you want to roll back all the policies, then see the **Activity** page of WASL to identify the number of remediations done on different workload elements. Then run the rollback operation on those workload elements that many numbers of times.

Example

The **OS security Level 2 for SLES 12** and **OS Security Extras for SAP HANA** policies are deployed on the Node Workload element. The SAP HANA 2.0 DB Security Level 2 policy is deployed on SAP HANA System workload element for a specific workload. The remediation can be done on all these policies in one go. However, to move the Workload configuration to the state present before remediation, rollback has to be done twice on the Node workload element and once on SAP HANA system workload element.

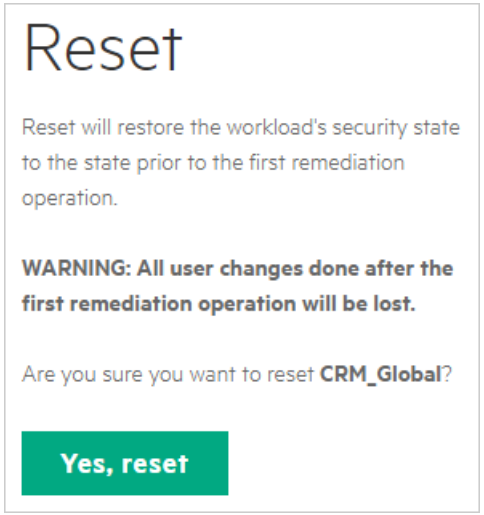
Rollback works by taking snapshot of the workload element before remediation operation. The snapshot of workload configuration gets stored on the end node getting remediated. This snapshot contains configuration files, service settings, RPM package status, audit file, password policy settings, PAM settings, SAP HANA configuration settings and much more. It is based on the workload element. On doing rollback, the configuration snapshot that is stored is applied back.

NOTE:

1. During snapshot of default Policies, WASL takes a backup of multiple configurations related to the default Policy and other related Policy. For example, during remediation of "SAP HANA 2.0 DB Security Level 1", a snapshot is taken for both "SAP HANA 2.0 DB Security Level 1" and "SAP HANA 2.0 DB Security Level 2" policies, since both these policies are derived from the same XCCDF sources. It can result in extra snapshot being taken though a specific policy might not be deployed on the workload. Thus rollback might revert more changes than expected on the workload element based on the snapshot.
2. Snapshot will take entire file backup. For example, the **`/etc/ssh/sshd_config`** file is backed up during snapshot stage of secure shell configuration. During rollback any other user-specific changes on these files will be lost.
3. Policy tailoring, specifically if you are changing the content of any of the XCCDF Value/variable using `<set-value>` tag might leave gaps while taking snapshot. For more information, see **Policy customization**. It is recommended to test the tailoring done for Policy rollback operation from SMS.
4. Rollback of newly imported policy is possible only if snapshot and rollback options are supported with the policy. You will have to check with the provider of the policy to be imported.

Reset Workload

Prerequisites
This option is visible to users with "Administrator' or 'Security Administrator' roles.



Procedure

Reset Workload resets all the security operations performed on the workload to the original state.

The Reset of the workload runs Rollback on all the remediation done so far on the workload elements in the reverse order.

1. Click the workload in the **Workload** page.
2. Click the **Reset** button.
   A reset operation is used in situations when you want to eliminate the operating system or application hardening as a potential cause towards an application downtime.

NOTE: Cautiously, use the Reset option as multiple Remediates could have got performed on a workload over a period. Use the rollback of workload recursively instead of reset.

User Management

This section describes the various operations that are supported for managing the users of SMS.

View Users

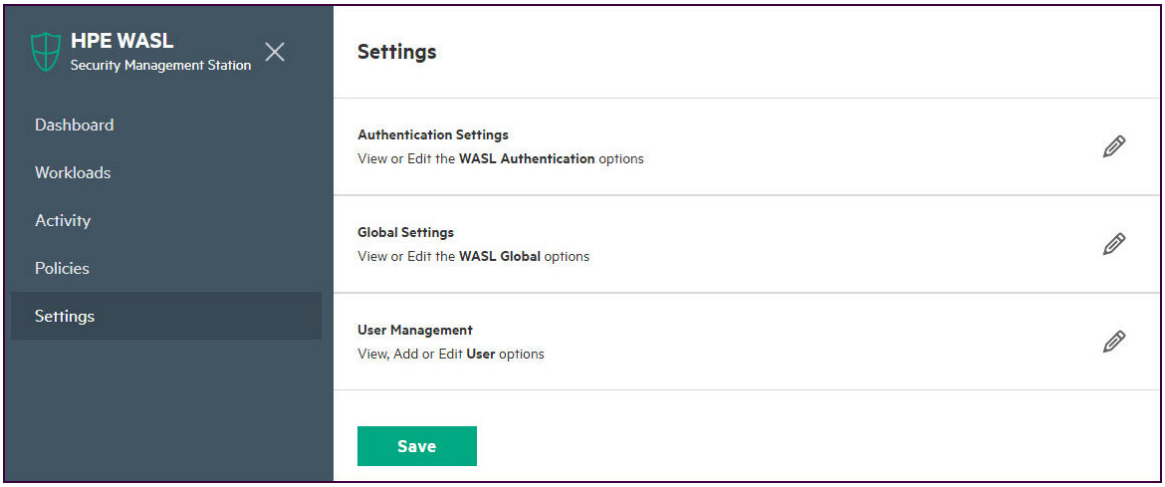
Prerequisites

This option is visible to users with "Administrator' or 'User Administrator' roles.

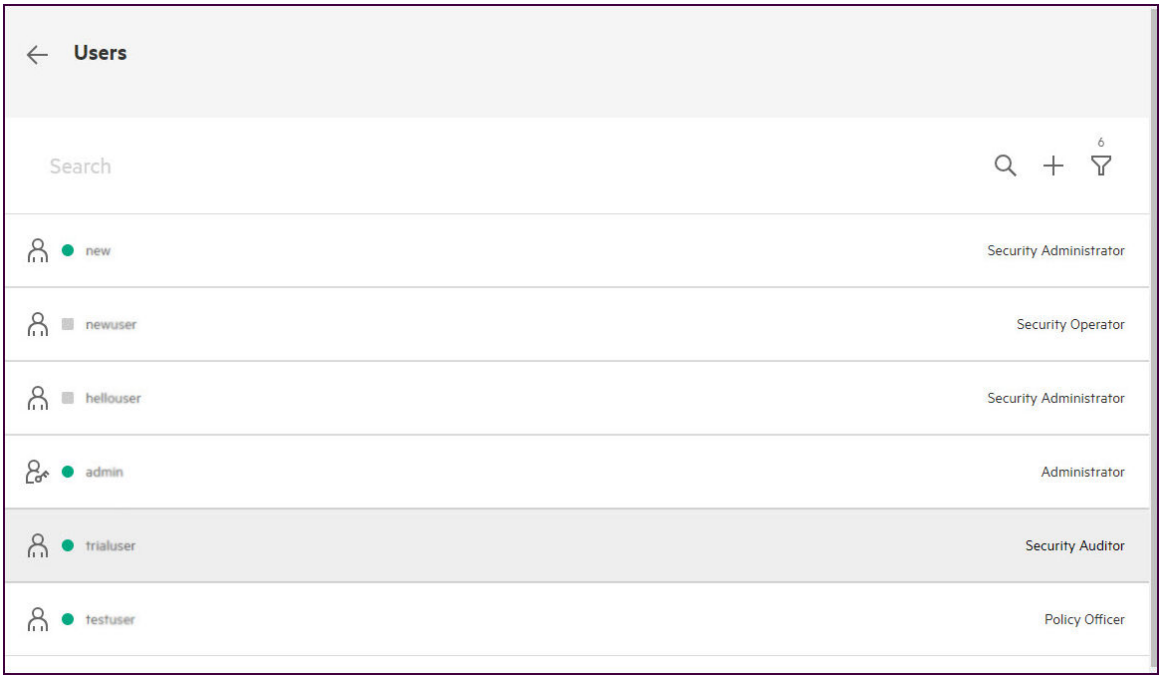
Procedure

To view users,

1. Select from the left pane **Settings** > **User Management** option.

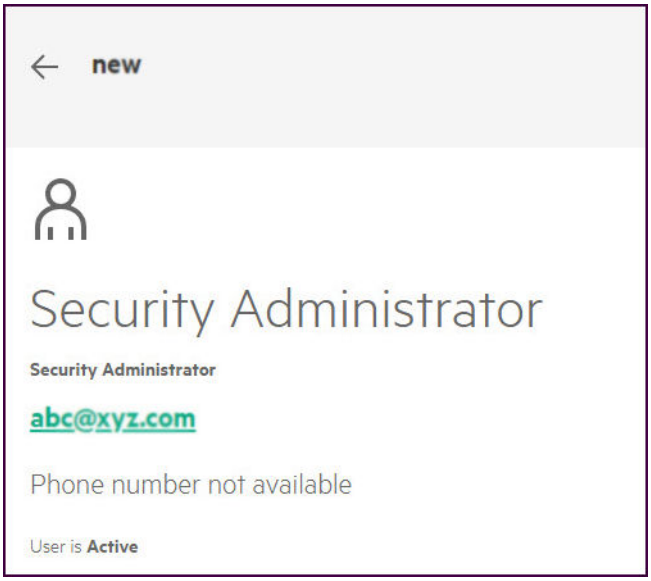


A list of users on SMS is displayed.



- If the icon before the user is gray in color, then the user is in "De-activate" state. The users in De-activate state are not allowed to log in to SMS.
- A user with green icon is in "Activated" state and can log in to SMS.

2. On the Right side of each user, you can view the role assigned to the user.
3. To view more details on the user and perform operation on the user, click any of the users account.



Add User

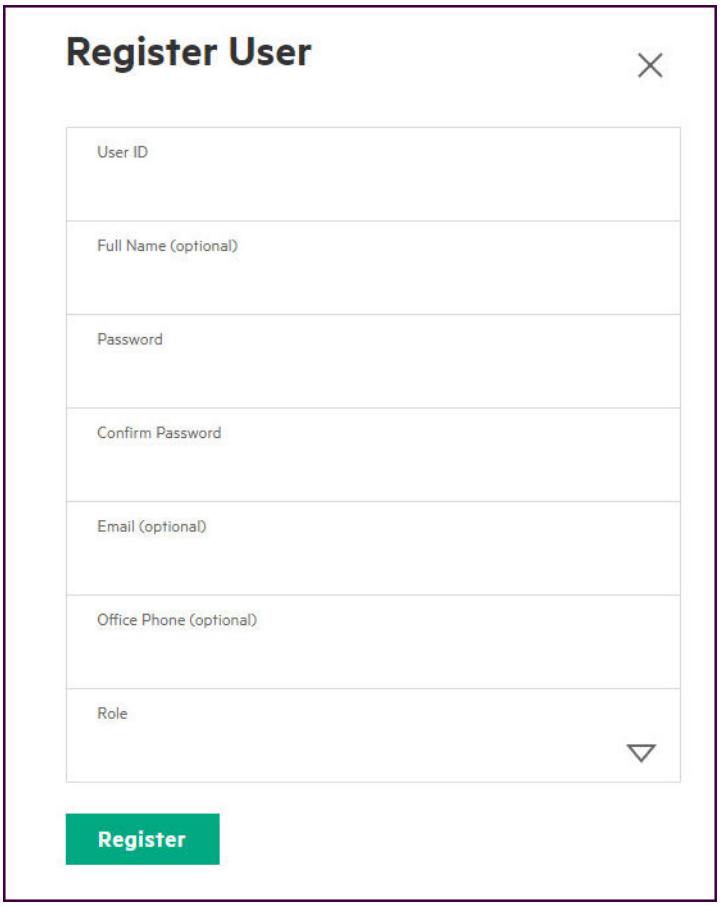
Prerequisites
This option is visible to users with "Administrator' or 'User Administrator' roles. You can enter new user credentials.

Procedure

To add user,

1. Select the **Settings** > **User Management** option from the left pane.
2. Click **+** symbol.

   Enter the following details on the **Register User** window.



   a. **User ID**
   b. **Full Name (Optional)**
   c. **Password**
   d. **Confirm Password**
   e. **Email (Optional)**
   f. **Office Phone (Optional)**

3. To assign the user, select from the list of **Role**. For different user roles and operations that are allowed for each role, see **User Roles**.
4. Click **Register** button.

The new user will require to change the password during first-time login.

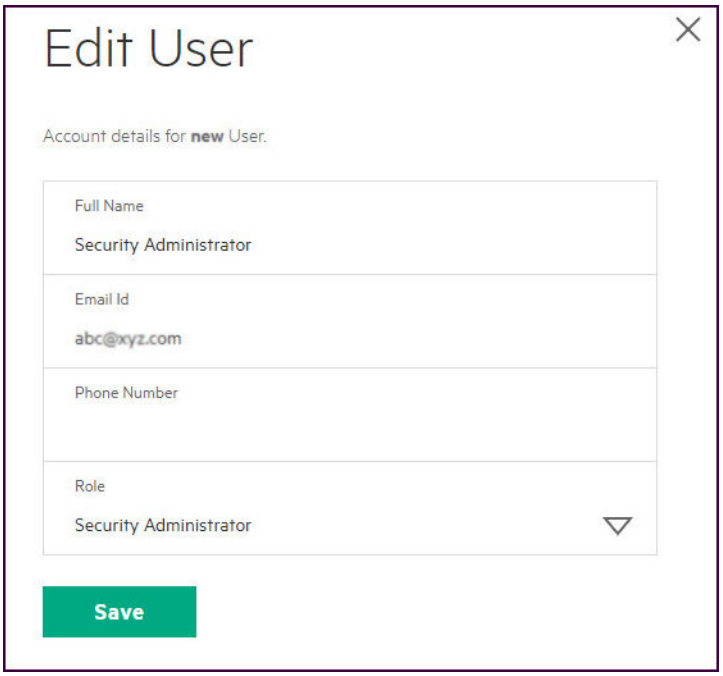
Edit User

Prerequisites
This option is visible to users with "Administrator' or 'User Administrator' roles.

Procedure

To edit user,

1. Select the **Settings** > **User Management** option from the left pane.
2. Click the specific user you want to edit.



3. To edit the user details or change the user role and save, click the **Edit User** option.

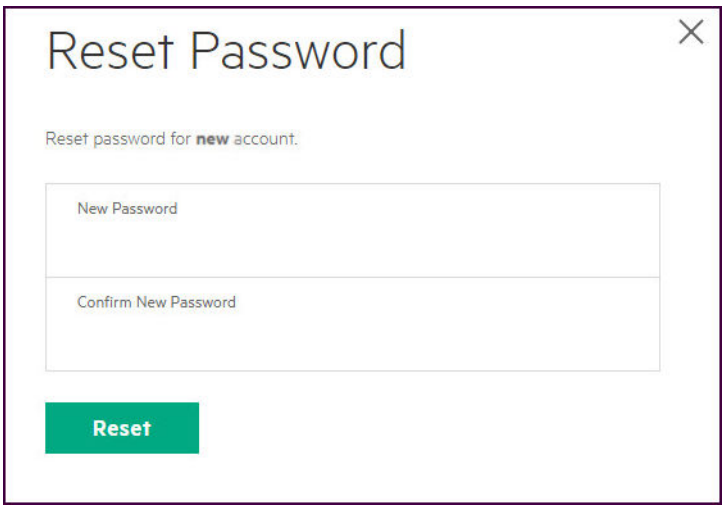
Reset Password

Prerequisites
This option is visible to users with "Administrator' or 'User Administrator' roles. If the user forgets the password, the password can be reset.

Procedure

To reset user password,

1. Select the **Settings** > **User Management** option from the left pane.
2. Click the specific user you want to edit.



3. To reset the user password, click the **Reset Password** option.

The user will require to change the password during next login.

Activate/De-activate Users

The user account apart from 'admin' user can be activated or de-activated at any time.

Prerequisites
This option is visible to users with "Administrator' or 'User Administrator' roles.

Procedure

1. Select the **Settings** > **User Management** option from the left pane.
2. Click the specific user you want to activate or de-activate.
3. Select **Activate** or **De-activate** option.

Example

The user can be deactivated for multiple reasons like:

- The administrator is performing a maintenance operation.
- There is a suspicious operation being performed from a user-account.
- The user has left the organization.

Delete User.

Prerequisites
This option is visible to users with "Administrator' or 'User Administrator' roles.

Procedure

To delete user,

1. Select the **Settings** > **User Management** option from the left pane.

2. Click the specific user you want to delete.
3. Click **Delete User** option.

   A user can be deleted only when no operations are performed using this user credentials. All operations performed by the users are logged and retained for security audit and forensic analysis.

Policy Operations

View policies

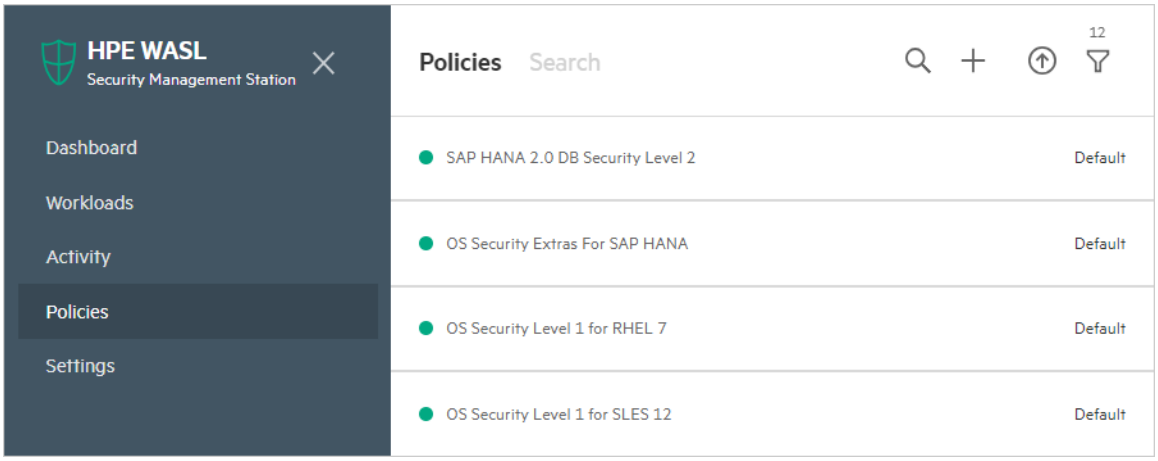
Prerequisites

This option is visible to users with "Administrator' or 'Policy Officer' roles.

Procedure

To View the list of security policies provided in WASL:

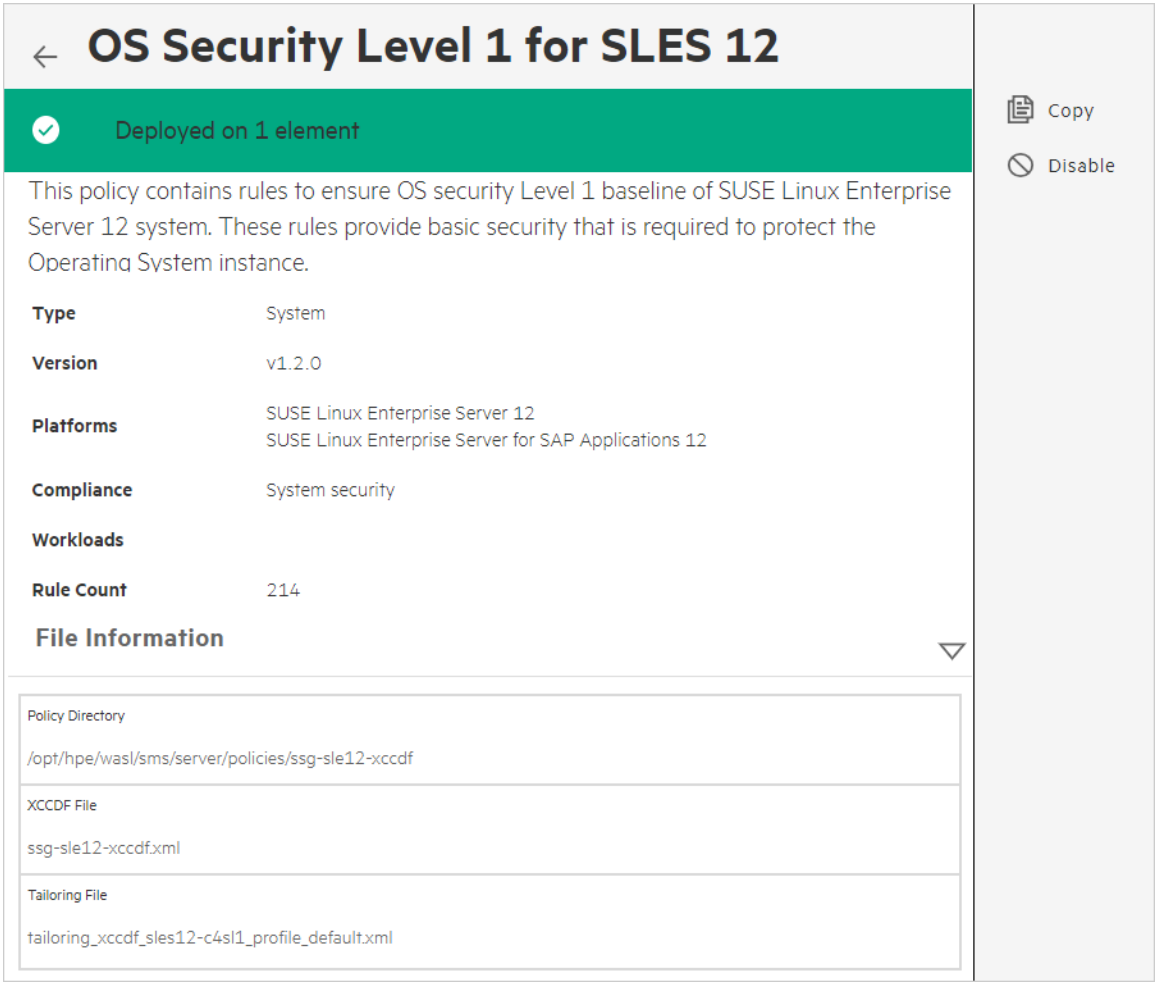
1. Select the **Policies** option from the left pane.



   A list of policies available on SMS is displayed.

   - If the icon before the policy is gray in color, then the policy is in "Disable" state. The policies in disable state are not available for deployment on SMS workload element.
   - A policy with green icon is in "enable" state and available for deployment on the workload element.
   - Policies highlighted as **Default** are provided with WASL product.
   - Policies highlighted as **User Defined** are created by Policy customization. For more information, see **Policy customization**.

2. To get more information on the Policy, click a specific policy. The policy details display the following fields:



3. **Policy Name**: Name of the policy is displayed on the top of the page.
4. **Status task bar**: Green color Indicates policy is enabled and can be deployed on a workload. Grey color indicates that policy is disabled and cannot be deployed on workloads any more. The status task bar also indicates the number of Workload elements on which the policy is already deployed.
5. **Type**:
   a. The type **System** indicates that the Policy can be deployed on Node elements of the workload (Operating system Only workload).
   b. The type **Application** indicates that the policy can be deployed on an application like SAP HANA database that is running on the Node.
6. **Platforms**: The Operating System versions on which the policy can be deployed. This version maps to “PRETTY_NAME” filed in /etc/os-release file on the end Node.
7. **Compliance**: Indicates if the Policy addresses some compliance.
8. **Workloads**: If the Policy type is Application, then the Workload entry indicates the type of application which this policy secures.
9. **Rule Count**: The number of rules (or group of rules) inside the policy.
10. **File Information**: Click to view the following details:

a. **Policy Directory**: The directory on WASL SMS system where all the policy-related files are stored.

b. **XCCDF File**: XCCDF is the main XML file based on XCCDF standards. It has entry point for all the rules in the policy and actions to be taken during evaluation and remediation of the policy. The XCCDF file also has profiles (List of rules or List of group of rules), which is used by WASL to create policies.

c. **Tailoring File**: Tailoring file is created by WASL when the XCCDF file is loaded into WASL product for the first time. There will be one unique tailoring file per policy. Each tailoring file contains an XCCDF profile (List of rules or List of group of rules). The XCCDF profile is picked from the XCCDF file during first-time load of the XCCDF file by WASL.

Disable/Enable security policy

Prerequisites
This option is visible to users with "Administrator' or 'Policy Officer' roles.

Procedure

To enable/disable security policy.

1. Select the **Policies** option from the left pane.
2. To get more information on the Policy, click a specific policy.
3. To disable the policy, click **Disable** option from the right side operations menu.
   - Once a policy is disabled, it is not available to deploy on any workload.
   - If the policy is already deployed on a workload, those deployments will not be affected.
4. To enable the policy for deployment to workload, click **Enable** option. Only enabled policies can be deployed on a workload.

Policy customization

Tailoring an existing Policy (Copy and Edit security policy)

Prerequisites: This option is visible to users with "Administrator' or 'Policy Officer' roles.

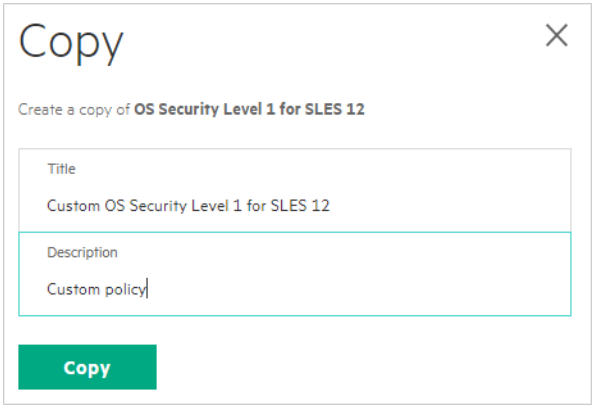
This option provides a way to copy an existing policy and tailor it to the organization-specific policy.

NOTE:

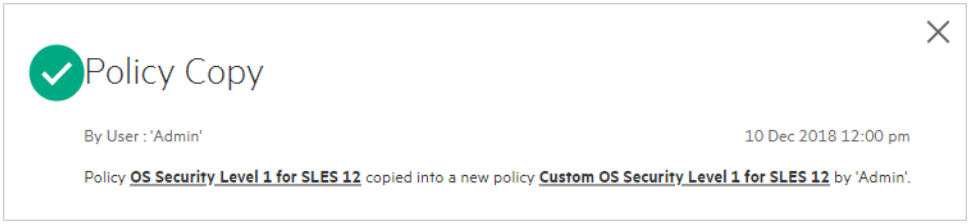
1. Tailoring can only be done on a newly copied policy before the policy is enabled.
2. If you are planning major changes to a policy by tailoring it, then it is recommended to use a test SMS node with test Workloads. Create and test this tailored policy first. If there are issues in a tailored policy, it can.
   - Cause issues on the workload.
   - There are chances that you might create multiple tailored policies to get the final desired policy. You cannot delete a tailored policy loaded and deployed on a Workload, Policy already deployed once, can only be disabled. It can leave too many unwanted intermediate tailored policies on the SMS.

---

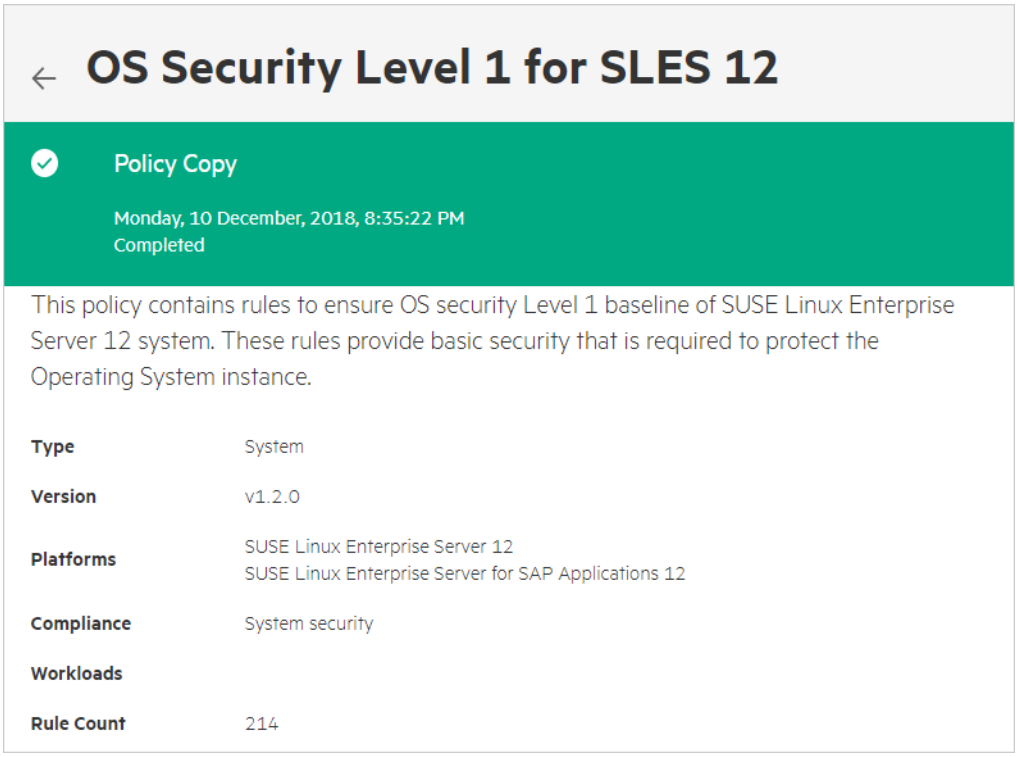
1. Select the **Policies** option from the left pane.
2. Click on the policy you want to create a copy.
3. To copy the policy to a new Policy, click **Copy** option.



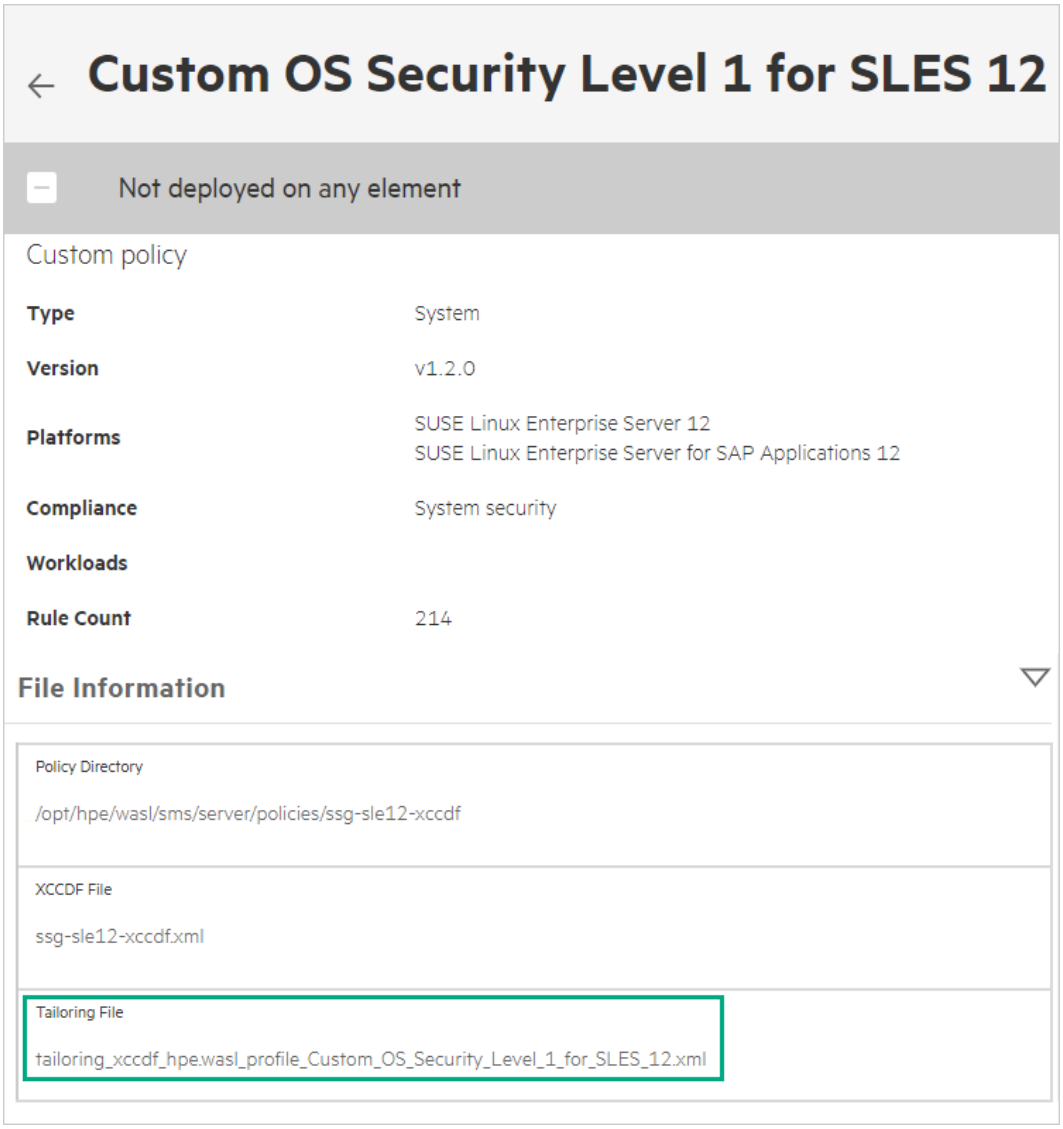
4. Provide a new unique Policy Name under **Title** and also provide the **Description** of this new policy.
5. To see the copied policy, click **Task (Activity)** which indicates the successful policy copy operation. Alternatively, you can search for the new policy in the **Policies** page of WASL.



6. Click the new policy that is copied. The details of the new policies are displayed in the center window.



7. To see the policy details such as location of policy files on WASL Virtual Appliance, click the arrow next to **File Information** option.



8. To tailor the new policy on the SMS system by using a text editor like vim, edit only the tailoring file.

   Example:

```
Sms-node: # cd /opt/hpe/wasl/sms/server/policies/ssg-sle12-xccdf
Sms-node: # ll tailoring_xccdf_hpe.wasl_profile_Custom_OS_Security_Level_1_for_SLES_12.xml
-rw-rw---- 1 waslsms waslsms 30696 Apr 23 15:29
tailoring_xccdf_hpe.wasl_profile_Custom_OS_Security_Level_1_for_SLES_12.xml
Sms-node: # vi tailoring_xccdf_hpe.wasl_profile_Custom_OS_Security_Level_1_for_SLES_12.xml
```

NOTE:

a. The tailoring file must be owned by **`waslsms`** user and group.

b. There are chances that remnant files (like the vim editor swap file) will be created sometimes in the policy directory. Ensure that such files are deleted before you reload the policy to SMS.

c. You can run the following command to check if any files have user and group other than **`waslsms`**:

```
# find . \! -user waslsms
# find . \! -group waslsms
```

Take appropriate action of either deleting these files or changing the user/group ownership.

d. Policy tailoring, specifically if you are changing the content of the any of the XCCDF Value/ variable using `<set-value>` tag might leave gaps while taking snapshot. For information on snapshot, see **Rollback last Remediation operation on Workload**). It is recommended to test the tailoring done for Policy rollback operation from SMS.

9. A sample edit of a copied profile is as follows:

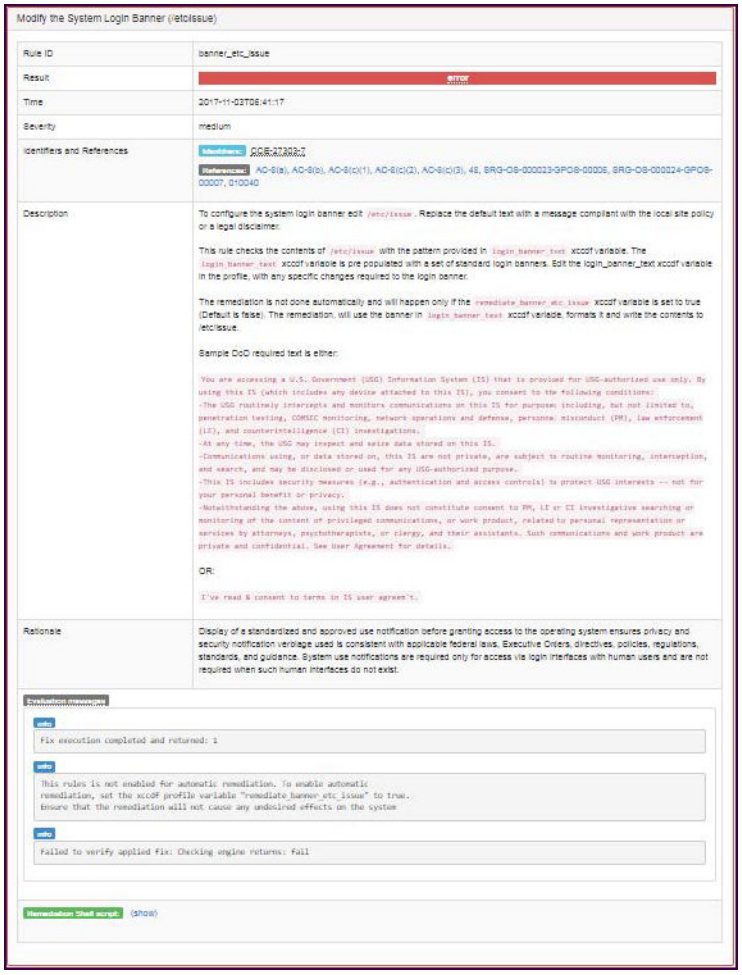
a. Copy the **OS Security Level 1 For SLES 12** security policy to **Custom OS Security Level 1 For SLES 12** security policy.

b. We will try changing the rules in **Custom OS Security Level 1 For SLES 12** to **change the terminal banner messages and enable remediation (in /etc/issues and /etc/issues.net),** and also **disable the gnome login banner rules**.

Following is the set of rules related to this:

- `banner_etc_issue - Check and Modify the System Login Banner (/etc/issue)`
- `banner_etc_issue_net - Check and Modify the System Login Banner (/etc/issue.net)`
- `dconf_gnome_banner_enabled - Checks and Enable gnome login banner`
- `dconf_gnome_login_banner_text - Check and Modify the gnome login banner text`

If we do evaluation or remediation of an **OS Security Level 1 For SLES 12** policy, the rule description in the evaluation or remediation reports has details on these rules and the XCCDF variables used by them. Details on these rules and XCCDF variables are also available in the XCCDF file (in this case **`ssgsle12-xccdf.xml`**).



Only edit the Tailoring file **/opt/hpe/wasl/sms/server/policies/ssg-sle12-xccdf/tailoring_xccdf_hpe.wasl_profile_Custom_OS_Security_Level_1_for_SLES_12.xml** in the WASL Virtual Appliance to make all the necessary changes.

c. The `dconf_gnome_banner_enabled` and `dconf_gnome_login_banner_text` can be disabled by setting the selected="true" to selected="false" for the following rules:

Change from:

```
-
<refine-rule idref="dconf_gnome_login_banner_text" weight="0" />
<select idref="dconf_gnome_login_banner_text" selected="true"></select>
--
<refine-rule idref="dconf_gnome_banner_enabled" weight="0" />
<select idref="dconf_gnome_banner_enabled" selected="true" />
-
```

Change to:

```
-
<refine-rule idref="dconf_gnome_login_banner_text" weight="0" />
<select idref="dconf_gnome_login_banner_text" selected="false"></select>
--
<refine-rule idref="dconf_gnome_banner_enabled" weight="0" />
<select idref="dconf_gnome_banner_enabled" selected="false" />
-
```

d. The `banner_etc_issue` and `banner_etc_issue_net` rule depends on the following XCCDF variables:

- **login_banner_text**: This variable has the banner text against which evaluation and remediation is done. The default value is set to a banner as prescribed by United States Government Configuration Baseline and identified by "usgcb_default" idref (ID reference) in the XCCDF file. There are also options to set this to DOD default (identified by "dod_default" idref) or short (identified by "dod_short" idref) or DOD Office of Designated Approving Authority DDA (identified by "dod_odda_default" idref) login banners.

  To use any of the alternative idref `("usgcb_default", "dod_default", "dod_short", "dod_odda_default")` already available, use `<refine-value>` tag in the tailoring file. However, in this sample we can use `<set-value>` tag, and set the login banner to a different text as follows:

```
<set-value idref="login_banner_text">
This system belongs to Demo corp.
Only authorized users are allowed to Login.
I've read &amp;amp; consent to terms in IS user agreem't.
</set-value>
```

- **remediate_banner_etc_issue**: This variable needs to be set to true to enable remediation on banner_etc_issue rule. The default value is "false". The other possible value supported in the XCCDF is "true". In this sample, we can use `<refine-value>` tag in the tailoring file and enable remediation as:

```
<refine-value idref="remediate_banner_etc_issue" selector="true" />
```

- **remediate_banner_etc_issue_net**: This variable needs to be set to true to enable remediation on banner_etc_issue_net rule. The default value is "false". The other possible value supported in the XCCDF is "true". In this sample, we can use `<refine-value>` tag in the tailoring file and enable remediation as:

```
<refine-value idref="remediate_banner_etc_issue_net"
selector="true" />
```

e. The **`tailoring_xccdf_hpe.wasl_profile_Custom_OS_Security_Level_1_for_SLES_12.xml`** after editing will be as follows:

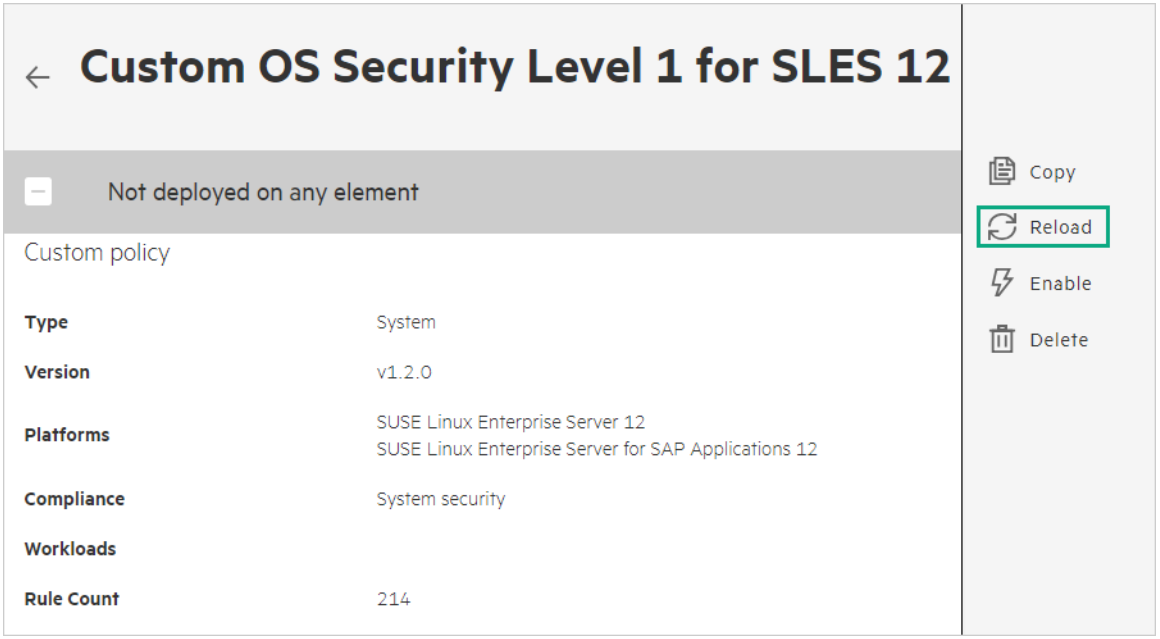
```
<?xml version='1.0' encoding='utf-8'?>
<Tailoring id="xccdf_org.open-scap_tailoring_example"
  xmlns="http://checklists.nist.gov/xccdf/1.2">
  <status>incomplete</status>
  <version time="2013-01-15T16:00:00.000+02:00">1.0</version>
  <Profile id="xccdf_hpe.wasl_profile_Custom_OS_Security_Level_1_for_SLES_12">
    <title>Custom OS Security Level 1 for SLES 12</title>
    <description>Custom policy for organization</description>
    <set-value idref="login_banner_text">
This system belongs to Demo corp.
Only authorized users are allowed to Login.
I've read &amp;amp; consent to terms in IS user agreem't.
</set-value>
    <refine-value idref="remediate_banner_etc_issue" selector="true" />
    <refine-value idref="remediate_banner_etc_issue_net" selector="true" />
-
-
    <refine-rule idref="dconf_gnome_login_banner_text" weight="0" />
    <select idref="dconf_gnome_login_banner_text" selected="false"></select> <!-- marked the rule selected to false
-->
-
-
    <refine-rule idref="dconf_gnome_banner_enabled" weight="0" />
    <select idref="dconf_gnome_banner_enabled" selected="false" />  <!-- marked the rule selected to false -->
-
-
-
```

f. To summarize, the following actions are taken in the tailoring file:

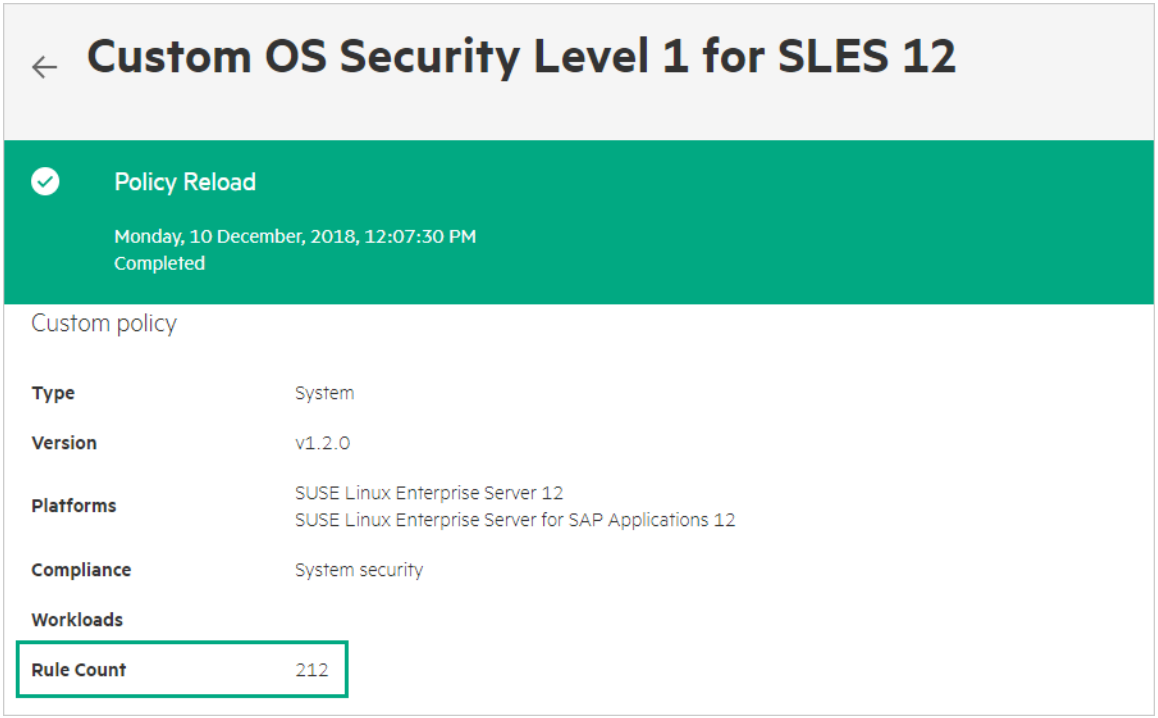
- Set **selected=false** on rules `dconf_gnome_banner_enabled` and `dconf_gnome_login_banner_text`.
- Set the Login banner to be evaluated and remediated to:

  ```
  This system belongs to Demo corp.
  Only authorized users are allowed to Login.
  I've read & consent to terms in IS user agreem't
  ```

- Enabled remediation on "banner_etc_issue" and "banner_etc_issue_net" by setting idref="remediate_banner_etc_issue" and idref="remediate_banner_etc_issue_net" to "true".



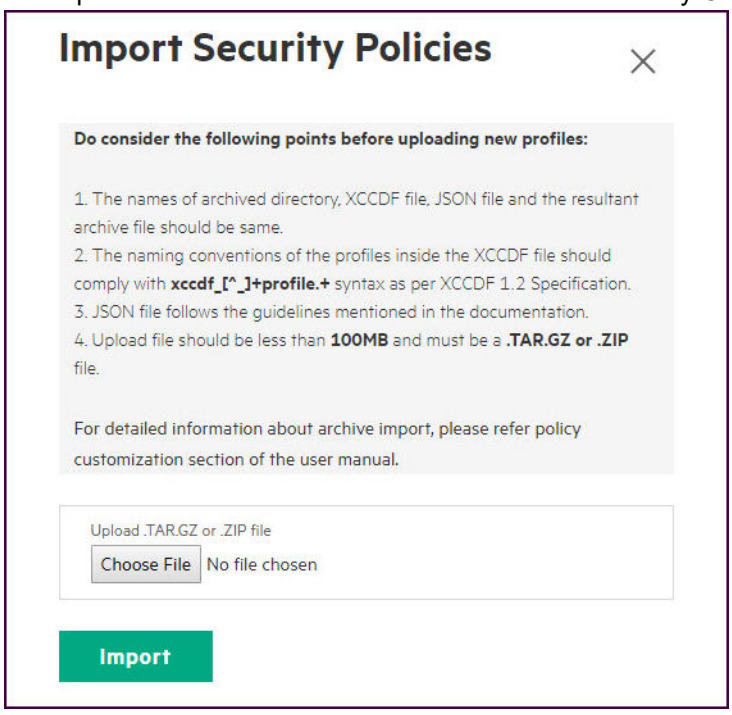
10. Once the tailoring file is edited and saved on WASL Virtual Appliance, the Policy can be reloaded, by clicking on the "Reload" option in the Policy screen. You can note any changes in **Rule Count** if any rules are disabled.



11. This Policy needs to be finally enabled, so that it can be deployed on different workloads.

Import new policy

Prerequisites
This option is visible to users with "Administrator' or 'Policy Officer' roles.



Procedure

To import new policy.

1. Select the **Policies** option from the left pane.
2. Click **+** symbol.

   A window is displayed to specify the details of security policy to import into Security Management Station (SMS).
3. To import the file into SMS, click **Choose file** option.
4. Read the instructions displayed on the screen carefully.
5. A policy is a ZIP or TAR.GZ file. It consists of four different types of files in a directory:

   a. XCCDF file, which has the various rules and the profile.

      I. Profiles are list of rules or list of group of rules present in the XCCDF file. The list is created to achieve specific security protection together.

      II. For each Profile in the XCCDF, a tailoring file is created by SMS that maps to an SMS Policy. The Name of the profiles must match the pattern as **`Xccdf_[^#]_profile.+`**. For example, **`xccdf_sample_profile_1`**.

   b. OVAL and/or Script file that has the implementation for evaluation and remediation of the rules. The OpenSCAP product shipped with WASL on the node to be secured is enabled with Script Check Engine **https://www.open-scap.org/features/other-standards/sce/**. It allows Evaluation of a rule to happen using scripts (like python and shell scripts) along with the OVAL XML files based evaluations.

   c. JSON file required by SMS to identify the policy name, applicable OS version for the policy and the compliance fulfillment of the policy, Type of Application (Workload). See the Sample JSON file with details at **Sample JSON file used to import policy**.

   d. Optional `profile_apis.py` (Python file), primarily to enable snapshot (taken during remediation) and rollback features on a workload for the policy. APIs should be exported from `profile_apis.py` for doing snapshot and rollback. Other APIs also can be exposed from `profile_apis.py`. The APIs get called during Workload Operation for the set of Policies that is getting imported. See the Sample `profile_apis.py` file at **Sample profile_apis.py optionally used in importing policy**.

6. Ensure that the following files have same names with different extensions:

   a. Names of directory holding the files

   b. The XCCDF file name

   c. The JSON file name

   d. The resultant archive .tar.gz or .zip file

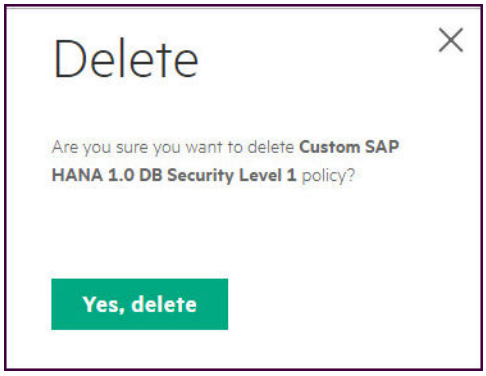
   SMS uses this name to identify the different files.
7. On successful completion of **Import** operation, a new policy is registered to SMS. If the policy is not in compliance with XCCDF standards, the import operation is unsuccessful. The respective activity errors logs can be referenced for further actions.
8. The imported policy is displayed in SMS as a **User defined** policy. By default the policy is in disable status. Enable the policy to make it available to deploy on the workload element.

Delete Policy.

Prerequisites

This option is visible to users with "Administrator' or 'Policy Officer' roles.

Delete Option is not provided to policies that are already deployed once. Even if the policy is undeployed from all workload elements for auditing reasons.



Procedure

To Delete the policy,

1. Select the **Policies** option from the left pane.

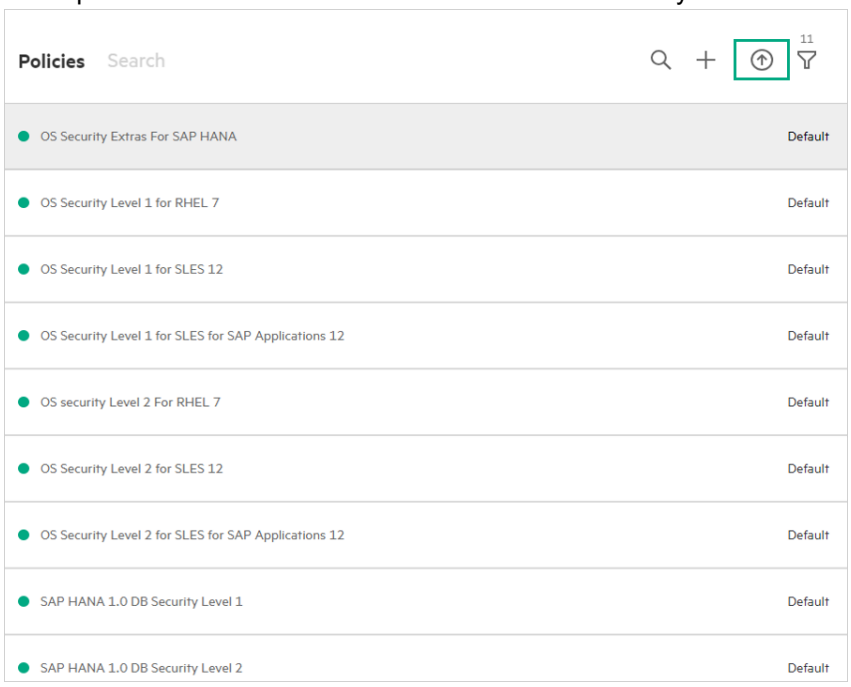
   A list of policies available on SMS is displayed.

2. Select the **User defined** policy that has to be deleted.
3. To delete the policy from SMS, use the **Delete** option.

Policy update

Prerequisites

This option is visible to users with 'Administrator' or 'Policy Officer' roles.



Procedure

To perform Policy update,

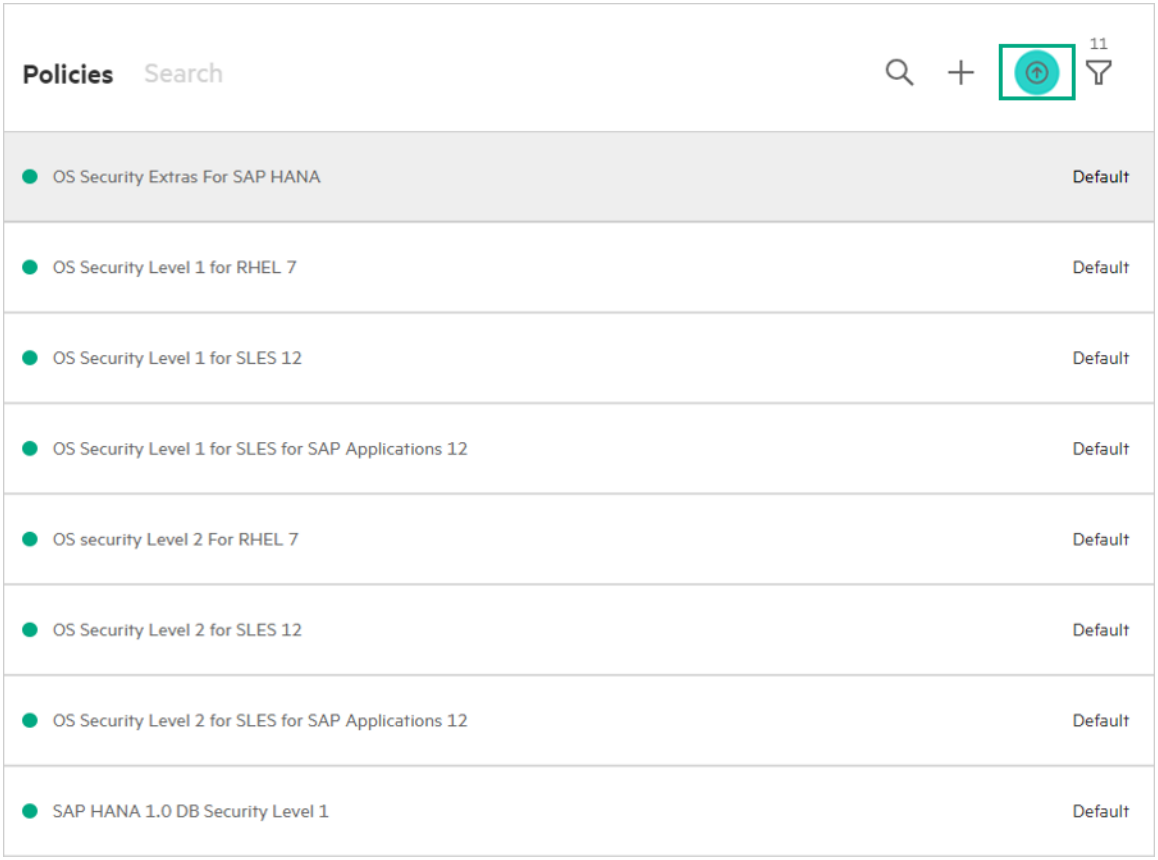
1. Transfer any new policy rpm packages provided to the WASL Virtual Appliance using **`wasladmin`** user access.
2. Log in to the WASL Virtual Appliance through secure shell or console access as **`wasladmin`** user.
3. Unlock the **`root`** user account for a period until you install the new rpm packages:

```
# sudo /opt/hpe/wasl/sms/tools/lockunlock_root.sh -unlock
[sudo] password for wasladmin:    <<<<< Enter the password of wasladmin here
Enter the root user Password :    <<<<< Enter a new password for root user
Confirm the root user Password :    <<<<< Re-Enter the new password once again
root user is enabled with the given password. Please lock the root user after
usage.
```

4. Once the **`root`** user is unlocked, login to the WASL Virtual Appliance as **`root`** user using the password set in **Step 3**. Install the policy rpm packages using `yum install <rpm_package>` command.
5. Once the packages are installed, logout of the **`root`** session.
6. Log in to the WASL Virtual Appliance through secure shell or console access as **`wasladmin`** user. Lock the **`root`** user account using the following command:

```
# sudo /opt/hpe/wasl/sms/tools/lockunlock_root.sh -lock
```

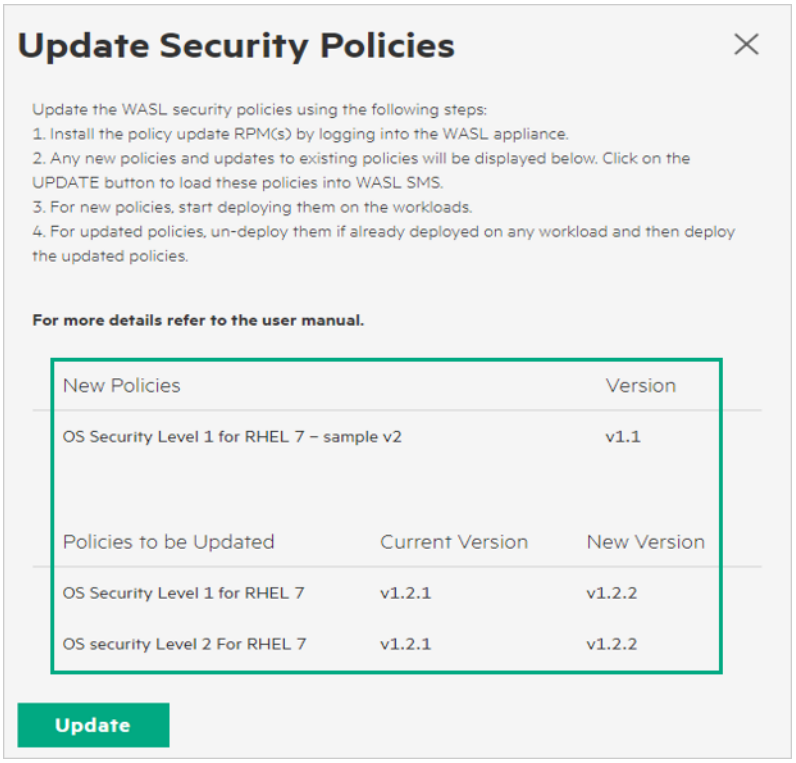
7. Wait for around 15 seconds and then check the update button by logging into the SMS.
8. If the updates are available, then the update button gets highlighted.



9. If the update button is not highlighted, you can make WASL SMS to recheck for updates by logging into WASL Virtual Appliance through Secure Shell/Console as **`wasladmin`** user and running the following command:

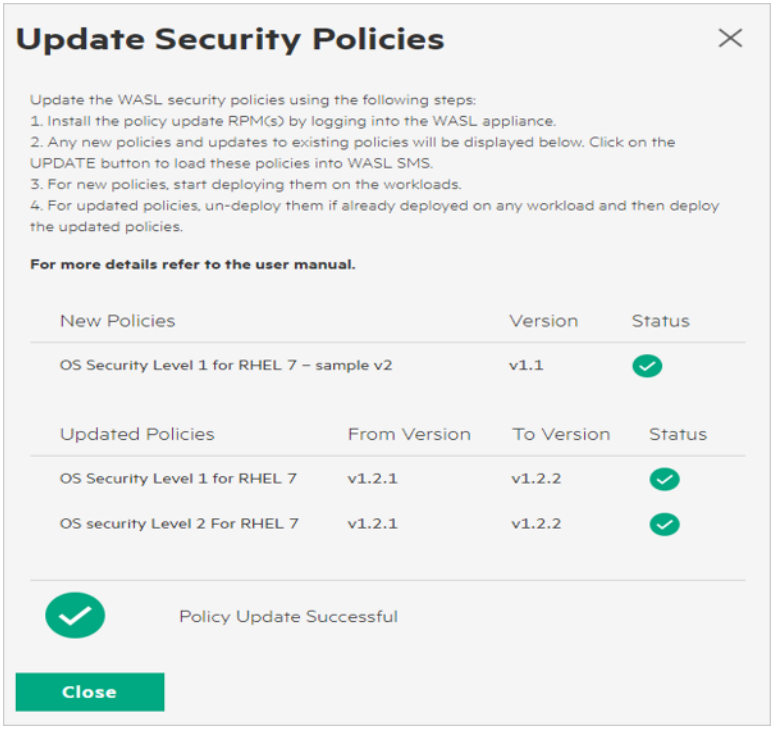
```
# sudo /opt/hpe/wasl/sms/tools/wasl_sms.sh -check_policy_updates
```

10. To see the details of policies to be updated as well as new policies if any, click the update button in SMS GUI.

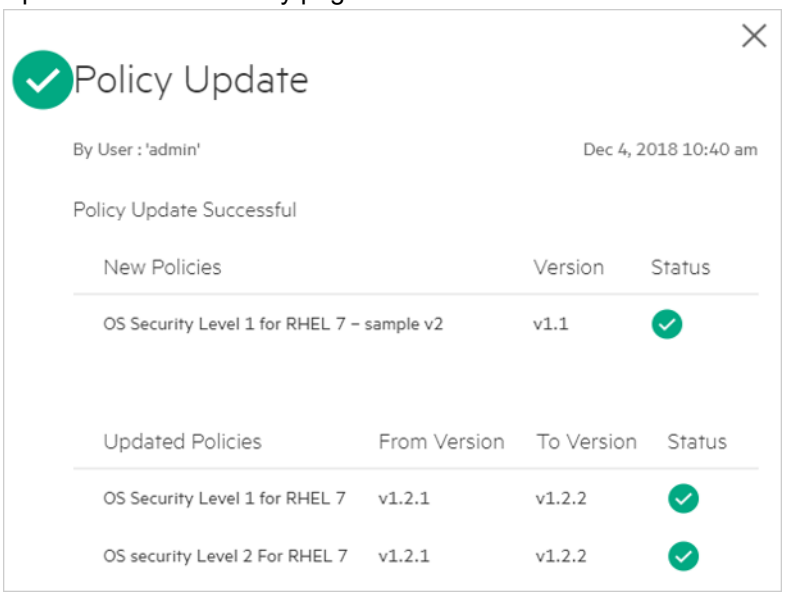


11. To consume the policy update, click the update button

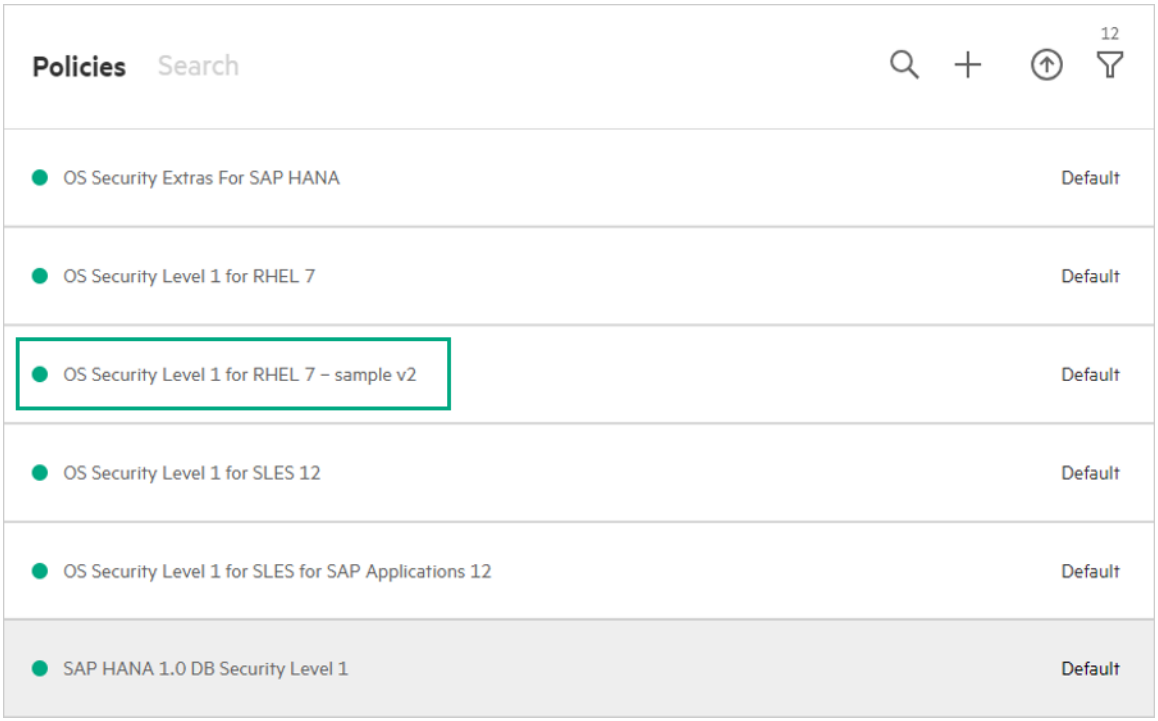
12. Once the policy update is consumed, the final status is displayed.



13. Check the activity page as well for Policy Update status. For any issues during the update, the Policy Update status on activity page will show "Additional Information".



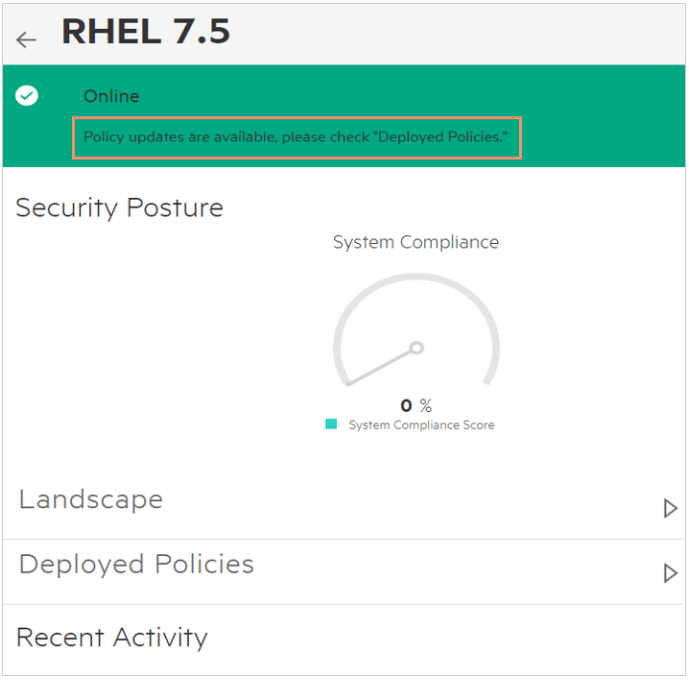
14. Click the policy page to see the new policy **OS security Level 1 for RHEL 7 - sample v2** added to the existing policy list.



15. The above steps ensures that SMS has the recent updated policies or new policies loaded. You can start deploying this new or updated policies on any new workloads.

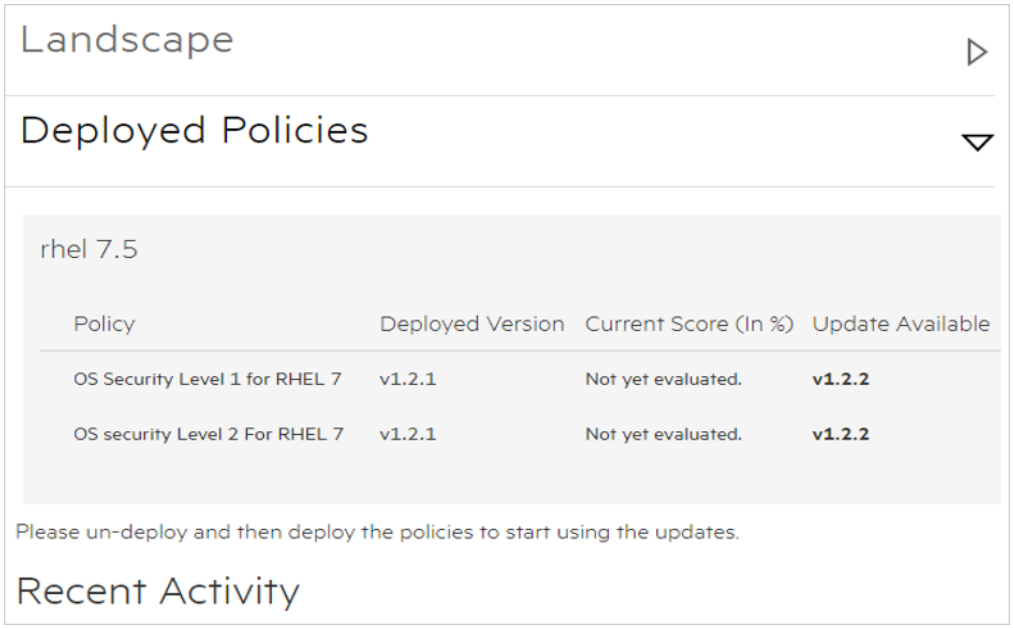
16. On workload having an older version of the updated policy, Un-Deploy the older version and start using the latest version of the Policy. Following are the steps:

    a. Click workloads where the old policies were deployed. A banner message is displayed as *Policy updates are available. Please check "Deployed Policies*.



    b. Scroll down on the same page and click deployed policies to check policy details. In the example here, two policies by name **OS security Level 1 for RHEL 7** and **OS security Level 2 for RHEL**

7 are deployed with version number 1.2.1 and an updated version of 1.2.2 is available.



c. Un-deploy these policies and redeploy them to use the latest version of policies.

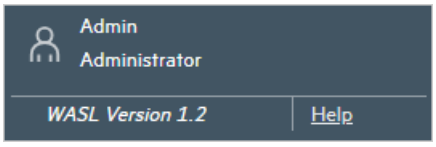
NOTE: It is possible that the updated policies might require the latest WASL Node packages to be installed on the Workload. It is recommended to first Install the latest Node packages on the Workload before deploying the latest policies.

To install the Node packages automatically, edit the Workload, click on Node element and select "Install Packages". For more information on Installing the Node packages, see the WASL Install and Setup Guide.

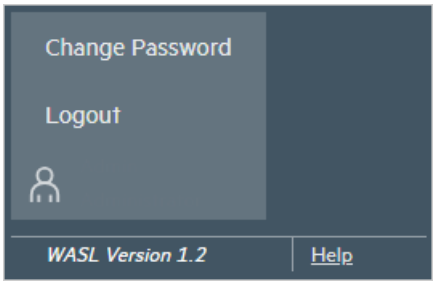
Session operation and Help

All users who log in to WASL SMS can see the user name and the role that they have logged in. To view user name and role:

1. Click the LeftHand bottom corner screen after the user icon.



2. The following options are displayed:



- **Change Password**: Change the password of the current logged in user. The newly updated password gets applied from next login.
- **Logout**: To log out from SMS.
- **WASL Version**: To identify the version of WASL.
- **Help**: Opens the WASL Help, to view information about each of the WASL screens in SMS.

Websites

General websites

Hewlett Packard Enterprise Information Library

www.hpe.com/info/EIL

Server Infrastructure Security Solutions

http://www.hpe.com/go/security

WASL websites

HPE WASL User Guide

OpenSCAP portal

https://www.open-scap.org/

For additional websites, see **Support and other resources**.

Support and other resources

Accessing Hewlett Packard Enterprise Support

- For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website:

  http://www.hpe.com/info/assistance

- To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website:

  http://www.hpe.com/support/hpesc

Information to collect

- Technical support registration number (if applicable)
- Product name, model or version, and serial number
- Operating system name and version
- Firmware version
- Error messages
- Product-specific reports and logs
- Add-on products or components
- Third-party products or components

Accessing updates

- Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.
- To download product updates:

  Hewlett Packard Enterprise Support Center

  www.hpe.com/support/hpesc

  Hewlett Packard Enterprise Support Center: Software downloads

  www.hpe.com/support/downloads

  Software Depot

  www.hpe.com/support/softwaredepot

- To subscribe to eNewsletters and alerts:

  www.hpe.com/support/e-updates

- To view and update your entitlements, and to link your contracts and warranties with your profile, go to the Hewlett Packard Enterprise Support Center **More Information on Access to Support Materials** page:

  www.hpe.com/support/AccessToSupportMaterials

IMPORTANT: Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HPE Passport set up with relevant entitlements.

Customer self repair

Hewlett Packard Enterprise customer self repair (CSR) programs allow you to repair your product. If a CSR part needs to be replaced, it will be shipped directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your Hewlett Packard Enterprise authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider or go to the CSR website:

http://www.hpe.com/support/selfrepair

Remote support

Remote support is available with supported devices as part of your warranty or contractual support agreement. It provides intelligent event diagnosis, and automatic, secure submission of hardware event notifications to Hewlett Packard Enterprise, which will initiate a fast and accurate resolution based on your product's service level. Hewlett Packard Enterprise strongly recommends that you register your device for remote support.

If your product includes additional remote support details, use search to locate that information.

Remote support and Proactive Care information

HPE Get Connected

www.hpe.com/services/getconnected

HPE Proactive Care services

www.hpe.com/services/proactivecare

HPE Proactive Care service: Supported products list

www.hpe.com/services/proactivecaresupportedproducts

HPE Proactive Care advanced service: Supported products list

www.hpe.com/services/proactivecareadvancedsupportedproducts

Proactive Care customer information

Proactive Care central

www.hpe.com/services/proactivecarecentral

Proactive Care service activation

www.hpe.com/services/proactivecarecentralgetstarted

Warranty information

To view the warranty information for your product, see the links provided below:

HPE ProLiant and IA-32 Servers and Options

www.hpe.com/support/ProLiantServers-Warranties

HPE Enterprise and Cloudline Servers

www.hpe.com/support/EnterpriseServers-Warranties

HPE Storage Products

www.hpe.com/support/Storage-Warranties

HPE Networking Products

www.hpe.com/support/Networking-Warranties

Regulatory information

To view the regulatory information for your product, view the *Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products*, available at the Hewlett Packard Enterprise Support Center:

www.hpe.com/support/Safety-Compliance-EnterpriseProducts

Additional regulatory information

Hewlett Packard Enterprise is committed to providing our customers with information about the chemical substances in our products as needed to comply with legal requirements such as REACH (Regulation EC No 1907/2006 of the European Parliament and the Council). A chemical information report for this product can be found at:

www.hpe.com/info/reach

For Hewlett Packard Enterprise product environmental and safety information and compliance data, including RoHS and REACH, see:

www.hpe.com/info/ecodata

For Hewlett Packard Enterprise environmental information, including company programs, product recycling, and energy efficiency, see:

www.hpe.com/info/environment

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Sample JSON file used to import policy

Following is a sample JSON file used during policy import:

```
[
{
"id": "xccdf_sles12-c4sl1_profile_default",
"info": {
                "version":"v1.1",
                "xccdf_file":"ssg-sle12-xccdf.xml",
                "applicable_platforms": ["SUSE Linux Enterprise Server
12","SUSE Linux Enterprise Server for SAP Applications 12"],
                 "applicable_compliance": ["System security"],
                 "type":"System" }
},
{
"id": "xccdf_sles12-c4sl2_profile_default",
"info": {
                "version":"v1.1",
                "xccdf_file":"ssg-sle12-xccdf.xml",
                 "applicable_platforms": ["SUSE Linux Enterprise Server
12","SUSE Linux Enterprise Server for SAP Applications 12"],
                 "applicable_compliance": ["System security"],
                 "type":"System" }
}
]
```

Here:

id: Should point to one of the profile defined in the XCCDF file. I.e. In the above example, the corresponding XCCDF file should have the following entry:

```
<Profile id="xccdf_sles12-c4sl1_profile_default">
-
-
</Profile>
```

SMS looks up in the XCCDF file for this profile, validate, and load it as a policy in SMS. The **<title>** in the XCCDF file is used to identify the Policy. This profile title should be unique across all profiles in the XCCDF file. Multiple profiles presented in the XCCDF file is specified as multiple blocks of the JSON file separated by curly braces {} (displayed in the example).

- **Version:** Version of the Policy
- **xccdf_file:** Name of the XCCDF file for corresponding policy
- **applicable_platforms:** The Operating System versions on which the policy can be deployed. This version maps to "PRETTY_NAME" filed in /etc/os-release file on the end Node.
- **applicable_workloads:** If the Policy type is Application, then the Workload entry indicates the type of application which this policy secures. Example: "SAP HANA".
- **applicable_compliance**: Indicates if the Policy addresses some compliances.
- **type:** Type "System" indicates that the Policy is for system compliance (that is. compliance of the Node element of Workload). Type "Application" indicates that the Policy is for Application compliance (like compliance of SAP HANA System element of Workload).

Sample profile_apis.py optionally used in importing policy

```
# (c)Copyright 2017 Hewlett Packard Enterprise Development LP
import sys,os,pwd,json,importlib

import common.helper
import common.workload_helper
from common.workload_helper import raise_error

import common.text_logger
from common.text_logger import get_logger

from config.core_config import SS_POLICY,LIB_PATH

from config.core_config import SNAPSHOT_LOCATION,SS_POLICY,LOGGER_NAME,SS_LOG_PATH,TMP_PATH

logger = get_logger(LOGGER_NAME)


policy_type = "hana"    # can be either hana or system currently

'''
Define generic entry points
'''
#
# This API gets called before multiple operations to get a
# descriptive name of the workload
#
def workload_descriptive_name():
    return "Sample Workload"

#
# This API gets called before multiple operations of SMS like
# policy evaluation, remediation, rollback.
#
# This API can implement different validation logic
# to check if the system or application that needs to
# to be secured is running properly.
#
# call raise_error(<string_message>), in order to indicate a
# failure of this API. The <string_message> will be displayed to
# end users of SMS
#
#
# For SAP HANA workload type, provide following API:
# def validate_hana():
# For SYSTEM workload type, provide following API:
# def validate_system():
def validate_hana():
    try:
        logger.debug("Perform Validation here")
    except Exception,e:
        raise_error("Error occurred during validation:"+str(e))
#
#
# This API gets called after the policy is deployed.
#
# This API can implement checks to perform post deployment
# activity.
#
# call raise_error(<string_message>), in order to indicate a
# failure of this API. The <string_message> will be displayed to
# end users of SMS.
# On calling a raise_error(), the deploy operation is indicated
# as a failure and the policy will be removed from the
# target deployed directory.
#
def validate_deploy(profile_name, target_profile_dir_deployed):
    try:
```

```
        logger.debug("Perform post deploy check here”)
    except Exception,e:
        raise_error("Error occurred during deploy:"+str(e))

#
# This API gets called during the SMS evaluation operation, before
# the evaluation operation is performed on a policy
#
# Following are the different arguments passed:
#    1) profile_name - Name of the Profile
#    2) xccdf_file - XCCDF file name
#    3) tailor_file - Name of the tailoring file
#
# call raise_error(<string_message>), in order to indicate a
# failure of this API. The <string_message> will be displayed to
# end users of SMS
#
def pre_evaluate(profile_name,xccdf_file=None,tailor_file=None):
    base_policy_path=SS_POLICY+"/"+policy_type+"/"+profile_name
    try:
        logger.debug("Perform pre evaluation here")
    except Exception,e:
        raise_error("Error occurred during pre evaluation:"+str(e))

#
# This API gets called during the SMS evaluation operation, after
# the evaluation operation is performed on a policy
#
# Following are the different arguments passed:
#    1) primary_status - The status of the evaluate operation. zero
#       indicates a success. Any other status apart from zero is an error.
#       See /opt/hpe/wasl/core/common/error.py on an end Node to see the list
#      of status.
#    2) secondary_status - The secondary status of the evaluate operation.
#       zero indicates a success. Any other status apart from zero is an
#       error.
#    3) profile_name - Name of the Profile
#    4) xccdf_file - XCCDF file name
#    5) tailor_file - Name of the tailoring file
#    6) report_file - The HTML report file that is generated and having the
#       evaluation report (output of OpenSCAP evaluation)
#    7) result_file - The XML XCCDF evaluation result  (output of OpenSCAP
#       evaluation)
#
# call raise_error(<string_message>), in order to indicate a
# failure of this API. The <string_message> will be displayed to
# end users of SMS
#
#
def post_evaluate(primary_status,secondary_status,profile_name,
       xccdf_file=None,tailor_file=None,report_file=None,result_file=None):
    base_policy_path=SS_POLICY+"/"+policy_type+"/"+profile_name
    try:
        logger.debug("Perform post evaluation here")
    except Exception,e:
        raise_error("Error occurred during post evaluation:"+str(e))

#
# This API gets called during the SMS remediation operation, before
# the remediation operation is performed on a policy
#
# Following are the different arguments passed:
#    1) profile_name - Name of the Profile
#    2) xccdf_file - XCCDF file name
#    3) tailor_file - Name of the tailoring file
#
# call raise_error(<string_message>), in order to indicate a
# failure of this API. The <string_message> will be displayed to
# end users of SMS
#
def pre_remediate(profile_name,xccdf_file=None,tailor_file=None):
    base_policy_path=SS_POLICY+"/"+policy_type+"/"+profile_name
    try:
        logger.debug("Perform pre remediation here")
    except Exception,e:
```

```
        raise_error("Error occurred during pre remediation:"+str(e))

#
# This API gets called during the SMS remediation operation, before
# the remediation operation and after pre_remediate() API is called.
#
# The Snapshot i.e. the configuration state of the different files,
# sysctl parameters, other configuration which the policy is expected
# to remediate, should be collected and stored in snapshot_dir in
# snapshot() API.
# The rollback() API should be able to revert this collect configuration
# state back on the system.
#
# Following are the different arguments passed:
#    1) snapshot_dir - The directory to which snapshot should be taken
#       (With path). This is same as:
#       SNAPSHOT_LOCATION+"/"+policy_type+"/"+snapshot_id
#    2) snapshot_id - The final snapshot directory
#    3) reports - not used currently
#
# The Policy XCCDF, OVAL, Scripts, including this profile_apis.py will be
# stored in SNAPSHOT_LOCATION+"/"+policy_type+"/"+snapshot_id+"/policy"
# directory while before snapshot() API.
#
# Before calling this API, the details of the Policy, like profile name
# gets stored in file:
# SNAPSHOT_LOCATION+"/"+policy_type+"/"+snapshot_id+"/policy/profile.dat"
#
# call raise_error(<string_message>), in order to indicate a
# failure of this API. The <string_message> will be displayed to
# end users of SMS
#
def snapshot(snapshot_dir,snapshot_id=None,reports=None):
    try:
        logger.debug("Perform configuration snapshot here")
    except Exception,e:
        raise_error("Error occurred during snapshot:"+str(e))

#
# This API gets called during the SMS remediation operation, after
# the remediation operation is performed on a policy
#
# Following are the different arguments passed:
#    1) primary_status - The status of the remediate operation. zero
#       indicates a success. Any other status apart from zero is an error.
#       See /opt/hpe/wasl/core/common/error.py on an end Node to see the list
#      of status.
#    2) secondary_status - The secondary status of the remediate operation.
#       zero indicates a success. Any other status apart from zero is an
#       error.
#    3) profile_name - Name of the Profile
#    4) xccdf_file - XCCDF file name
#    5) tailor_file - Name of the tailoring file
#    6) report_file - The HTML report file that is generated and having the
#       remediation report (output of OpenSCAP remediation)
#    7) result_file - The XML XCCDF remediation result  (output of OpenSCAP
#       remediation)
#
# call raise_error(<string_message>), in order to indicate a
# failure of this API. The <string_message> will be displayed to
# end users of SMS
#
#
def post_remediate(primary_status,secondary_status,profile_name,
        xccdf_file=None,tailor_file=None,report_file=None,result_file=None,
        snapshot_id=None):
    base_policy_path=SS_POLICY+"/"+policy_type+"/"+profile_name
    try:
        logger.debug("Perform post remediation here")
    except Exception,e:
        raise_error("Error occurred during post remediation:"+str(e))

#
# This API gets called during the SMS rollback operation, before
# the rollback operation is performed on a policy.
```

```
#
# Following are the different arguments passed:
#    1) snapshot_id - The final snapshot directory.
#
# The complete snapshot directory having the snapshot of configuration
# stored in snapshot() API will be present here:
# SNAPSHOT_LOCATION+"/"+policy_type+"/"+snapshot_id
#
# The Policy XCCDF, OVAL, Scripts, including this profile_apis.py will be
# stored in SNAPSHOT_LOCATION+"/"+policy_type+"/"+snapshot_id+"/policy"
# directory while before snapshot() API.
# This current API will be invoked from profile_apis.py stored in
# SNAPSHOT_LOCATION+"/"+policy_type+"/"+snapshot_id+"/policy" directory.
#
# Before calling this API, the details of the Policy, like profile name
# gets stored in file:
# SNAPSHOT_LOCATION+"/"+policy_type+"/"+snapshot_id+"/policy/profile.dat"
#
# call raise_error(<string_message>), in order to indicate a
# failure of this API. The <string_message> will be displayed to
# end users of SMS
#
def pre_rollback(snapshot_id):
    try:
        logger.debug("Perform pre rollback here")
    except Exception,e:
        raise_error("Error occurred during pre rollback:"+str(e))

#
# This API gets called during the SMS rollback operation, after
# the rollback operation is performed on a policy.
#
# Following are the different arguments passed:
#    1) primary_status - The status of the rollback operation. zero
#       indicates a success. Any other status apart from zero is an error.
#       See /opt/hpe/wasl/core/common/error.py on an end Node to see the list
#      of status.
#    2) secondary_status - The secondary status of the rollback operation.
#       zero indicates a success. Any other status apart from zero is an
#       error.
#    3) snapshot_id - The final snapshot directory.
#
#
# The complete snapshot directory having the snapshot of configuration
# stored in snapshot() API will be present here:
# SNAPSHOT_LOCATION+"/"+policy_type+"/"+snapshot_id
#
# The Policy XCCDF, OVAL, Scripts, including this profile_apis.py will be
# stored in SNAPSHOT_LOCATION+"/"+policy_type+"/"+snapshot_id+"/policy"
# directory while before snapshot() API.
# This current API will be invoked from profile_apis.py stored in
# SNAPSHOT_LOCATION+"/"+policy_type+"/"+snapshot_id+"/policy" directory.
#
# Before calling this API, the details of the Policy, like profile name
# gets stored in file:
# SNAPSHOT_LOCATION+"/"+policy_type+"/"+snapshot_id+"/policy/profile.dat"
#
# call raise_error(<string_message>), in order to indicate a
# failure of this API. The <string_message> will be displayed to
# end users of SMS
#
def post_rollback(primary_status,secondary_status,snapshot_id):
    try:
        logger.debug("Perform post rollback here")
    except Exception,e:
        raise_error("Error occurred during post rollback:"+str(e))



#
# This API gets called during the SMS rollback operation.
#
# The Snapshot i.e. the configuration state of the different files,
# sysctl parameters, other configuration which the policy is expected
# to remediate, should be collected and stored in snapshot_dir in
```

```
# snapshot() API.
# The rollback() API should be able to revert this collect configuration
# state back on the system.
#
# Following are the different arguments passed:
#    1) snapshot_dir - The directory to which snapshot was taken
#       (With path) that should be reverted back. This is same as:
#       SNAPSHOT_LOCATION+"/"+policy_type+"/"+snapshot_id
#    2) snapshot_id - The final snapshot directory
#    3) reports - not used currently
#
# The Policy XCCDF, OVAL, Scripts, including this profile_apis.py will be
# stored in SNAPSHOT_LOCATION+"/"+policy_type+"/"+snapshot_id+"/policy"
# directory while before snapshot() API.
# This current API will be invoked from profile_apis.py stored in
# SNAPSHOT_LOCATION+"/"+policy_type+"/"+snapshot_id+"/policy" directory.
#
# Before calling this API, the details of the Policy, like profile name
# gets stored in file:
# SNAPSHOT_LOCATION+"/"+policy_type+"/"+snapshot_id+"/policy/profile.dat"
#
# call raise_error(<string_message>), in order to indicate a
# failure of this API. The <string_message> will be displayed to
# end users of SMS
#
def rollback(snapshot_path,snapshot_id=None,reports=None):
    try:
        logger.debug("Perform rollback of configuration here")
    except Exception,e:
        raise_error("Error occurred during rollback:"+str(e))
```

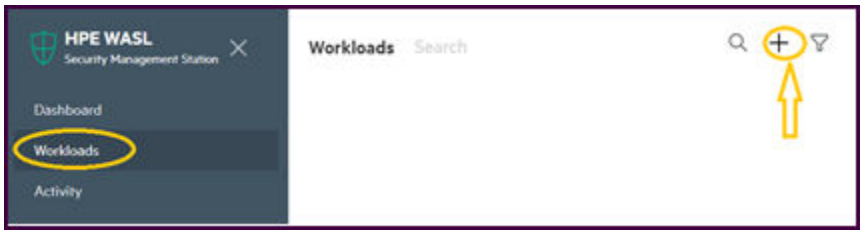
Hardened WASL SMS Appliance

The WASL 1.3.0 SMS Virtual Appliance can be hardened using the OS security Policy.

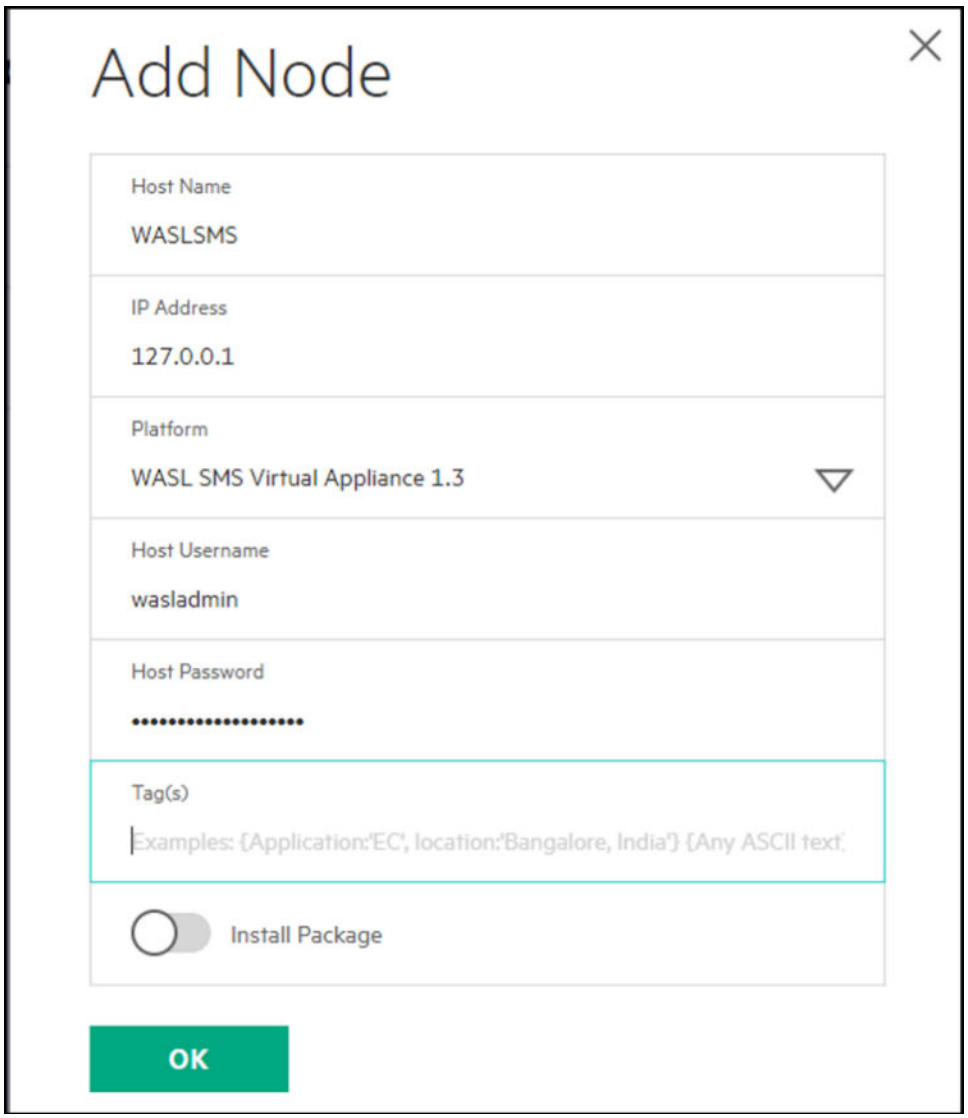
How to harden appliance

Procedure

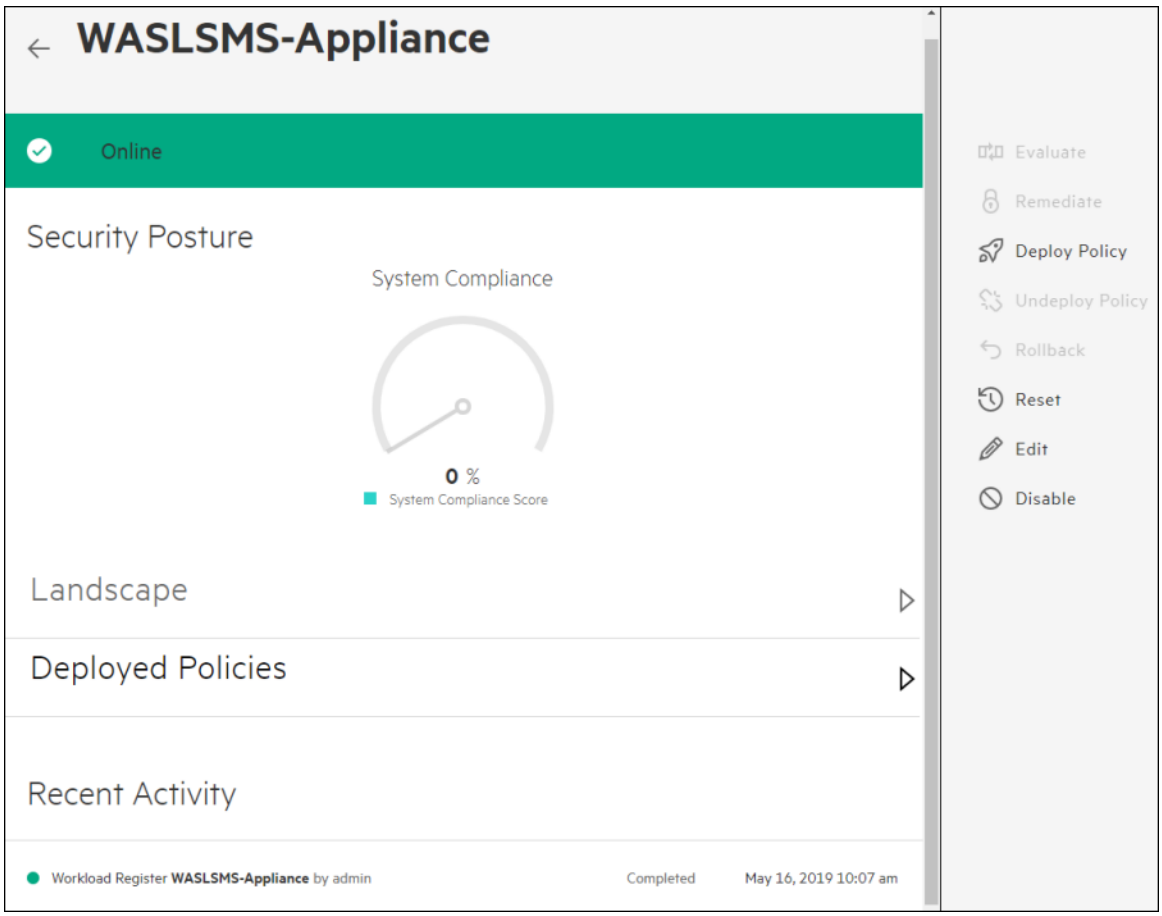
1. Add or register a workload from the Workloads tab
2. Click **+** icon.



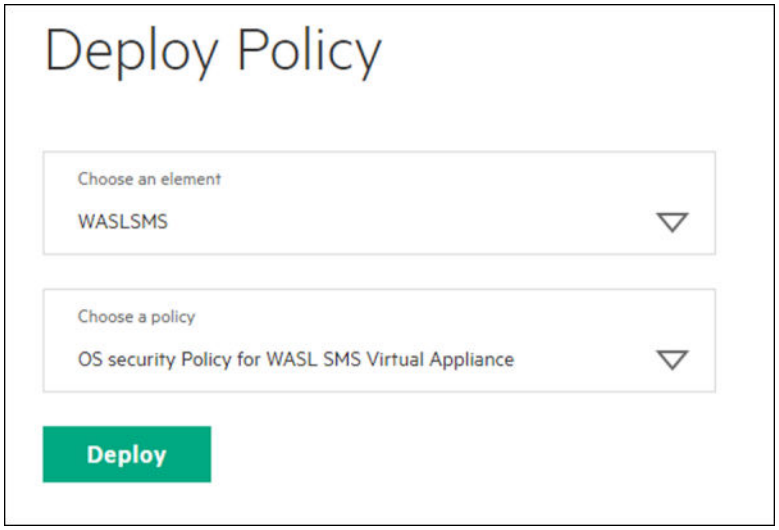
3. Enter the **Workload Name**.
4. Enter the **Workload Type**.
5. Click **Add Node** to register the node associated with the workload.



6. WASLSMS-Appliance is created.



7. To deploy WASL-Appliance on the workload, select the **Deploy Policy** button.

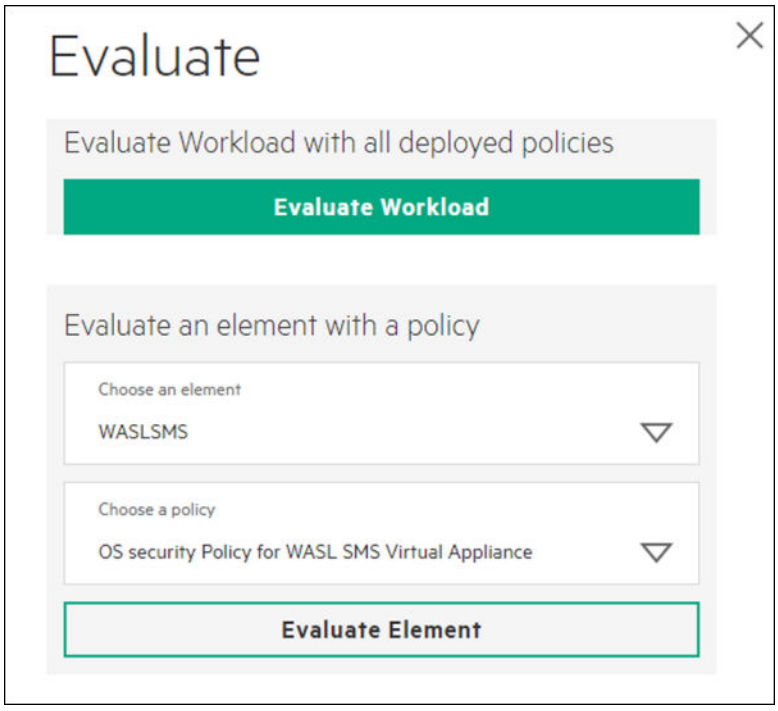


8. Select the Workload elements that is configured during *Add or Register Workload* operation from the drop-down of **Choose an element** option.
9. Select the OS security Policy for WASL SMS Virtual Appliance policy from the drop-down of **Choose a policy** option.
10. Click the **Deploy** button.

WASL transfers the policy-related files to the Node having the workload and validate the workload settings.

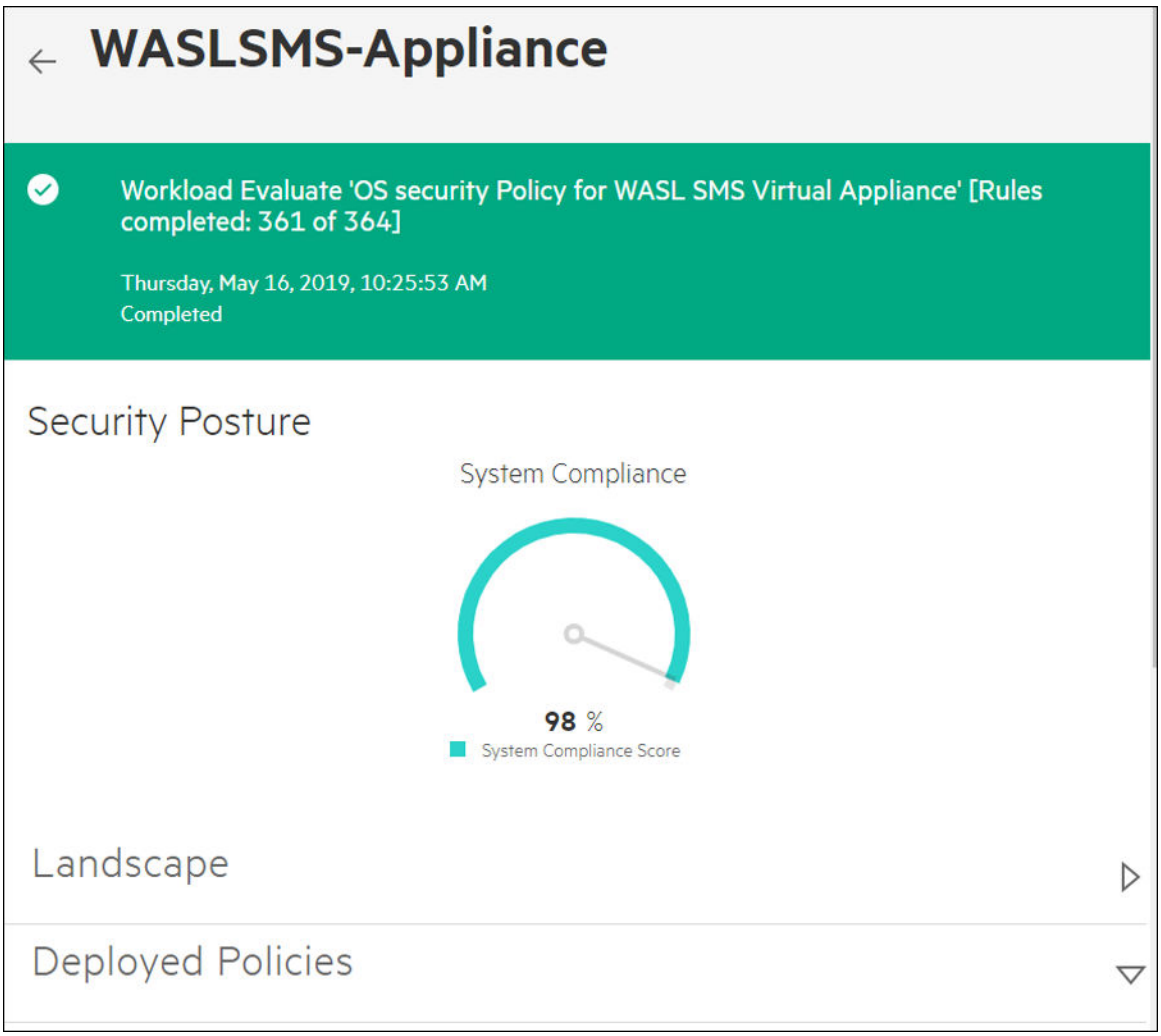
Evaluate the appliance

How to evaluate

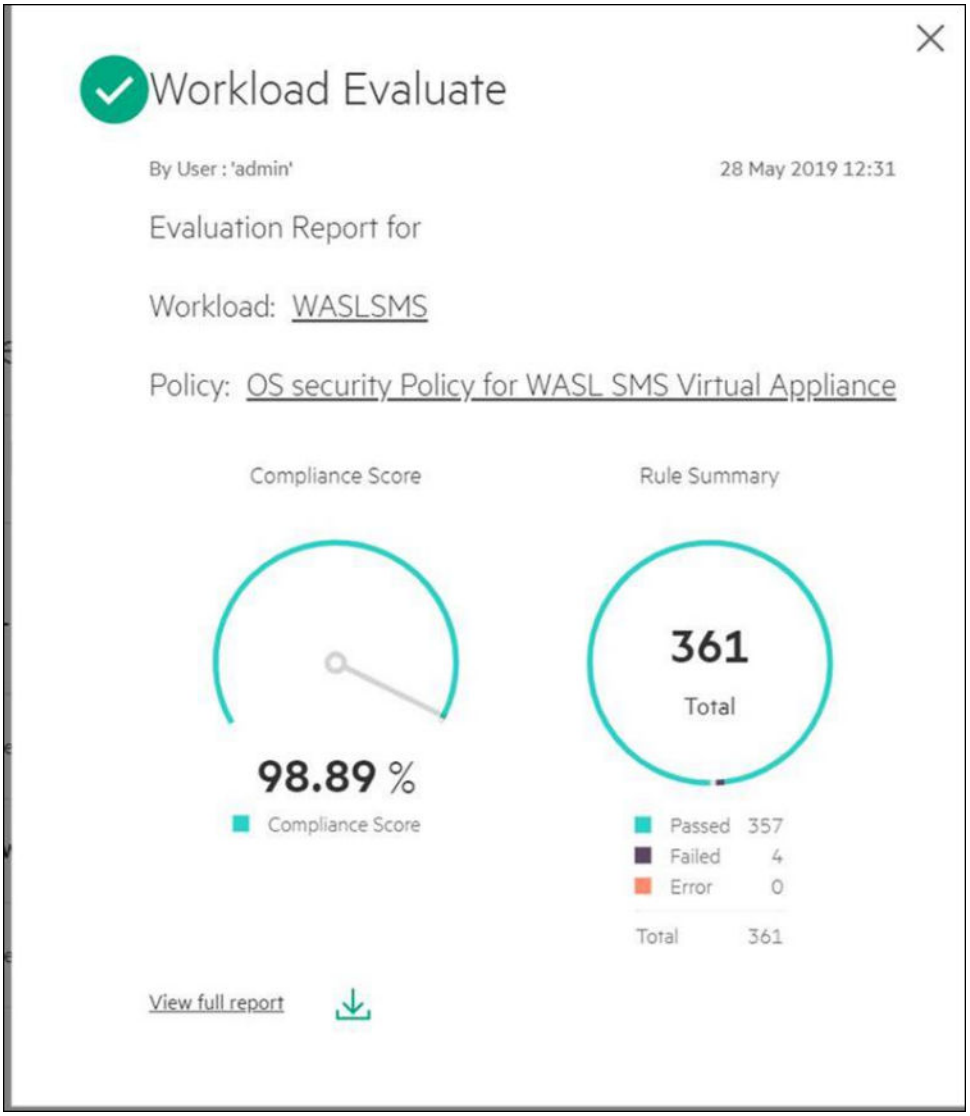


Procedure

1. Click the workload in the **Workload** page.
2. Select WASLSMS from the drop-down of **Choose an element** option. Click **Evaluate Element**.
   a. Select from the drop-down of **Choose an element** option. The **Choose a policy** displays the applicable policies that are deployed on the workload element. Select one of the policies. Click **Evaluate Element**.
3. Select the OS Security Policy for SMS Virtual Appliance from the drop-down of **Choose a policy**. Select
4. After the evaluation is complete, the Workload Meters indicates the current score of the Workload against the policies deployed.



5. To view more details on Evaluate Workload activity like the number of Passed, Failed rules or Rules with Error in Policy, click each activity.

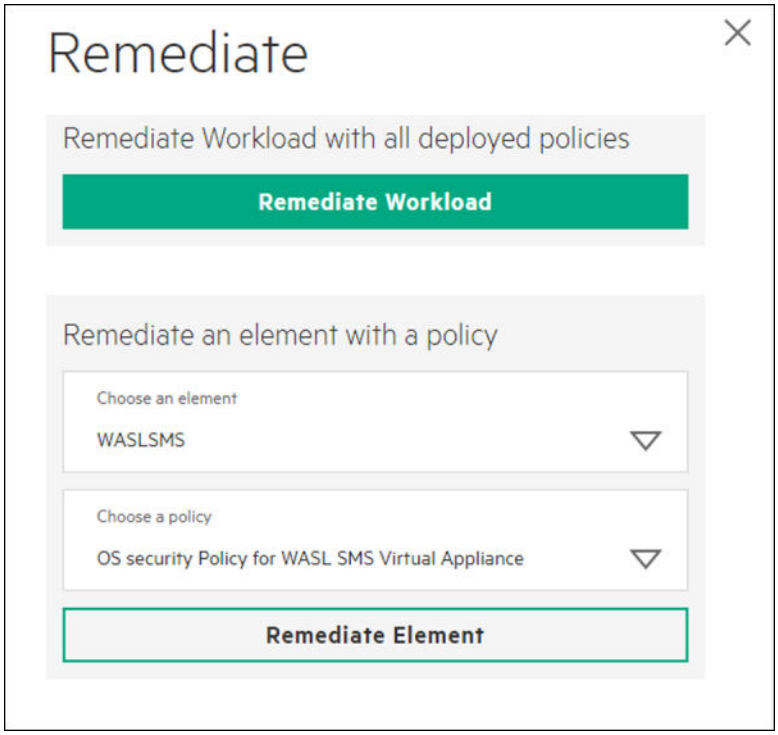


6. In the **Workload Evaluated** window, click the **View Full Report** to see a complete HTML Report. You can also download it by clicking the download icon.

NOTE: After evaluating the WASL SMS virtual appliance 1.3.0 using the default OS policy (OS security Policy for WASL SMS Virtual Appliance), the compliance score is around ~98%. There are four rules that depend on the target environment and therefore are not enforced by default in the appliance. These rules can be fixed manually by following the instructions described in the evaluation report.

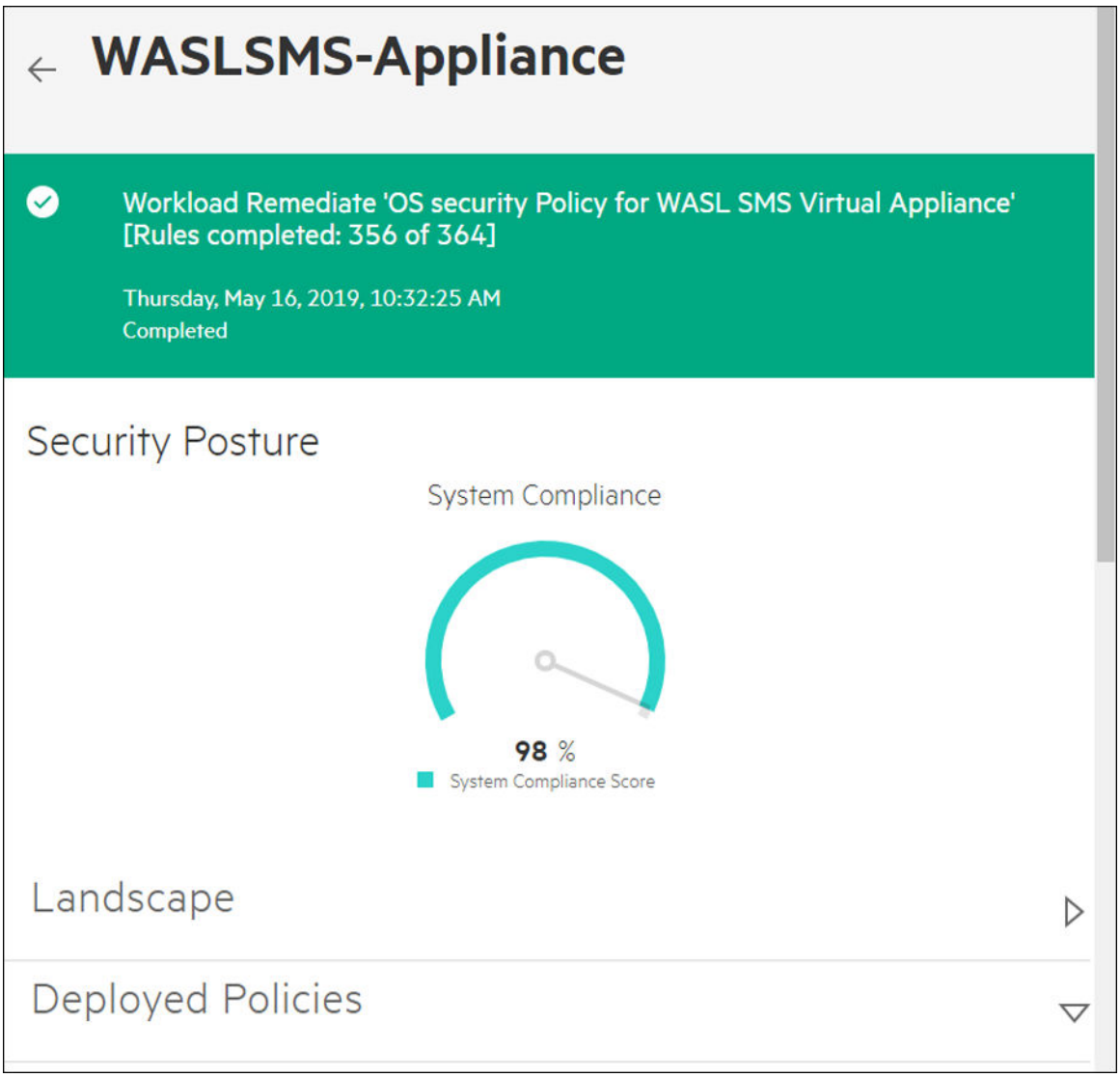
Remediate the appliance

This section provides information to remediate the WASL SMS Virtual Appliance. By default the appliance is remediated.

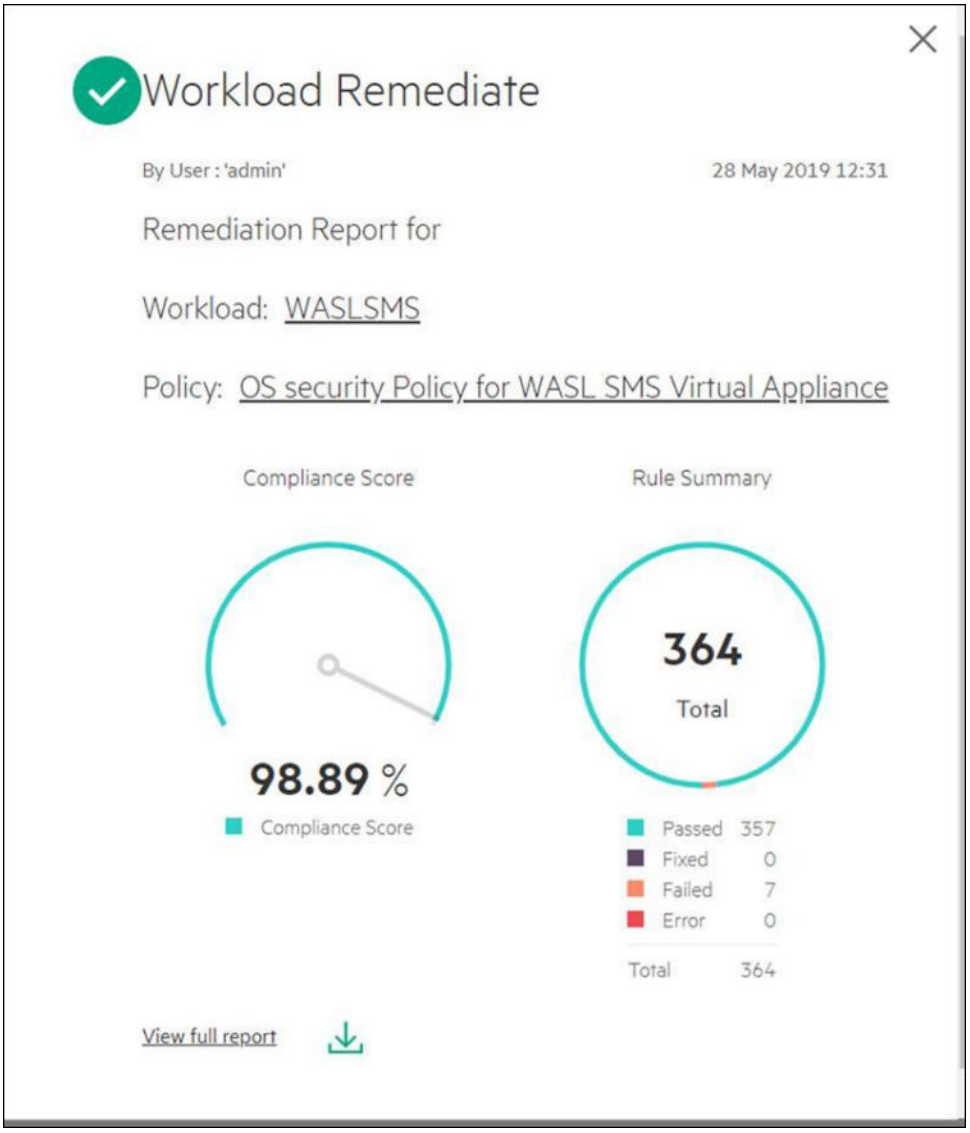


Procedure

1. Select WASLSMS from the drop-down of **Choose an element** option.
2. Select the OS security policy for WASL SMS Virtual appliance from the **Choose a policy** drop-down.
3. Click **Remediate Workload**.
4. After the remediation is complete, the Workload Meters indicates the current score of the Workload against the policies deployed.



5. To view more details on Workload Remediate activity like the number of Fixed, Passed, Failed rules or Rules with Error in Policy, click each activity.



6. For the failed rules, click the corresponding rule. Then, follow the instructions mentioned in the report to get 100% compliance score.

Guide to the Secure Configuration of Red Hat Enterprise Linux 7

with profile OS security Policy for WASL SMS Virtual Appliance

— This policy contains rules to evaluate and secure WASL SMS Virtual Appliance.

The SCAP Security Guide Project
https://www.open-scap.org/security-policies/scap-security-guide
This guide presents a catalog of security-relevant configuration settings for Red Hat Enterprise Linux 7. It is a rendering of content structured in the eXtensible Configuration Checklist Description Format (XCCDF) in order to support security automation.

Providing system administrators with such guidance informs them how to securely configure systems under their control in a variety of network roles. Policy makers and baseline creators can use this catalog of settings, with its associated references to higher-level security control catalogs, in order to assist them in security baseline creation. This guide is a *catalog, not a checklist*, and satisfaction of every item is not likely to be possible or sensible in many operational scenarios. However, the XCCDF format enables granular selection and adjustment of settings and provides an automated checking capability. Transformations of this document, and its associated automated checking content, are capable of providing baselines that meet a diverse set of policy objectives. Some example XCCDF *Profiles*, which are selections of items that form checklists and can be used as baselines, are available with this guide. They can be processed, in an automated fashion, with tools that support the Security Content Automation Protocol (SCAP).

Do not attempt to implement any of the settings in this guide without first testing them in a non-operational environment.

Evaluation Characteristics

Target machine	WASLSMS
Benchmark URL	/opt/hpe/wasl/core//policy/system/xccdf_wasl-c4s/2_profile_default/ssg-rhel7-xccdf.xml
Profile ID	xccdf_wasl-c4s/2_profile_default
Started at	2019-05-28T03:02:26
Finished at	2019-05-28T03:02:26
Performed by	wasladmin

CPE Platforms

Addresses

- IPv4 127.0.0.1
- IPv4 15.213.142.106
- MAC 00:00:00:00:00:00
- MAC 00:0C:29:03:45:96

Compliance and Scoring

The target system did not satisfy the conditions of 4 rules! Please review rule results and consider applying remediation.

Rule results

357 passed | 4

Severity of failed rules

1 low | 2 medium | 1 high

Score

Scoring system	Score	Maximum	Percent
urn:xccdf:scoring:flat	357.000000	361.000000	98.89%

Rule Overview

pass fail notchecked
fixed error notapplicable
informational unknown

Search through XCCDF rules | Search

Group rules by: Default

Title	Severity	Result
Guide to the Secure Configuration of Red Hat Enterprise Linux 7 4x fail 3x notchecked		
System Settings 3x fail 3x notchecked		
Installing and Maintaining Software		
File Permissions and Masks 1x fail		
Restrict Partition Mount Options		
Restrict Dynamic Mounting and Unmounting of Filesystems		

Acronyms

Acronym	Definition
WASL	Workload Aware Security for Linux
SMS	Security Management Station
RHEL	Red Hat Enterprise Linux
SLES	SUSE Linux Enterprise Server
SAP HANA	SAP High Performance Analytic Appliance
TDI	Tailored Data Center Integration
SP1, SP2, SP3, SP4	Service Pack 1, Service Pack 2, Service Pack 3, Service Pack 4
CS 500 / 900	ConvergedSystem 500 / 900
XCCDF	Extensible Configuration Checklist Description Format
GUI	Graphical User Interface
OpenSCAP	Open Security Containment and Automation Protocol
OVAL	Open Vulnerability and Assessment Language
FTP	File Transfer Protocol
DB	Database
SSH	Secure Shell
REST	Representational State Transfer
SFTP	Secure File Transfer Protocol