Sonatype CLM for Nexus

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Chapter 1

Introduction

Nexus comes in two forms, the popular Nexus Open Source , as well as industry-leading Nexus Professional. In addition, users of Nexus Professional can add the Nexus CLM License to expand functionality to include use of Sonatype CLM as part of Nexus Professional staging capabilities. This allows you to enjoy a robust repository manager coupled with the advanced policy and risk management features provided by Sonatype CLM.

In this section we'll discuss all the capabilities provided by the integration of Nexus Professional and Sonatype CLM. When necessary, we will indicate if a feature is exclusive to a Nexus Professional CLM Edition.

Note
If you are unsure of which Nexus License you have, please contact our Support Team at support@sonatype.com.

Chapter 2

Repository Health Check (RHC) vs. Sonatype CLM

It's likely, even as a user of Nexus Open Source, that you have seen some of the capabilities of Repository Health Check. For those that haven't, Repository Health Check (RHC) is a tool included within Nexus providing users with a quick glance at component properties in a repository. The results include a top level view of security vulnerabilities and license characteristics. Users of Nexus Professional are provided with security and license information as well as age and popularity data when searching for components. All this information is available in Nexus for manual searches and interaction with Nexus. There is however no automation available and no direct relationship to your software exists besides the fact that it's build accesses Nexus.

Sonatype CLM allows you to identify applications within your business. These applications can then be evaluated throughout the software development life cycle. This includes during development in your IDE, at build time in your CI server, and during the release phases in your repository manager.

With each evaluation of an application, components will be identified, and in the cases where components can be matched to those in the Central Repository, information similar to that in RHC will be provided. An additional aspect of this evaluation is the ability to establish policy. Policy is simply a set of rules that allows you to validate the components used in your application based on the aspects available in CLM. When a component is found to break one of these rules, a violation occurs, and these results are provided through a number of reports, all available in the Sonatype CLM Server.

Taking a step back, looking at both RHC and Sonatype CLM at a high level, RHC is a static and limited view of specific data. This can help improve your component usage, but offers limited mitigation of risk. In contrast, the features of Sonatype CLM provide a robust set of features allowing you greatly expanded control over what components are used in your applications and take advantage of automation tools throughout the different phases of your software development lifecycle.

Note

Nexus Open Source and Nexus Professional both provide access to RHC, though the capabilities are expanded for Nexus Professional users. For more information on RHC and Nexus in general, please refer to the free book Repository Management with Nexus.

Chapter 3

Connecting Nexus to CLM Server

The first step to enabling the features associated with Sonatype CLM is connecting to an existing Sonatype CLM Server. The Sonatype CLM Server is a separate server application that Nexus integrates with via API calls.

If this is your first time working with Sonatype CLM, and you haven't already installed and configured your Sonatype CLM Server, you will want to do that before moving forward. Instruction can be found in our Sonatype CLM Server Install and Configuration User Guide.

Once your Sonatype CLM Server is installed and configured, you are ready to connect Nexus to the CLM Server. From within Nexus Professional, click on the *CLM* menu item in *Administration* section on the left of the Nexus application window. This will open the tab visible in Figure 3.1.

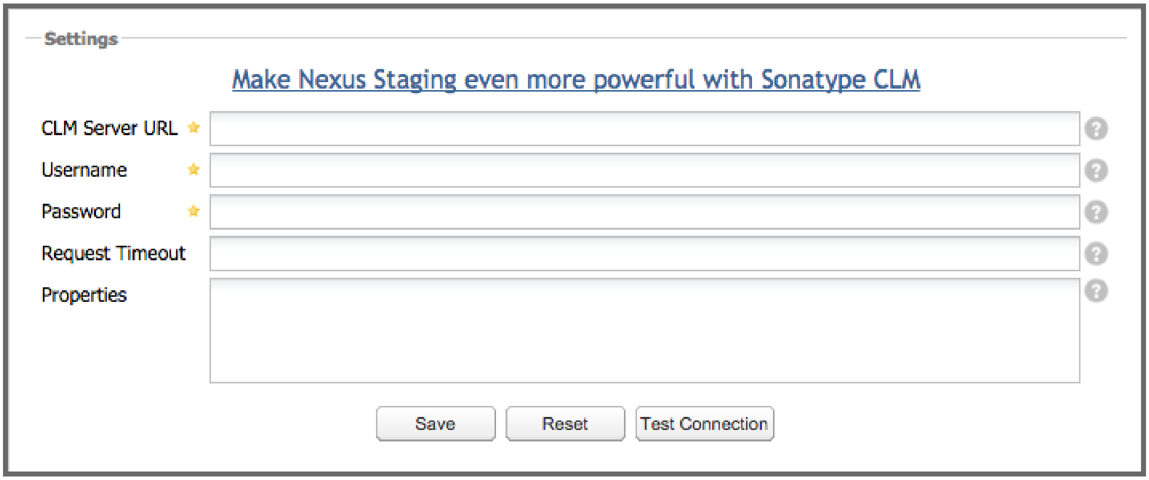


Figure 3.1: CLM configuration tab in Nexus

To configure the connection to the Sonatype CLM Server, follow these instructions:

1. Enter the URL location for your installation of the Sonatype CLM server.
2. Enter the Username and Password.

    Tip
    We recommend that you create a unique machine account that has access to the application(s) you wish to link to your Nexus repositories. . (*Optional*) Enter a *Request Timeout*. . (*Optional*) Enter information in the *Properties* input field using a key=value definition per line. An example is

    ---

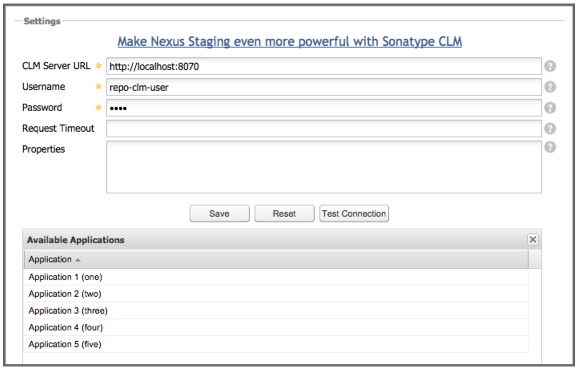
    ```
    procArch=false
    ipAddresses=true
    operatingSystem=false
    ```

    These properties are passed to the CLM Server and can, for example, determine what properties are logged as part of a validation. Consult the CLM Server documentation for suitable parameters. In most use cases you will not need to configure any properties.

3. Click *Test Connection* to verify the information you have entered is correct and a connection to the CLM Server can be established.
4. Click the *Save* button.

If successfully connected, a list of available applications will be displayed as seen in Figure 3.2. For more information of setting up organizations, applications, and policies, please review our Sonatype CLM Policy Management Guide.

Alternatively you can enable, disable, and/or configure the Sonatype CLM integration by adding the *CLM: Configuration* capability like any other capability as documented in the Accessing and Configuring Capabilities section of the Nexus book.


Settings

Make Nexus Staging even more powerful with Sonatype CLM

CLM Server URL: http://localhost:8070

Username: repo-clm-user

Password: ••••

Request Timeout:

Properties:

Available Applications

Application
Application 1 (one)
Application 2 (two)
Application 3 (three)
Application 4 (four)
Application 5 (five)

Figure 3.2: CLM configuration tab after Test Connection

Note
The features described here require licenses for Nexus Professional as well as Sonatype CLM Server that activate them. You can obtain them from our support team and will have to install them prior to the configuration.

Chapter 4

Configuring the CLM Server

With the connection between the CLM Server and Nexus established, you can configure any organizations, applications, and policies in the CLM server. Because Nexus will be accessing the CLM server using an application identifier (App ID), you will need to configure one application for each different application use case in Nexus.

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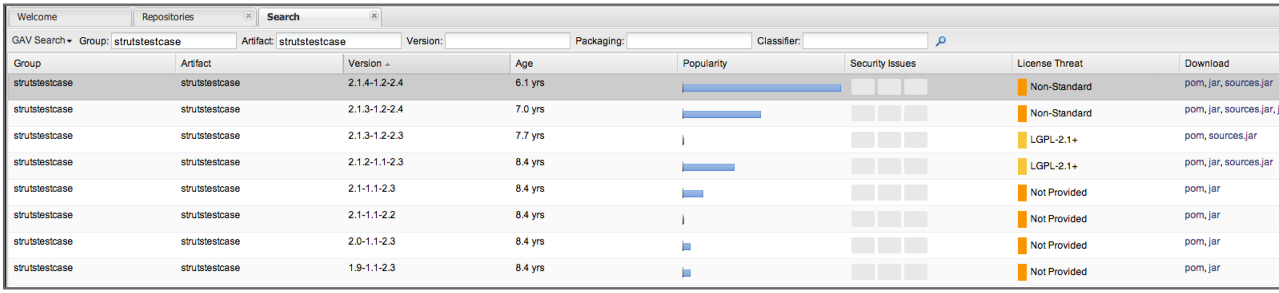
Chapter 5

Accessing CLM Component Information

As a native capability, Nexus provides robust search capability for returning components that exist in your repositories. When components are returned in your search results (see below), an option to see all versions is displayed.



Group: strutstestcase Artifact: strutstestcase Version: Packaging: Classifier:

Group	Artifact	Version	Age	Popularity	Security Issues	License Threat	Download
strutstestcase	strutstestcase	2.1.4-1.2-2.4	6.1 yrs			🟧 Non-Standard	pom, jar, sources.jar
strutstestcase	strutstestcase	2.1.3-1.2-2.4	7.0 yrs			🟧 Non-Standard	pom, jar, sources.jar, j
strutstestcase	strutstestcase	2.1.3-1.2-2.3	7.7 yrs			🟨 LGPL-2.1+	pom, sources.jar
strutstestcase	strutstestcase	2.1.2-1.1-2.3	8.4 yrs			🟨 LGPL-2.1+	pom, jar, sources.jar
strutstestcase	strutstestcase	2.1-1.1-2.3	8.4 yrs			🟧 Not Provided	pom, jar
strutstestcase	strutstestcase	2.1-1.1-2.2	8.4 yrs			🟧 Not Provided	pom, jar
strutstestcase	strutstestcase	2.0-1.1-2.3	8.4 yrs			🟧 Not Provided	pom, jar
strutstestcase	strutstestcase	1.9-1.1-2.3	8.4 yrs			🟧 Not Provided	pom, jar

Figure 5.1: Typical Search Results in Nexus Pro

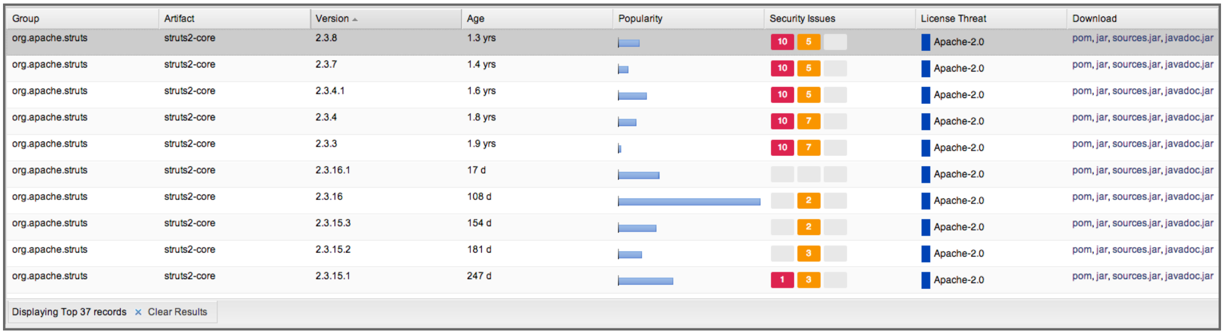
Tip

To get results that are not in the local Nexus cache, you will want to make sure the *Download Remote Index* option is enabled for the proxy repository. For guidance on this, checkout section 6.2.4 (specifically Fig 6.9): Configuring Repositories in the Nexus Book.

Clicking this link will display additional information in the search panel, as well as expand information available for each selected component. Depending on your Nexus license you will have one of the two options below.

RHC
Configuring an applicable repository to use RHC (Repository Health Check) will enable the repository to be analyzed by Sonatype directly, and will display (when available) security, license, age and popularity data. Details are provided in the Component Info tab located below the search panel.

Sonatype CLM
Configuring Nexus to connect to Sonatype CLM will provide the same information available for RHC, but will also provide additional general and policy violation information for each component.



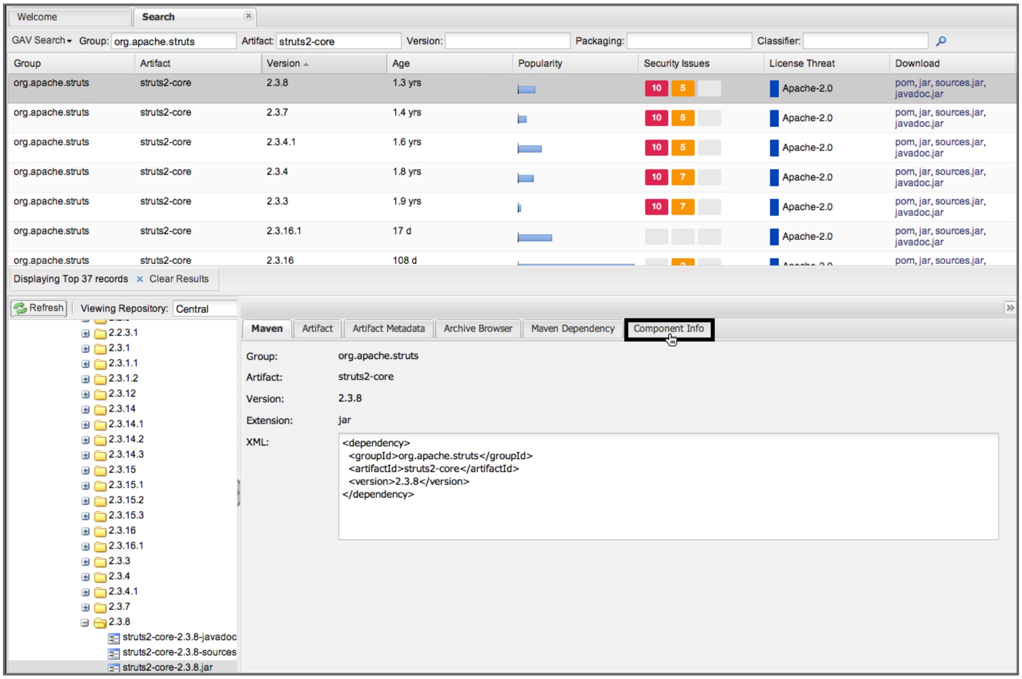
Group	Artifact	Version ▲	Age	Popularity	Security Issues	License Threat	Download
org.apache.struts	struts2-core	2.3.8	1.3 yrs		10 5	Apache-2.0	pom, jar, sources.jar, javadoc.jar
org.apache.struts	struts2-core	2.3.7	1.4 yrs		10 5	Apache-2.0	pom, jar, sources.jar, javadoc.jar
org.apache.struts	struts2-core	2.3.4.1	1.6 yrs		10 5	Apache-2.0	pom, jar, sources.jar, javadoc.jar
org.apache.struts	struts2-core	2.3.4	1.8 yrs		10 7	Apache-2.0	pom, jar, sources.jar, javadoc.jar
org.apache.struts	struts2-core	2.3.3	1.9 yrs		10 7	Apache-2.0	pom, jar, sources.jar, javadoc.jar
org.apache.struts	struts2-core	2.3.16.1	17 d			Apache-2.0	pom, jar, sources.jar, javadoc.jar
org.apache.struts	struts2-core	2.3.16	108 d		2	Apache-2.0	pom, jar, sources.jar, javadoc.jar
org.apache.struts	struts2-core	2.3.15.3	154 d		2	Apache-2.0	pom, jar, sources.jar, javadoc.jar
org.apache.struts	struts2-core	2.3.15.2	181 d		3	Apache-2.0	pom, jar, sources.jar, javadoc.jar
org.apache.struts	struts2-core	2.3.15.1	247 d		1 3	Apache-2.0	pom, jar, sources.jar, javadoc.jar

Displaying Top 37 records × Clear Results

Figure 5.2: Nexus Search Showing All Versions

Note
Nexus search is only available for open source Java components.

For now, we'll focus on the additional information available through Sonatype CLM. To access this, you need to click on the Component Info tab. It is located just below the displayed search results, to the right of the directory tree for the selected component.



GAV Search Group: org.apache.struts Artifact: struts2-core Version: Packaging: Classifier:

Group	Artifact	Version	Age	Popularity	Security Issues	License Threat	Download
org.apache.struts	struts2-core	2.3.8	1.3 yrs		10 5	Apache-2.0	pom, jar, sources.jar, javadoc.jar
org.apache.struts	struts2-core	2.3.7	1.4 yrs		10 5	Apache-2.0	pom, jar, sources.jar, javadoc.jar
org.apache.struts	struts2-core	2.3.4.1	1.6 yrs		10 5	Apache-2.0	pom, jar, sources.jar, javadoc.jar
org.apache.struts	struts2-core	2.3.4	1.8 yrs		10 7	Apache-2.0	pom, jar, sources.jar, javadoc.jar
org.apache.struts	struts2-core	2.3.3	1.9 yrs		10 7	Apache-2.0	pom, jar, sources.jar, javadoc.jar
org.apache.struts	struts2-core	2.3.16.1	17 d			Apache-2.0	pom, jar, sources.jar, javadoc.jar
org.apache.struts	struts2-core	2.3.16	108 d				pom, jar, sources.jar,

Displaying Top 37 records × Clear Results

Viewing Repository: Central

- 2.2.3.1
- 2.3.1
- 2.3.1.1
- 2.3.1.2
- 2.3.12
- 2.3.14
- 2.3.14.1
- 2.3.14.2
- 2.3.14.3
- 2.3.15
- 2.3.15.1
- 2.3.15.2
- 2.3.15.3
- 2.3.16
- 2.3.16.1
- 2.3.3
- 2.3.4
- 2.3.4.1
- 2.3.7
- 2.3.8
  - struts2-core-2.3.8-javadoc
  - struts2-core-2.3.8-sources
  - struts2-core-2.3.8.jar

Group: org.apache.struts

Artifact: struts2-core

Version: 2.3.8

Extension: jar

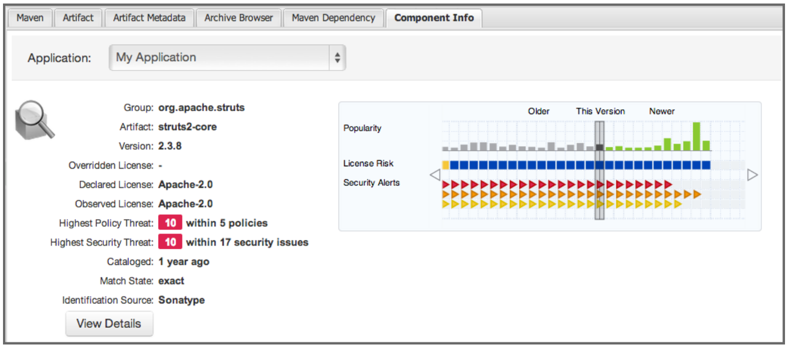
XML:

```
<dependency>
  <groupId>org.apache.struts</groupId>
  <artifactId>struts2-core</artifactId>
  <version>2.3.8</version>
</dependency>
```

Figure 5.3: Accessing the Component Info Tab

Note
Only users that are logged in will be able to see the Component Info tab.

Clicking on the Component Info tab will display a drop down list of applications associated with your Sonatype CLM Server. Once you have selected an application, the Component Information Panel (CIP), similar to what is provided via the Application Composition Report and CLM for Eclipse, will be displayed.



Application: My Application

Group: org.apache.struts
Artifact: struts2-core
Version: 2.3.8
Overridden License: -
Declared License: Apache-2.0
Observed License: Apache-2.0
Highest Policy Threat: 10 within 5 policies
Highest Security Threat: 10 within 17 security issues
Cataloged: 1 year ago
Match State: exact
Identification Source: Sonatype

Figure 5.4: Component Information Panel

Note

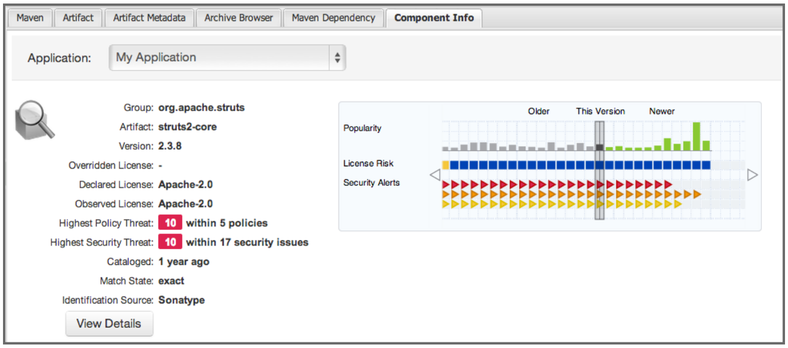
Information on the Component Info tab requires a Sonatype CLM License. Nexus Pro Users will simply be provided with additional details regarding the security vulnerabilities and license issues. Those using Nexus Open Source will not have access to the Component Info tab.

Chapter 6

The Component Information Panel (CIP)

As mentioned above, when the Component Information Panel is first displayed, you will need to select an application corresponding to your application on the CLM Server. This application will not change until you select a new one.

The Component Information Panel is divided into two areas. On the left side is component data, which includes information related to the component itself. To the right of the component information, a graphical display of any security or license issues, as well as popularity data for each version of the component is displayed. By default the current version of the component is selected. In the event there are more versions than can be displayed, arrows on the right and left allow for scrolling to newer or older versions. In addition, you can click on any of these versions (if available), which will change the information that is displayed on the left of the CIP.



Application: My Application

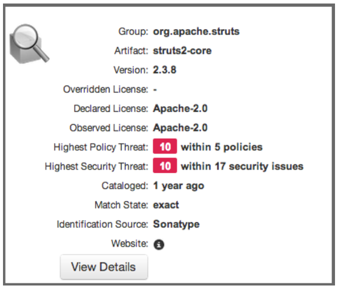
Group: org.apache.struts
Artifact: struts2-core
Version: 2.3.8
Overridden License: -
Declared License: Apache-2.0
Observed License: Apache-2.0
Highest Policy Threat: 10 within 5 policies
Highest Security Threat: 10 within 17 security issues
Cataloged: 1 year ago
Match State: exact
Identification Source: Sonatype

Figure 6.1: Component Information Panel Example

Note

In the screenshot above, we have sized the panels in Nexus to make all CIP information visible. By default the view will allow you to vertically scroll to view all information.

The textual information on the left includes:



Group: org.apache.struts
Artifact: struts2-core
Version: 2.3.8
Overridden License: -
Declared License: Apache-2.0
Observed License: Apache-2.0
Highest Policy Threat: 10 within 5 policies
Highest Security Threat: 10 within 17 security issues
Cataloged: 1 year ago
Match State: exact
Identification Source: Sonatype
Website:

Figure 6.2: CIP Text

Coordinates
The identifying information for a component.

Overridden License
If you have chosen a different license for the component, it will be displayed here. This could e.g. be the case if you have purchased a license for a component allowing distribution, while the component is originally GPL.

Declared License
Any license that has been declared by the author.

Observed License
Any license(s) found during the scan of the component's source code.

Highest Policy Threat
The highest threat level policy that has been violated, as well as the total number of violations.

Highest Security Threat
The highest threat level security issue and the total number of security issues.

Cataloged
The age of the component based on when it first was uploaded to the Central Repository.

Match State
How the component was matched (exact, similar, or unknown).

Identification Source
Whether a component is identified by Sonatype, or claimed during your own process.

Website
If available, an information icon providing a link to the project is displayed.

The graph itself is laid out like a grid, with each vertical piece representing a particular version. The selected version being identified by a vertical line. The information displayed in the graph includes:

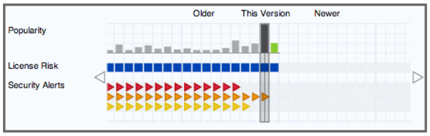


Figure 6.3: CIP Graph

Popularity
The popularity for each version is shown as a bar graph. The larger the graph the more popular the version.

License Risk
This will display the license risk based on the application that is selected, and the associated policy and/or license threat groups for that application. Use the application selector to change the application, and corresponding policies the component should be evaluated against.

Security Alerts

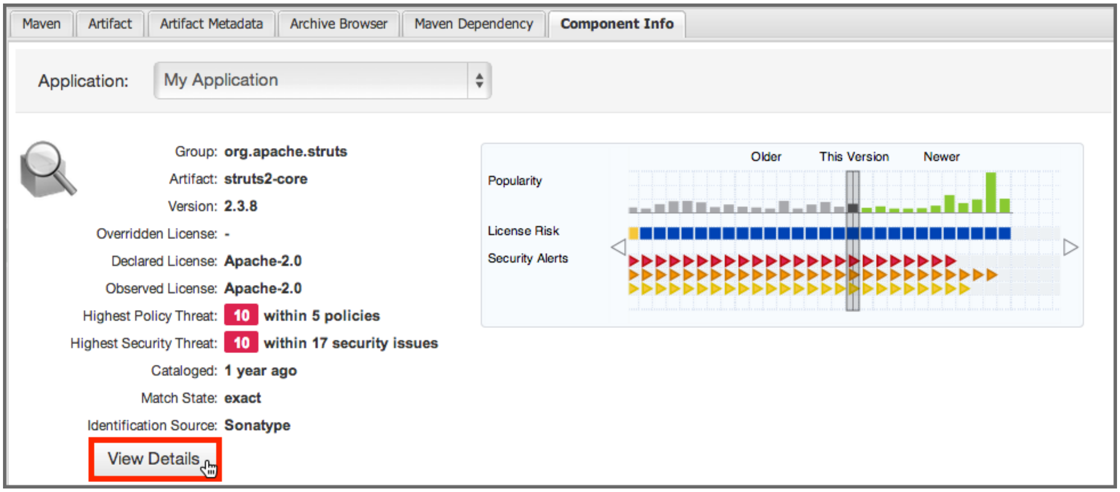
For each version, the highest security threat will be displayed by color, with the highest shown as red, and no marker indicating no threat.

Chapter 7

Component Details (CLM)

In addition to the security vulnerability and license issue details provided, any particular policy violations for a component will be displayed as well. This can be helpful in determining if a component will meet the standards for component lifecycle management your company has established.

To view these details, click on the *View Details* button located below the Component Information.

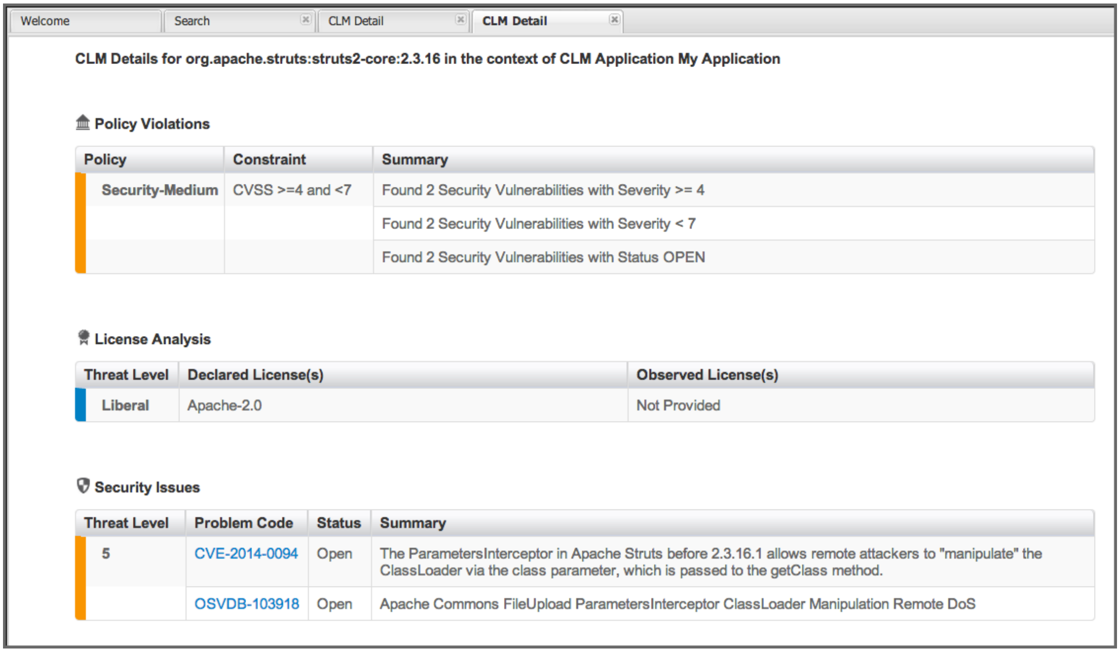


Application: My Application

Group: org.apache.struts
Artifact: struts2-core
Version: 2.3.8
Overridden License: -
Declared License: Apache-2.0
Observed License: Apache-2.0
Highest Policy Threat: 10 within 5 policies
Highest Security Threat: 10 within 17 security issues
Cataloged: 1 year ago
Match State: exact
Identification Source: Sonatype

Figure 7.1: View Details Button

This will create a new tab in the main Nexus panel with the label CLM Detail.



CLM Details for org.apache.struts:struts2-core:2.3.16 in the context of CLM Application My Application

Policy Violations

Policy	Constraint	Summary
Security-Medium	CVSS >=4 and <7	Found 2 Security Vulnerabilities with Severity >= 4
		Found 2 Security Vulnerabilities with Severity < 7
		Found 2 Security Vulnerabilities with Status OPEN

License Analysis

Threat Level	Declared License(s)	Observed License(s)
Liberal	Apache-2.0	Not Provided

Security Issues

Threat Level	Problem Code	Status	Summary
5	CVE-2014-0094	Open	The ParametersInterceptor in Apache Struts before 2.3.16.1 allows remote attackers to "manipulate" the ClassLoader via the class parameter, which is passed to the getClass method.
	OSVDB-103918	Open	Apache Commons FileUpload ParametersInterceptor ClassLoader Manipulation Remote DoS

Figure 7.2: View Details

Note

In order to see the details for additional components, select another component from the search results, or select a different version in the CIP, and then click the *View Details* button.

Chapter 8

Introduction

CLM for staging in Nexus combines the powerful controls for your release process from Nexus with the rich information and validation available in the CLM Server. Using them together you can ensure that any releases you produce are actively and automatically validated against up to date information in terms of security vulnerabilities and license characteristics of all the components you use and any whitelists or blacklists you maintain as well as other policies you have defined are enforced.

You will need to have completed the following items before using CLM with Nexus Staging. This includes:

On the CLM Server

- Created an Organization
- Created an Application
- Created a Policy

In Nexus CLM

- Created a Staging Profile

Note

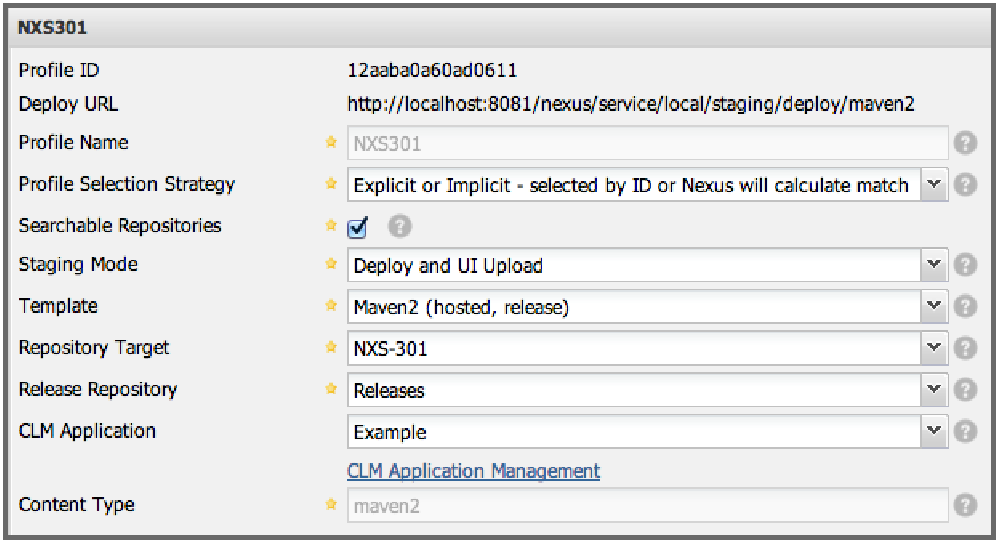
Before using CLM for staging you should be familiar with the general setup and usage patterns of the Nexus Staging Suite documented in the chapter on staging, located in the Nexus book. There, you will be guided through the process to get Nexus prepared to handle your staging needs.

Chapter 9

Staging Profile Configuration

As mentioned in the note above, you should already have your staging profile configured. This configuration can then be used for a staging profile or a build promotion profile by configuring the *CLM Application* field in the Staging Profile.

The figure below shows an example staging profile with a CLM application configured.



NXS301

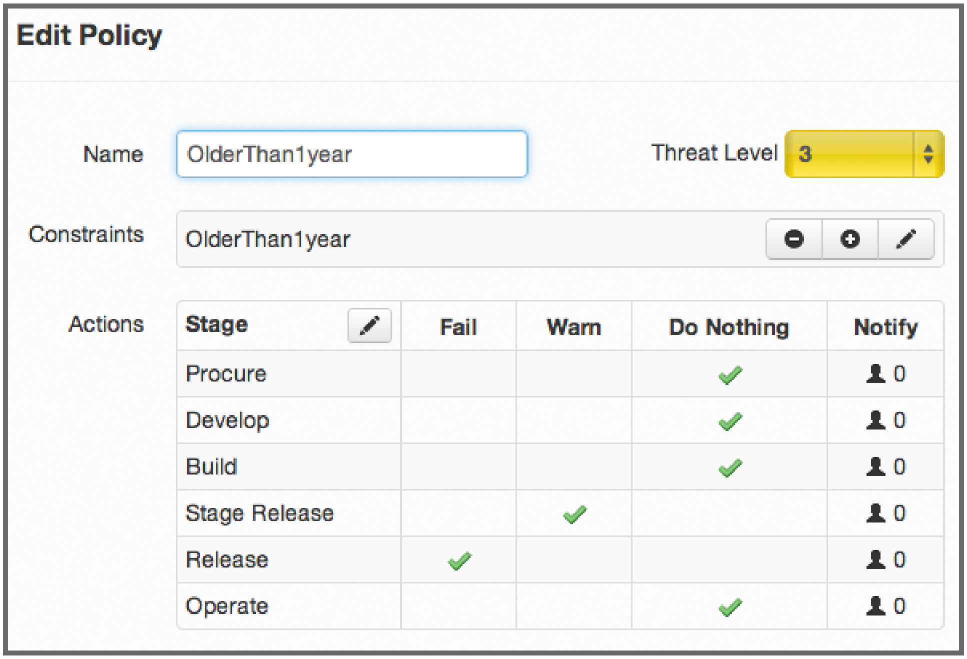
Profile ID	12aaba0a60ad0611
Deploy URL	http://localhost:8081/nexus/service/local/staging/deploy/maven2
Profile Name	NXS301
Profile Selection Strategy	Explicit or Implicit - selected by ID or Nexus will calculate match
Searchable Repositories	☑
Staging Mode	Deploy and UI Upload
Template	Maven2 (hosted, release)
Repository Target	NXS-301
Release Repository	Releases
CLM Application	Example
	CLM Application Management
Content Type	maven2

Figure 9.1: Staging Profile with a CLM Application Configured

Chapter 10

Policy Actions

While not a requirement for using CLM with Nexus staging, CLM does have the ability to Fail or Warn on staging closure. This is managed by setting the *Stage Release* and *Release* actions for each policy. These policy actions can be configured to warn, fail, or do nothing (default). The figure below provides an example policy that would warn for a staging deployment and fail a release.



Edit Policy

Name: OlderThan1year

Threat Level: 3

Constraints: OlderThan1year

Actions

Stage	Fail	Warn	Do Nothing	Notify
Procure			✓	👤 0
Develop			✓	👤 0
Build			✓	👤 0
Stage Release		✓		👤 0
Release	✓			👤 0
Operate			✓	👤 0

Figure 10.1: Staging and Release Configuration for a Policy in the CLM Server

Configuration of Policy Actions is managed via the Sonatype CLM Server. While we'll cover the basic settings below, for instruction on setting these actions, please review the Policy Management Guide, specifically the section on managing policy actions.

The configuration of the *Stage Release* action of a policy in the CLM Server is used for closing the staging repository. Based on the action chosen, the staging repository will respond as follows:

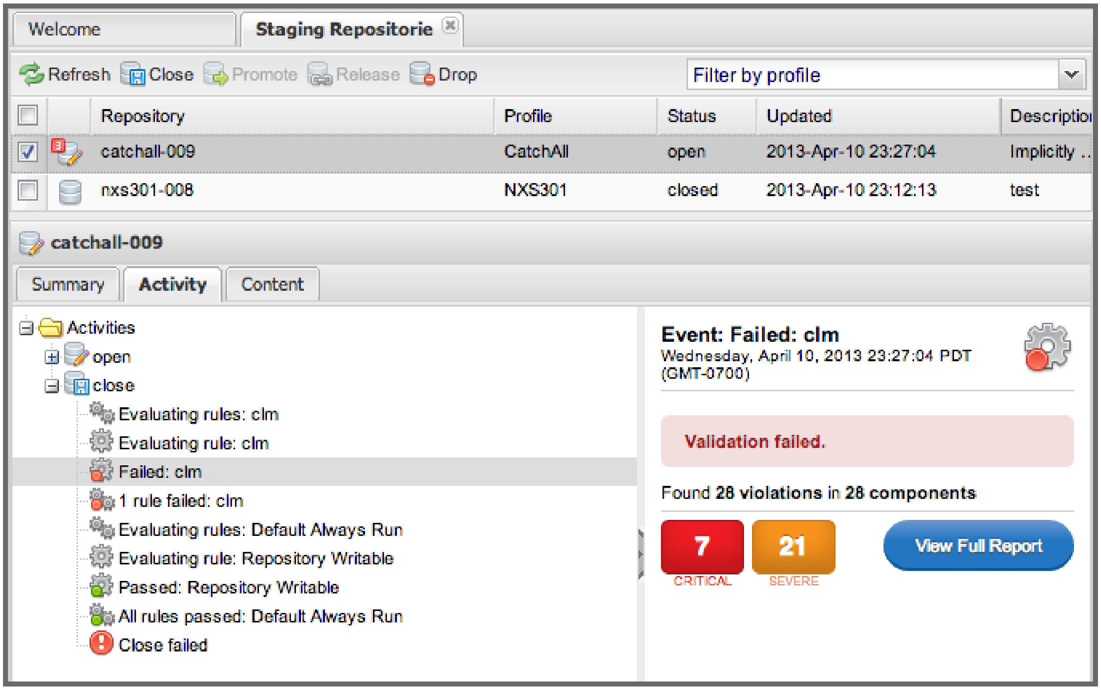
- If the policy action is set to *Fail*, when a policy is violated, the staging repository closing fails.
- If the policy action is set to *Warn*, when a policy is violated, the staging repository closes successfully, but a warning will be produced.
- If the policy action is set to *Do Nothing*, the staging repository closes successfully regardless of any policy violations.

Chapter 11

Release Repository Actions

As with CLM and policy, Nexus also has actions specific to the *Release* feature, and these can be configured to fail, warn or do nothing and are used for releasing or promoting the staging repository.

Once the staging profile is configured with the CLM application identifier any deployment triggers a CLM policy evaluation, which will be visible as *Activity* for the staging repository. Any rule failures are provided with further information in the detail panel. Figure 11.1 displays a staging repository with CLM rule validations and a failure. The *View Full Report* buttons links back to the Sonatype CLM Server, which displays the detailed Application Composition Report.



☐	Repository	Profile	Status	Updated	Descriptio
☑	catchall-009	CatchAll	open	2013-Apr-10 23:27:04	Implicitly ..
☐	nxs301-008	NXS301	closed	2013-Apr-10 23:12:13	test

- Activities
  - open
  - close
    - Evaluating rules: clm
    - Evaluating rule: clm
    - Failed: clm
    - 1 rule failed: clm
    - Evaluating rules: Default Always Run
    - Evaluating rule: Repository Writable
    - Passed: Repository Writable
    - All rules passed: Default Always Run
    - Close failed

Event: Failed: clm
Wednesday, April 10, 2013 23:27:04 PDT (GMT-0700)

Validation failed.

Found **28 violations** in **28 components**

7 CRITICAL
21 SEVERE

Figure 11.1: Staging Repository Activity with a CLM Evaluation Failure and Details