

# **SonargraphBuild User Manual**

**Version 9.1.1**

---

# **SonargraphBuild User Manual: Version 9.1.1**

Copyright © 2016 hello2morrow GmbH

---

# Table of Contents

|  |    |
|--|----|
| 1. Sonargraph's Next Generation - SonargraphBuild .....                  | 1  |
| 2. Licensing .....   | 2  |
| 2.1. Getting an Activation Code or a License .....                       | 2  |
| 2.2. Activation Code Based Licensing .....                               | 2  |
| 2.3. Proxy Settings .....  | 3  |
| 2.4. License Server Settings .....                                       | 3  |
| 3. Getting Started .....   | 4  |
| 3.1. Installation Requirements .....                                     | 4  |
| 3.2. Prerequisites .....   | 4  |
| 4. Executing from the Command-line .....                                 | 5  |
| 4.1. Report Creation .....   | 5  |
| 4.2. Specify Conditions for Build Failure .....                          | 7  |
| 5. Integrating with Ant .....  | 10 |
| 6. Integration with Maven .....  | 11 |
| 6.1. Maven Tips and Best Practices .....                                 | 11 |
| 6.2. Parameters of Goal "create-report" .....                            | 12 |
| 6.3. Configuration for goal "dynamic-report" .....                       | 14 |
| 6.4. Maven FailSet Configuration .....                                   | 17 |
| 6.5. Example POM .....   | 18 |
| 7. Integration with Gradle .....   | 20 |
| 7.1. Gradle Tips and Best Practices .....                                | 20 |
| 7.2. Parameters of Task "sonargraphReport" .....                         | 20 |
| 7.3. Configuration for Task "sonargraphDynamicReport" .....              | 23 |
| 7.4. Gradle FailSet Configuration .....                                  | 26 |
| 7.5. Example Gradle Build File .....                                     | 26 |
| 8. Integration with SonarQube .....                                      | 28 |
| 8.1. SonarQube Configuration .....                                       | 28 |
| 8.2. SonarQube Maven Configuration .....                                 | 29 |
| 8.3. SonarQube Gradle Configuration .....                                | 30 |
| 8.4. SonarQube Ant Runner Configuration .....                            | 30 |
| 9. Integration with Jenkins .....  | 32 |
| 9.1. Jenkins Server Configuration .....                                  | 32 |
| 9.2. Jenkins Job Configuration .....                                     | 32 |
| 9.3. Charts Configuration .....  | 33 |
| 9.4. Build Configuration .....   | 34 |
| 10. Trademark Attributions, Library License Texts, and Source Code ..... | 35 |
| 11. Legal Notice .....   | 36 |
| A. SonargraphBuild API Documentation .....                               | 37 |
| Index .....  | 38 |

---

# Chapter 1. Sonargraph's Next Generation - SonargraphBuild

*SonargraphBuild* integrates quality checks into the continuous integration build and can create XML and HTML reports via an Ant task or shell scripts. These reports contain all information about quality issues and calculated metrics. The XML report can be used for further downstream processing via transformations. The XML schema for the report can be found in <sonargraphBuild-inst>/doc.

*SonargraphBuild* additionally offers the possibility to mark the build as failed based on issues detected during the analysis. So, if you have written custom queries via Groovy scripts that check on the proper usage of an external library or detect a code smell, you can be sure that it is detected immediately.

---

# Chapter 2. Licensing

When you start *Sonargraph* you will be asked for an activation code or a license file. For additional licensing and pricing information please contact <sales@hello2morrow.com> or <support@hello2morrow.com>

## 2.1. Getting an Activation Code or a License

When you have purchased a *Sonargraph* license, an activation code or a license file will be delivered to you.

There might be a program for free *Sonargraph* licenses which are time-limited and/or size-limited. Please register on our website and check the available programs.

In order to replace a valid license by a new one, choose "Help" → "Manage License..." from the user menu in the GUI-based product. *Sonargraph* licenses are bound to a named user. The usage by a different user is a violation of the license agreement.

## 2.2. Activation Code Based Licensing

Activation code based licensing activates *Sonargraph* licenses via Internet or a local license server by requesting a so-called ticket. Every activation code is customer specific and represents a pool of *Sonargraph* user licenses as purchased and licensed to the specific customer. Activation code based licensing technically requires that *Sonargraph* has Internet access or that a local license server is reachable. There are 2 types of activation code based licenses available:

- Flexible User License (if you bought *Sonargraph* before version 9.0 you have flexible user licenses)
- Floating License (new with *Sonargraph* 9.0)

*Flexible user licenses* support a feature that allows customer-driven transfer of a *Sonargraph* user license to another user after some amount of time. This works like this:

- When an activation code based license is requested, *Sonargraph* automatically requests a license ticket from the hello2morrow license server. This ticket expires after some time, for example after 30 days. During these 30 days, the use of the *Sonargraph* installation that requested the ticket is licensed (by the user who ran *Sonargraph* when the license ticket was requested). *Sonargraph* can be used during this period without any access to the Internet.
- After the ticket of a *Sonargraph* installation has expired (in our example scenario, this happens on the 31st day after the ticket has been requested), one of two things typically happen:
  1. The same *Sonargraph* installation is started again. *Sonargraph* then notices that the license ticket has expired and lets the user know about it by presenting a dialog to manually request a new ticket from the hello2morrow license server, for the same activation code or a different one if desired. The new ticket again is valid for the same time period. You can toggle the feature at ' Help → Renew License Ticket Automatically ' to have *Sonargraph* silently perform license ticket requests using the current activation code, without further user interaction.
  2. Alternatively, the user of the installation might not continue to work with *Sonargraph* ; then the license is now, after the expiration of the ticket in the *Sonargraph* installation, available to some other user. The hello2morrow license server will supply a license ticket to the next user that requests one for the given activation code.

Note that the number of license tickets that can be supplied by the license server for some activation code might be more than one. For example, a company might license *Sonargraph* for 20 users. The same activation code can be used by all of them, but as soon as the 21st license ticket is requested for this activation code, this request will be denied. A new request for a ticket will only be fulfilled after one of the already supplied tickets has expired, so that at any one moment, at most 20 non-expired license tickets exist for the activation code.

It is not required that the same user requests a replacement of an expired license ticket; any user that knows the activation code can request one of the free tickets. This mechanism reduces the effort needed for license management in a changing user group. However, in order to avoid any misuse we strongly encourage you to restrict the information about your activation code to those persons who are supposed to use *Sonargraph* .

If you have any suspicion about misuse please inform <support@hello2morrow.com> immediately. We can promptly deactivate an activation code so that any further misuse is stopped and provide a new activation code to you.

*Floating licenses* bind a ticket to an instance of Sonargraph while it is running. As soon as Sonargraph is terminated the license can be used by another user.

Most of our customers are using our Internet based license server, so there is no need for you to operate your own license server as long as the machines running Sonargraph have access to the Internet. If this is not the case or you want to avoid being dependent on the availability of hello2morrow's web-based license server you can request the usage of a local license server by contacting us via <sales@hello2morrow.com> or <support@hello2morrow.com>. Once your request has been approved, you can download hello2morrow's local license server and run it on your premises. If you have a *flexible user license* it is also possible to run Sonargraph with file based licenses.

## 2.3. Proxy Settings

If you use hello2morrow's Internet servers and Activation code based licensing, you need Internet access. If your network configuration does not allow direct Internet access, but provides access through an HTTP proxy instead, you can specify the host name and port of the proxy server. If the proxy server access is password protected, you can supply a user name and a password in order to authenticate.

For the GUI-based product, the proxy settings can be changed via "Preferences..." → "Proxy Settings" .

## 2.4. License Server Settings

If you use your own license server you need to configure the access to it. You must specify the host name and port of the license server.

For the GUI-based product, the proxy settings can be changed via "Preferences..." → "License Server Settings" .

---

# Chapter 3. Getting Started

This chapter summarizes what is needed for *SonargraphBuild* to run.

## 3.1. Installation Requirements

The following prerequisites must be fulfilled for *SonargraphBuild* :

1. Microsoft™ Windows™ , Mac OS-X or Linux® operating system.
2. Java Runtime Environment 1.8 or higher
3. At least 2048 MB RAM (Win32: 1400 MB)

### NOTE

Sonargraph keeps all information in main memory. For very large systems, you need to increase the memory for the JVM in case you run into out of memory exceptions.

## 3.2. Prerequisites

1. If you plan to run *SonargraphBuild* via ANT or the command line you need to download it from our web site: <https://www.hello2morrow.com/products/downloads> and extract the Zip file to a convenient location. If you are using Maven for your build process you only need to install *SonargraphBuild* if your build server has no Internet connectivity.
2. If the machine that executes *SonargraphBuild* has internet access, use an activation code parameter to obtain a ticket from your pool of licenses. If the machine does not have internet access, you need to obtain a license file and pass the location of this file as a parameter to your build.
3. For integration with Shell script or Ant a "software system" must have been created via Sonargraph containing a valid workspace configuration including modules and root directories.

Integrations with Maven and Gradle allow to dynamically create a "software system" on the fly and create a report for it. Those integrations can be used to create an initial software system that is refined using Sonargraph rich-client application.

---

# Chapter 4. Executing from the Command-line

*SonargraphBuild* can be executed as a standalone Java application which enables the integration in any kind of continuous integration environment. The necessary configuration is straight-forward and an example shell script is provided in the directory `<inst-dir>/example/bin`. The batch script starts *SonargraphBuild* and specifies an XML file for the detailed configuration.

## NOTE

*SonargraphBuild* returns an exit code indicating the execution status:

- 0 : Successful execution
- 1 : Execution failed because of failset properties
- 2 : Execution failed because of handled exception, e.g. configuration error, license error, etc.
- 3 : Execution failed because of unexpected exception. Please check the log file for details.

## NOTE

The attribute "logLevel" affects the logging after the SonargraphBuild engine has been started. Setting it to "debug" and below will generate additional debug information into the report.

## WARNING

Setting the attribute "reportType" to "standard" only generates metric values for "system" and "module" levels. "full" generates values for all element levels, but results in a significant larger report!

The splitting of the HTML report into different files is controlled by the attribute "elementCountToSplitHtmlReport". The resulting detail pages contain tables of issues / resolutions of a specific issue type. The maximum number of items shown is limited by the parameter "maxElementCountForHtmlDetailsPage".

## WARNING

The attribute "qualityModelFile" can be used to apply a fixed set of scripts, architecture files and analyzer configurations across several systems.

The reported issues are most likely very different from the results of analyzing the system with the Sonargraph application. If you specify a "qualityModelFile", it is advisable to specify the "Parser" virtual model, since resolutions e.g. for architecture violations probably will not match.

## 4.1. Report Creation

The following table lists all parameters that are available to create a report for an existing Sonargraph system:

| Attribute             | Mandatory | Description  | Default    |
|-----------------------|-----------|--|------------|
| installationDirectory | Yes       | Installation directory of SonargraphBuild  | No default |
| activationCode        | No        | Sonargraph license activation code. If this parameter is not specified, you must specify a license file parameter (see below). | No default |
| licenseServerPort     | No        | Port of license server to be used. This parameter is ignored if licenseServerHost is not set.                                  | 8080       |
| licenseServerHost     | No        | Host name or IP address of license server. If this parameter is not specified, the web-based                                   | No default |



| Attribute              | Mandatory | Description  | Default   |
|------------------------|-----------|--|---|
|                        |           | hello2morrow license server will be used for activation code based licenses.   |   |
| licenseFile            | No        | Sonargraph license file location. If this parameter is not specified, you must specify the activation code parameter (see above).  | No default  |
| languages              | No        | The languages that should be initialized, separated by ",". The fewer languages are specified the faster the startup of SonargraphBuild. If no value is specified, all languages will be initialized.  | Java, CSharp, CPlusPlus   |
| logFile                | No        | Path of the log file to be used for SonargraphBuild.   | \${currentDir}/sonargraph_build.log   |
| logLevel               | No        | Level of logging detail. One of: off, error, warn, info, debug, trace, all   | info  |
| compilerDefinitionPath | No        | The path to the active compiler definition file to be used for parsing a C/C++ system. If a built-in or automatically generated definition should be used, prefix the definition with "CPlusPlus:", e.g. CPlusPlus:GnuCpp.cdef.<br><br><b>NOTE:</b> If the standalone Sonargraph application is used on the same machine with the same user and this parameter is empty, the active definition specified with the standalone application will be used. | If empty, the default compiler definition for the build server's operating system is used: GnuCpp.cdef (Linux), CLang.cdef (Mac), VisualCpp*.cdef (Windows, generated definition for the latest Visual Studio installation) |
| systemDirectory        | Yes       | Directory of the Sonargraph System (xyz.sonargraph)  | No default  |
| virtualModel           | No        | The virtual model to be used when checking for issues. This parameter overrides the default virtual model that is set when the system is opened. The default virtual model is "Modifiable.vm", if virtual models are licensed, "Parser" if not licensed.<br><b>Parameter can only be used with Sonargraph Architect license.</b>   | No default  |
| workspaceProfile       | No        | The profile file name (e.g. "BuildProfile.xml") for transforming the workspace paths to match the build environment.   | No default  |
| qualityModelFile       | No        | The path to the quality model file (xyz.sgqm) that should be applied for the report creation. Built-in quality models are the language-independent "Sonargraph:Default.sgqm" and language-specific "Sonargraph:Java.sgqm", "Sonargraph:CSharp.sgqm" and "Sonargraph:CPlusPlus.sgqm". <b>NOTE: All scripts, analyzer configurations and architecture files present in the system are ignored!</b>   | No default  |
| snapshotDirectory      | No        | Target directory for the created snapshot. Only if either this parameter or snapshotFileName is provided, a snapshot will be generated. Parameter can only be used with Sonargraph Architect license.  | Current directory   |
| snapshotFileName       | No        | The target file name (without extension). Only if either this parameter or snapshotDirectory is  | <system-name>_<timestamp>   |

| Attribute                             | Mandatory | Description   | Default                   |
|---------------------------------------|-----------|---|---------------------------|
|                                       |           | provided, a snapshot will be generated. Parameter can only be used with Sonargraph Architect license.   |                           |
| reportDirectory                       | No        | Target directory for the created report   | Current directory         |
| reportFileName                        | No        | The target file name (without extension)  | <system-name>_<timestamp> |
| reportType                            | No        | "standard" only creates metric information of system and module level. "full" creates metric information of all levels.   | standard                  |
| reportFormat                          | No        | "xml", "html" or "xml, html"  | html                      |
| elementCountToSplit<br>HtmlReport     | No        | Issue and resolution tables might contain too many items making it impossible to open the HTML report in a browser. This parameter controls the lower limit of items that will cause separate files being generated per issue type. Possible values are: -1 (never split), 0 (use default value), 1 (always split), positive number > 1 (threshold for split)               | 1000                      |
| maxElementCountFor<br>HtmlDetailsPage | No        | If HTML report is split because of too many issues and/or resolutions, detail tables might contain too many items making it impossible to open the page in a browser. This parameter controls the upper limit of elements shown in the table. Possible values are: -1 (no limit), 0 (use default limit), positive number > 1 (maximum number of elements contained in page) | 2000                      |
| splitByModule                         | No        | If set to 'true', individual HTML reports are created per module.   | false                     |
| proxyHost                             | No        | Proxy host  | No default                |
| proxyPort                             | No        | Proxy port  | No default                |
| proxyUsername                         | No        | Proxy user name   | No default                |
| proxyPassword                         | No        | Proxy password  | No default                |

**Table 4.1. Configuration for Element "sonargraphBuild"**

## Example

This is an example configuration for creating an XML and HTML report:

```
<sonargraphBuild
  activationCode="_your activation code_"
  languages="Java"
  installationDirectory="..."
  systemDirectory="../javaProject/AlarmClock.sonargraph"
  reportDirectory="._temp/report"
  reportFileName=""
  reportType="full"
  reportFormat="xml,html"
  snapshotFileName="._temp/AlarmClock.snapshot"
  proxyHost=""
  proxyPort=""
  proxyUsername=""
  proxyPassword=""
  logLevel="warn">
</sonargraphBuild>
```

## 4.2. Specify Conditions for Build Failure

*SonargraphBuild* can check for the existence of specific issues and mark the build as failed. The nested "failSet" element of the "sonargraphBuild" element can include any number of "include" and "exclude" definitions based on the issues that are either built-in (like duplicate warnings, cycle group warnings, etc.) or custom issues created via Groovy scripts.

## TIP

The issue type that must be specified for include/exclude definitions can be determined via the Properties View of *Sonargraph*.

## TIP

If you want the build to fail only for newly introduced issues, apply resolutions like "Ignore" or "Fix" to the already known issues in *Sonargraph* and only filter for resolution value "none".

## TIP

If you want the build to fail because of certain metric values (e.g. Lines of Code per Source File), define a threshold for that metric in *Sonargraph* to create issues if files grow too large.

## TIP

The include/exclude definitions are applied in the following sequence, regardless of their definition order:

1. First all include definitions are matched against the set of existing issues.
2. Then the exclude definitions are applied and the set of previously matched issues is reduced accordingly.

| Element         | Parameter            | Mandatory | Description  | Default    |
|-----------------|----------------------|-----------|--|------------|
| failSet         | failOnEmptyWorkspace | No        | Marks the build as failed if modules and root directories are detected but no components are found. Possible values are "true" or "false". | true       |
| include/exclude | issueType            | Yes       | Name of the issue type or "any" for wildcard matching.   | No default |
| include/exclude | severity             | No        | Severity of the issue. Possible values are: error, warning, info, none, any  | any        |
| include/exclude | resolution           | No        | The issue's resolution type. Possible values are: task, ignore, any, none  | none       |

**Table 4.2. Configuration Parameters for Build Failure**

## Example

This is an example failSet definition:

```
<sonargraphBuild
...
  <failSet failOnEmptyWorkspace="false">
    <include issueType="any" severity="error" resolution="none"/>
    <exclude issueType="ScriptCompilationError"/>
    <include issueType="Supertype uses subtype"/>
    <include issueType="any" severity="warning"/>
    <exclude issueType="ThresholdViolation"/>
  </failSet>
</sonargraphBuild>
```

The console output provides some basic information about the number of issues matched by either "include" and "exclude":

Failed:

Sonargraph: Start creating report...

Sonargraph: Opening system...

Sonargraph: Refreshing system...

Sonargraph: Creating report...

Sonargraph: Check if build should be marked as failed...

Include filter [issueType=any, severity=error, resolution=none] matches 0 issue(s).

Include filter [issueType=Supertype uses subtype, severity=any, resolution=none] matches 0 issue(s).

Include filter [issueType=any, severity=warning, resolution=none] matches 2 issue(s).

Exclude filter [issueType=ScriptCompilationError, severity=any, resolution=none] removes 0 previously matched issue(s).

Exclude filter [issueType=ThresholdViolation, severity=any, resolution=none] removes 0 previously matched issue(s).

Summary: Build failed as 2 issue(s) match the specified failset on virtual model 'Modifiable.vm'.

Sonargraph: Finished.

---

# Chapter 5. Integrating with Ant

The provided `SonargraphReportTask` makes it easy to integrate *SonargraphBuild* into Apache Ant based builds and generate HTML or XML reports containing info about metrics and issues of a software system. Additionally, using the optional `failSet` element, the Ant build can be marked as failed if certain issues exist.

Prerequisites:

1. You need at least Ant 1.8.3 installed.
2. Set the environment variable `ANT_HOME`.
3. Include `ANT_HOME/bin` in your `PATH` environment variable.

The following shows the `SonargraphReportTask` definition:

```
<taskdef name="sonargraphBuild"
  classname="com.hello2morrow.sonargraph.build.client.ant.SonargraphReportTask">
  <classpath>
    <fileset dir="${sonargraph.build.installation}/plugins">
      <include name="org.eclipse.osgi_3.10*.jar" />
      <include name="com.hello2morrow.sonargraph.build.client*.jar"/>
    </fileset>
    <fileset dir="${sonargraph.build.installation}/client" includes="*.jar" />
  </classpath>
</taskdef>
```

An example Ant `build.xml` is provided in the directory `<inst-dir>/example/ant`. The parameters are the same as for the shell integration described in Chapter 4, *Executing from the Command-line*

---

# Chapter 6. Integration with Maven

The *SonargraphBuild* Maven plugin makes it easy to check the quality of your projects. The plugin is able to automatically download and install *SonargraphBuild* if your build server has Internet connectivity. You can make the build fail depending on issues detected by *SonargraphBuild*.

There are two different goals available:

1. **create-report**: Creates a report for an existing system.
2. **dynamic-report**: Creates a system on-the-fly and creates a report for it. This is currently only available for Java systems.

A third command **help** shows more information and can be parameterized to show detailed parameter info.

Prerequisites:

1. You need at least Maven 3.0.5 installed.
2. The plugin requires at least a Java 8 runtime.
3. The plugin cannot be used together with Tycho.

## 6.1. Maven Tips and Best Practices

### TIP

Add the following repository to your Maven settings.xml, so you do not need to repeat it in your project's pom.xml:

```
<pluginRepository>
  <id>hello2morrow.maven.repository</id>
  <url>http://maven.hello2morrow.com/repository</url>
</pluginRepository>
```

### TIP

The goals are **not** configured to be executed within any default Maven lifecycle phase. Typically you would run the plugin with a command-line like the following to ensure that everything is compiled from scratch before the report is created. The first command-line explicitly specifies a version, the second one uses the Maven prefix resolution (check *Maven Prefix Resolution* for details):

```
mvn clean compile com.hello2morrow:sonargraph-maven-plugin:9.1.1:create-report
mvn clean compile sonargraph:create-report
```

### TIP

All parameters of the top-level goals (i.e. not the failSet) can equally be set via the command-line using system properties of the form

```
-Dsonargraph.<parameter-name>=<value>
```

### TIP

To enforce certain rules, specify a failSet that lets the build fail based on detected issues. See Section 6.4, “Maven FailSet Configuration”

### NOTE

The plugin cannot be used together with Tycho.

You need to use another option to execute Sonargraph. See Chapter 4, *Executing from the Command-line*, Chapter 5, *Integrating with Ant*. If the class root paths of the Sonargraph workspace do not match the Maven target

directories, check the section about "Workspace Profiles" in the user manual of the standalone application: [http://eclipse.hello2morrow.com/doc/standalone/content/workspace\\_profiles.html](http://eclipse.hello2morrow.com/doc/standalone/content/workspace_profiles.html)

## NOTE

The attribute "logLevel" affects the logging after the SonargraphBuild engine has been started. Setting it to "debug" and below will generate additional debug information into the XML report.

## WARNING

Setting the attribute "reportType" to "standard" only generates metric values for "system" and "module" levels. "full" generates values for all element levels, but results in a significant larger report!

The splitting of the HTML report into different files is controlled by the attribute "elementCountToSplitHtmlReport". The resulting detail pages contain tables of issues / resolutions of a specific issue type. The maximum number of items shown is limited by the parameter "maxElementCountForHtmlDetailsPage".

## WARNING

The attribute "qualityModelFile" can be used to apply a fixed set of scripts, architecture files and analyzer configurations across several systems.

The reported issues are most likely very different from the results of analyzing the system with the Sonargraph application. If you specify a "qualityModelFile", it is advisable to specify the "Parser" virtual model, since resolutions e.g. for architecture violations probably will not match.

## 6.2. Parameters of Goal "create-report"

The following table lists all parameters that are available to create a report for an existing Sonargraph system. The build can be marked as failed based on a failSet. See Section 6.4, "Maven FailSet Configuration".

| Attribute              | Mandatory | Description  | Default    |
|------------------------|-----------|--|------------|
| sonargraphBuildVersion | No        | Allows you to use a specific or restricted version of SonargraphBuild. Can be used in combination with 'autoUpdate'. As an example, if you specify '8.7' the newest available version starting with '8.7' will be used. If you specify '8.7.0.361' you are locked on that specific version of SonargraphBuild. There are two special values: "same" and "newest". If "same" is defined the version of SonargraphBuild must be the same as the version of the Maven plugin. If "newest" is defined the plugin will always try to use the newest version of SonargraphBuild. | same       |
| skip                   | No        | Skip SonargraphBuild.  | false      |
| autoUpdate             | No        | If the plugin is configured to download SonargraphBuild automatically, this parameter decides if it also should be updated automatically if a new version becomes available.   | false      |
| useHttpProxyHost       | No        | The id of a proxy entry in the Maven settings. If defined the plugin will use this proxy for all HTTP communication.   | No default |
| installationDirectory  | No        | Installation directory of SonargraphBuild. If unspecified the plugin will automatically download SonargraphBuild. The version to be downloaded can be controlled by the parameter 'sonargraphBuildVersion'.  | No default |

| Attribute                   | Mandatory | Description  | Default   |
|-----------------------------|-----------|--|---|
| activationCode              | No        | Sonargraph license activation code. If this parameter is not specified, you must specify a license file parameter (see below).   | No default  |
| licenseServerPort           | No        | Port of license server to be used. This parameter is ignored if licenseServerHost is not set.  | 8080  |
| licenseServerHost           | No        | Host name or IP address of license server. If this parameter is not specified, the web-based hello2morrow license server will be used for activation code based licenses.  | No default  |
| licenseFile                 | No        | Sonargraph license file location. If this parameter is not specified, you must specify the activation code parameter (see above).  | No default  |
| languages                   | No        | The languages that should be initialized, separated by ",". The fewer languages are specified the faster the startup of SonargraphBuild. Possible values: Java, CSharp, CPlusPlus.   | Java  |
| logFile                     | No        | Path of the log file to be used for SonargraphBuild.   | \${baseDir}/\${target}/sonargraph_build.log   |
| logLevel                    | No        | Level of logging detail. One of: off, error, warn, info, debug, trace, all   | info  |
| compilerDefinitionPath      | No        | The path to the active compiler definition file to be used for parsing a C/C++ system. If a built-in or automatically generated definition should be used, prefix the definition with "CPlusPlus:", e.g. CPlusPlus:GnuCpp.cdef.<br><br><b>NOTE:</b> If the standalone Sonargraph application is used on the same machine with the same user and this parameter is empty, the active definition specified with the standalone application will be used. | If empty, the default compiler definition for the build server's operating system is used: GnuCpp.cdef (Linux), CLang.cdef (Mac), VisualCpp*.cdef (Windows, generated definition for the latest Visual Studio installation) |
| systemDirectory             | No        | Directory of the Sonargraph System (xyz.sonargraph)  | \${baseDir}/\${artifact.id}.sonargraph  |
| overrideSonargraphWorkspace | No        | If true the output directories defined in the Sonargraph system will be overridden by the ones provided by the client.   | true  |
| includeTestCode             | No        | If true the workspace will also contain the test source and test class file directories.   | false   |
| virtualModel                | No        | The virtual model to be used when checking for issues. This parameter overrides the default virtual model that is set when the system is opened. The default virtual model is "Modifiable.vm", if virtual models are licensed, "Parser" if not licensed.<br><b>Parameter can only be used with Sonargraph Architect license.</b>   | No default  |
| qualityModelFile            | No        | The path to the quality model file (xyz.sgqm) that should be applied for the report creation. Built-in quality models are the language-independent "Sonargraph:Default.sgqm" and language-specific "Sonargraph:Java.sgqm", "Sonargraph:CSharp.sgqm" and "Sonargraph:CPlusPlus.sgqm". <b>NOTE: All scripts,</b>   | No default  |



| Attribute                             | Mandatory | Description   | Default                           |
|---------------------------------------|-----------|---|-----------------------------------|
|                                       |           | <b>analyzer configurations and architecture files present in the system are ignored!</b>  |                                   |
| snapshotDirectory                     | No        | Target directory for the created snapshot. Only if either this parameter or snapshotFileName is provided, a snapshot will be generated. Parameter can only be used with Sonargraph Architect license.   | \${basedir}/\${target}            |
| snapshotFileName                      | No        | The target file name (without extension). Only if either this parameter or snapshotDirectory is provided, a snapshot will be generated. Parameter can only be used with Sonargraph Architect license.   | <system-name>_<timestamp>         |
| reportDirectory                       | No        | Target directory for the created report   | \${basedir}/\${target}/sonargraph |
| reportFileName                        | No        | The target file name (without extension)  | <system-name>_<timestamp>         |
| reportType                            | No        | "standard" only creates metric information of system and module level. "full" creates metric information of all levels.   | standard                          |
| reportFormat                          | No        | "xml", "html" or "xml, html"  | html                              |
| elementCountToSplit<br>HtmlReport     | No        | Issue and resolution tables might contain too many items making it impossible to open the HTML report in a browser. This parameter controls the lower limit of items that will cause separate files being generated per issue type. Possible values are: -1 (never split), 0 (use default value), 1 (always split), positive number > 1 (threshold for split)               | 1000                              |
| maxElementCountFor<br>HtmlDetailsPage | No        | If HTML report is split because of too many issues and/or resolutions, detail tables might contain too many items making it impossible to open the page in a browser. This parameter controls the upper limit of elements shown in the table. Possible values are: -1 (no limit), 0 (use default limit), positive number > 1 (maximum number of elements contained in page) | 2000                              |
| splitByModule                         | No        | If set to 'true', individual HTML reports are created per module.   | false                             |
| prepareForSonarQube                   | No        | Creates an XML report and stores it at \${basedir}/\${target}/sonargraph/sonargraph-sonarqube-report.xml, where the SonarQube Sonargraph plugin expects it.   | false                             |

**Table 6.1. Configuration for goal "create-report"****Related topics:**

- Section 6.1, "Maven Tips and Best Practices"
- Section 6.4, "Maven FailSet Configuration"
- Section 6.5, "Example POM"

## 6.3. Configuration for goal "dynamic-report"

The following table lists all parameters that are available to create a report for a Java project where no Sonargraph system has been defined. A Sonargraph system is created on the fly based on the workspace information contained in the Maven project setup. The build can be marked as failed based on a failSet. See Section 6.4, “Maven FailSet Configuration”.

| Attribute              | Mandatory | Description  | Default                                     |
|------------------------|-----------|--|---|
| sonargraphBuildVersion | No        | Allows you to use a specific or restricted version of SonargraphBuild. Can be used in combination with 'autoUpdate'. As an example, if you specify '8.7' the newest available version starting with '8.7' will be used. If you specify '8.7.0.361' you are locked on that specific version of SonargraphBuild. There are two special values: "same" and "newest". If "same" is defined the version of SonargraphBuild must be the same as the version of the Maven plugin. If "newest" is defined the plugin will always try to use the newest version of SonargraphBuild. | same  |
| skip                   | No        | Skip SonargraphBuild.  | false                                       |
| autoUpdate             | No        | If the plugin is configured to download SonargraphBuild automatically, this parameter decides if it also should be updated automatically if a new version becomes available.   | false                                       |
| useHttpProxyHost       | No        | The id of a proxy entry in the Maven settings. If defined the plugin will use this proxy for all HTTP communication.   | No default                                  |
| installationDirectory  | No        | Installation directory of SonargraphBuild. If unspecified the plugin will automatically download SonargraphBuild. The version to be downloaded can be controlled by the parameter 'sonargraphBuildVersion'.  | No default                                  |
| activationCode         | No        | Sonargraph license activation code. If this parameter is not specified, you must specify a license file parameter (see below).   | No default                                  |
| licenseServerPort      | No        | Port of license server to be used. This parameter is ignored if licenseServerHost is not set.  | 8080  |
| licenseServerHost      | No        | Host name or IP address of license server. If this parameter is not specified, the web-based hello2morrow license server will be used for activation code based licenses.  | No default                                  |
| licenseFile            | No        | Sonargraph license file location. If this parameter is not specified, you must specify the activation code parameter (see above).  | No default                                  |
| languages              | No        | The languages that should be initialized, separated by ",". The fewer languages are specified the faster the startup of SonargraphBuild. Possible values: Java, CSharp, CPlusPlus.   | Java  |
| logFile                | No        | Path of the log file to be used for SonargraphBuild.   | \${baseDir}/\${target}/sonargraph_build.log |
| logLevel               | No        | Level of logging detail. One of: off, error, warn, info, debug, trace, all   | info  |
| systemBaseDirectory    | No        | The directory where the Sonargraph System (\${artifactId}.sonargraph) is created.  | \${baseDir}/\${target}                      |
| systemId               | No        | A system id should stay constant over the lifetime of a software system and should be also unique with   | \${groupId}_<br>\${artifactId}              |

| Attribute                             | Mandatory | Description  | Default                           |
|---------------------------------------|-----------|--|-----------------------------------|
|                                       |           | respect to other systems. If you anticipate that the the group id or artifact id of the root pom might change you should assign a value to this parameter.   |                                   |
| useGroupIdInModuleName                | No        | If true the module names will use group id and artifact id as their name, separated by an underscore. By default only the artifact id is used as the module name.  | false                             |
| includeTestCode                       | No        | If true the workspace will also contain the test source and test class file directories.   | false                             |
| virtualModel                          | No        | The virtual model to be used when checking for issues. This parameter overrides the default virtual model that is set when the system is opened. The default virtual model is "Modifiable.vm", if virtual models are licensed, "Parser" if not licensed.<br><b>Parameter can only be used with Sonargraph Architect license.</b>   | No default                        |
| qualityModelFile                      | No        | The path to the quality model file (xyz.sgqm) that should be applied for the report creation. Built-in quality models are the language-independent "Sonargraph:Default.sgqm" and language-specific "Sonargraph:Java.sgqm", "Sonargraph:CSharp.sgqm" and "Sonargraph:CPlusPlus.sgqm". <b>NOTE: All scripts, analyzer configurations and architecture files present in the system are ignored!</b> | No default                        |
| snapshotDirectory                     | No        | Target directory for the created snapshot. Only if either this parameter or snapshotFileName is provided, a snapshot will be generated. Parameter can only be used with Sonargraph Architect license.  | \${basedir}/\${target}            |
| snapshotFileName                      | No        | The target file name (without extension). Only if either this parameter or snapshotDirectory is provided, a snapshot will be generated. Parameter can only be used with Sonargraph Architect license.  | <system-name>_<timestamp>         |
| reportDirectory                       | No        | Target directory for the created report  | \${basedir}/\${target}/sonargraph |
| reportFileName                        | No        | The target file name (without extension)   | <system-name>_<timestamp>         |
| reportType                            | No        | "standard" only creates metric information of system and module level. "full" creates metric information of all levels.  | standard                          |
| reportFormat                          | No        | "xml", "html" or "xml, html"   | html                              |
| elementCountToSplit<br>HtmlReport     | No        | Issue and resolution tables might contain too many items making it impossible to open the HTML report in a browser. This parameter controls the lower limit of items that will cause separate files being generated per issue type. Possible values are: -1 (never split), 0 (use default value), 1 (always split), positive number > 1 (threshold for split)                                    | 1000                              |
| maxElementCountFor<br>HtmlDetailsPage | No        | If HTML report is split because of too many issues and/or resolutions, detail tables might contain too many items making it impossible to open the page in a browser. This parameter controls the upper limit of   | 2000                              |

| Attribute           | Mandatory | Description   | Default |
|---------------------|-----------|---|---------|
|                     |           | elements shown in the table. Possible values are: -1 (no limit), 0 (use default limit), positive number > 1 (maximum number of elements contained in page)  |         |
| splitByModule       | No        | If set to 'true', individual HTML reports are created per module.   | false   |
| prepareForSonarQube | No        | Creates an XML report and stores it at \${basedir}/\${target}/sonargraph/sonargraph-sonarqube-report.xml, where the SonarQube Sonargraph plugin expects it. | false   |

**Table 6.2. Configuration for goal "dynamic-report"**

### Related topics:

- Section 6.1, “Maven Tips and Best Practices”
- Section 6.4, “Maven FailSet Configuration”
- Section 6.5, “Example POM”

## 6.4. Maven FailSet Configuration

The following elements allow to mark a build as failed. An example is shown in the next section Section 6.5, “Example POM”.

### TIP

The issue type that must be specified for include/exclude definitions can be determined via the Properties View of *Sonargraph*.

### TIP

If you want the build to fail only for newly introduced issues, apply resolutions like "Ignore" or "Fix" to the already know issues in *Sonargraph* and only filter for resolution value "none".

### TIP

If you want the build to fail because of certain metric values (e.g. Lines of Code per Source File), define a threshold for that metric in *Sonargraph* to create issues if files grow too large.

### TIP

The include/exclude definitions are applied in the following sequence, regardless of their definition order:

1. First all include definitions are matched against the set of existing issues.
2. Then the exclude definitions are applied and the set of previously matched issues is reduced accordingly.

| Element | Parameter            | Mandatory | Description  | Default |
|---------|----------------------|-----------|--|---------|
| failSet | failOnEmptyWorkspace | No        | Marks the build as failed if modules and root directories are detected but no components are found. Possible values are "true" or "false". | true    |

| Element         | Parameter  | Mandatory | Description   | Default    |
|-----------------|------------|-----------|---|------------|
| include/exclude | issueType  | Yes       | Name of the issue type or "any" for wildcard matching.                      | No default |
| include/exclude | severity   | No        | Severity of the issue. Possible values are: error, warning, info, none, any | any        |
| include/exclude | resolution | No        | The issue's resolution type. Possible values are: task, ignore, any, none   | none       |

**Table 6.3. Configuration Parameters for Build Failure**

## 6.5. Example POM

The following example shows how to integrate the Sonargraph Maven plugin into your project specific pom file. For multi-module projects it is sufficient to only add the plugin to the pom of the root project. It runs as an aggregator after all modules have been compiled. The example project in the installation contains a complete pom.xml. Typically you would run the plugin with a command-line like the following to ensure that everything is compiled from scratch before the report is created. The first command-line explicitly specifies a version, the second one uses the Maven prefix resolution (check *Maven Prefix Resolution* for details):

```
mvn clean compile com.hello2morrow:sonargraph-maven-plugin:9.1.1:create-report
```

```
mvn clean compile sonargraph:create-report
```

The following shows the relevant section of a pom.xml file that demonstrates the configuration of the Sonargraph functionality:

```
<pluginRepositories>
  <pluginRepository>
    <id>hello2morrow.maven.repository</id>
    <url>http://maven.hello2morrow.com/repository</url>
  </pluginRepository>
</pluginRepositories>
<build>
  <plugins>
    <plugin>
      <groupId>com.hello2morrow</groupId>
      <artifactId>sonargraph-maven-plugin</artifactId>
      <version>9.1.1</version>
      <configuration>
        <systemDirectory>${basedir}/crm-domain-example.sonargraph</systemDirectory>
        <activationCode>...</activationCode>
        <autoUpdate>true</autoUpdate>
        <failSet>
          <failOnEmptyWorkspace>true</failOnEmptyWorkspace>
          <includes>
            <include>
              <issueType>ArchitectureViolation</issueType>
            </include>
            <include>
              <issueType>any</issueType>
              <severity>error</severity>
            </include>
          </includes>
          <excludes>
            <exclude>
              <issueType>ScriptCompilationError</issueType>
              <resolution>none</resolution>
            </exclude>
          </excludes>
        </failSet>
      </configuration>
      <executions>
        <execution>
          <goals>
            <goal>create-report</goal>
            <goal>dynamic-report</goal>
          </goals>
        </execution>
      </executions>
    </plugin>
  </plugins>
</build>
```

In this example the build will fail if the project contains a package cycle or an architecture violation without a resolution. Since the parameter 'installationDirectory' is not defined, the Maven plugin will automatically download the newest release of *SonargraphBuild* and also will keep it updated automatically. Of course this requires that the build server has access to the Internet.

---

# Chapter 7. Integration with Gradle

The *SonargraphBuild* Gradle plugin makes it easy to check the quality of your projects. The plugin is able to automatically download and install *SonargraphBuild* if your build server has Internet connectivity. You can make the build fail depending on issues detected by *SonargraphBuild*.

There are two different Gradle "tasks" available for which parameters can be defined in Gradle "extensions" with the same names:

1. **sonargraphReport**: Creates a report for an existing system.
2. **sonargraphDynamicReport**: Creates a system on-the-fly and creates a report for it. This is currently only available for Java systems.

Prerequisites:

1. You need at least Gradle 2.9 installed.
2. The plugin requires at least a Java 8 runtime.

## 7.1. Gradle Tips and Best Practices

### TIP

To enforce certain rules, specify a failSet that lets the build fail based on detected issues. See Section 7.4, "Gradle FailSet Configuration"

### NOTE

The attribute "logLevel" affects the logging after the SonargraphBuild engine has been started. Setting it to "debug" and below will generate additional debug information into the XML report.

### WARNING

Setting the attribute "reportType" to "standard" only generates metric values for "system" and "module" levels. "full" generates values for all element levels, but results in a significant larger report!

The splitting of the HTML report into different files is controlled by the attribute "elementCountToSplitHtmlReport". The resulting detail pages contain tables of issues / resolutions of a specific issue type. The maximum number of items shown is limited by the parameter "maxElementCountForHtmlDetailsPage".

### WARNING

The attribute "qualityModelFile" can be used to apply a fixed set of scripts, architecture files and analyzer configurations across several systems.

The reported issues are most likely very different from the results of analyzing the system with the Sonargraph application. If you specify a "qualityModelFile", it is advisable to specify the "Parser" virtual model, since resolutions e.g. for architecture violations probably will not match.

## 7.2. Parameters of Task "sonargraphReport"

The following table lists all parameters that are available to create a report for an existing Sonargraph system. The build can be marked as failed based on a failSet. See Section 7.4, "Gradle FailSet Configuration".

| Attribute              | Mandatory | Description   | Default |
|------------------------|-----------|---|---------|
| sonargraphBuildVersion | No        | Allows you to use a specific or restricted version of SonargraphBuild. Can be used in combination with 'autoUpdate'. As an example, if you specify '8.7' the newest available version starting with '8.7' will be | same    |

| Attribute              | Mandatory | Description  | Default   |
|------------------------|-----------|--|---|
|                        |           | used. If you specify '8.7.0.361' you are locked on that specific version of SonargraphBuild. There are two special values: "same" and "newest". If "same" is defined the version of SonargraphBuild must be the same as the version of the Maven plugin. If "newest" is defined the plugin will always try to use the newest version of SonargraphBuild.   |   |
| skip                   | No        | Skip SonargraphBuild.  | false   |
| autoUpdate             | No        | If the plugin is configured to download SonargraphBuild automatically, this parameter decides if it also should be updated automatically if a new version becomes available.   | false   |
| useHttpProxyHost       | No        | If true, the proxy configuration of the Gradle settings is used. The plugin will use this proxy for all HTTP communication. Check the <i>Gradle online documentation</i> for details.  | false   |
| installationDirectory  | No        | Installation directory of SonargraphBuild. If unspecified the plugin will automatically download SonargraphBuild. The version to be downloaded can be controlled by the parameter 'sonargraphBuildVersion'.  | No default  |
| activationCode         | No        | Sonargraph license activation code. If this parameter is not specified, you must specify a license file parameter (see below).   | No default  |
| licenseServerPort      | No        | Port of license server to be used. This parameter is ignored if licenseServerHost is not set.  | 8080  |
| licenseServerHost      | No        | Host name or IP address of license server. If this parameter is not specified, the web-based hello2morrow license server will be used for activation code based licenses.  | No default  |
| licenseFile            | No        | Sonargraph license file location. If this parameter is not specified, you must specify the activation code parameter (see above).  | No default  |
| languages              | No        | The languages that should be initialized, separated by ", ". The fewer languages are specified the faster the startup of SonargraphBuild. Possible values: Java, CSharp, CPlusPlus.  | Java  |
| logFile                | No        | Path of the log file to be used for SonargraphBuild.   | \${project.buildDir}/sonargraph_build.log   |
| logLevel               | No        | Level of logging detail. One of: off, error, warn, info, debug, trace, all   | info  |
| compilerDefinitionPath | No        | <p>The path to the active compiler definition file to be used for parsing a C/C++ system. If a built-in or automatically generated definition should be used, prefix the definition with "CPlusPlus:", e.g. CPlusPlus:GnuCcpp.cdef.</p> <p><b>NOTE:</b> If the standalone Sonargraph application is used on the same machine with the same user and this parameter is empty, the active definition specified with the standalone application will be used.</p> | If empty, the default compiler definition for the build server's operating system is used: GnuCcpp.cdef (Linux), CLang.cdef (Mac), VisualCcpp*.cdef (Windows, generated definition for the latest Visual Studio installation) |



| Attribute                         | Mandatory | Description  | Default   |
|-----------------------------------|-----------|--|---|
| systemDirectory                   | No        | Directory of the Sonargraph System (xyz.sonargraph)  | \${project.buildDir}/<br>\${project.group}<br>.sonargraph |
| overrideSonargraphWorkspace       | No        | If true the output directories defined in the Sonargraph system will be overridden by the ones provided by the client.   | true  |
| includeTestCode                   | No        | If true the workspace will also contain the test source and test class file directories.   | false   |
| productionSourceSets              | No        | Comma separated list of source set names that contain production code. This parameter is only needed when you are not using the gradle default "main".   | main  |
| testSourceSets                    | No        | Comma separated list of source set names that contain test code. This parameter is only needed when you are not using the gradle default "test".   | test  |
| virtualModel                      | No        | The virtual model to be used when checking for issues. This parameter overrides the default virtual model that is set when the system is opened. The default virtual model is "Modifiable.vm", if virtual models are licensed, "Parser" if not licensed.<br><b>Parameter can only be used with Sonargraph Architect license.</b>   | No default  |
| qualityModelFile                  | No        | The path to the quality model file (xyz.sgqm) that should be applied for the report creation. Built-in quality models are the language-independent "Sonargraph:Default.sgqm" and language-specific "Sonargraph:Java.sgqm", "Sonargraph:CSharp.sgqm" and "Sonargraph:CPlusPlus.sgqm". <b>NOTE: All scripts, analyzer configurations and architecture files present in the system are ignored!</b> | No default  |
| snapshotDirectory                 | No        | Target directory for the created snapshot. Only if either this parameter or snapshotFileName is provided, a snapshot will be generated. Parameter can only be used with Sonargraph Architect license.  | \${project.buildDir}                                      |
| snapshotFileName                  | No        | The target file name (without extension). Only if either this parameter or snapshotDirectory is provided, a snapshot will be generated. Parameter can only be used with Sonargraph Architect license.  | <system-name>_<timestamp>                                 |
| reportDirectory                   | No        | Target directory for the created report  | \${project.buildDir}/<br>sonargraph                       |
| reportFileName                    | No        | The target file name (without extension)   | <system-name>_<timestamp>                                 |
| reportType                        | No        | "standard" only creates metric information of system and module level. "full" creates metric information of all levels.  | standard  |
| reportFormat                      | No        | "xml", "html" or "xml, html"   | html  |
| elementCountToSplit<br>HtmlReport | No        | Issue and resolution tables might contain too many items making it impossible to open the HTML report in a browser. This parameter controls the lower limit of items that will cause separate files  | 1000  |

| Attribute                         | Mandatory | Description   | Default |
|-----------------------------------|-----------|---|---------|
|                                   |           | being generated per issue type. Possible values are: -1 (never split), 0 (use default value), 1 (always split), positive number > 1 (threshold for split)   |         |
| maxElementCountForHtmlDetailsPage | No        | If HTML report is split because of too many issues and/or resolutions, detail tables might contain too many items making it impossible to open the page in a browser. This parameter controls the upper limit of elements shown in the table. Possible values are: -1 (no limit), 0 (use default limit), positive number > 1 (maximum number of elements contained in page) | 2000    |
| splitByModule                     | No        | If set to 'true', individual HTML reports are created per module.   | false   |
| prepareForSonarQube               | No        | Creates an XML report and stores it at \${basedir}/\${target}/sonargraph/sonargraph-sonarqube-report.xml, where the SonarQube Sonargraph plugin expects it.   | false   |

**Table 7.1. Configuration for Task/Extension "sonargraphReport"**

**Related topics:**

- Section 7.1, “Gradle Tips and Best Practices”
- Section 7.4, “Gradle FailSet Configuration”
- Section 7.5, “Example Gradle Build File”

## 7.3. Configuration for Task "sonargraphDynamicReport"

The following table lists all parameters that are available to create a report for a Java project where no Sonargraph system has been defined. A Sonargraph system is created on the fly based on the workspace information contained in the Gradle project setup. The build can be marked as failed based on a failSet. See Section 7.4, “Gradle FailSet Configuration”.

| Attribute              | Mandatory | Description  | Default |
|------------------------|-----------|--|---------|
| sonargraphBuildVersion | No        | Allows you to use a specific or restricted version of SonargraphBuild. Can be used in combination with 'autoUpdate'. As an example, if you specify '8.7' the newest available version starting with '8.7' will be used. If you specify '8.7.0.361' you are locked on that specific version of SonargraphBuild. There are two special values: "same" and "newest". If "same" is defined the version of SonargraphBuild must be the same as the version of the Maven plugin. If "newest" is defined the plugin will always try to use the newest version of SonargraphBuild. | same    |
| skip                   | No        | Skip SonargraphBuild.  | false   |
| autoUpdate             | No        | If the plugin is configured to download SonargraphBuild automatically, this parameter decides if it also should be updated automatically if a new version becomes available.   | false   |
| useHttpProxyHost       | No        | If true, the proxy configuration of the Gradle settings is used. The plugin will use this proxy for  | false   |

| Attribute              | Mandatory | Description   | Default                                   |
|------------------------|-----------|---|---|
|                        |           | all HTTP communication. Check the <i>Gradle online documentation</i> for details.   |   |
| installationDirectory  | No        | Installation directory of SonargraphBuild. If unspecified the plugin will automatically download SonargraphBuild. The version to be downloaded can be controlled by the parameter 'sonargraphBuildVersion'.   | No default                                |
| activationCode         | No        | Sonargraph license activation code. If this parameter is not specified, you must specify a license file parameter (see below).  | No default                                |
| licenseServerPort      | No        | Port of license server to be used. This parameter is ignored if licenseServerHost is not set.   | 8080                                      |
| licenseServerHost      | No        | Host name or IP address of license server. If this parameter is not specified, the web-based hello2morrow license server will be used for activation code based licenses.   | No default                                |
| licenseFile            | No        | Sonargraph license file location. If this parameter is not specified, you must specify the activation code parameter (see above).   | No default                                |
| languages              | No        | The languages that should be initialized, separated by ", ". The fewer languages are specified the faster the startup of SonargraphBuild. Possible values: Java, CSharp, CPlusPlus.   | Java                                      |
| logFile                | No        | Path of the log file to be used for SonargraphBuild.  | \${project.buildDir}/sonargraph_build.log |
| logLevel               | No        | Level of logging detail. One of: off, error, warn, info, debug, trace, all  | info                                      |
| systemBaseDirectory    | No        | The directory where the Sonargraph System (\${artifactId}.sonargraph) is created.   | \${project.buildDir}                      |
| systemId               | No        | A system id should stay constant over the lifetime of a software system and should be also unique with respect to other systems. If you anticipate that the the group id or artifact id of the root pom might change you should assign a value to this parameter. | \${project.group}_<br>\${project.name}    |
| useGroupIdInModuleName | No        | If true the module names will use group id and artifact id as their name, separated by an underscore. By default only the artifact id is used as the module name.   | false                                     |
| includeTestCode        | No        | If true the workspace will also contain the test source and test class file directories.  | false                                     |
| productionSourceSets   | No        | Comma separated list of source set names that contain production code. This parameter is only needed when you are not using the gradle default "main".  | main                                      |
| testSourceSets         | No        | Comma separated list of source set names that contain test code. This parameter is only needed when you are not using the gradle default "test".  | test                                      |
| virtualModel           | No        | The virtual model to be used when checking for issues. This parameter overrides the default virtual model that is set when the system is opened. The default virtual model is "Modifiable.vm", if virtual   | No default                                |

| Attribute                             | Mandatory | Description  | Default                         |
|---------------------------------------|-----------|--|---------------------------------|
|                                       |           | models are licensed, "Parser" if not licensed.<br><b>Parameter can only be used with Sonargraph Architect license.</b>   |                                 |
| qualityModelFile                      | No        | The path to the quality model file (xyz.sgqm) that should be applied for the report creation. Built-in quality models are the language-independent "Sonargraph:Default.sgqm" and language-specific "Sonargraph:Java.sgqm", "Sonargraph:CSharp.sgqm" and "Sonargraph:CPlusPlus.sgqm". <b>NOTE: All scripts, analyzer configurations and architecture files present in the system are ignored!</b> | No default                      |
| snapshotDirectory                     | No        | Target directory for the created snapshot. Only if either this parameter or snapshotFileName is provided, a snapshot will be generated. Parameter can only be used with Sonargraph Architect license.  | \${project.buildDir}            |
| snapshotFileName                      | No        | The target file name (without extension). Only if either this parameter or snapshotDirectory is provided, a snapshot will be generated. Parameter can only be used with Sonargraph Architect license.  | <system-name>_<timestamp>       |
| reportDirectory                       | No        | Target directory for the created report  | \${project.buildDir}/sonargraph |
| reportFileName                        | No        | The target file name (without extension)   | <system-name>_<timestamp>       |
| reportType                            | No        | "standard" only creates metric information of system and module level. "full" creates metric information of all levels.  | standard                        |
| reportFormat                          | No        | "xml", "html" or "xml, html"   | html                            |
| elementCountToSplit<br>HtmlReport     | No        | Issue and resolution tables might contain too many items making it impossible to open the HTML report in a browser. This parameter controls the lower limit of items that will cause separate files being generated per issue type. Possible values are: -1 (never split), 0 (use default value), 1 (always split), positive number > 1 (threshold for split)                                    | 1000                            |
| maxElementCountFor<br>HtmlDetailsPage | No        | If HTML report is split because of too many issues and/or resolutions, detail tables might contain too many items making it impossible to open the page in a browser. This parameter controls the upper limit of elements shown in the table. Possible values are: -1 (no limit), 0 (use default limit), positive number > 1 (maximum number of elements contained in page)                      | 2000                            |
| splitByModule                         | No        | If set to 'true', individual HTML reports are created per module.  | false                           |
| prepareForSonarQube                   | No        | Creates an XML report and stores it at \${basedir}/\${target}/sonargraph/sonargraph-sonarqube-report.xml, where the SonarQube Sonargraph plugin expects it.  | false                           |

**Table 7.2. Configuration for Task/Extension "sonargraphDynamicReport"**

**Related topics:**

- Section 7.1, “Gradle Tips and Best Practices”
- Section 7.4, “Gradle FailSet Configuration”
- Section 7.5, “Example Gradle Build File”

## 7.4. Gradle FailSet Configuration

The following elements allow to mark a build as failed. An example is shown in the next section Section 7.5, “Example Gradle Build File”.

**TIP**

The issue type that must be specified for include/exclude definitions can be determined via the Properties View of *Sonargraph*.

**TIP**

If you want the build to fail only for newly introduced issues, apply resolutions like "Ignore" or "Fix" to the already know issues in *Sonargraph* and only filter for resolution value "none".

**TIP**

If you want the build to fail because of certain metric values (e.g. Lines of Code per Source File), define a threshold for that metric in *Sonargraph* to create issues if files grow too large.

**TIP**

The include/exclude definitions are applied in the following sequence, regardless of their definition order:

1. First all include definitions are matched against the set of existing issues.
2. Then the exclude definitions are applied and the set of previously matched issues is reduced accordingly.

| Element         | Parameter            | Mandatory | Description  | Default    |
|-----------------|----------------------|-----------|--|------------|
| failSet         | failOnEmptyWorkspace | No        | Marks the build as failed if modules and root directories are detected but no components are found. Possible values are "true" or "false". | true       |
| include/exclude | issueType            | Yes       | Name of the issue type or "any" for wildcard matching.   | No default |
| include/exclude | severity             | No        | Severity of the issue. Possible values are: error, warning, info, none, any  | any        |
| include/exclude | resolution           | No        | The issue's resolution type. Possible values are: task, ignore, any, none  | none       |

**Table 7.3. Configuration Parameters for Build Failure**

## 7.5. Example Gradle Build File

The following example shows how to integrate the SonargraphBuild Gradle plugin into your project. For multi-project builds it is sufficient to only add the plugin to the root project. It runs as an aggregator after all modules have been compiled. The example project in the installation contains a complete build.gradle file. Typically you would run the plugin with a command-line like the following to ensure that everything is compiled from scratch before the report is created:

```
gradlew clean build sonargraphReport
```

The following shows the relevant section of a build.gradle file that demonstrates the configuration of the Sonargraph functionality:

```
apply plugin: 'com.hello2morrow.sonargraph'

task wrapper(type: Wrapper)
{
    gradleVersion = '2.11'
}

buildscript
{
    repositories
    {
        mavenLocal()
        mavenCentral()
        maven
        {
            url 'http://maven.hello2morrow.com/repository'
        }
        maven
        {
            url 'http://maven.hello2morrow.com/snapshots'
        }
    }

    dependencies
    {
        classpath('com.hello2morrow:sonargraph-gradle-plugin:9.1.1')
    }
}

sonargraphReport
{
    // This is a activation code for Sonargraph-Explorer Build which you can use for testing.
    // Replace with your own if you have one.
    activationCode = "36E2-0F3E-643F-B4F2"
    failSet
    {
        failOnEmptyWorkspace = true
        include(issueType: "any", severity: "error", resolution: "none")
        include(issueType: "ArchitectureViolation")
        include(issueType: "any", severity: "warning")
        exclude(issueType: "ScriptCompilationError", resolution: "none")
        exclude(issueType: "ThresholdViolation")
    }
}

sonargraphDynamicReport
{
    activationCode = "36E2-0F3E-643F-B4F2"
    qualityModelFile = "Sonargraph:Java.sggm" //default Java quality model
    failSet
    {
        failOnEmptyWorkspace = true
        include(issueType: "any", severity: "error", resolution: "none")
        include(issueType: "ArchitectureViolation")
        include(issueType: "any", severity: "warning")
        exclude(issueType: "ScriptCompilationError", resolution: "none")
        exclude(issueType: "ThresholdViolation")
    }
}
```

In this example the build will fail if the project contains a package cycle or an architecture violation without a resolution. Since the parameter 'installationDirectory' is not defined, the Gradle plugin will automatically download the newest release of *SonargraphBuild* and also will keep it updated automatically. Of course this requires that the build server has access to the Internet.

---

# Chapter 8. Integration with SonarQube

For Java projects the findings of Sonargraph can be stored and visualized in *SonarQube* using the *SonarQube Sonargraph Integration Plugin*. The plugin is available via the SonarQube update center and on the plugin's GitHub page at <https://github.com/sonargraph/sonar-sonargraph-integration/releases>. The plugin is compatible with SonarQube versions 5.3 and higher.

## NOTE

The plugin reads the information of the XML report that has been generated using *SonargraphBuild*. You need to configure your build pipeline accordingly.

## NOTE

The plugin is currently only available for Java systems.

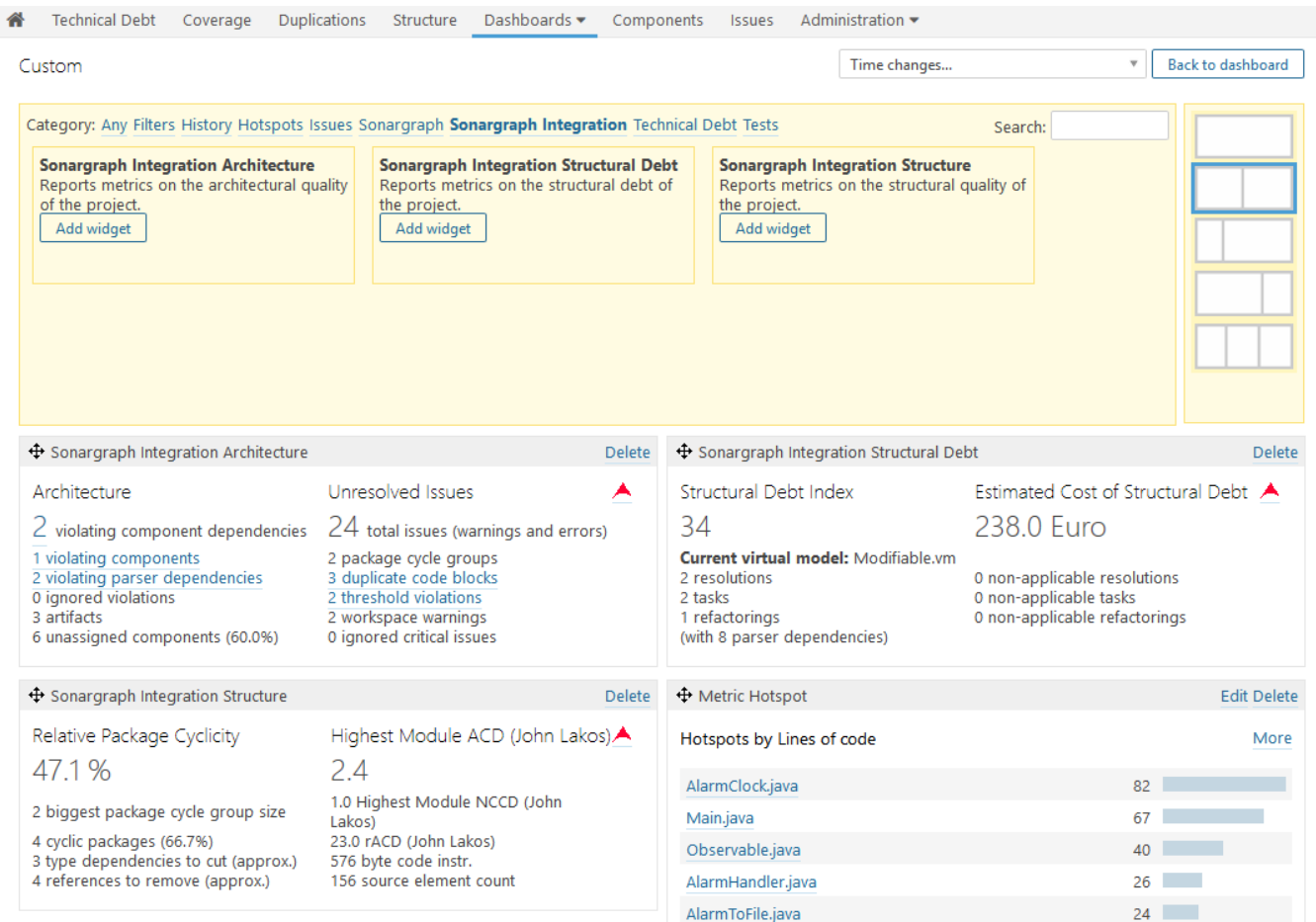
## 8.1. SonarQube Configuration

The first step is to activate Sonargraph rules in the quality profile of the project. If no Sonargraph rules are activated, the plugin will skip this project. You can either search for rules using the term "Sonargraph Integration", or the tag "sonargraph-integration".

The next step is to configure a dashboard to include the Sonargraph widgets.

## NOTE

The Sonargraph widgets are no longer available for SonarQube versions 6.1 and newer, since SonarQube project dashboards have been dropped.



**Figure 8.1. SonarQube Dashboard Configuration**

Core metrics and rules of Sonargraph are pre-defined in the plugin. If you want to track custom metrics that are generated via scripts, you first need to export the report meta-data via the standalone application's menu "File" → "Export Meta-Data...". The directory of this meta-data file needs to be specified in the plugin's configuration page. The additional metrics will be available after a restart of the SonarQube server and an additional execution of the SonarQube checks.

## NOTE

This configuration is affecting all projects that use the Sonargraph plugin. If you have several projects with different metrics, store the separate meta-data files in the same directory. The plugin will merge the info of the different configuration files.

## Related topics:

- See the section about "Workspace Profiles" in the user manual of the standalone application, if the root directories on your build server do not match the workspace definition.
- Chapter 6, *Integration with Maven*
- Chapter 7, *Integration with Gradle*
- Chapter 5, *Integrating with Ant*

## 8.2. SonarQube Maven Configuration

If you use the SonarQube Maven plugin, you must set the following parameter in the configuration of the SonargraphBuild Maven plugin in your project's pom.xml:



```
<configuration>
  <prepareForSonarQube>true</prepareForSonarQube>
  ...
</configuration>
```

The SonargraphBuild Maven plugin will automatically create an XML report (if not already configured) and will copy the report to `${target}/sonargraph/sonargraph-sonarqube-report.xml` for the root project and all modules (excluding those with packaging "pom").

The example project contains an example pom.xml and also a batch file that demonstrates how the check can be called from the command-line.

### Related topics:

- Chapter 6, *Integration with Maven*
- Section 6.5, “Example POM”

### NOTE

For very large systems with a high number of modules, do not use the `prepareForSonarQube` flag. This causes the generated report to be copied into each project's target folder.

Instead, use the parameters to specify the report format ("xml"), the report's target directory and file name and use the parameter `"sonar.sonargraph_integration.report.path"` as explained in Section 8.4, “SonarQube Ant Runner Configuration”. This causes the same report instance to be re-used for every module being analyzed by SonarQube.

An example command-line with the aforementioned parameters (added line-breaks for readability):

```
mvn clean package
  sonargraph:create-report -Dsonargraph.reportFormat=xml
    -Dsonargraph.reportDirectory=D:/temp/report -Dsonargraph.reportFileName=MyReport
  sonar:sonar -Dsonar.sonargraph_integration.report.path=D:/temp/report/MyReport.xml
```

## 8.3. SonarQube Gradle Configuration

If you use the SonarQube Gradle plugin, you must set the following parameter in the configuration of the SonargraphBuild tasks in your project's build.gradle:

```
sonargraphReport
{
  activationCode = "36E2-0F3E-643F-B4F2"
  prepareForSonarQube = "true"
}
```

The SonargraphBuild Gradle plugin will automatically create an XML report (if not already configured) and will copy the report to `${target}/sonargraph/sonargraph-sonarqube-report.xml` for the root project and all modules.

### Related topics:

- Chapter 7, *Integration with Gradle*
- Section 6.5, “Example POM”

## 8.4. SonarQube Ant Runner Configuration

If you use the SonarQube Ant Runner the Sonargraph XML report must have been created and this report must be configured for the Sonargraph SonarQube plugin using the following parameter:

```
<property name="sonar.sonargraph_integration.report.path" value="${path.target.report}" />
```

The example project contains this configuration in the Ant build file.

## **Related topics:**

- Chapter 5, *Integrating with Ant*

---

# Chapter 9. Integration with Jenkins

With *Jenkins Sonargraph Integration Plugin* for *Jenkins* jobs the findings of *Sonargraph* can be used to let builds fail, or mark them unstable. Additionally *Sonargraph* metric values are stored for every build and can be visualized as charts.

## 9.1. Jenkins Server Configuration

The first step is to configure one or more versions of Sonargraph Build in "Manage Jenkins" → "Configure System". Click "Sonargraph Build installations..."



Figure 9.1. Jenkins - Sonargraph Build Configuration

and select a name, a version and an installer.

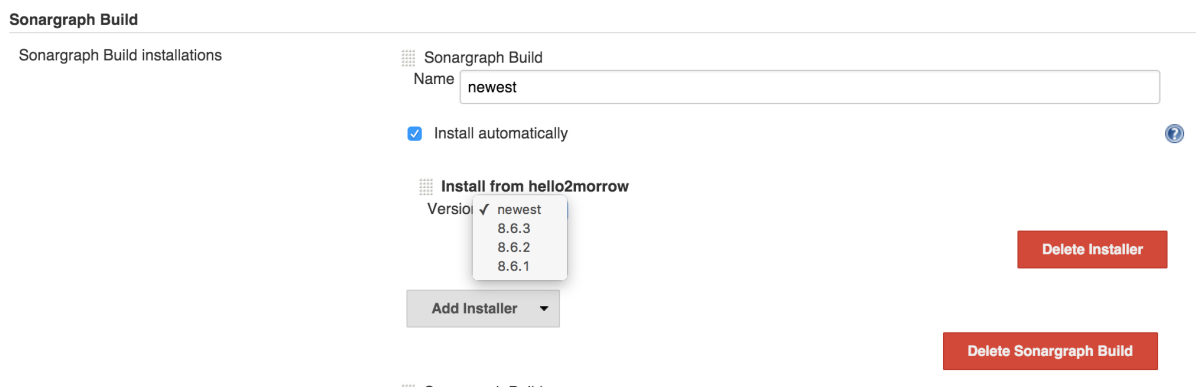


Figure 9.2. Jenkins - New Sonargraph Build

## 9.2. Jenkins Job Configuration

Add post build action "Sonargraph Integration Report Generation & Analysis" to your job.



Figure 9.3. Job - Post Build Action

First decide if *Sonargraph Build* is used to create the report,

☒ Generate with Sonargraph Build

Sonargraph System File:

Sonargraph License File:

Sonargraph Activation Code (requires Internet access):

Advanced...

**Figure 9.4. Report - Generate With Sonargraph Build**

or there already exists a report generated by an upstream build action.

☒ Pre-Generated

Sonargraph XML Report:

**Figure 9.5. Report - Pre Generated**

When *Sonargraph Build* is used to create the report fill out all required information:

☒ Generate with Sonargraph Build

Sonargraph System Directory:

Sonargraph License File:

Sonargraph Activation Code (requires Internet access):

Advanced...

**Figure 9.6. Report - Standard Options**

By pressing "Advanced..." some more options pop up:

Workspace Profile:

Quality Model:

Virtual Model:

Snapshot Directory:

Snapshot File Name:

Sonargraph Build Version:

JDK:

Java: ☐

C#: ☐

C++: ☐

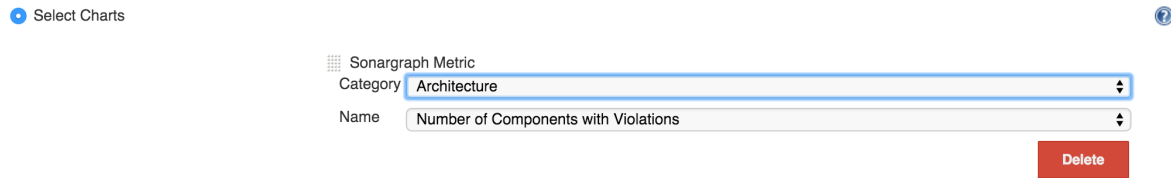
**Figure 9.7. Report - Advanced Options**

## 9.3. Charts Configuration

To see some charts, a meta-data file must be configured, and either all contained charts/metrics are shown, or a list of charts/metrics to be shown can be given. If you want to track custom metrics that are generated via scripts, you first need to export the report meta-data via the standalone application's menu "File" → "Export Meta-Data..."



The screenshot shows the 'Chart Configuration' section of the Jenkins job configuration. It includes a 'Meta Data File' text field containing 'spring-petclinic/MetaData.xml'. Below it, a radio button labeled 'All charts taken from Meta Data File' is selected. A help icon is visible on the right.

**Figure 9.8. Job - Chart Configuration**

The screenshot shows the 'Select Charts' section. It features a 'Sonargraph Metric' category dropdown set to 'Architecture' and a 'Name' dropdown set to 'Number of Components with Violations'. A red 'Delete' button is located at the bottom right. A help icon is visible on the right.

**Figure 9.9. Job - Select Charts**

## 9.4. Build Configuration

Finally the reasons for marking the build as failed or unstable can be set:



The screenshot shows the 'Mark Build' section with a table of conditions and their corresponding build status. All conditions are currently set to 'Build unstable'.

| Mark Build                                      |                |
|---|----------------|
| If architecture violations exist, mark build as | Build unstable |
| If unassigned types exist, mark build as        | Build unstable |
| If cyclic elements exist, mark build as         | Build unstable |
| If threshold violations exist, mark build as    | Build unstable |
| If architecture warnings exist, mark build as   | Build unstable |
| If workspace warnings exist, mark build as      | Build unstable |
| If work items exist, mark build as              | Build unstable |
| If the workspace is empty, mark build as        | Build unstable |

**Figure 9.10. Mark build failed or instable**

Related topics:

- See the section about "Workspace Profiles" in the user manual of the standalone application, if the root directories on your build server do not match the workspace definition.
- Chapter 6, *Integration with Maven*

---

# Chapter 10. Trademark Attributions, Library License Texts, and Source Code

Eclipse is a trademark of Eclipse Foundation, Inc.

IntelliJ is a trademark of JetBrains s.r.o.

Java and all Java-based trademarks are trademarks of Oracle Corporation in the United States and other countries.

Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries.

Microsoft, and Windows are trademarks of Microsoft Corporation in the United States and other countries.

Other company, product, and service names may be trademarks or service marks of others.

---

# Chapter 11. Legal Notice

All rights reserved. Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- Neither the name of hello2morrow GmbH nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

---

# Appendix A. SonargraphBuild API Documentation

SonargraphBuild API is documented via JavaDoc that is available within the installation of the product.

[Link to JavaDoc of SonargraphBuild API.](#)



---

# Index

## A

Activation Code, 2, 2  
Ant Integration, 10

## B

Build Server Integration  
    Jenkins, 32  
    SonarQube, 28

## C

Command-line Interface, 5  
Configuration  
    Build Failure, 7  
    Report Creation, 5

## G

Gradle  
    FailSet Configuration, 26  
    sonargraphDynamicReport, 23  
Gradle Configuration  
    sonargraphReport, 20  
    Tips, 20  
Gradle Integration, 20

## I

Installation Requirements, 4

## J

Jenkins Integration, 32  
    Build Configuration, 34  
    Charts Configuration, 33  
    Job Configuration, 32  
    Server Configuration, 32

## L

License, 2  
License Server Settings, 3

## M

Maven  
    dynamic-report, 14  
    FailSet Configuration, 17  
Maven Configuration  
    create-report, 12  
    Tips, 11  
Maven Integration, 11

## P

Prerequisites, 4  
Proxy Settings, 3

## S

SonargraphBuild API, 37

SonarQube Integration, 28  
  Ant Runner Configuration, 30  
  Configuration, 28  
  Gradle Configuration, 30  
  Maven Configuration, 29