Fortify Security Report

Jan 29, 2020

pgupta25

Executive Summary

Issues Overview

On Jan 29, 2020, a source code review was performed over the adminui code base. 902 files, 46,879 LOC (Executable) were scanned and reviewed for defects that could lead to potential security vulnerabilities. A total of 24 reviewed findings were uncovered during the analysis.

Issues by Fortify Priority Order	
High	24

Recommendations and Conclusions

The Issues Category section provides Fortify recommendations for addressing issues at a generic level. The recommendations for specific fixes can be extrapolated from those generic recommendations by the development group.

Project Summary

Code Base Summary

Code location:

Number of Files: 902

Lines of Code: 46879

Build Label: <No Build Label>

Scan Information

Scan time: 01:15:52

SCA Engine version: 19.1.0.2241

Machine Name: vclv99-89.hpc.ncsu.edu

Username running scan: pgupta25

Results Certification

Results Certification Valid

Details:

Results Signature:

SCA Analysis Results has Valid signature

Rules Signature:

There were no custom rules used in this scan

Attack Surface

Attack Surface:

Command Line Arguments:

null.null.null
null.Runner.display_klasses
null.Runner.display_tasks
null.Runner.help
null.Runner.initialize_thorfiles
null.Runner.install
null.Runner.list
null.Runner.method_missing
null.Runner.save_yaml
null.Runner.self.banner
null.Runner.thorfiles
null.Runner.thorfiles_relevant_to
null.Runner.uninstall
null.Runner.update
null.Thor.help
null.Thor.self.banner
null.Thor.self.check_unknown_options!
null.Thor.self.check_unknown_options?
null.Thor.self.create_task

null.Thor.self.default_task
null.Thor.self.desc
null.Thor.self.dispatch
null.Thor.self.find_subcommand
null.Thor.self.find_subcommand_and_update_argv
null.Thor.self.find_subcommand_possibilities
null.Thor.self.help
null.Thor.self.long_desc
null.Thor.self.map
null.Thor.self.method_option
null.Thor.self.method_options
null.Thor.self.normalize_task_name
null.Thor.self.printable_tasks
null.Thor.self.register
null.Thor.self.retrieve_task_name
null.Thor.self.subcommand
null.Thor.self.subcommand_help
null.Thor.self.task_help

Private Information:
null.null.null

System Information:
null.null.null

Filter Set Summary

Current Enabled Filter Set:
Quick View

Filter Set Details:

Folder Filters:
If [fortify priority order] contains critical Then set folder to Critical
If [fortify priority order] contains high Then set folder to High
If [fortify priority order] contains medium Then set folder to Medium
If [fortify priority order] contains low Then set folder to Low
Visibility Filters:
If impact is not in range [2.5, 5.0] Then hide issue
If likelihood is not in range (1.0, 5.0] Then hide issue

Audit Guide Summary

Audit guide not enabled

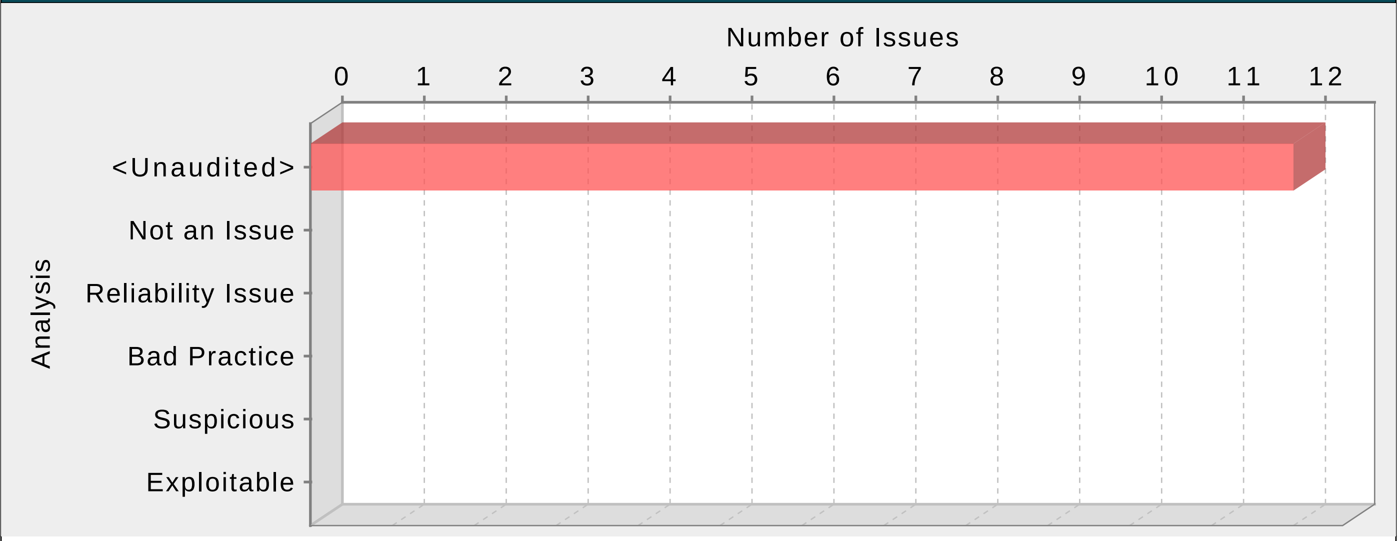
Results Outline

Overall number of results

The scan found 24 issues.

Vulnerability Examples by Category

Category: Password Management: Password in Configuration File (12 Issues)



Abstract:

Storing a plain text password in a configuration file may result in a system compromise.

Explanation:

Storing a plain text password in a configuration file allows anyone who can read the file access to the password-protected resource. Developers sometimes believe that they cannot defend the application from someone who has access to the configuration, but this attitude makes an attacker's job easier. Good password management guidelines require that a password never be stored in plain text.

Recommendations:

A password should never be stored in plain text. An administrator should be required to enter the password when the system starts. If that approach is impractical, a less secure but often adequate solution is to obfuscate the password and scatter the de-obfuscation material around the system so that an attacker has to obtain and correctly combine multiple system resources to decipher the password.

Some third-party products claim the ability to manage passwords in a more secure way. For example, WebSphere Application Server 4.x uses a simple XOR encryption algorithm for obfuscating values, but be skeptical about such facilities. WebSphere and other application servers offer outdated and relatively weak encryption mechanisms that are insufficient for security-sensitive environments. For a secure solution the only viable option is a proprietary one.

Tips:

1. Fortify Static Code Analyzer searches configuration files for common names used for password properties. Audit these issues by verifying that the flagged entry is used as a password and that the password entry contains plain text.

2. If the entry in the configuration file is a default password, require that it be changed in addition to requiring that it be obfuscated in the configuration file.

messages.properties, line 75 (Password Management: Password in Configuration File)

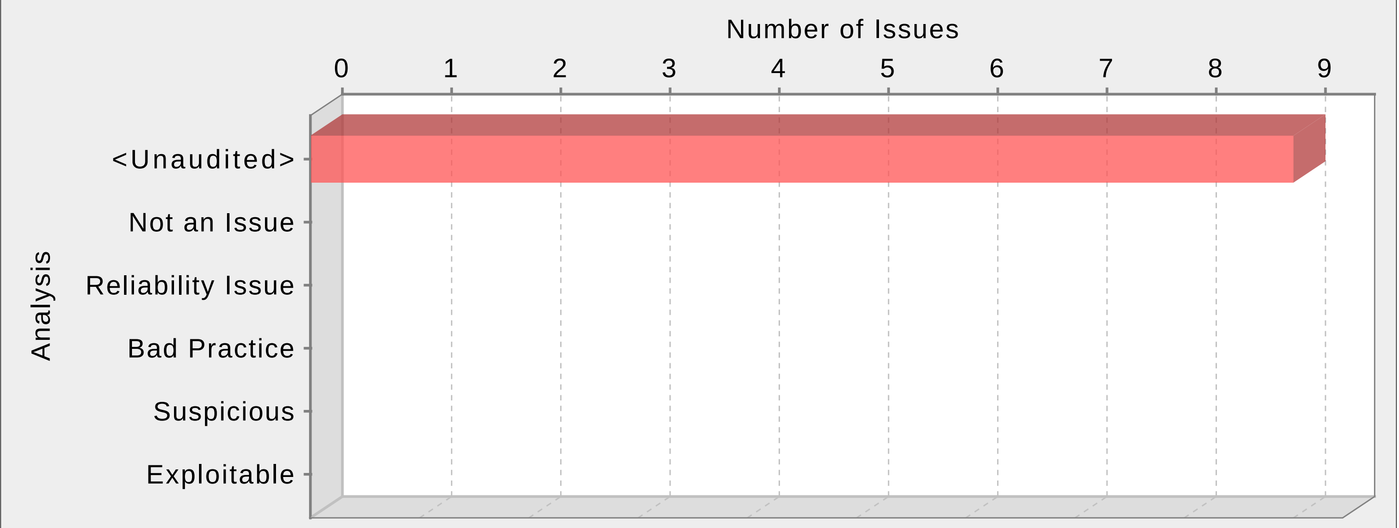
Fortify Priority:	High	**Folder**	High
Kingdom:	Environment		

Abstract: Storing a plain text password in a configuration file may result in a system compromise.

Sink: messages.properties:75 adminui.myAccount.password.label()

```
73    adminui.myAccount=My Account
74    adminui.myAccount.myLanguages.title=My Languages
75    adminui.myAccount.password.label=Password
76    adminui.myAccount.changeSecretQuestion.label=Secret Question
77    adminui.myAccount.defaults.label=User Defaults
```

Category: Dynamic Code Evaluation: Code Injection (9 Issues)



Abstract:

The file actions.rb interprets unvalidated user input as source code on line 217. Interpreting user-controlled instructions at run-time can allow attackers to execute malicious code.

Explanation:

Many modern programming languages allow dynamic interpretation of source instructions. This capability allows programmers to perform dynamic instructions based on input received from the user. Code injection vulnerabilities occur when the programmer incorrectly assumes that instructions supplied directly from the user will perform only innocent operations, such as performing simple calculations on active user objects or otherwise modifying the user's state. However, without proper validation, a user might specify operations the programmer does not intend.

Example: In this code injection example, the application implements a basic calculator that allows the user to specify commands for execution.

```
...
user_ops = req['operation']
result = eval(user_ops)
...
```

The program behaves correctly when the operation parameter is a benign value, such as "8 + 7 * 2", in which case the result variable is assigned a value of 22. However, if an attacker specifies languages operations that are both valid and malicious, those operations would be executed with the full privilege of the parent process. Such attacks are even more dangerous when the underlying language provides access to system resources or allows execution of system commands. With Ruby this is allowed, and as multiple commands can be ran by delimiting the lines with a semi-colon (;), it would also enable being able to run many commands with a simple injection, whilst still not breaking the program.

If an attacker were to submit for the parameter operation "system(\"nc -l 4444 &\");8+7*2", then this would open port 4444 to listen for a connection on the machine, and then would still return the value of 22 to result

Recommendations:

Avoid interpreting dynamic code whenever possible. If your program must interpret code dynamically, you can minimize the likelihood of a successful attack by constraining the code that your program will execute dynamically as much as possible, limiting it to a program- and context-specific subset of the base programming language. Unvalidated user input should never be directly interpreted and executed by the program. Instead, use a level of indirection: create a list of legitimate operations and data objects that users are allowed to specify, and only allow users to select from the list. With this approach, input provided by users is never executed directly.

actions.rb, line 217 (Dynamic Code Evaluation: Code Injection)

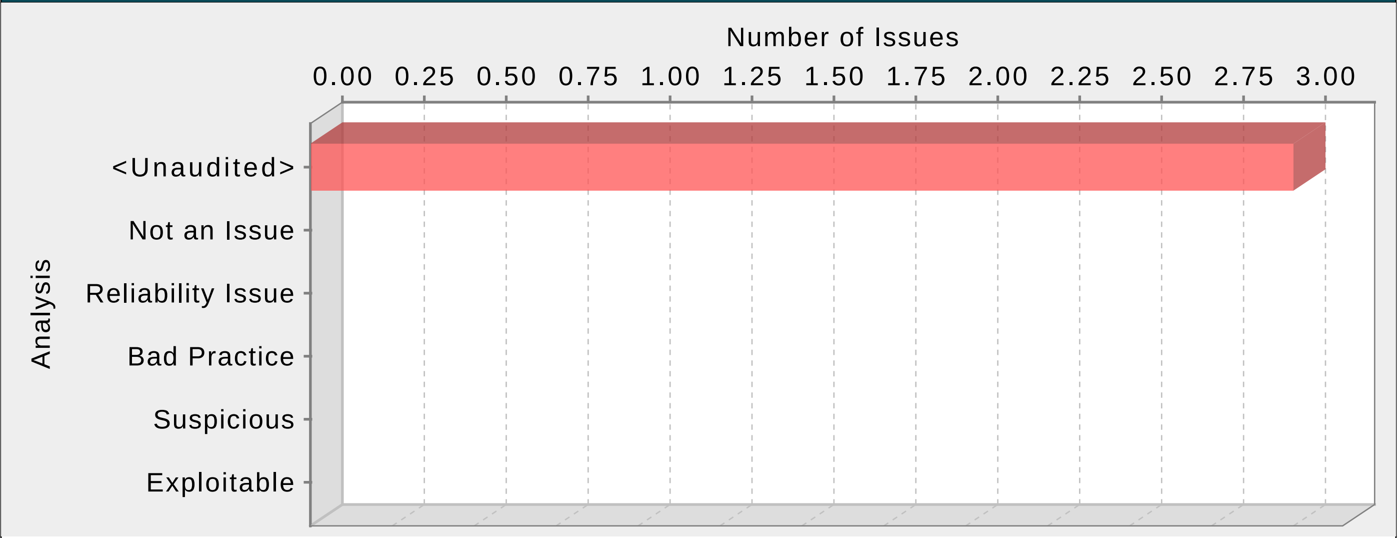
Fortify Priority:	High	**Folder**	High
Kingdom:	Input Validation and Representation		

Abstract: The file actions.rb interprets unvalidated user input as source code on line 217. Interpreting user-controlled instructions at run-time can allow attackers to execute malicious code.

Sink: actions.rb:217 FunctionCall: instance_eval()

```
215          end
216
217          instance_eval(contents, path)
218          shell.padding -= 1 if verbose
219        end
```

Category: Password Management: Hardcoded Password (3 Issues)



Abstract:

Hardcoded passwords may compromise system security in a way that cannot be easily remedied.

Explanation:

It is never a good idea to hardcode a password. Not only does hardcoding a password allow all of the project's developers to view the password, it also makes fixing the problem extremely difficult. After the code is in production, the password cannot be changed without patching the software. If the account protected by the password is compromised, the owners of the system must choose between security and availability.

Example: The following code uses a hardcoded password to connect to an application and retrieve address book entries:

```
...
obj = new XMLHttpRequest();
obj.open('GET','/fetchusers.jsp?id='+form.id.value,'true','scott','tiger');
...
```

This code will run successfully, but anyone who accesses the containing web page will be able to view the password.

Recommendations:

Passwords should never be hardcoded and should generally be obfuscated and managed in an external source. Storing passwords in plain text anywhere on the web site allows anyone with sufficient permissions to read and potentially misuse the password. For JavaScript calls that require passwords, it is better to prompt the user for the password at connection time.

Tips:

1. Avoid hardcoding passwords in source code and avoid using default passwords. If a hardcoded password is the default, require that it be changed and remove it from the source code.

2. To identify null, empty, or hardcoded passwords, default rules only consider fields and variables that contain the word password. However, the Fortify Custom Rules Editor provides the Password Management wizard that makes it easy to create rules for detecting password management issues on custom-named fields and variables.

userDetails.js, line 139 (Password Management: Hardcoded Password)

Fortify Priority:	High	**Folder**	High
Kingdom:	Security Features		

Abstract: Hardcoded passwords may compromise system security in a way that cannot be easily remedied.

Sink: userDetails.js:139 FieldAccess: forcePassword()

```
137                                     var uProperties = {};
138                                     if(modelUser.userProperties.forcePassword){
139                                         uProperties.forcePassword =******
140                                     }
141                                     angular.forEach(modelUser.userProperties, function(value, key) {
```

Issue Count by Category

Issues by Category	
Password Management: Password in Configuration File	12
Dynamic Code Evaluation: Code Injection	9
Password Management: Hardcoded Password	3

Issue Breakdown by Analysis

Issues by Analysis