

INSTITUTO SUPERIOR TÉCNICO - ALAMEDA

SOFTWARE SECURITY PROJECT REPORT

Static Code Analysis Tool

Discovering vulnerabilities in PHP Web Applications

Group 10

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Experimental part

Our analysis tool was conceived using the `Python` programming language, version 3.6.3. It consists of a main component, the analyser (`analyser.py`), containing the logic for traversing some elements of an AST, and a pattern module (`pattern.py`) that houses the `Pattern` class, used to instantiate objects that represent vulnerable patterns which can be found in the `patterns` file, another component of the tool.

Components

Analyser

The main analyser component is run by invoking it and passing it a PHP program slice in JSON object format as a command line argument.

```
$ analyser.py /path/to/slice.json
```

Listing 1: Command line to run analyser

The slice being provided must already be in the form of an AST just like the ones produced by Glayzzle’s PHP Parser [1]. Otherwise, the tool will not work as it’s designed to only accept ASTs with that specific format.

Patterns

The `patterns` file contains a set of vulnerable patterns with the following format:

```
Vulnerability
Entry1, Entry2, ..., Entryi
Sanitizer1, Sanitizer2, ..., Sanitizerj
Sink1, Sink2, ..., Sinkk
```

Listing 2: Vulnerable pattern template

where `Vulnerability` is the name of the vulnerability, `Entry` is an entry point, `Sanitizer` is a sanitization/validation function, and `Sink` a sensitive sink. Example:

```
SQL injection (PostgreSQL)
$_GET, $_POST, $_COOKIE, $_REQUEST
pg_escape_string, pg_escape_bytea
pg_query, pg_send_query
```

Listing 3: SQL Injection pattern, specific to PostgreSQL

References

- [1] Glayzzle and Various Contributors. PHP Parser. Available at <https://github.com/glayzzle/php-parser>. NodeJS PHP Parser - extract AST or tokens (PHP5 and PHP7).