CandyVault

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Difficulty: Easy

Classification: Official

Synopsis

MongoDB noSQL authentication bypass.

Skills Required

- HTTP requests interception via proxy tools, e.g., Burp Suite / OWASP ZAP.
- Basic understanding of Flask and Python.
- Basic understanding of MongoDB or noSQL databases.

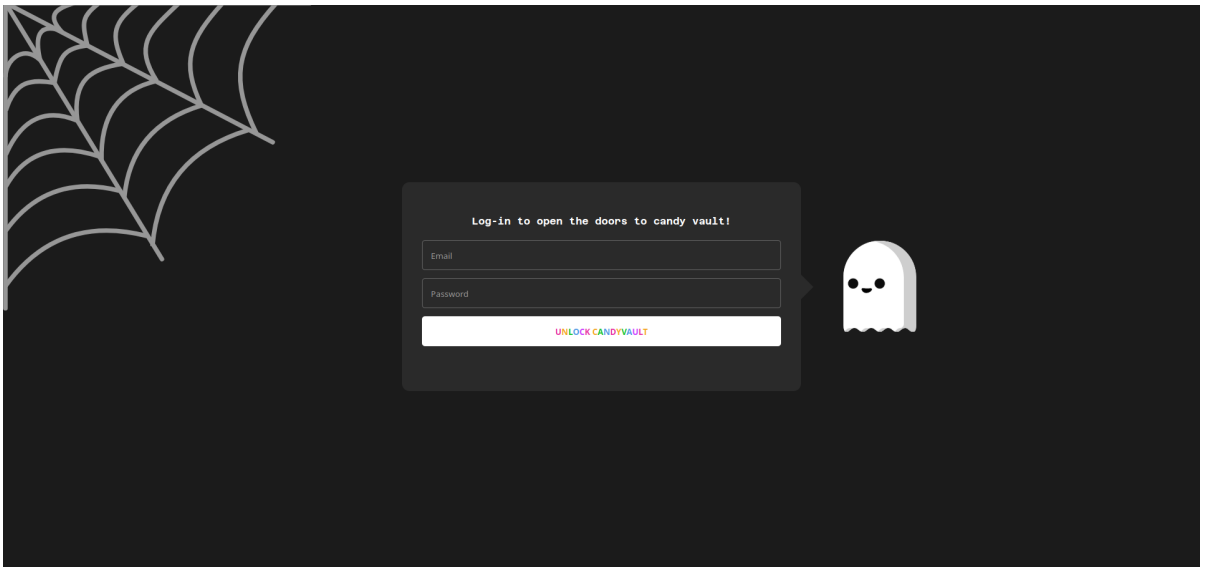
Skills Learned

- Performing authentication bypass on noSQL databases.

Solution

Application Overview

On the homepage we can see a login page to the candy-vault.



By examining the file `./challenge/application/app.py` file we can see that there is a MongoClient instance set-up and some routes registered.

```
from flask import Flask, Blueprint, render_template, redirect, jsonify, request
from flask_bcrypt import Bcrypt
from pymongo import MongoClient

app = Flask(__name__)
app.config.from_object("application.config.Config")
bcrypt = Bcrypt(app)

client = MongoClient(app.config["MONGO_URI"])
db = client[app.config["DB_NAME"]]
users_collection = db["users"]

@app.errorhandler(Exception)
def handle_error(error):
    message = error.description if hasattr(error, "description") else [str(x)
for x in error.args]

    response = {
        "error": {
            "type": error.__class__.__name__,
            "message": message
        }
    }

    return response, error.code if hasattr(error, "code") else 500


@app.route("/", methods=["GET"])
def index():
    return render_template("index.html")


@app.route("/login", methods=["POST"])
def login():
    content_type = request.headers.get("Content-Type")

    if content_type == "application/x-www-form-urlencoded":
```

```
        email = request.form.get("email")
        password = request.form.get("password")

    elif content_type == "application/json":
        data = request.get_json()
        email = data.get("email")
        password = data.get("password")

    else:
        return jsonify({"error": "Unsupported Content-Type"}), 400

    user = users_collection.find_one({"email": email, "password": password})

    if user:
        return render_template("candy.html", flag=open("flag.txt").read())
    else:
        return redirect("/")
```

The `/` route simply renders the login page.

```
@app.route("/", methods=["GET"])
def index():
    return render_template("index.html")
```

The `/login` route is responsible for handling the authentication, if the user is authenticated successfully the page `candy.html` is rendered alongside a variable that contains the **flag** that is read from the `flag.txt` file. Otherwise the user gets redirected to the to `/` which renders the login page once more.

```
@app.route("/login", methods=["POST"])
def login():
    content_type = request.headers.get("Content-Type")

    if content_type == "application/x-www-form-urlencoded":
        email = request.form.get("email")
        password = request.form.get("password")

    elif content_type == "application/json":
        data = request.get_json()
        email = data.get("email")
        password = data.get("password")

    else:
        return jsonify({"error": "Unsupported Content-Type"}), 400

    user = users_collection.find_one({"email": email, "password": password})

    if user:
        return render_template("candy.html", flag=open("flag.txt").read())
    else:
        return redirect("/")
```

If we take a closer look we can see that this endpoint expects the `Content-Type` header to be set in the request.

If it is equal to `application/x-www-form-urlencoded` it reads **email** and **password** inputs as forms and if it is equal to `application/json` it expects them from a json object.

After the content type check, the mongodb `.find_one` method is called on the `users_collection` with **{"email": email, "password": password}** as the parameter. This queries MongoDB for a user that matches the provided email and password.

If a match is found the `candy.html` page that contains the flag is rendered, so this is the logic that must be bypassed.

NoSQL exploitation

Since we can control whether the **email** and **password** are read from a json object, this means that we are not limited to inserting only strings as input.

A typical MongoDB login bypass can be used here with the payload looking like this:

```
{
    "email": {
        "$ne": 0
    },
    "password": {
        "$ne": 0
    }
}
```

A payload like this will force MongoDB to fetch a user where **email** is not equal to **0** and **password** is not equal to **0**, in our case this would be the first user, and since a valid user is returned we get authenticated and retrieve the flag!