Security Advisory
Regular Expression Denial of service (ReDoS) in npm/ssri

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Overview

This document provides technical details of a Regular Expression Denial of Service vulnerability in the ssri npm package from version 5.2.2 until the fix in version 8.0.1.

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Summary

The npm package ssri processes SRIs using a regular expression which is vulnerable to Regular Expression Denial of Service (REDoS). Malicious SRIs could take an extremely long time to process, leading to Denial of Service. This issue only affects consumers using the strict option.

Technical Description

The vulnerable regular expression is:

```javascript
const STRICT_SRI_REGEX = /^([^-]+-([A-Za-z0-9+/=]{44,88})(\?\[\x21-\x7e]*)*)$/
```

https://github.com/npm/ssri/blob/41b764f91eda13867745f8d97c624c316e9c162e/index.js#L12

An attempt had been made to correct quadratic complexity worst-case behavior (assigned CVE-2018-7651) in commit https://github.com/npm/ssri/commit/d0ebcdc. However, the commit actually made the REDoS situation significantly worse, as the regex now backtracks with exponential worst-case complexity.

The section at the end (`(?\[\x21-\x7e]*)*$`) can be abused by sending a long string of question marks (`\x3f`) followed by a character not in `\x21-\x7e`.

The complexity is exponential: each extra question mark doubles the processing time.
If the strict option is set to false (the default), a non-vulnerable regular expression is used instead.

**Proof-of-Concept**

Run the following NodeJS code:

```javascript
require('ssri').parse('sha512-00000000000000000000000000000000000000000000' + '?'.repeat(35) + '\x1f', {strict: true})
```

**Remediation**

The maintainers have released an update (8.0.1) to address this issue:

- [https://github.com/npm/ssri/releases/tag/v8.0.1](https://github.com/npm/ssri/releases/tag/v8.0.1)
- Commit [https://github.com/npm/ssri/commit/76e223317d971](https://github.com/npm/ssri/commit/76e223317d971)

**Disclosure Timeline**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020-12-07</td>
<td>Vulnerability disclosed via email to security@npmjs</td>
</tr>
<tr>
<td>2020-12-18</td>
<td>Reply stating to contact maintainers from npm owner ls ssri</td>
</tr>
<tr>
<td>2020-12-30</td>
<td>Vulnerability disclosed via email to the last active maintainer</td>
</tr>
<tr>
<td>2021-01-19</td>
<td>Vulnerability disclosed via email to three other maintainers</td>
</tr>
<tr>
<td>2021-01-19</td>
<td>Vulnerability patched</td>
</tr>
<tr>
<td>2021-01-27</td>
<td>Patch released as version 8.0.1</td>
</tr>
<tr>
<td>2021-03-11</td>
<td>Doyensec advisory published</td>
</tr>
</tbody>
</table>