



**Sri Lanka Institute of Information Technology**

**IE2062**

**Web Security**

**Bug Bounty Report V**

Submitted by:

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## **Acknowledgement**

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## **Executive Summary**

This report aims to provide an overview of the vulnerability identified in a particular domain. The bug bounty platform called Hackerone was used for this purpose. This report analyses the domain of Ring (<http://ring.com/>).

This report uses different tools to gather information detect vulnerabilities and perform penetration testing. The tool name Netsparker and Owasp Zap was mainly used to identify the vulnerability. Further this report provides the vulnerability title, vulnerability description, Affected Components, Impact Assessment, Steps to reproduce the vulnerability, proof of concept and the proposed mitigation.

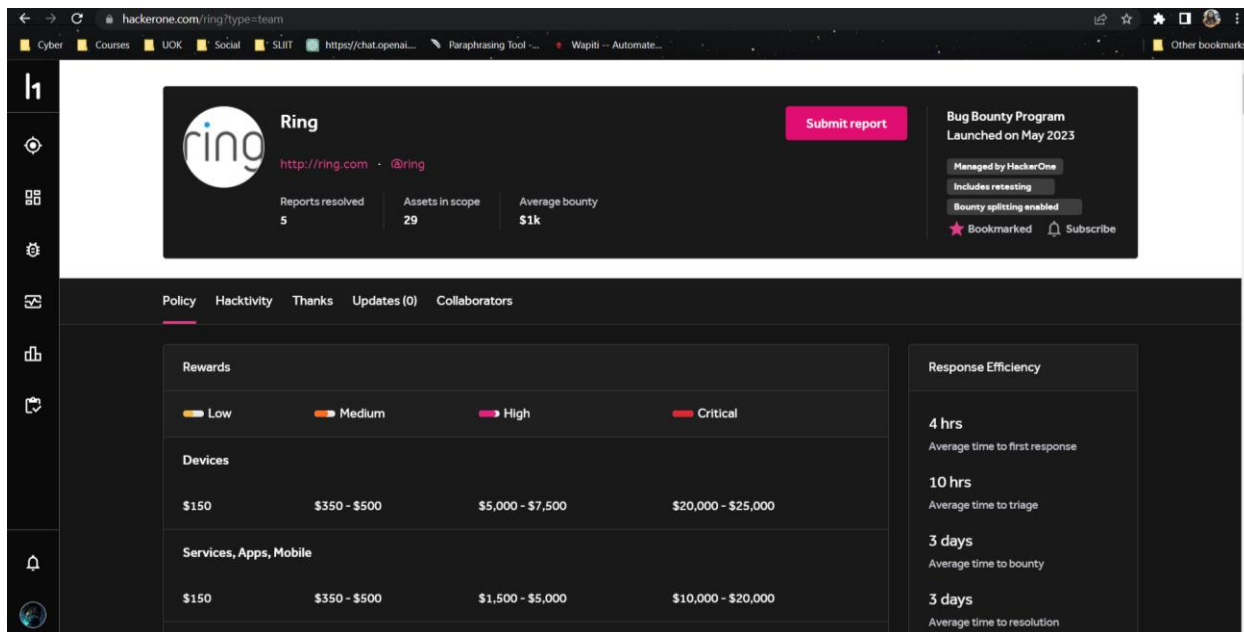
By including these comprehensive details for each vulnerability, the report provides a comprehensive overview of the security weaknesses present within the system and offers actionable insights for remediation and improvement.

## **Contents**

Introduction.....	4
Information gathering .....	4
Vulnerability Title .....	5
Vulnerability Description.....	5
Affected Components .....	6
Impact Assessment.....	7
Proof of Concept .....	8
Proposed mitigation .....	9
External Reference.....	11

# Introduction

Affected URL: <http://ring.com/>



The screenshot shows the Ring Bug Bounty Program page on HackerOne. The page header includes the Ring logo, a 'Submit report' button, and program details: 'Bug Bounty Program Launched on May 2023', 'Managed by HackerOne', 'Includes retesting', 'Bounty splitting enabled', 'Bookmarked', and 'Subscribe'.

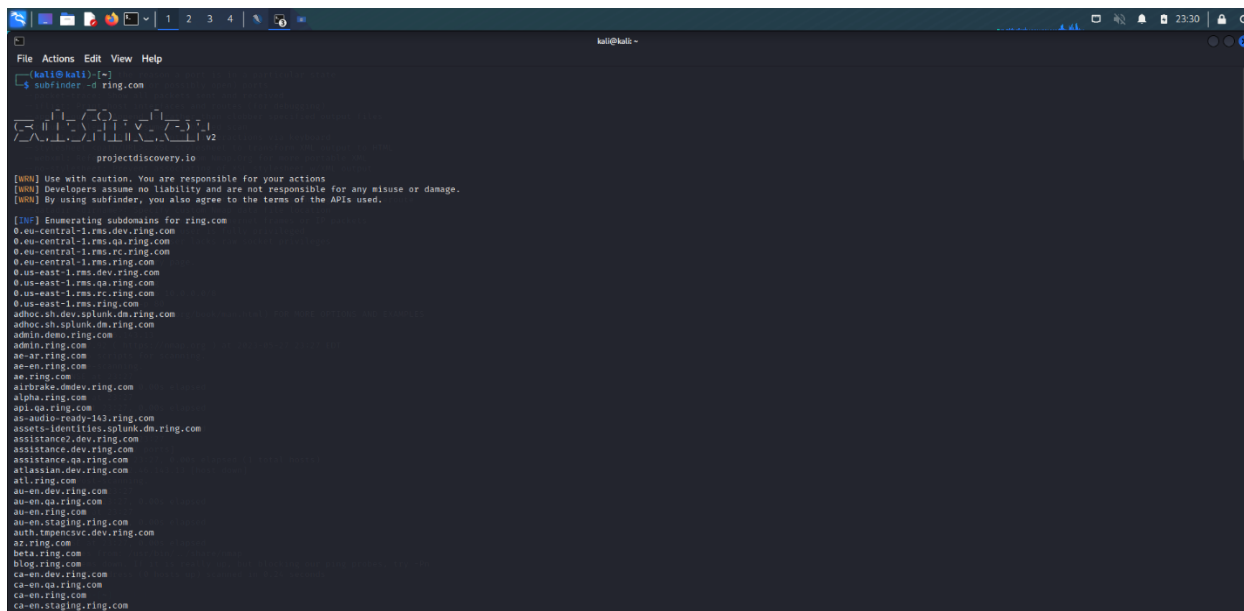
Below the header, there are statistics: Reports resolved (5), Assets in scope (29), and Average bounty (\$1k). Navigation links include Policy, Hacktivity, Thanks, Updates (0), and Collaborators.

The main content area is divided into two sections: Rewards and Response Efficiency.

Rewards			
Low	Medium	High	Critical
<b>Devices</b>			
\$150	\$350 - \$500	\$5,000 - \$7,500	\$20,000 - \$25,000
<b>Services, Apps, Mobile</b>			
\$150	\$350 - \$500	\$1,500 - \$5,000	\$10,000 - \$20,000

Response Efficiency
<b>4 hrs</b> Average time to first response
<b>10 hrs</b> Average time to triage
<b>3 days</b> Average time to bounty
<b>3 days</b> Average time to resolution

# Information gathering



The screenshot shows a terminal window with the command `subfinder -d ring.com` executed. The output lists various subdomains discovered for ring.com, including:

```

[INFO] Enumerating subdomains for ring.com
0.eu-central-1.rms.dev.ring.com
0.eu-central-1.rms.qa.ring.com
0.eu-central-1.rms.rc.ring.com
0.eu-central-1.rms.ring.com
0.us-east-1.rms.dev.ring.com
0.us-east-1.rms.qa.ring.com
0.us-east-1.rms.rc.ring.com
0.us-east-1.rms.ring.com
adhoc.sh.dev.splunk.de.ring.com
adhoc.sh.splunk.de.ring.com
admin-demo.ring.com
admin.ring.com
ae-ar.ring.com
ae-en.ring.com
ae.ring.com
airbrake.dmddev.ring.com
alpha.ring.com
api.qa.ring.com
as-audio-ready-143.ring.com
assets-identities.splunk.de.ring.com
assistance2.dev.ring.com
assistance.dev.ring.com
assistance.qa.ring.com
atlassian.dev.ring.com
atl.ring.com
au-en-dev.ring.com
au-en-qa.ring.com
au-en.ring.com
au-en-staging.ring.com
auth.tmpencsv.dev.ring.com
az.ring.com
beta.ring.com
blog.ring.com
ca-en-dev.ring.com
ca-en-qa.ring.com
ca-en.ring.com
ca-en-staging.ring.com

```

```

[kali@kali:~]$ dig ring.com

; <<> DiG 9.18.4-2-Debian <<> ring.com
;; global options: +cmd
;; Got answer:
;; --HEADER-- opcode: QUERY, status: NOERROR, id: 58553
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags: udp: 4096
;; QUESTION SECTION:
;ring.com.                IN      A

;; ANSWER SECTION:
ring.com.                4      IN      A      52.46.143.13
ring.com.                4      IN      A      52.46.138.93
ring.com.                4      IN      A      52.46.158.238

;; Query time: 19 msec
;; SERVER: 2402:4000::1#53(2402:4000::1) (UDP)
;; WHEN: Sat May 27 23:40:15 EDT 2023
;; MSG SIZE  rcv= 85


[kali@kali:~]$ nslookup ring.com
Server:      2402:4000::2
Address:     2402:4000::2#53

Non-authoritative answer:
Name:   ring.com
Address: 52.46.158.238
Name:   ring.com
Address: 52.46.138.93
Name:   ring.com
Address: 52.46.143.13


[kali@kali:~]$ dmitry ring.com
Deepmagic Information Gathering Tool
"There be some deep magic going on"

HostIP:52.46.158.238
HostName:ring.com

```

## Vulnerability Title

Password Transmitted over a Query String

Severity Level

Risk Level:  
**MEDIUM**

## Vulnerability Description

When a password or other sensitive information is sent as part of the URL in the query string parameters, it is referred to as "password transmitted over a query string." The portion of a URL that follows the question mark ("?") and contains key-value pairs of the format "key=value" is known as the query string.

Because query strings are frequently recorded in multiple places, such as server logs, proxy logs, and browser histories, such as these, transmitting passwords in this way is regarded as a security issue. Additionally, if shared or stored incorrectly, they can be quickly captured by network sniffers or accessed by unwanted parties.

Passwords should not be transmitted over query strings for a number of reasons:

- Passwords included in query strings are frequently logged in a variety of logs created by web servers, apps, or proxies. The possibility of unauthorized people accessing these logs and their potential long-term retention raise the danger of password compromise.
- URL visibility, the address bar, bookmarks, and history of most browsers display URLs that contain query strings. An attacker can readily harvest the credentials from any of these sources and utilize them for their own evil purposes.
- Links that are shared with others becomes hazardous when passwords are present in the query string. Even though the password was intended to remain private, it may be accessible to everyone with access to the URL if someone mistakenly discloses it.
- Transport layer security, since query strings are sent along with the URL, they are encrypted using the same transport layer security (TLS) protocol as the URL as a whole. The query string could, however, be displayed in plain text elsewhere if the URL is copied or bookmarked, which raises the risk of unwanted access.

## **Affected Components**

Password transmission over a query string vulnerability affects the following components:

- Client-side code: The client-side code is in charge of creating the URL with the query string containing the password. This could be browser-based JavaScript code or any other client-side technology that creates URLs.
- Server-side code: The server-side code handles the request after receiving the URL and the query string that contains the password. It could potentially expose information if it records the incoming request, logs the URL, or handles the password improperly.
- Networking Devices: Routers, switches, proxies, and any other networking devices that help with data transfer through networks are all considered to be part of the network infrastructure. The password can be extracted if the network is compromised or accessed by unauthorized individuals, who can then intercept the URL with the query string.
- Logging programs: Passwords contained in URLs with query strings can be recorded by server logs, proxy logs, and other logging programs. The passwords may be made public if these logs are improperly secured, viewed by unauthorized people, or kept for an extended amount of time.

- End-user devices: End-user devices, such as laptops, mobile phones, or tablets, maintain bookmarks and browsing histories that may include URLs with passwords sent over query strings. The passwords can be retrieved if these devices are compromised or accessed by unauthorized people.

## **Impact Assessment**

Password transmission over a query string vulnerability can have a severe negative effect and result in several security concerns and repercussions, including:

- Password exposure: Passwords sent over query strings in plain text are vulnerable to unwanted access. Attackers can quickly extract the password from the query string and use it to obtain unauthorized access to user accounts, sensitive data, or other systems if they manage to intercept or acquire access to the query string.
- Account breach: If an attacker gains access to a user's password, they may be able to compromise the account that goes with it. Unauthorized access to private information, financial information, secret documents, or other delicate resources may result from this.
- Data Breaches: Passwords transmitted over query strings that are intercepted by attackers may result in data breaches. Attackers may use the stolen credentials to access larger networks, databases, or systems, exposing or stealing private information belonging to people or businesses.
- Credential reuse: If users use the same password for several accounts, the compromise of just one password sent over a query string can have far-reaching consequences. Attackers may try to access additional accounts using the stolen password, which could result in unlawful access to a number of online services or systems.

## Proof of Concept

# 2. [Possible] Password Transmitted over Query String

MEDIUM 1

### Request

```
GET /users/sign_up HTTP/1.1
Host: ring.com
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8
Accept-Encoding: gzip, deflate
Accept-Language: en-us,en;q=0.5
Cache-Control: no-cache
Cookie: rsas=9d6a8ea6-72b3-4ab4-81a1-514e0c119556; rs_hwid=7de147c5-1754-48d6-b1ae-3a5761531363; _a_id=e3083889-5db9-4ee8-9fb7-e68db4b3ca24; _slvddv=true; _slvcl=en; _srsb=a1961a93-ad1f-43cf-97ba-1b8e1c7a575a; _landing_page=%2F; _orig_referrer=; _slvs=ee37bf4b-b88a-4472-8f8b-3719ddb56049; campaign=%7B%22data%22%3A%7B%22utm_source%22%3Anull%2C%22utm_medium%22%3Anull%2C%22utm_campaign%22%3Anull%2C%22utm_content%22%3Anull%2C%22utm_term%22%3Anull%2C%22referrer%22%3A%22https%3A%2F%2Fring.com%2F%22%2C%22path%22%3A%22%2Fcollections%2Foffers%22%7D%7D; _cap_a=%7B%22purpose%22%3A%7B%22a%22%3Atrue%2C%22p%22%3Atrue%2C%22m%22%3Atrue%2C%22t%22%3Atrue%7D%2C%22display_banner%22%3Afalse%2C%22merchant_geo%22%3A%22US%22%2C%22sale_of_data_region%22%3Afalse%7D; _s=8179480c-21af-48de-86d7-df8f46e84e88; _shopify_s=8179480c-21af-48de-86d7-df8f46e84e88; _shopify_y=08a7a6f3-fde7-4887-ab85-bec0e9091f00; _y=08a7a6f3-fde7-4887-ab85-bec0e9091f00; rs_sis=eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJjc3JmVG9rZW41O1I1UmY3eUdSMnZtRFBZTVh3WU1DN0dRIiw1ZiXhwaXJlc1RzIjoxNjg0ODcxMjExOTUxLCJpcCI6IjEyMy4yMzEuMTI1IiwiaWF0IjoiNjVzZXJ8Z2ZVudCI6Ikl1emlsbG6EwN54wIChXaW5kb3d3IE5UIDEwLjA7IHg2NCkgQXBwbGVXZWQLaXQvNTM3LjM2IChLSFRNTCwgbGlrZSB8ZW50cmVkeWkgQ2hyb211LzcvLjAuMzUzOC43My8yYXZhcmlvNTM3LjM2IiwiaGFyZDhcnVjZCI6IjJkZTE0N2M1LTE3NTQtND8kN111MWF1LTNhNTc2MTUzMTM2MyIsImhhdCI6MTY4NDg3MDMxM5w1YXVkJjoiHR8cHM6Ly9yaW5nLnNvbSI6ImIzcyI6Ijpbcm91fQ.05-Zl3KDjctohNIJLDnwrqA7QAuBUpaZ6-HvUIH2QiY; privacy-banner=true; privacy-banner-clicked=true; privacy-cookie=%7B%22version%22%3A12%2C%22analytic_s_heap%22%3Afalse%2C%22analytics_optimizely%22%3Afalse%2C%22analytics_yext%22%3Afalse%2C%22analytics_fuillstory%22%3Afalse%2C%22advertising_amazonDisplay%22%3Afalse%2C%22advertising_kenshoo%22%3Afalse%2C%22advertising_sizeek%22%3Afalse%2C%22consentUrl%22%3A%22https%3A%2F%2Fring.com%2Fauthorized-ring-retail-partners%22%2C%22consentDate%22%3A%22Tue%2C%2023%20May%202023%2019%3A31%3A53%20GMT%22%7D; chosen_country=HT; rs_geo=HT; rw_locale=%2F419%2Fes; rw_np=HT
Referer: ../../../../../../../../../../../../../../etc/passwd({
User-Agent: Mozilla/5.0 (Windows NT 10.0; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/70.0.3538.77 Safari/537.36
X-Scanner: Netsparker
```



```

Response

Response Time (ms): 798.7334   Total Bytes Received : 52762   Body Length : 52253   Is Compressed : No

HTTP/1.1 200 OK
Server: Server
X-Content-Type-Options: nosniff
Expires: Fri, 01 Jan 1990 00:00:00 GMT
Connection: keep-alive
X-Request-Id: f17absnkh4xx@vmam3nj1
X-Frame-Options: SAMEORIGIN
Strict-Transport-Security: max-age=31536000
x-amz-rid: C3DA4K0EQVJAYCSAKRFQ
Pragma: no-cache
Content-Type: text/html; charset=utf-8
Transfer-Encoding: chunked
Date: Tue, 23 May 2023 19:31:54 GMT
Cache-Control: no-cache, no-store, max-age=0, must-revalidate
Vary: Content-Type,Accept-Enco
-
ringLogo-letters)"/>
</svg></span>

<h1 class="title">Create your password.</h1>

<div class="field">
<label for="password">Create Password</label>
<input id="password"
name="password"
type="password"
placeholder=" "
autocomplete="new-password"
spellcheck="false"
minlength="8"
required />

<span class="toggle-password-vi
-

```

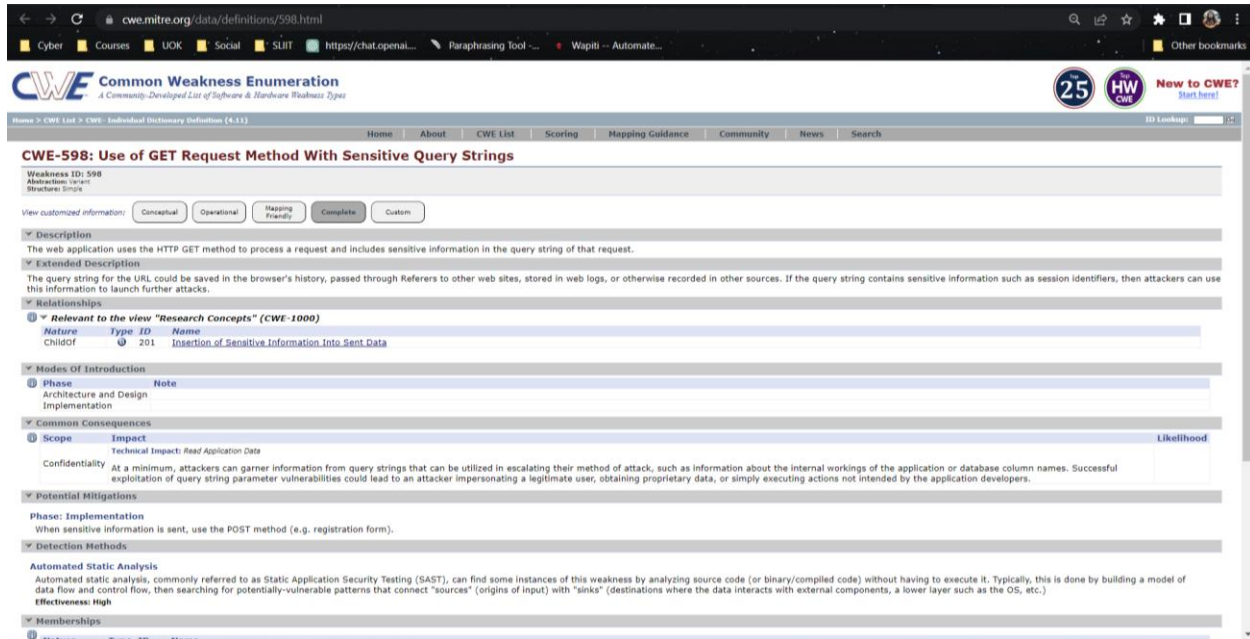
## **Proposed mitigation**

Consider the following best practices to lessen the risk of sending passwords over a query string:

- Use secure transmission protocols: To make sure that passwords and other sensitive data are sent across encrypted channels, such as HTTPS. This lessens the chance of interception by encrypting the communication between the client and server.
- Utilize HTTP POST requests: To convey sensitive data, utilize HTTP POST requests rather than include passwords in query strings. The data is transmitted in the request body for POST requests, which is not directly visible in the URL or recorded in the server logs.

- **Employ reliable authentication techniques:** To increase the security of user accounts, employ reliable authentication techniques like token-based authentication or multi-factor authentication (MFA). Because of this, even if passwords are intercepted, illegal access is largely avoided.
- **Password hashing and salting:** Use powerful hashing algorithms (like bcrypt, Argon2, or scrypt) along with a different salt for each user when storing passwords. Even if an attacker is able to obtain the hashes that are saved, hashing makes it very challenging for them to recover the original password.
- **Passwords shouldn't be kept in logs:** Make sure that sensitive data, such as passwords, is not logged or saved in plaintext or another format that may be easily retrieved. To prevent unwanted access, implement logging procedures that exclude sensitive data, and periodically evaluate and protect log storage.
- **Informing users** Increase user awareness about safe password handling procedures. Encourage them to practice proper password hygiene, which includes using strong and distinct passwords for each account, and to refrain from sharing passwords through unsafe methods, such as query strings.
- **Implement security testing:** To find and fix potential vulnerabilities in your system, undertake regular security assessments, such as vulnerability scanning and penetration testing. This makes it more likely that password-related problems will be found and fixed.
- **Follow coding practices:** Make that developers adhere to secure coding standards, which should include input validation, output encoding, and secure handling of sensitive data. To reduce the risk of vulnerabilities, implement security frameworks and controls like the OWASP (Open Web Application Security Project) recommendations.

## External Reference



The screenshot shows the MITRE Common Weakness Enumeration (CWE) page for CWE-598: Use of GET Request Method With Sensitive Query Strings. The page is viewed in a browser with the URL <https://cwe.mitre.org/data/definitions/598.html>. The page header includes the MITRE logo, navigation links (Home, About, CWE List, Scoring, Mapping Guidance, Community, News, Search), and a search bar. The main content area is titled "CWE-598: Use of GET Request Method With Sensitive Query Strings" and includes a "Weakness ID: 598" label. Below the title, there are tabs for "Description", "Extended Description", "Relationships", "Modes Of Introduction", "Common Consequences", "Potential Mitigations", "Detection Methods", and "Memberships". The "Description" tab is selected, showing a detailed explanation of the weakness: "The web application uses the HTTP GET method to process a request and includes sensitive information in the query string of that request." The "Extended Description" tab is also visible, providing further context: "The query string for the URL could be saved in the browser's history, passed through Referers to other web sites, stored in web logs, or otherwise recorded in other sources. If the query string contains sensitive information such as session identifiers, then attackers can use this information to launch further attacks." The "Relationships" tab shows a table of related weaknesses, including CWE-1000 (Relevant to the view "Research Concepts") and CWE-201 (Insertion of Sensitive Information Into Sent Data). The "Modes Of Introduction" tab shows a table with columns for "Phase", "Note", and "Likelihood". The "Common Consequences" tab shows a table with columns for "Scope", "Impact", and "Likelihood". The "Potential Mitigations" tab shows a table with columns for "Phase", "Implementation", and "Likelihood". The "Detection Methods" tab shows a table with columns for "Automated Static Analysis", "Effectiveness", and "Likelihood". The "Memberships" tab shows a table with columns for "Nature", "Type", "ID", and "Name".

## VULNERABILITIES

## CVE-2019-6531 Detail

### Description

An attacker could retrieve passwords from a HTTP GET request from the Kunbus PR100088 Modbus gateway versions prior to Release R02 (or Software Version 1.1.13166) if the attacker is in an MITM position.

### Severity

CVSS Version 3.x

CVSS Version 2.0

CVSS 3.x Severity and Metrics:



NIST: NVD

 Base Score: **8.1 HIGH**

Vector: CVSS:3.1/AV:N/AC:H/PR:N/UI:N/S:U/C:H/I:H/A:H

NVD Analysts use publicly available information to associate vector strings and CVSS scores. We also display any CVSS information provided within the CVE List from the CNA.

Note: NVD Analysts have published a CVSS score for this CVE based on publicly available information at the time of analysis. The CNA has not provided a score within the CVE List.

### QUICK INFO

#### CVE Dictionary Entry:

CVE-2019-6531

#### NVD Published Date:

04/02/2019

#### NVD Last Modified:

06/22/2021

#### Source:

ICS-CERT

### References to Advisories, Solutions, and Tools

By selecting these links, you will be leaving NIST webspace. We have provided these links to other web sites because they may have information that would be of interest to you. No inferences should be drawn on account of other sites being referenced, or not, from this page. There may be other web sites that are more appropriate for your purpose. NIST does not necessarily endorse the views expressed, or concur with the facts presented on these sites. Further, NIST does not endorse any commercial products that may be mentioned on these sites. Please address comments about this page to [nvd@nist.gov](mailto:nvd@nist.gov).

Hypertink	Resource
<a href="https://ics-cert.us-cert.gov/advisories/ICSA-19-036-05">https://ics-cert.us-cert.gov/advisories/ICSA-19-036-05</a>	Third Party Advisory US Government Resource

### Weakness Enumeration

CWE-ID	CWE Name	Source
NVD-CWE-Other	Other	NIST
CWE-598	Use of GET Request Method With Sensitive Query Strings	ICS-CERT