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CYBER SECURITY ADVISORY

IRC5
RobotWare – PROFINET Stack Vulnerability
CVE ID: CVE-2024-6157

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Purpose

ABB has a rigorous internal cyber security continuous improvement process which involves regular testing with industry leading tools and periodic assessments to identify potential product issues. Occasionally an issue is determined to be a design or coding flaw with implications that may impact product cyber security.

When a potential product vulnerability is identified or reported, ABB immediately initiates our vulnerability handling process. This entails validating if the issue is in fact a product issue, identifying root causes, determining what related products may be impacted, developing a remediation, and notifying end users and governmental organizations.

The resulting Cyber Security Advisory intends to notify customers of the vulnerability and provide details on which products are impacted, how to mitigate the vulnerability or explain workarounds that minimize the potential risk as much as possible. The release of a Cyber Security Advisory should not be misconstrued as an affirmation or indication of an active threat or ongoing campaign targeting the products mentioned here. If ABB is aware of any specific threats, it will be clearly mentioned in the communication.

The publication of this Cyber Security Advisory is an example of ABB's commitment to the user community in support of this critical topic. Responsible disclosure is an important element in the chain of trust we work to maintain with our many customers. The release of an Advisory provides timely information which is essential to help ensure our customers are fully informed.

Affected products

Platform	Product	Version
IRC5	RobotWare 6	< 6.15.06 except 6.10.10, and 6.13.07

Vulnerability IDs

CVE-2024-6157

Summary

An update is available that resolves a privately reported vulnerability in the product versions listed above. An attacker who successfully exploited this vulnerability could cause the robot to stop.

Recommended immediate actions

The vulnerability is corrected in the following product versions:

RobotWare version 6.10.10, 6.13.07, and 6.15.06.

ABB recommends that customers apply the update at earliest convenience.

Vulnerability severity and details

A vulnerability exists in the PROFINET stack included in the RobotWare versions listed above. An attacker could exploit the vulnerability by sending a specially crafted message to the system node, causing the robot to stop.

The severity assessment has been performed by using the FIRST Common Vulnerability Scoring System (CVSS) for both v3.1[1] and v4.0[2].

CVE-2024-6157 Null pointer dereference

The vulnerability could potentially be exploited to perform unauthorized actions by an attacker.
This vulnerability arises under specific conditions when specifically crafted message is processed by the system.

CVSS v3.1 Base Score:	5.1 (Medium)
CVSS v3.1 Temporal Score:	4.7 (Medium)
CVSS v3.1 Vector:	AV:L/AC:H/PR:N/UI:N/S:U/C:N/I:N/A:H/E:F/RL:O/RC:C
CVSS v4.0 Score	5.9 (Medium)
CVSS v4.0 Vector:	CVSS:4.0/AV:L/AC:H/AT:N/PR:N/UI:N/VC:N/VI:N/VA:H/SC:N/SI:N/SA:N
NVD Summary Link:	https://nvd.nist.gov/vuln/detail/CVE-2024-6157

Mitigating factors

Refer to section "General security recommendations" for further advise on how to keep your system secure.

Frequently asked questions

What causes the vulnerability?

The vulnerability is caused by an unchecked input data in the PROFINET stack in RobotWare.

What is RobotWare?

RobotWare is the software installed in the ABB robot controllers and designed to operate the robot.

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[1] For the CVSS v3.1 scoring only the CVSS Base Score and the Temporal Score (if information is available) are considered in this advisory. The CVSS Environmental Score, which can affect the vulnerability severity, is not provided in this advisory since it reflects the potential impact of a vulnerability within the end-user organizations' computing environment; end-user organizations are therefore recommended to analyze their situation and specify the Environmental Score.

[2] For the CVSS v4.0 scoring only the CVSS Base Metrics and the CVSS Supplemental Metrics (if information is available) are considered in this advisory. The CVSS Environmental and Threat Metrics, which can affect the vulnerability severity, are not provided in this advisory since they reflect the potential impact of a vulnerability within the end-user organizations' computing environment and over time depending on the vulnerability exploit maturity. Therefore, end-user organizations are recommended to analyze their situation and specify the Environmental and Threat Metrics.

What might an attacker use the vulnerability to do?

An attacker who successfully exploited this vulnerability could cause the affected robot to stop.

How could an attacker exploit the vulnerability?

An attacker could try to exploit the vulnerability by creating a specially crafted message and sending the message to the robot controller. This would require that the attacker has access to the system network, by connecting to the network either directly or through a wrongly configured or penetrated security system.

Recommended practices help mitigate such attacks, see section Mitigating Factors above.

Could the vulnerability be exploited remotely?

Yes, an attacker who has network access to an affected robot controller could exploit this vulnerability. Recommended practices include that robot controllers are physically protected, have no direct connections to the Internet, and are separated from other networks by means of a security system that has a minimal number of ports exposed.

What does the update do?

The update removes the vulnerability by modifying the way that the robot controller validates PROFINET communication messages.

When this security advisory was issued, had this vulnerability been publicly disclosed?

No, ABB received information about this vulnerability through responsible disclosure.

When this security advisory was issued, had ABB received any reports that this vulnerability was being exploited?

No, ABB had not received any information indicating that this vulnerability had been exploited when this security advisory was originally issued.

General security recommendations

For any installation of software-related ABB products we strongly recommend the following (non-exhaustive) list of cyber security practices:

– Isolate special purpose networks (e.g. for automation systems) and remote devices behind firewalls and separate them from any general-purpose network (e.g. office or home networks).

– Install physical controls so no unauthorized personnel can access your devices, components, peripheral equipment, and networks.

– Never connect programming software or computers containing programing software to any network other than the network for the devices that it is intended for.

– Scan all data imported into your environment before use to detect potential malware infections.

– Minimize network exposure for all applications and endpoints to ensure that they are not accessible from the Internet unless they are designed for such exposure and the intended use requires such.

– Ensure all nodes are always up to date in terms of installed software, operating system, and firmware patches as well as anti-virus and firewall.

– When remote access is required, use secure methods, such as Virtual Private Networks (VPNs). Recognize that VPNs may have vulnerabilities and should be updated to the most current version available. Also, understand that VPNs are only as secure as the connected devices.

More information on recommended practices can be found in the following documents:

3HAC050940-001   Operating manual - IRC5 Integrator's guide

Support

For additional instructions and support please contact your local ABB service organization. For contact information, see www.abb.com/contactcenters.

Information about ABB's cyber security program and capabilities can be found at www.abb.com/cyber-security.

Revision history

Rev. Ind.	Page (p) Chapter (c)	Change description	Rev. date
A	all	Initial version	2024-10-10