



## **Advisory 2023-03**

Security update for CODESYS runtime system V3 communication server

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## 1 Affected Products

All variants of the following CODESYS V3 products in all versions prior V3.5.19.0 containing the component CmpDevice are affected, regardless of the CPU type or operating system:

- CODESYS Control RTE (SL)
- CODESYS Control RTE (for Beckhoff CX) SL
- CODESYS Control Win (SL)
- CODESYS Runtime Toolkit
- CODESYS Safety SIL2 Runtime Toolkit
- CODESYS Safety SIL2 PSP
- CODESYS Edge Gateway for Windows
- CODESYS Gateway
- CODESYS HMI (SL)
- CODESYS Development System V3

Note: Within the CODESYS Development System V3, the simulation runtime is affected.

In addition, the following products based on the CODESYS Control V3 Runtime System Toolkit are affected in all versions prior to V4.8.0.0:

- CODESYS Control for BeagleBone SL
- CODESYS Control for emPC-A/iMX6 SL
- CODESYS Control for IOT2000 SL
- CODESYS Control for Linux SL
- CODESYS Control for PFC100 SL
- CODESYS Control for PFC200 SL
- CODESYS Control for PLCnext SL
- CODESYS Control for Raspberry Pi SL
- CODESYS Control for WAGO Touch Panels 600 SL
- CODESYS Edge Gateway for Linux

## 2 Vulnerability overview

### 2.1 Type

CWE-1288: Improper Validation of Consistency within Input [7]

### 2.2 Management Summary

Crafted communication requests can cause the affected products to read internally from an invalid address, potentially leading to a denial-of-service condition.

### 2.3 References

CVE: CVE-2022-47391 [6]

CODESYS JIRA: CDS-84820

### 2.4 Severity Rating

CODESYS GmbH has rated this vulnerability as high.

The CVSS v3.1 base score of 7.5 has been assigned. The CVSS vector string is (CVSS:3.1/AV:N/AC:L/PR:N/UI:N/S:U/C:N/I:N/A:H). [8]

## 3 Vulnerability details

### 3.1 Detailed Description

CODESYS products such as the CODESYS Control runtime systems contain communication servers for the CODESYS protocol to enable communication with clients like the CODESYS Development System. Specific crafted communication requests with inconsistent content can cause the CmpDevice component to read internally from an invalid address, potentially leading to a denial-of-service condition.

### 3.2 Exploitability

This vulnerability could be exploited remotely.

### 3.3 Difficulty

An attacker with low skills would be able to exploit this vulnerability.

### 3.4 Existence of exploit

No known public exploits specifically target this vulnerability in CODESYS products.

## 4 Available software updates

CODESYS GmbH has released version V3.5.19.0, which solves the identified security vulnerabilities for the following products:

- CODESYS Control RTE (SL)
- CODESYS Control RTE (for Beckhoff CX) SL
- CODESYS Control Win (SL)
- CODESYS Runtime Toolkit
- CODESYS Safety SIL2 Runtime Toolkit
- CODESYS Safety SIL2 PSP
- CODESYS Edge Gateway for Windows
- CODESYS Gateway
- CODESYS HMI (SL)
- CODESYS Development System V3

For the below listed products, these issues will be fixed by version V4.8.0.0, which is based on the CODESYS Control V3 Runtime System Toolkit V3.5.19.0:

- CODESYS Control for BeagleBone SL
- CODESYS Control for emPC-A/iMX6 SL
- CODESYS Control for IOT2000 SL
- CODESYS Control for Linux SL
- CODESYS Control for PFC100 SL
- CODESYS Control for PFC200 SL
- CODESYS Control for PLCnext SL
- CODESYS Control for Raspberry Pi SL
- CODESYS Control for WAGO Touch Panels 600 SL
- CODESYS Edge Gateway for Linux

The release of version V4.8.0.0 is expected for beginning of April 2023.

The CODESYS Development System and the products available as CODESYS AddOns can be downloaded and installed directly with the CODESYS Installer or be downloaded from the CODESYS Store.

Alternatively, as well as for all other products, you will find further information on obtaining the software update in the CODESYS Update area [3].

## 5 Mitigation

CODESYS GmbH recommends using the available software update to fix the vulnerability.

In case the software update is not applied, CODESYS GmbH has not identified any specific workarounds for this vulnerability.

As part of a security strategy, CODESYS GmbH recommends the following general defense measures to reduce the risk of exploits:

- Use controllers and devices only in a protected environment to minimize network exposure and ensure that they are not accessible from outside
- Use firewalls to protect and separate the control system network from other networks
- Use VPN (Virtual Private Networks) tunnels if remote access is required
- Activate and apply user management and password features

- Use encrypted communication links
- Limit the access to both development and control system by physical means, operating system features, etc.
- Protect both development and control system by using up to date virus detecting solutions

For more information and general recommendations for protecting machines and plants, see also the CODESYS Security Whitepaper [1].

## 6 Acknowledgments

This vulnerability was discovered by Vladimir Tokarev, Section 52, Azure IoT Security at Microsoft.

CODESYS GmbH thanks for reporting following coordinated disclosure. This helps us to improve our products and to protect customers and users.

## 7 Further Information

For additional information regarding the CODESYS products, especially the above-mentioned versions, or about the described vulnerability please contact the CODESYS support team [5].

## 8 Disclaimer

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Note: Not all CODESYS features are available in all territories. For more information on geographic restrictions, please contact sales@codesys.com.

## Bibliography

- [1] CODESYS GmbH: [CODESYS Security Whitepaper](#)
- [2] CODESYS GmbH: [Coordinated Disclosure Policy](#)
- [3] CODESYS GmbH update area: <https://www.codesys.com/download>
- [4] CODESYS GmbH security information page: <https://www.codesys.com/security>
- [5] CODESYS GmbH support contact site: <https://www.codesys.com/support>
- [6] Common Vulnerabilities and Exposures (CVE): <https://cve.mitre.org>
- [7] Common Weakness Enumeration (CWE): <https://cwe.mitre.org>
- [8] CVSS Calculator: <https://www.first.org/cvss/calculator/3.1>

The latest version of this document can be found here:

<https://customers.codesys.com/index.php?eID=dumpFile&t=f&f=17555&token=212fc7e39bdd260cab6d6ca84333d42f50bcb3da&download=>

## Change History

Version	Description	Date
1.0	First version	23.02.2023
2.0	Software updates available	08.03.2023