



CODESYS

Advisory 2019-01

Security update for CODESYS V3 web server

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1 Affected Products

In CODESYS V3 the web server is an optional part of the CODESYS runtime system. Therefore all CODESYS V3 runtime systems containing the web server (CmpWebServer) in all versions prior V3.5.14.10 are affected, regardless of the CPU type or operating system:

- CODESYS Control for BeagleBone
- CODESYS Control for emPC-A/iMX6
- CODESYS Control for IOT2000
- CODESYS Control for Linux
- CODESYS Control for PFC100
- CODESYS Control for PFC200
- CODESYS Control for Raspberry Pi
- CODESYS Control RTE V3
- CODESYS Control RTE V3 (for Beckhoff CX)
- CODESYS Control Win V3 (also part of the CODESYS Development System setup)
- CODESYS HMI V3
- CODESYS Control V3 Runtime System Toolkit
- CODESYS V3 Embedded Target Visu Toolkit
- CODESYS V3 Remote Target Visu Toolkit

2 Vulnerability overview

2.1 Type

Remote DoS, remote code execution, directory traversal

2.2 Management Summary

Crafted http or https requests allow to access files outside the restricted working directory of the controller. Furthermore a stack overflow could crash the web server and lead to a denial-of-service condition or may be utilized for remote code execution.

2.3 References

CODESYS JIRA: CDS-64543, CDS-64587, CDS-64588, CDS-64663, CDS-64700, CDS-64702

2.4 Severity Rating

3S-Smart Software Solutions GmbH has rated this vulnerability as critical.

The CVSS v3.0 base score of 10 has been assigned. The CVSS vector string is (CVSS:3.0/AV:N/AC:L/PR:N/UI:N/S:C/C:H/I:H/A:H). [7]

3 Vulnerability details

3.1 Detailed Description

The CODESYS web server is used by the CODESYS WebVisu to display CODESYS visualization screens in a web browser. Crafted http or https requests allow to access files outside the restricted working directory of the controller. Furthermore a stack overflow could crash the web server and lead to a denial-of-service condition or may be utilized for remote code execution. As the webserver is part of the CODESYS runtime system, this may result in unforeseen behavior of the complete runtime system.

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.

4 Available software updates

3S-Smart Software Solutions GmbH has released versions V3.5.12.80 and V3.5.14.10, which solve the noted vulnerability issue.

Version V3.5.14.10 (and version V3.5.15.0) contain a fix for all affected CODESYS products. In opposite to that, in version V3.5.12.80 there is only a fix for the following affected CODESYS products available:

- CODESYS Control RTE V3
- CODESYS Control RTE V3 (for Beckhoff CX)
- CODESYS Control Win V3 (also part of the CODESYS Development System setup)
- CODESYS HMI V3
- CODESYS Control V3 Runtime System Toolkit
- CODESYS V3 Embedded Target Visu Toolkit
- CODESYS V3 Remote Target Visu Toolkit

Commonly, we recommend to use version V3.5.14.10 or higher as preferred before using version V3.5.12.80

This issue will also be fixed by V3.5.15.0 of the affected products.

The release of version V3.5.15.0 is expected for July 2019.

Please visit the CODESYS update area for more information on how to obtain the software update [3].

5 Mitigation

Currently, 3S-Smart Software Solutions GmbH has not identified any workarounds for this vulnerability.

In general, 3S-Smart Software Solutions GmbH recommends as part of the mitigation strategy the following defensive measures to reduce the risk of exploitation of this vulnerability:

- 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
- 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

3S-Smart Software Solutions GmbH thanks those in the security community, who help us to improve our products and to protect customers and users through coordinated vulnerability disclosure.

We thank Ivan Cheyreyzy of Schneider Electric for reporting this vulnerability following coordinated disclosure.

7 Further Information

For additional information regarding the CODESYS products, especially the above mentioned versions, or about the described vulnerability please contact the 3S-Smart Software Solutions support team [5].

8 Disclaimer

3S-Smart Software Solutions GmbH assumes no liability whatsoever for indirect, collateral, accidental or consequential losses that occur by the distribution and/or use of this document or any losses in connection with the distribution and/or use of this document. All information published in this document is provided on good faith by 3S-Smart Software Solutions GmbH. Insofar as permissible by law, however, none of this information shall establish any guarantee, commitment or liability on the part of 3S-Smart Software Solutions GmbH.

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

Bibliography

- [1] 3S-Smart Software Solutions GmbH: [CODESYS Security Whitepaper](#)
- [2] 3S-Smart Software Solutions GmbH: [Coordinated Disclosure Policy](#)
- [3] 3S-Smart Software Solutions GmbH CODESYS update area: <https://www.codesys.com/download>
- [4] 3S-Smart Software Solutions GmbH security information page: <https://www.codesys.com/security>
- [5] 3S-Smart Software Solutions GmbH support contact site: <https://www.codesys.com/support>
- [6] Common Vulnerabilities and Exposures (CVE): <https://cve.mitre.org>
- [7] CVSS Calculator: <https://www.first.org/cvss/calculator/3.0>
- [8] ICS-CERT: <https://ics-cert.us-cert.gov>

The latest version of this document can be found here:

https://customers.codesys.com/fileadmin/data/customers/security/2019/Advisory2019-01_CDS-64543.pdf

Change History

Version	Description	Date
1.0	First version	12.02.2019
2.0	Software update available	20.02.2019
3.0	Software update available, chapter Available software updates adapted	26.04.2019