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CYBERSECURITY ADVISORY

# **SECURITY Multiple Vulnerabilities in ABB Central Licensing System**

CVE ID: CVE-2020-8481, CVE-2020-8479, CVE-2020-8475, CVE-2020-8476, CVE-2020-8471

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## Affected products/components

**ABB Central Licensing System (CLS)** versions 5.1 to 6.1.

ABB CLS is not a standalone product but a common component that is exclusively distributed as part of other ABB products. The following table lists all products that are using these versions of CLS and distribute CLS as part of their installation media.

Products	Affected Versions
ABB Ability™ System 800xA and related system extensions	5.1, 6.0 and 6.1
Compact HMI	5.1, 6.0
Control Builder Safe	1.0, 1.1 and 2.0
ABB Ability™ Symphony® Plus - S+ Operations	3.0 to 3.3
ABB Ability™ Symphony® Plus - S+ Engineering	1.1 to 2.3
Composer Harmony	5.1, 6.0, 6.1
Composer Melody	Melody Composer 6.1
Harmony OPC Server (HAOPC) Standalone	6.0, 6.1, 7.0
ABB Ability™ System 800xA / Advant® OCS Control Builder A	1.3 and 1.4
Advant® OCS AC 100 OPC Server	5.1, 6.0 and 6.1
Composer CTK	CTK 6.1, 6.2
AdvaBuild	3.7 SP1, 3.7 SP2
OPC Server for MOD 300 (non-800xA)	1.4
OPC Data Link	2.1, 2.2
ABB Ability™ Knowledge Manager	8.0, 9.0, 9.1
ABB Ability™ Manufacturing Operations Management	1812 and 1909

## Summary

ABB is aware that the ABB Central Licensing System contains several vulnerabilities which require user attention. The above-mentioned products use CLS and are affected by the following vulnerabilities. The table indicates which of the two installation types of CLS that are affected: Client-Server and Standalone.

CVE ID	CVSS * V3 base score	Vulnerability	CLS Client-Server installation	CLS Standalone installation
CVE-2020-8481	9.8	Information Disclosure	Affected	Affected
CVE-2020-8479	9.3	XML External Entity Injection	Affected	Not Affected
CVE-2020-8475	5.3	Denial of Service	Affected	Not Affected
CVE-2020-8476	5.3	Elevation of Privilege	Affected	Not Affected
CVE-2020-8471	7.8	Weak File Permissions	Affected	Affected

\* CVSS - Common Vulnerability Scoring System

For some of the affected products the CVSS score may be lower. This is described in the advisories listed in the section “Product specific cybersecurity advisories” below.

## Affected CLS versions

This table indicates which CLS versions that are affected. The product specific cybersecurity advisories describe which CLS versions that are used by these products.

ABB Central Licensing System version	CVE-2020-8481	CVE-2020-8479	CVE-2020-8475	CVE-2020-8476	CVE-2020-8471
5.1.0/0 (5.1.0.14)					
5.1.0/1 (5.1.0.35)	Y	Y	Y	Y	Y
5.1.0/1 (5.1.0.38)					
5.1.0-2 (5.1.0.53)					
5.1.0-2 (5.1.0.55)					
5.1.0-3 (5.1.0.65)	N	Y	Y	Y	Y
5.1.0-4 (5.1.0.70)					
5.1.0-5 (5.1.0.84)					
5.1.0-6 (5.1.0.99)					
5.1.0-6 (5.1.0.100)					
5.1.0-6 (5.1.0.102)	N	Y	Y	Y	N
5.1.0-6 (5.1.0.103)					
6.0.0-0 (6.0.0.26)					
6.0.1-0 (6.0.00100.54)					
6.0.1-0 (6.0.00100.55)					
6.0.1-0 (6.0.00100.57)					
6.0.3-0 (6.0.03000.73)	N	Y	Y	Y	N
6.0.3-0 (6.0.03000.74)					
6.0.3-0 (6.0.03000.84)					
6.0.3-0 (6.0.03000.95)					
6.0.3-0 (6.0.03000.192)	N	N	Y	Y	N
6.1.0-0 (6.1.00000.16)					
6.1.0-0 (6.1.00000.18)	N	Y	Y	Y	N
6.1.0-0 (6.1.00000.398)					
6.1.0-0 (6.1.00100.417)	N	N	Y	Y	N
6.1.1-0 (6.1.00100.499)	N	N	N	N	N
6.1.1-0 (6.1.01000.502)	N	N	N	N	N

## Recommended immediate actions

The product specific cybersecurity advisories provide specific recommendations for the affected products.

### Additional general recommendations:

Recommended baseline security practices and firewall configurations can help protect a network and its attached devices from attacks that originate from outside the network. For example, common practices are for process control systems to be physically protected from direct access by unauthorized personnel, have no direct connections to the internet, and are separated from other networks by means of a firewall system that has a minimal number of ports exposed, and others that must be evaluated case by case. Process control and automation systems should not be used for general business functions (e, g. internet browsing, email, etc.) which are not critical industrial processes. Portable computers and removable storage media should be carefully scanned for viruses before they are connected to a control system.

Install software security updates validated by ABB.

Install the updated virus definition files for the recommended / supported malware protection solution.

## Vulnerability details

1. **CVE-2020-8481:** Information Disclosure vulnerability: Confidential data is written in an unprotected file. An attacker who successfully exploited this vulnerability could take full control of the computer.
2. **CVE-2020-8479:** XML External Entity Injection vulnerability: An attacker who successfully exploited the vulnerabilities could read or call arbitrary files from the license server and/or from the network and may also block the license handling.
3. **CVE-2020-8475:** Denial of Service vulnerability: An attacker who successfully exploited this vulnerability could block the license handling.
4. **CVE-2020-8476:** Elevation of privilege vulnerability: An attacker who successfully exploited this vulnerability in the license server could alter licenses assigned to the system nodes. This could potentially lead to a situation where legitimate nodes in the system network are denied licenses.
5. **CVE-2020-8471:** Weak File Permissions: An authenticated attacker who successfully exploited this vulnerability, could block the license handling, escalate his/her privileges, and execute arbitrary code.

Exploitation of some of these vulnerabilities may block the license handling. The effect of this may differ for different products. A usual behavior is that launching of engineering functions may be blocked and that operator functions may still work but annoyance messages may be displayed. The product specific cybersecurity advisories may describe the behavior in more detail.

## Product specific cybersecurity advisories

This section will be updated with references when relevant. The following product specific advisories are available:

- SECURITY ABB Central Licensing System Vulnerabilities, impact on System 800xA, Compact HMI and Control Builder Safe (2PAA121230),  
<http://search.abb.com/library/Download.aspx?DocumentID=2PAA121230&LanguageCode=en&DocumentPartId=&Action=Launch>
- SECURITY ABB Central Licensing System Vulnerabilities, impact on Symphony® Plus, Composer Harmony, Composer Melody, Harmony OPC Server (2PAA123981)  
<https://search.abb.com/library/Download.aspx?DocumentID=2PAA123981&LanguageCode=en&DocumentPartId=&Action=Launch>

These documents are available at <https://new.abb.com/about/technology/cyber-security/alerts-and-notifications>. They are also available for registered users, together with more relevant information, in the ABB customer portal (MyABB) in the My Control System section.

## Frequently asked questions

### What is the scope of the vulnerabilities?

An attacker who successfully exploited these vulnerabilities could take control of the affected system node, remotely cause an affected CLS Server node to stop or prevent legitimate access to the affected CLS Server.

## What causes the vulnerabilities?

The vulnerabilities are caused

- by SW writing excessive confidential information into an unprotected file
- by insufficient input data validation in the license server communication.
- by insufficient access control in a folder with executable code.

## What is the Central Licensing Service?

The Central Licensing Service actively monitors and enforces the licensed features with the purpose to validate the usage against the licenses that were procured. The CLS server dynamically distributes the available licenses, as required on all other nodes (License Clients) within the system. The user is informed about the possible license violations by means of license violation annoyance popup message.

## What might an attacker use the vulnerabilities to do?

See “Vulnerability details” above.

## How could an attacker exploit the vulnerabilities?

### **CVE-2020-8481: ABB CLS - Information Disclosure**

An attacker could exploit the vulnerability by logging into the affected node as a low privileged user, read confidential data from an unprotected file.

### **CVE-2020-8479: ABB CLS - XXE vulnerability**

### **CVE-2020-8475: ABB CLS - Denial of Service vulnerability**

### **CVE-2020-8476: ABB CLS - Elevation of privilege vulnerability**

An attacker could exploit these vulnerabilities by sending specially crafted message to the CLS Web Service. 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 firewall, or that he installs malicious software on a system node or otherwise infects the network with malicious software.

### **CVE-2020-8471: ABB CLS – Weak File Permissions**

An attacker could exploit the vulnerability by logging in to an 800xA node and modify the files in the folders with weak access control lists.

## Could the vulnerability be exploited remotely?

### **CVE-2020-8481: ABB CLS - Information Disclosure**

### **CVE-2020-8471: ABB CLS – Weak File Permissions**

No, to exploit this vulnerability an attacker would need to have physical access to an affected system node.

### **CVE-2020-8479: ABB CLS - XXE vulnerability**

### **CVE-2020-8475: ABB CLS - Denial of Service vulnerability**

### **CVE-2020-8476: ABB CLS - Elevation of privilege vulnerability**

Yes, an attacker who has network access to an affected system node could exploit these vulnerabilities remotely. Recommended practices include that process control systems are physically protected, have no direct connections to the Internet, and are separated from other networks by means of a firewall system that has a minimal number of ports exposed.

## What do the updates do?

Some of the vulnerabilities have been corrected. Details are described in the advisories listed in the section “Product specific cybersecurity advisories” above.

### **CVE-2020-8481: ABB CLS - Information Disclosure**

The update prevents sensitive information from being written to an unprotected file.

### **CVE-2020-8479: ABB CLS - XXE vulnerability**

The update disables the XML processor from resolving external entities within the DTD.

### **CVE-2020-8471: ABB CLS – Weak File Permissions**

The updates remove the vulnerability by ensuring that the access control list for the folders, limits access to files and folders.

### **CVE-2020-8475: ABB CLS - Denial of Service vulnerability**

The update performs Input validation to prevent the crash in the CLS server. In addition, HTTPS is implemented for CLS server and client communication.

### **CVE-2020-8476: ABB CLS - Elevation of privilege vulnerability**

The update restricts the access to the CLS Server.

## When this security advisory was issued, had these vulnerabilities been publicly disclosed?

No, ABB received information about these vulnerabilities through responsible disclosure.

## When this security advisory was issued, had ABB received any reports that these vulnerabilities were being exploited?

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

# Acknowledgement

ABB thanks William Knowles and his colleagues at Applied Risk for helping to identify the vulnerabilities and protecting our customers.

# Support

For additional instructions and support please contact your local ABB service organization. For contact information, see [www.abb.com/contactcenters](http://www.abb.com/contactcenters).

Information about ABB’s cybersecurity program and capabilities can be found at [www.abb.com/cyber-security](http://www.abb.com/cyber-security).

## Revisions

Rev.	Page (P) Chapt. (C)	Description	Date
A	all	New document	2020-03-30
B	P2,P4	Revised Vulnerability details and CVSS score for CVE-2020-8479	2020-04-21
C	P2, P3, P6	Revised affected versions for S+ Operations, S+ Engineering and Composer Melody. Included updates available for CVE-2020-8475 and CVE-2020-8476.	2021-06-30