SSA-479842: Apache Log4j Vulnerabilities - Impact to Siemens Energy Sensformer / Sensgear (Platform, Basic and Advanced)

Publication Date: 2021-12-21
Last Update: 2021-12-23
Current Version: V1.1
CVSS v3.1 Base Score: 10.0

SUMMARY

On 2021-12-09, a vulnerability in Apache Log4j (a logging tool used in many Java-based applications) was disclosed, that could allow remote unauthenticated attackers to execute code on vulnerable systems. The vulnerability is tracked as CVE-2021-44228 and is also known as "Log4Shell".

On 2021-12-14 an additional denial of service vulnerability (CVE-2021-45046) was published rendering the initial mitigations and fix in version 2.15.0 as incomplete under certain non-default configurations. Log4j versions 2.16.0 and 2.12.2 are supposed to fix both vulnerabilities.

On 2021-12-17, CVE-2021-45046 was reclassified with an increased CVSS base score (from 3.7 to 9.0). The potential impact of CVE-2021-45046 now includes - besides denial of service - also information disclosure and local (and potential remote) code execution. Furthermore, one additional denial of service vulnerability, CVE-2021-45105, was disclosed.

The Siemens Energy Sensformer / Sensgear cloud service was affected by these vulnerabilities and has remediated them. No user actions are necessary.

AFFECTED PRODUCTS AND SOLUTION

Affected Product and Versions	Remediation
Sensformer / Sensgear Platform (6BK1602-0AA12-0TP0): All versions < V2.7.0	Vulnerabilities fixed on central cloud service between 2021-12-10 (CVE-2021-44228) and 2021-12-21 (CVE-2021-45105); no user actions necessary
Sensformer / Sensgear Platform (6BK1602-0AA22-0TP0): All versions < V2.7.0	Vulnerabilities fixed on central cloud service between 2021-12-10 (CVE-2021-44228) and 2021-12-21 (CVE-2021-45105); no user actions necessary
Sensformer / Sensgear Platform (6BK1602-0AA32-0TP0): All versions < V2.7.0	Vulnerabilities fixed on central cloud service between 2021-12-10 (CVE-2021-44228) and 2021-12-21 (CVE-2021-45105); no user actions necessary
Sensformer / Sensgear Platform (6BK1602-0AA42-0TP0): All versions < V2.7.0	Vulnerabilities fixed on central cloud service between 2021-12-10 (CVE-2021-44228) and 2021-12-21 (CVE-2021-45105); no user actions necessary
Sensformer / Sensgear Platform (6BK1602-0AA52-0TP0): All versions < V2.7.0	Vulnerabilities fixed on central cloud service between 2021-12-10 (CVE-2021-44228) and 2021-12-21 (CVE-2021-45105); no user actions necessary

WORKAROUNDS AND MITIGATIONS

Siemens has not identified any additional specific workarounds or mitigations. Please follow the General Security Recommendations.

Product specific mitigations can be found in the section Affected Products and Solution.

GENERAL SECURITY RECOMMENDATIONS

Operators of critical power systems (e.g. TSOs or DSOs) worldwide are usually required by regulations to build resilience into the power grids by applying multi-level redundant secondary protection schemes. It is therefore recommended that the operators check whether appropriate resilient protection measures are in place. The risk of cyber incidents impacting the grid's reliability can thus be minimized by virtue of the grid design.

Siemens strongly recommends applying the provided security updates using the corresponding tooling and documented procedures made available with the product. If supported by the product, an automated means to apply the security updates across multiple product instances may be used. Siemens strongly recommends prior validation of any security update before being applied, and supervision by trained staff of the update process in the target environment.

As a general security measure Siemens strongly recommends to protect network access with appropriate mechanisms (e.g. firewalls, segmentation, VPN). It is advised to configure the environment according to our operational guidelines in order to run the devices in a protected IT environment.

PRODUCT DESCRIPTION

Sensformer / Sensgear contains the necessary sensors for entering the most important operating parameters – such as oil-level, temperature, LV winding current and GPS-positioning of a transformer.

VULNERABILITY CLASSIFICATION

The vulnerability classification has been performed by using the CVSS scoring system in version 3.1 (CVSS v3.1) (https://www.first.org/cvss/). The CVSS environmental score is specific to the customer's environment and will impact the overall CVSS score. The environmental score should therefore be individually defined by the customer to accomplish final scoring.

An additional classification has been performed using the CWE classification, a community-developed list of common software security weaknesses. This serves as a common language and as a baseline for weakness identification, mitigation, and prevention efforts. A detailed list of CWE classes can be found at: https://cwe.mitre.org/.

Vulnerability CVE-2021-44228

Apache Log4j V2, versions < 2.15.0 do not protect JNDI features (as used in configuration, log messages, and parameters) against attacker controlled LDAP and other JNDI related endpoints.

An attacker who can control log messages or log message parameters could execute arbitrary code loaded from LDAP servers when message lookup substitution is enabled.

CVSS v3.1 Base Score	10.0
CVSS Vector	CVSS:3.1/AV:N/AC:L/PR:N/UI:N/S:C/C:H/I:H/A:H/E:H/RL:O/RC:C
CWE	CWE-20: Improper Input Validation

Vulnerability CVE-2021-45046

The fix to address CVE-2021-44228 was incomplete in certain non-default configurations, when the logging configuration uses a non-default Pattern Layout with a Context Lookup (for example, ${ctx:loginId}).

This could allow attackers with control over Thread Context Map (MDC) input data to craft malicious input data using a JNDI Lookup pattern, resulting in an information leak and remote code execution in some environments and local code execution in all environments.

CVSS v3.1 Base Score	9.0
CVSS Vector	CVSS:3.1/AV:N/AC:H/PR:N/UI:N/S:C/C:H/I:H/A:H/E:P/RL:O/RC:C
CWE	CWE-20: Improper Input Validation

Vulnerability CVE-2021-45105

Apache Log4j2 versions 2.0-alpha1 through 2.16.0 did not protect from uncontrolled recursion from self-referential lookups, when the logging configuration uses a non-default Pattern Layout with a Context Lookup (for example, $${ctx:loginId}).

This could allow attackers with control over Thread Context Map (MDC) input data to craft malicious input data that contains a recursive lookup, resulting in a denial of service condition.

CVSS v3.1 Base Score	7.5
CVSS Vector	CVSS:3.1/AV:N/AC:L/PR:N/UI:N/S:U/C:N/I:N/A:H/E:P/RL:O/RC:C
CWE	CWE-674: Uncontrolled Recursion

ADDITIONAL INFORMATION

For further inquiries on security vulnerabilities in Siemens products and solutions, please contact the Siemens ProductCERT:

https://www.siemens.com/cert/advisories

HISTORY DATA

V1.0 (2021-12-21):   Publication Date
V1.1 (2021-12-23):   Included Sensgear, clarified product name and summary

TERMS OF USE