SSA-802578: Multiple File Parsing Vulnerabilities in JTTK before V11.1.1.0 and JT Utilities before V13.1.1.0

Publication Date: 2021-12-14
Last Update: 2021-12-14
Current Version: V1.0
CVSS v3.1 Base Score: 7.8

SUMMARY

JT Open Toolkit (JTTK) before V11.1.1.0 contains multiple vulnerabilities that could be triggered when it reads a maliciously crafted JT file. These vulnerabilities also affects JT Utilities before V13.1.1.0. If a user is tricked to open a malicious JT file with any of the affected products, this could lead the application to crash or potentially lead to arbitrary code execution.

Siemens recommends to update to the latest versions and to limit opening of untrusted files from unknown sources in the affected products.

AFFECTED PRODUCTS AND SOLUTION

Affected Product and Versions	Remediation
JT Utilities: All versions < V13.1.1.0	Update to V13.1.1.0 or later version https://support.sw.siemens.com/ See further recommendations from section Workarounds and Mitigations
JTTK: All versions < V11.1.1.0	Update to V11.1.1.0 or later version https://support.sw.siemens.com/ See further recommendations from section Workarounds and Mitigations

WORKAROUNDS AND MITIGATIONS

Siemens has identified the following specific workarounds and mitigations that customers can apply to reduce the risk:

- Avoid to open untrusted files from unknown sources using JTTK
- Avoid opening untrusted files from unknown sources in JT Utilities

GENERAL SECURITY RECOMMENDATIONS

As a general security measure, Siemens strongly recommends to protect network access to devices with appropriate mechanisms. In order to operate the devices in a protected IT environment, Siemens recommends to configure the environment according to Siemens' operational guidelines for Industrial Security (Download: https://www.siemens.com/cert/operational-guidelines-industrial-security), and to follow the recommendations in the product manuals.

Additional information on Industrial Security by Siemens can be found at: https://www.siemens.com/industrialsecurity

PRODUCT DESCRIPTION

JT is an openly published data format developed by Siemens Digital Industries Software, widely used for communication, visualization, digital mockup and a variety of other purposes. JT has been accepted by

ISO as International Standard 14306:2017. The JT Utilities provide a series of command line utilities that can be used to support application development and JT reuse.

JT Open Toolkit (also known as JTTK) is an application programming interface (API) for developers of JT-enabled software. The JT Open Toolkit is a read/write toolkit that enables consistent access to JT file content.

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-2021-44430

JTTK library in affected products is vulnerable to an out of bounds write past the end of an allocated structure while parsing specially crafted JT files. This could allow an attacker to execute code in the context of the current process. (ZDI-CAN-14829)

CVSS v3.1 Base Score	7.8
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:H/I:H/A:H/E:P/RL:O/RC:C
CWE	CWE-787: Out-of-bounds Write

Vulnerability CVE-2021-44431

JTTK library in affected products is vulnerable to an out of bounds read past the end of an allocated buffer when parsing specially crafted JT files. An attacker could leverage this vulnerability to leak information in the context of the current process. (ZDI-CAN-14841)

CVSS v3.1 Base Score	3.3
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:L/I:N/A:N/E:P/RL:O/RC:C
CWE	CWE-125: Out-of-bounds Read

Vulnerability CVE-2021-44432

JTTK library in affected products is vulnerable to stack based buffer overflow while parsing specially crafted JT files. An attacker could leverage this vulnerability to execute code in the context of the current process. (ZDI-CAN-14845)

CVSS v3.1 Base Score	7.8
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:H/I:H/A:H/E:P/RL:O/RC:C
CWE	CWE-121: Stack-based Buffer Overflow

Vulnerability CVE-2021-44433

JTTK library in affected products contains a use after free vulnerability that could be triggered while parsing specially crafted JT files. An attacker could leverage this vulnerability to execute code in the context of the current process. (ZDI-CAN-14900)

CVSS v3.1 Base Score	7.8
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:H/I:H/A:H/E:P/RL:O/RC:C
CWE	CWE-416: Use After Free

Vulnerability CVE-2021-44434

JTTK library in affected products is vulnerable to an out of bounds write past the end of an allocated structure while parsing specially crafted JT files. This could allow an attacker to execute code in the context of the current process. (ZDI-CAN-14902, ZDI-CAN-14866)

CVSS v3.1 Base Score	7.8
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:H/I:H/A:H/E:P/RL:O/RC:C
CWE	CWE-787: Out-of-bounds Write

Vulnerability CVE-2021-44435

JTTK library in affected products is vulnerable to stack based buffer overflow while parsing specially crafted JT files. An attacker could leverage this vulnerability to execute code in the context of the current process. (ZDI-CAN-14903)

CVSS v3.1 Base Score	7.8
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:H/I:H/A:H/E:P/RL:O/RC:C
CWE	CWE-121: Stack-based Buffer Overflow

Vulnerability CVE-2021-44436

JTTK library in affected products is vulnerable to an out of bounds read past the end of an allocated buffer when parsing specially crafted JT files. An attacker could leverage this vulnerability to leak information in the context of the current process. (ZDI-CAN-14905)

CVSS v3.1 Base Score	7.8
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:H/I:H/A:H/E:P/RL:O/RC:C
CWE	CWE-125: Out-of-bounds Read

Vulnerability CVE-2021-44437

JTTK library in affected products is vulnerable to an out of bounds write past the end of an allocated structure while parsing specially crafted JT files. This could allow an attacker to execute code in the context of the current process. (ZDI-CAN-14906)

CVSS v3.1 Base Score	7.8
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:H/I:H/A:H/E:P/RL:O/RC:C
CWE	CWE-787: Out-of-bounds Write

Vulnerability CVE-2021-44438

JTTK library in affected products is vulnerable to an out of bounds write past the end of an allocated structure while parsing specially crafted JT files. This could allow an attacker to execute code in the context of the current process. (ZDI-CAN-14907)

CVSS v3.1 Base Score	7.8
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:H/I:H/A:H/E:P/RL:O/RC:C
CWE	CWE-787: Out-of-bounds Write

Vulnerability CVE-2021-44439

JTTK library in affected products is vulnerable to an out of bounds read past the end of an allocated buffer when parsing specially crafted JT files. An attacker could leverage this vulnerability to leak information in the context of the current process. (ZDI-CAN-14908)

CVSS v3.1 Base Score	7.8
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:H/I:H/A:H/E:P/RL:O/RC:C
CWE	CWE-125: Out-of-bounds Read

Vulnerability CVE-2021-44440

JTTK library in affected products is vulnerable to memory corruption condition while parsing specially crafted JT files. An attacker could leverage this vulnerability to execute code in the context of the current process. (ZDI-CAN-14912)

CVSS v3.1 Base Score	7.8
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:H/I:H/A:H/E:P/RL:O/RC:C
CWE	CWE-119: Improper Restriction of Operations within the Bounds of a Memory Buffer

Vulnerability CVE-2021-44441

JTTK library in affected products contains an out of bounds write past the end of an allocated structure while parsing specially crafted JT files. This could allow an attacker to execute code in the context of the current process. (ZDI-CAN-14913)

CVSS v3.1 Base Score	7.8
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:H/I:H/A:H/E:P/RL:O/RC:C
CWE	CWE-787: Out-of-bounds Write

Vulnerability CVE-2021-44442

JTTK library in affected products contains an out of bounds write past the fixed-length heap-based buffer while parsing specially crafted JT files. This could allow an attacker to execute code in the context of the current process. (ZDI-CAN-14995)

CVSS v3.1 Base Score	7.8
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:H/I:H/A:H/E:P/RL:O/RC:C
CWE	CWE-122: Heap-based Buffer Overflow

Vulnerability CVE-2021-44443

JTTK library in affected products contains an out of bounds write past the end of an allocated structure while parsing specially crafted JT files. This could allow an attacker to execute code in the context of the current process. (ZDI-CAN-15039)

CVSS v3.1 Base Score	7.8
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:H/I:H/A:H/E:P/RL:O/RC:C
CWE	CWE-787: Out-of-bounds Write

Vulnerability CVE-2021-44444

JTTK library in affected products is vulnerable to an out of bounds read past the end of an allocated buffer when parsing specially crafted JT files. An attacker could leverage this vulnerability to leak information in the context of the current process. (ZDI-CAN-15052)

CVSS v3.1 Base Score	3.3
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:L/I:N/A:N/E:P/RL:O/RC:C
CWE	CWE-125: Out-of-bounds Read

Vulnerability CVE-2021-44445

JTTK library in affected products contains an out of bounds write past the fixed-length heap-based buffer while parsing specially crafted JT files. This could allow an attacker to execute code in the context of the current process. (ZDI-CAN-15054)

CVSS v3.1 Base Score	7.8
CVSS Vector	CVSS:3.1/AV:L/AC:L/PR:N/UI:R/S:U/C:H/I:H/A:H/E:P/RL:O/RC:C
CWE	CWE-122: Heap-based Buffer Overflow

ACKNOWLEDGMENTS

Siemens thanks the following parties for their efforts:

- Bentley Systems Incorporated for coordinated disclosure

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 (2021-12-14): Publication Date

TERMS OF USE