Communications Security Establishment | Centre de la sécurité des télécommunications

CANADIAN CENTRE FOR CYBER SECURITY

COMMON CRITERIA CERTIFICATION REPORT

Oracle Linux 7.6 UEK 5 KVM & Virtualization Manager 4.3

3 March 2023

571-LSS

Canada

FOREWORD

This certification report is an UNCLASSIFIED publication, issued under the authority of the Chief, Communications Security Establishment (CSE).

The Information Technology (IT) product identified in this certification report, and its associated certificate, has been evaluated at an approved testing laboratory established under the Canadian Centre for Cyber Security (a branch of CSE). This certification report, and its associated certificate, applies only to the identified version and release of the product in its evaluated configuration. The evaluation has been conducted in accordance with the provisions of the Canadian Common Criteria Program, and the conclusions of the testing laboratory in the evaluation report are consistent with the evidence adduced.

This report, and its associated certificate, are not an endorsement of the IT product by Canadian Centre for Cyber Security, or any other organization that recognizes or gives effect to this report, and its associated certificate, and no warranty for the IT product by the Canadian Centre for Cyber Security, or any other organization that recognizes or gives effect to this report, and its associated certificate, is either expressed or implied.

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OVERVIEW

The Canadian Common Criteria Program provides a third-party evaluation service for determining the trustworthiness of Information Technology (IT) security products. Evaluations are performed by a commercial Common Criteria Testing Laboratory (CCTL) under the oversight of the Certification Body, which is managed by the Canadian Centre for Cyber Security.

A CCTL is a commercial facility that has been approved by the Certification Body to perform Common Criteria evaluations; a significant requirement for such approval is accreditation to the requirements of ISO/IEC 17025, the General Requirements for the Competence of Testing and Calibration Laboratories.

By awarding a Common Criteria certificate, the Certification Body asserts that the product complies with the security requirements specified in the associated security target. A security target is a requirements specification document that defines the scope of the evaluation activities. The consumer of certified IT products should review the security target, in addition to this certification report, to gain an understanding of any assumptions made during the evaluation, the IT product's intended environment, the evaluated security functionality, and the testing and analysis conducted by the CCTL.

The certification report, certificate of product evaluation and security target are posted to the Common Criteria portal (the official website of the International Common Criteria Program).

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EXECUTIVE SUMMARY

Oracle Linux 7.6 UEK 5 KVM & Virtualization Manager 4.3 (hereafter referred to as the Target of Evaluation, or TOE), from **Oracle Corporation** , was the subject of this Common Criteria evaluation. A description of the TOE can be found in Section 1.2. The results of this evaluation demonstrate that the TOE meets the requirements of the conformance claim listed in Section 1.1 for the evaluated security functionality.

Lightship Security is the CCTL that conducted the evaluation. This evaluation was completed on **3 March 2023** and was carried out in accordance with the rules of the Canadian Common Criteria Program.

The scope of the evaluation is defined by the Security Target, which identifies assumptions made during the evaluation, the intended environment for the TOE, and the security functional/assurance requirements. Consumers are advised to verify that their operating environment is consistent with that specified in the security target, and to give due consideration to the comments, observations, and recommendations in this Certification Report.

The Canadian Centre for Cyber Security, as the Certification Body, declares that this evaluation meets all the conditions of the Arrangement on the Recognition of Common Criteria Certificates and that the product is listed on the Certified Products list (CPL) for the Canadian Common Criteria Program and the Common Criteria portal (the official website of the International Common Criteria Program).

1 IDENTIFICATION OF TARGET OF EVALUATION

The Target of Evaluation (TOE) is identified as follows:

Table 1: TOE Identification

TOE Name and Version	Oracle Linux 7.6 UEK 5 KVM & Virtualization Manager 4.3
Developer	Oracle Corporation

1.1 COMMON CRITERIA CONFORMANCE

The evaluation was conducted using the Common Methodology for Information Technology Security Evaluation, Version 3.1 Revision 4, for conformance to the Common Criteria for Information Technology Security Evaluation, Version 3.1 Revision 4.

The TOE claims the following conformance:

Protection Profile for Virtualization Version 1.0, 22 November 2016

Extended Package for Server Virtualization Version 1.0, 22 November 2016

Extended Package for Secure Shell (SSH) Version 1.0, 19 February 2016

1.2 TOE DESCRIPTION

The TOE is a server virtualization management platform that is bundled with Oracle Linux and is used to provide server virtualization capabilities to users. The TOE would typically be deployed onto enterprise grade hardware housed in data centers and users interact with the TOE via secure remote communication channels.

The TOE is used to provide virtualized instances of services traditionally executed on separate hardware platforms, such as web servers, file servers, and mail servers.

1.3 TOE ARCHITECTURE

A diagram of the TOE architecture is as follows:

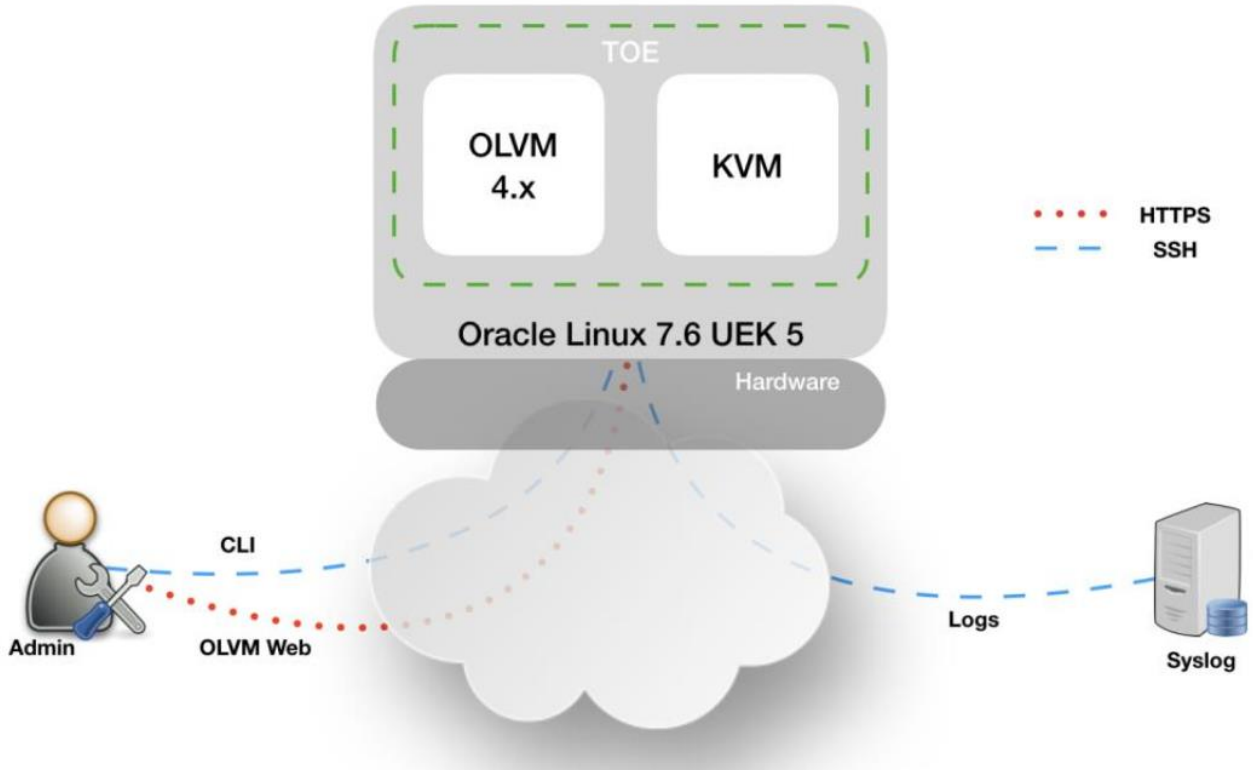

Figure 1: TOE Architecture

2 SECURITY POLICY

The TOE implements and enforces policies pertaining to the following security functionality:

- VM Hardware-based Isolation
- VM Resource Control
- VM Residual Information Clearing
- VM Networking & Separation
- VM User Interface
- VS Integrity
- VS Self Protection
- Protected Communications
- Secure Administration
- System Monitoring
- Cryptographic Operations

Complete details of the security functional requirements (SFRs) can be found in the Security Target (ST) referenced in section 8.2.

2.1 CRYPTOGRAPHIC FUNCTIONALITY

The following cryptographic implementations are used by the TOE and have been evaluated by the CAVP/CMVP:

Table 2: Cryptographic Implementation(s)

Cryptographic Module/Algorithm	Certificate Number
Oracle Linux 7.6 OpenSSL with AESNI, SHA1 AVX, SHA2 ASM v.R7-7.6.1	A1400
Oracle Linux 7.6 OpenSSL with AES and SHA1 assembler v.R7-7.6.1	A1401
Oracle Linux 7.6 OpenSSL VPAES and SHA1 SSSE3 v.R7-7.6.1	A1402

3 ASSUMPTIONS AND CLARIFICATION OF SCOPE

Consumers of the TOE should consider assumptions about usage and environmental settings as requirements for the product's installation and its operating environment. This will ensure the proper and secure operation of the TOE.

3.1 USAGE AND ENVIRONMENTAL ASSUMPTIONS

The following assumptions are made regarding the use and deployment of the TOE:

- The platform has not been compromised prior to installation of the Virtualization System
- Physical security commensurate with the value of the TOE and the data it contains is assumed to be provided by the environment.
- If the TOE has covert storage or timing channels, then for all VMs executing on that TOE, it is assumed that relative to the IT assets to which they have access, those VMs will have assurance sufficient to outweigh the risk that they will violate the security policy of the TOE by using those covert channels

3.2 CLARIFICATION OF SCOPE

This CC evaluation only covers the functionality identified in section 2.3 when Oracle Linux 7.6 UEK 5 KVM & Virtualization Manager 4.3.10.4-1.0.21 is configured in accordance with the CC guidance.

The TOE contains a REST API. Access to this interface requires valid administrator credentials. The REST API is not used in the evaluated configuration.

4 EVALUATED CONFIGURATION

The evaluated configuration for the TOE comprises:

TOE Software/Firmware	Oracle Linux 7.6 UEK 5 KVM & Virtualization Manager 4.3.10.4-1.0.21 (installed as part of Oracle Linux 7.6 UEK 5)
TOE Hardware	Oracle X7-2 hardware platform with the Intel Xeon Silver 4114 CPU.
Environmental Support	• Syslog Server

4.1 DOCUMENTATION

The following documents are provided to the consumer to assist in the configuration and installation of the TOE:

a) Oracle Linux 7.6 UEK 5 KVM & Virtualization Manager 4.3 Common Criteria Guide, v1.6, March 2023
b) Oracle Linux v7.6 Common Criteria Guidance Document, v0.9, September 2020
c) Oracle Linux Virtualization Manager: Getting Started Guide, F25124-11 September 2021
d) Oracle Linux Virtualization Manager Administration Guide, F22919-10 September 2021
e) oVirt Administration Guide (upstream OLVM documentation)
f) oVirt Upgrade Guide
g) oVirt Virtual Machine Management Guide
h) oVirt Introduction to the VM Portal
i) Oracle Linux KVM User's Guide

5 EVALUATION ANALYSIS ACTIVITIES

The evaluation analysis activities involved a structured evaluation of the TOE. Documentation and process dealing with Development, Guidance Documents, and Life-Cycle Support were evaluated.

5.1 DEVELOPMENT

The evaluators analyzed the documentation provided by the vendor; they determined that the design completely and accurately describes the TOE security functionality (TSF) interfaces and how the TSF implements the security functional requirements. The evaluators determined that the initialization process is secure, that the security functions are protected against tamper and bypass, and that security domains are maintained.

5.2 GUIDANCE DOCUMENTS

The evaluators examined the TOE preparative user guidance and operational user guidance and determined that it sufficiently and unambiguously describes how to securely transform the TOE into its evaluated configuration and how to use and administer the product. The evaluators examined and tested the preparative and operational guidance and determined that they are complete and sufficiently detailed to result in a secure configuration.

Section 4.1 provides details on the guidance documents.

5.3 LIFE-CYCLE SUPPORT

An analysis of the TOE configuration management system and associated documentation was performed. The evaluators found that the TOE configuration items were clearly marked.

The evaluators examined the delivery documentation and determined that it described all the procedures required to maintain the integrity of the TOE during distribution to the consumer.

6 TESTING ACTIVITIES

Testing consists of the following three steps: assessing developer tests, performing independent tests, and performing a vulnerability analysis.

6.1 ASSESSMENT OF DEVELOPER TESTS

The evaluators verified that the developer has met their testing responsibilities by examining their test evidence, and reviewing their test results, as documented in the Evaluation Test Report (ETR). The correspondence between the tests identified in the developer's test documentation and the functional specification was complete.

6.2 CONDUCT OF TESTING

The TOE was subjected to a comprehensive suite of formally documented, independent functional and penetration tests. The detailed testing activities, including configurations, procedures, test cases, expected results and observed results are documented in a separate Test Results document.

6.3 INDEPENDENT TESTING

During this evaluation, the evaluator developed independent functional & penetration tests by examining design and guidance documentation.

All testing was planned and documented to a sufficient level of detail to allow repeatability of the testing procedures and results. The following testing activities were performed:

a. PP Assurance Activities: The evaluator performed the assurance activities listed in the claimed PP

b. Cryptographic Implementation Verification: The evaluator verified that the cryptographic implementations were present in the TOE.

6.3.1 INDEPENDENT TESTING RESULTS

The developer's tests and the independent tests yielded the expected results, providing assurance that the TOE behaves as specified in its ST and functional specification.

6.4 VULNERABILITY ANALYSIS

The vulnerability analysis focused on 4 flaw hypotheses.

- Public Vulnerability based (Type 1)
- Technical community sources (Type 2)
- Evaluation team generated (Type 3)
- Tool Generated (Type 4)

The evaluators conducted an independent review of all evaluation evidence, public domain vulnerability databases and technical community sources (Type 1 & 2). Additionally, the evaluators used automated vulnerability scanning tools to discover potential network, platform, and application layer vulnerabilities (Type 4). Based upon this review, the evaluators formulated flaw hypotheses (Type 3), which they used in their vulnerability analysis.

Type 1 & 2 searches were conducted on **5 December 2022** and included the following search terms:

Oracle Linux Virtualization Manager 4.3 (oVirt 4.3 upstream)	oVirt 4.3 (upstream)	OpenSSH 7.4	Qemu-kvm 4.2.1
Oracle Linux 7.6	OpenSSL 1.0.2k	Postgresql 10.17	Libvirt 5.7
Oracle UEK 5	Apache 2.4	Open vSwitch 2.11.0	

Vulnerability searches were conducted using the following sources:

Oracle Critical Patch Updates, Security Alerts and Bulletins https://www.oracle.com/ca-en/security-alerts/	CISA - Known Exploited Vulnerabilities Catalog: https://www.cisa.gov/known-exploited-vulnerabilities-catalog
CCCS – Alerts and advisories: https://cyber.gc.ca/en/alerts-advisories	NIST National Vulnerability Database https://nvd.nist.gov/vuln/search
Rapid 7 Vulnerability & Exploit Database https://www.rapid7.com/db/	OpenSSL Vulnerabilities: https://www.openssl.org/news/vulnerabilities.html

6.4.1 VULNERABILITY ANALYSIS RESULTS

The vulnerability analysis did not uncover any security relevant residual exploitable vulnerabilities in the intended operating environment.

7 RESULTS OF THE EVALUATION

The Information Technology (IT) product identified in this certification report, and its associated certificate, has been evaluated at an approved testing laboratory established under the Canadian Centre for Cyber Security. This certification report, and its associated certificate, apply only to the specific version and release of the product in its evaluated configuration.

This evaluation has provided the basis for the conformance claim documented in Table 1. The overall verdict for this evaluation is **PASS**. These results are supported by evidence in the ETR.

7.1 RECOMMENDATIONS/COMMENTS

It is recommended that all guidance outlined in Section 4.1 be followed to configure the TOE in the evaluated configuration.

8 SUPPORTING CONTENT

8.1 LIST OF ABBREVIATIONS

Term	Definition
CAVP	Cryptographic Algorithm Validation Program
CCTL	Common Criteria Testing Laboratory
CMVP	Cryptographic Module Validation Program
CSE	Communications Security Establishment
EAL	Evaluation Assurance Level
ETR	Evaluation Technical Report
IT	Information Technology
ITS	Information Technology Security
PP	Protection Profile
SFR	Security Functional Requirement
ST	Security Target
TOE	Target of Evaluation
TSF	TOE Security Function

8.2 REFERENCES

Reference
Common Criteria for Information Technology Security Evaluation, Version 3.1 Revision 4, September 2012.
Common Methodology for Information Technology Security Evaluation, CEM, Version 3.1 Revision 4, September 2012.
Security Target Oracle Linux 7.6 UEK 5 KVM & Virtualization Manager 4.3, 3 March 2023 v2.3
Evaluation Technical Report Oracle Linux 7.6 UEK 5 KVM & Virtualization Manager 4.3, 3 March 2023 v1.1
Assurance Activity Report Oracle Linux 7.6 UEK 5 KVM & Virtualization Manager 4.3, 3 March 2023 v1.1