Communications Security Establishment | Centre de la sécurité des télécommunications

CANADIAN CENTRE FOR CYBER SECURITY

COMMON CRITERIA CERTIFICATION REPORT

Citrix Hypervisor ® 8.2 LTSR Premium Edition (CU1)

23 August 2022

580-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

Citrix Hypervisor ® 8.2 LTSR Premium Edition (CU1) (hereafter referred to as the Target of Evaluation, or TOE), from **Citrix Systems, Inc.** , 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 **23 August 2022** 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	Citrix Hypervisor ® 8.2 LTSR Premium Edition (CU1)
Developer	Citrix Systems, Inc.

1.1 COMMON CRITERIA CONFORMANCE

The evaluation was conducted using the Common Methodology for Information Technology Security Evaluation, Version 3.1 Revision 5, for conformance to the Common Criteria for Information Technology Security Evaluation, Version 3.1 Revision 5.

The TOE claims the following conformance:

EAL 2+ (ALC_FLR.2)

1.2 TOE DESCRIPTION

The TOE is a server virtualisation product that runs directly on server hardware. It establishes execution environments that create the appearance of physical computers into which guest operating systems may be installed and run. Each running virtual machine, referred to as a domain, is configured to operate with a set of virtual CPU, memory, storage, and network resources.

The resources allocated to each domain are isolated from any other domain (other than the control domain, dom0). This isolation is enforced by the TOE itself and does not rely on the behaviour of guest operating systems running within the domains.

1.3 TOE ARCHITECTURE

A diagram of the TOE architecture is as follows:

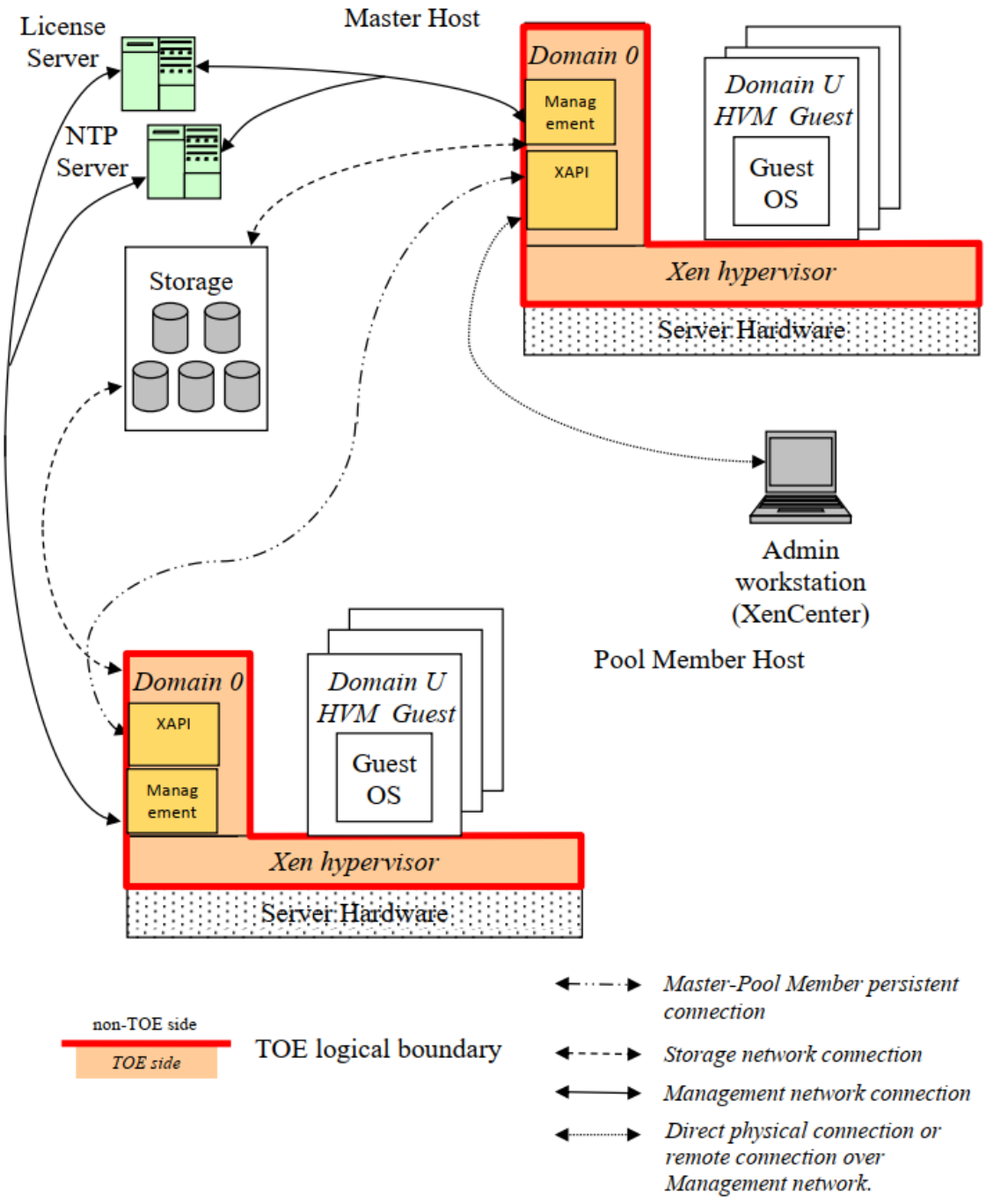

Figure 1: TOE Architecture

2 SECURITY POLICY

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

- VM Memory Separation
- VM Disk Separation
- Administrator Authentication
- Channel Protection

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 implementation is used by the TOE and has been evaluated by the CMVP:

Table 2: Cryptographic Implementation

Cryptographic Module	Certificate Number
Citrix FIPS Cryptographic Module v1.0.2	#2988

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 components of the TOE and IT environment are kept physically secure so that no unauthorised persons have access to the components, either physically or for connection (e.g. via console ports)
- The storage connection and storage devices used by the TOE are physically isolated from the other networks used by the TOE, and that the management, storage, and guest networks each use separate NICs (more than one NIC may be used for the guest network)

3.2 CLARIFICATION OF SCOPE

The following intrinsic capabilities and options within the basic TOE product were not included in the scope of the evaluation:

HVM UEFI guests	Storage live migration	Host BIOS boot
PV guests	Active Directory integration	Dynamic Memory Control (Ballooning)
Live VM migration	Live Memory Checkpoint	High availability
Role Based Administration	Direct Inspect APIs/HVI	Heterogeneous Resource Pools
SNMP	vGPU/GPUpass-through/GVT-g/GVT-d/AMD Tonga	Role Based Access Control (RBAC)
vSwitch	Intellicache	Software FCoE Storage
Software-boot-from iSCSI	Dynamic Workload Balancing & Audit Reporting (WLB)	VM storage on LVM
Disaster Recovery	GPU Virtualization	Provisioning Services
Health Check	vGPU live migration	Workload Balancing virtual appliance
vSwitch Controller virtual appliance	Citrix Hypervisor Conversion Manager	PVS Accelerator Supplemental Pack

4 EVALUATED CONFIGURATION

The evaluated configuration for the TOE comprises:

TOE Software/Firmware	Citrix Hypervisor ® 8.2 LTSR Premium Edition (Cumulative Update 1) with the following hotfixes installed: • XS82ECU1001 • XS82ECU1002 • XS82ECU1003 • XS82ECU1005 • XS82ECU1006 • XS82ECU1007 • XS82ECU1010 • XS82ECU1012 • XS82ECU1014
TOE Hardware	A dedicated x86 Server with the following specifications: • A 64-bit Intel-VT with EPT processor • Minimum of 3 Network Interface cards • Minimum 2 GB of RAM • Minimum 46 GB disk space
Environmental Support	• Citrix License Server Version 11 • NTP server that supports NTP version 4

4.1 DOCUMENTATION

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

a) Citrix Hypervisor 8.2 Product Documentation for Common Criteria, 9 December 2021, v1.0
b) Common Criteria Evaluated Configuration Guide for Citrix Hypervisor 8.2 Cumulative Update 1 Premium Edition, 25 July 2022, v1.5
c) Citrix Hypervisor 8.2 documentation 18 August 2022

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. Repeat of Developer's Tests: The evaluator repeated a subset of the developer's tests

b. Cryptographic Implementation Verification: The evaluator verified that the claimed cryptographic implementation was present in the TOE

c. Inbound Connection Cipher suites: The evaluator verified that the claimed cipher suites are used for inbound connections

d. Use of Trusted Channels with External Entities: The evaluator verified that the claimed protocols were used for communication with external entities

e. Configuring Networking Components: The evaluator verified that only the Administrator can configure network components

f. Trusted Updates: The evaluator verified that only legitimate updates to the TOE can be installed

g. Memory Isolation: The evaluator verified that the TOE isolates memory between VMs

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 **11 July 2022** and included the following search terms:

Citrix Hypervisor	Xen Hypervisor 4.13.4	stunnel 5.56
Citrix FIPS Cryptographic Module	OpenSSL 1.1.1k	

Vulnerability searches were conducted using the following sources:

NIST National Vulnerability Database https://nvd.nist.gov	CISA – Known exploited vulnerabilities Catalog https://www.cisa.gov/known-exploited-vulnerabilities-catalog
Citrix Support Knowledge Center https://support.citrix.com/search/	OpenSSL Vulnerabilities https://www.openssl.org/news/vulnerabilities-1.1.1.html
CVE Details https://www.cvedetails.com	Google https://google.ca

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 5, April 2017.
Common Methodology for Information Technology Security Evaluation, CEM, Version 3.1 Revision 5, April 2017.
Security Target Citrix Hypervisor ® 8.2 LTSR Premium Edition (CU1), 12 August 2022, v1.9
Evaluation Technical Report Citrix Hypervisor ® 8.2 LTSR Premium Edition (CU1), 23 August 2022, v1.0