



Communications  
Security Establishment

Centre de la sécurité  
des télécommunications

# CANADIAN CENTRE FOR **CYBER SECURITY**

## COMMON CRITERIA CERTIFICATION REPORT

### Dell EMC™ XtremIO v6.3.1-5 with the 6.3.1-5 Storage Controller Software 14 October 2020

**489 EWA 2019**

# 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 evaluation facility established under the Canadian Centre for Cyber Security (CCCS). 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 CC Scheme, and the conclusions of the evaluation facility 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 Scheme provides a third-party evaluation service for determining the trustworthiness of Information Technology (IT) security products. Evaluations are performed by a commercial Common Criteria Evaluation Facility (CCEF) under the oversight of the Certification Body, which is managed by the Canadian Centre for Cyber Security.

A CCEF 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, in order 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 CCEF.

The certification report, certificate of product evaluation and security target are listed on the Certified Products list (CPL) for the Canadian CC Scheme and posted on the Common Criteria portal (the official website of the International Common Criteria Project).



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## EXECUTIVE SUMMARY

The Dell EMC™ XtremIO v6.3.1-5 with the 6.3.1-5 Storage Controller Software (hereafter referred to as the Target of Evaluation, or TOE), from Dell EMC, 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.

EWA-Canada is the CCEF that conducted the evaluation. This evaluation was completed on 14 October 2020 and was carried out in accordance with the rules of the Canadian Common Criteria Scheme.

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 CC Scheme and the Common Criteria portal (the official website of the International Common Criteria Project).

# 1 IDENTIFICATION OF TARGET OF EVALUATION

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

**Table 1: TOE Identification**

<b>TOE Name and Version</b>	Dell EMC™ XtremIO v6.3.1-5 with the 6.3.1-5 Storage Controller Software
<b>Developer</b>	Dell EMC

## 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:

EAL2 + ALC\_FLR.2

## 1.2 TOE DESCRIPTION

The TOE is an all-flash system providing storage for enterprise applications, based on a scale-up and scale-out architecture. The system uses building blocks, called X-Bricks, which can be clustered together. Each X-Brick contains two storage nodes in a group of Self Encrypting Devices (SEDs) used in performing Data at Rest Encryption of all data stored on the TOE.

System operation is controlled via a stand-alone dedicated server (using a proprietary hardened Linux OS), called the XtremIO Management Server (XMS). Each XtremIO cluster requires its own XMS host appliance. The XMS enables control and management of XtremIO clusters, including:

- Creating, formatting, and initializing new clusters
- Monitoring cluster performance
- Collecting cluster performance statistics
- Providing GUI and CLI services to administrators
- Implementing volume management and data protection groups
- Providing operational support functions

Host Initiators (or Enterprise storage servers) access data on the XtremIO system via the iSCSI protocol. Volumes within XtremIO are only exposed to initiators that they have been mapped to, and may be further restricted by Virtual Local Area Networks (VLANs).

### 1.3 TOE ARCHITECTURE

A diagram of the TOE architecture is as follows:

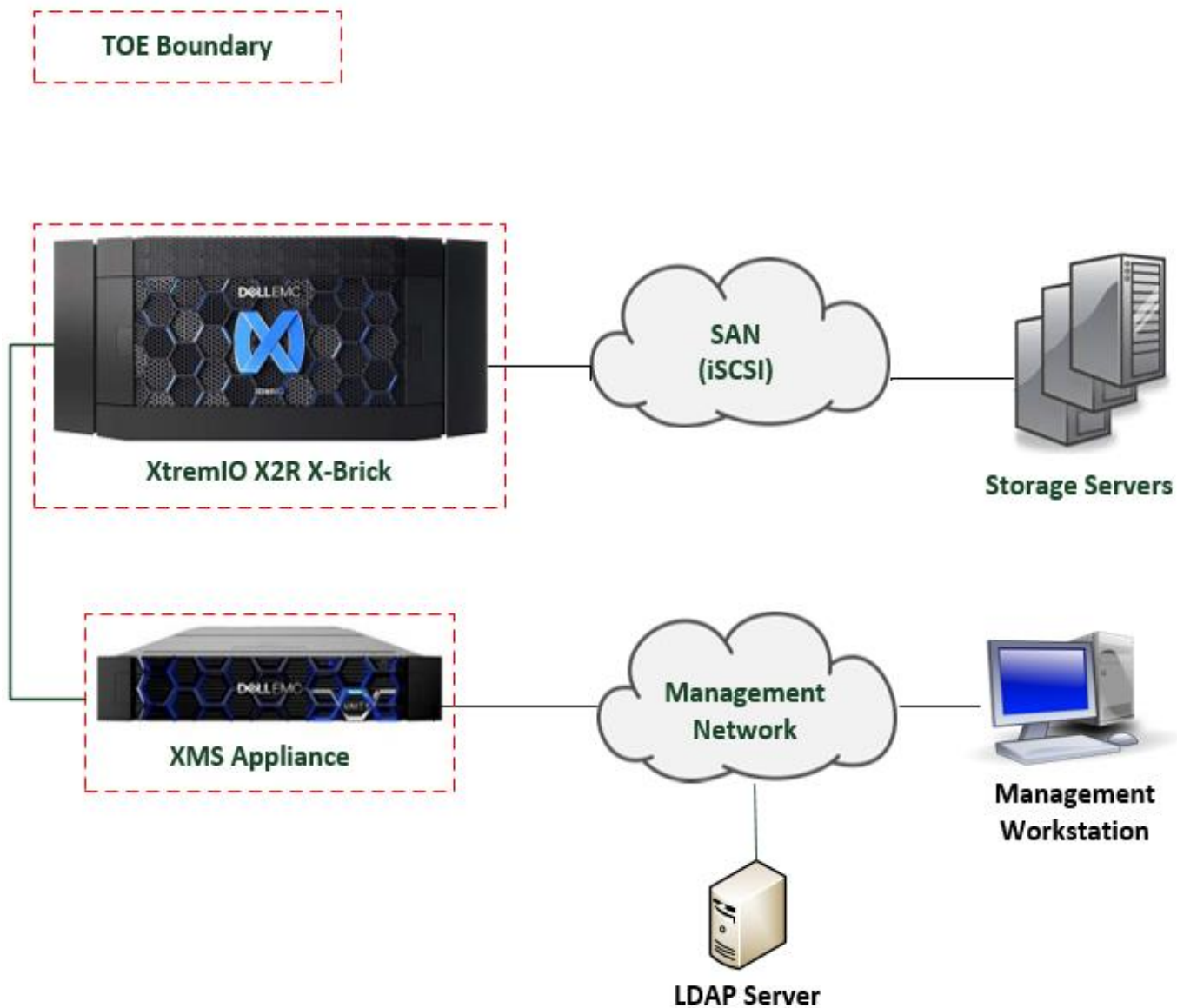


Figure 1: TOE Architecture



## 2 SECURITY POLICY

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

- Security audit;
- Cryptographic support;
- User data protection;
- Identification and authentication;
- Security management;
- Protection of the TSF; and
- TOE access.

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

**Table 2: Cryptographic Implementation**

Cryptographic Module	Certificate Number
KIOXIA TCG Enterprise SSC Crypto Sub-Chip	3290

## 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 TOE will be located within controlled access facilities, which will prevent unauthorized physical access.
- There are one or more competent individuals assigned to manage the TOE. These administrators are not careless, wilfully negligent, or hostile, are appropriately trained and will follow the instructions provided by the TOE documentation.

### 3.2 CLARIFICATION OF SCOPE

The following features were excluded from the evaluation:

- Public Key Authentication
- Challenge-Handshake Authentication Protocol (CHAP) authentication of host initiators
- High availability
- Support Assist Enterprise (SAE)
- OpenStack

The following interfaces were not used in the evaluated configuration:

- REST API
- PowerShell API

## 4 EVALUATED CONFIGURATION

The evaluated configuration for the TOE comprises:

- XtremIO X2R X-Brick with 6.3.1-5 Storage controller software
- XMS Appliance with XMS 6.3.1-5 software

The following are required in the operational environment:

- Management workstation with 64-bit Windows 10 operating system
- iSCSI Host with CentOS 6
- LDAP Server with Windows Server 2012 operating system

### 4.1 DOCUMENTATION

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

- Dell EMC XtremIO Storage Array X1 and X2 Cluster Types XMS Versions 6.2.0 and 6.2.1, XIOS Versions 4.0.15, 4.0.25, 4.0.26, 4.0.27, 6.0.0, 6.0.1, 6.0.2, 6.1.0, 6.2.0 and 6.2.1 User Guide REV. 06, April 2019
- Dell EMC XtremIO Storage Array X1 and X2 Cluster Types XMS Versions 6.2.0 and 6.2.1, XIOS Versions 4.0.15, 4.0.25, 4.0.26, 4.0.27, 6.0.0, 6.0.1, 6.0.2, 6.1.0, 6.2.0 and 6.2.1 Security Configuration Guide, REV. 03, 16 April 2019
- Dell EMC XtremIO Storage Array X1 and X2 Cluster Types XMS Versions 6.2.0 and 6.2.1, XIOS Versions 4.0.15, 4.0.25, 4.0.26, 4.0.27, 6.0.0, 6.0.1, 6.0.2, 6.1.0, 6.2.0 and 6.2.1 Admin CLI Guide, REV. 03, April 2019
- Dell EMC XtremIO Storage Array X2 Cluster Type XMS Versions 6.2.0 and 6.2.1, XIOS Versions 6.0.0, 6.0.1, 6.0.2, 6.1.0, 6.2.0 and 6.2.1 Site Preparation Guide, REV. 03, 18 April 2019
- Dell EMC™ XtremIO® Common Criteria Guidance Supplement, Version 1.4, 13 October 2020

## 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 of 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 functional tests, and performing penetration tests.

### 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 FUNCTIONAL TESTING

During this evaluation, the evaluator developed independent functional 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. User Role Permissions: For each of user roles that can be created by the administrator, the evaluator verified that such users were limited to the tasks specified for their assigned role
- c. Verification of Cryptographic Implementation: The evaluator verified the presence of the claimed cryptographic module used by the TOE

#### 6.3.1 FUNCTIONAL TEST RESULTS

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

## 6.4 INDEPENDENT PENETRATION TESTING

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The penetration testing effort 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 penetration testing effort.

### 6.4.1 PENETRATION TEST RESULTS

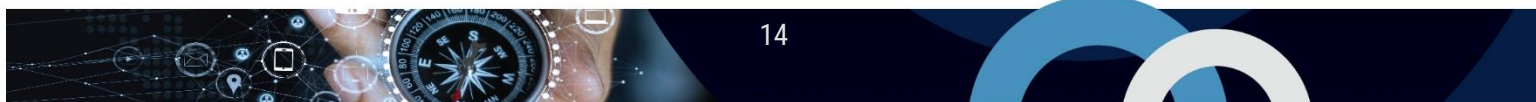
Type 1 & 2 searches were conducted on 7/30/2020 and included the following search terms:

- XtremIO
- XtremIO 6.3.1-5
- Host Initiator
- Storage Controller Software 6.3.1-5

Vulnerability searches were conducted using the following sources:

- National Vulnerability Database: <https://nvd.nist.gov/vuln/search>
- EMC Support: <https://support.emc.com/>
- Common Vulnerabilities and Exposures: <http://google.ca>

The independent penetration testing did not uncover any residual exploitable vulnerabilities in the intended operating environment.



## 7 RESULTS OF THE EVALUATION

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.

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### 7.1 RECOMMENDATIONS/COMMENTS

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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
CCCS	Canadian Centre for Cyber Security
CCEF	Common Criteria Evaluation Facility
CM	Configuration Management
CMVP	Cryptographic Module Validation Program
CSE	Communications Security Establishment
EAL	Evaluation Assurance Level
ETR	Evaluation Technical Report
GC	Government of Canada
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.
Dell EMC XtremIO v6.3.1 Security Target, Version 1.7, 13 October 2020
Evaluation Technical Report for Common Criteria Evaluation of Dell EMC XtremIO v6.3.1, Version 1.3, 14 October 2020