KECS-CR-21-10

ShadowCube V7.0

Certification Report

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IT Security Certification Center

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This document is the certification report for ShadowCube V7.0 of Duruan Co., Ltd

The Certification Body

IT Security Certification Center

The Evaluation Facility

Telecommunications Technology Association (TTA)

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1. Executive Summary

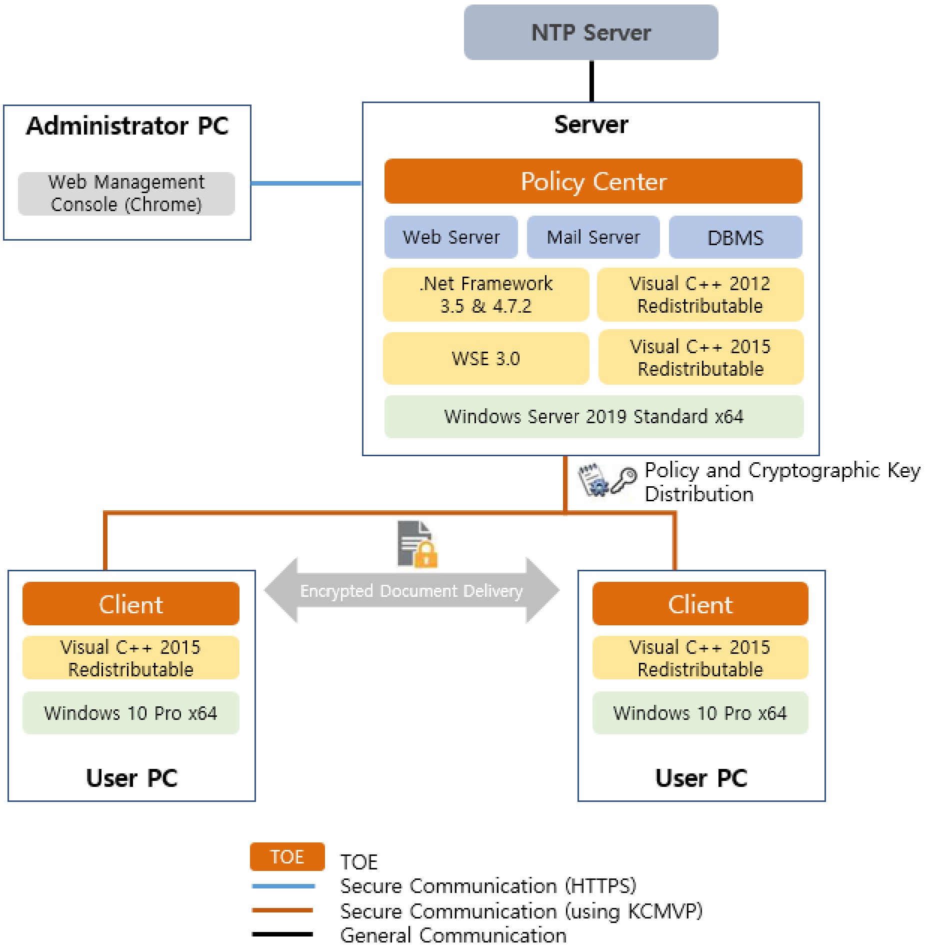
This report describes the certification result drawn by the certification body on the results of the ShadowCube V7.0 developed by Duruan Co., Ltd. with reference to the Common Criteria for Information Technology Security Evaluation (“CC” hereinafter)[1]. It describes the evaluation result and its soundness and conformity.

The Target of Evaluation (“TOE” hereinafter) is Electronic Document Encryption designed to protect important documents managed by the organization based on the encryption/decryption. Also, the TOE provide a variety of security features: security audit, the user identification and authentication including mutual authentication between TOE components, security management, the TOE access session management, and the TSF protection function, etc.

The evaluation of the TOE has been carried out by Telecommunications Technology Association (TTA) and completed on February 25, 2021. This report grounds on the Evaluation Technical Report (ETR) [4] TTA had submitted and the Security Target (ST) [5].

The ST claims strict conformance to the Korean National PP for Electronic Document Encryption V1.1 [3]. All Security Assurance Requirements (SARs) in the ST are based only upon assurance component in CC Part 3. The ST and the resulting TOE is CC Part 3 conformant. The Security Functional Requirements (SFRs) are based upon both functional components in CC Part 2 and a newly defined component in the Extended Component Definition chapter of the PP, therefor the ST, and the TOE satisfies the SFRs in the ST. Therefore the ST and the resulting TOE is CC Part 2 extended.

[Figure 1] shows the operational environment of the TOE. The TOE is composed of Policy Center which manages the security policy and cryptographic key, the Client installed in the user PC to encrypt/decrypt Electronic Document.


NTP Server
Administrator PC
Web Management Console (Chrome)
Server
Policy Center
Web Server
Mail Server
DBMS
.Net Framework 3.5 & 4.7.2
Visual C++ 2012 Redistributable
WSE 3.0
Visual C++ 2015 Redistributable
Windows Server 2019 Standard x64
Policy and Cryptographic Key Distribution
Encrypted Document Delivery
Client
Visual C++ 2015 Redistributable
Windows 10 Pro x64
User PC
Client
Visual C++ 2015 Redistributable
Windows 10 Pro x64
User PC
TOE
TOE
Secure Communication (HTTPS)
Secure Communication (using KCMVP)
General Communication

[Figure 1] Operational Environment of the TOE

The minimum requirements for hardware, software to install and operate the TOE are shown in below:

Component		Requirement
Policy Center	H/W	CPU : Intel i7 Quad Core 2.0GHz or higher Memory : 8GB or higher HDD : 600MB or higher required for installing the TOE NIC : 100/1000 Mbps 1 Port or higher
	S/W	Microsoft Windows Server 2019 Standard (64bit) PostgreSQL 12.5 IIS (Internet Information Services) 10.0 SMTP Virtual Server 10.0 Microsoft Visual C++ 2012 Redistributable (x86) - 11.0.61030 Microsoft Visual C++ 2012 Redistributable (x64) - 11.0.61030 Microsoft Visual C++ 2015 Redistributable (x86) - 14.0.24215 Microsoft Visual C++ 2015 Redistributable (x64) - 14.0.24215 Microsoft .NET Framework 3.5

Component		Requirement
		Microsoft .NET Framework 4.7.2 WSE (Web Service Enhancements) 3.0 Chrome 88.0
Client	H/W	CPU : Intel i3 Dual Core 1.0GHz or higher Memory : 4GB or higher HDD : 180 MB or higher required for installing the TOE NIC : 100/1000 Mbps 1 Port or higher
	S/W	Microsoft Windows 10 Pro (64bit) Microsoft Visual C++ 2015 Redistributable (x86) - 14.0.24215 Microsoft Visual C++ 2015 Redistributable (x64) - 14.0.24215 MS Notepad, MS WordPad, MS Paint Microsoft Office 2007, 2010, 2013, 2016, 2019 Hancom Office 2010, 2014(VP), NEO, 2018, 2020 Acrobat Reader 11, DC Autodesk AutoCAD 2019, 2020, 2021

The hardware / software requirements of the PC used by the authorized administrator to manage the TOE are shown in below:

Component	Requirement
S/W	Chrome 88.0

External IT entity linked to the TOE operation is NTP Server.

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2. Identification

The TOE reference is identified as follows.

TOE	ShadowCube V7.0	
Version	7.0	
Detailed version	7.0.7	
TOE Components	Policy Center	Policy Center 7.0.7.1409 - server_7.0.7.1409.exe
	Client	Client 7.0.7.1409 - scsetup_7.0.7.1409.exe
Guidance Documents	ShadowCube V7.0 Administrator Operational Guidance V1.4.pdf ShadowCube V7.0 User Guidance V1.4.pdf ShadowCube V7.0 Preparative Procedure V1.5.pdf	

[Table 1] TOE identification

[Table 2] summarizes additional information for scheme, developer, sponsor, evaluation facility, certification body, etc.

Scheme	Korea Evaluation and Certification Guidelines for IT Security (August 24, 2017) Korea Evaluation and Certification Regulation for IT Security (September 12, 2017)
TOE	ShadowCube V7.0
Common Criteria	Common Criteria for Information Technology Security Evaluation, Version 3.1 Revision 5, CCMB-2017-04-001 ~ CCMB-2017-04-003, April 2017
Protection Profile	Korean National Protection Profile for Electronic Document Encryption V1.1, KECS-PP-0821a-2017
Developer	Duruan Co., Ltd.
Sponsor	Duruan Co., Ltd.
Evaluation Facility	Telecommunications Technology Association (TTA)
Completion Date of Evaluation	February 25, 2021
Certification Body	IT Security Certification Center

[Table 2] Additional identification information

3. Security Policy

The TOE complies security policies defined in the ST [5] by security requirements. Thus the TOE provides following security features. For more details refer to the ST [5].

TSF	Explanation
Security Audit	The TOE generates audit records of security relevant events such as the start-up/shutdown of the audit functions, integrity violation, self-test failures, and stores them in the DBMS.
Cryptographic Support	The TOE performs cryptographic operation such as encryption/decryption, and cryptographic key management such as key generation/distribution/destruction using MagicCrypto V2.2.0
User Data Protection	The TOE protects user's documents by making them Secured Documents by means of encrypting them and controlling access to them in accordance to the access control policy per user set by the administrator.
Identification and Authentication	The Policy Center identifies and authenticates the administrators (System administrators) based on ID/PW. and authentication code. and The Client identifies and authenticates the user based on Certification/PW. Mutual authentication between TOE components.
Security Management	The TOE provides functions such as TOE security function management, security attribute management and TSF data management to the authorized administrator.
Protection of the TSF	The TOE provides secure communications amongst TOE components to protect confidentiality and integrity of the transmitted data between them. The TOE also protects TSF data against unauthorized exposure and modification through encryption, digital signature and proprietary encoding.
TOE Access	The TOE manages the authorized administrator's access to itself by terminating interactive sessions after defined time interval of their inactivity.

[Table 3] The TOE Security Functions

4. Assumptions and Clarification of Scope

There are no explicit Assumptions in the Security Problem Definition in the Low Assurance ST. The followings are procedural method supported from operational environment in order to provide the TOE security functionality accurately.

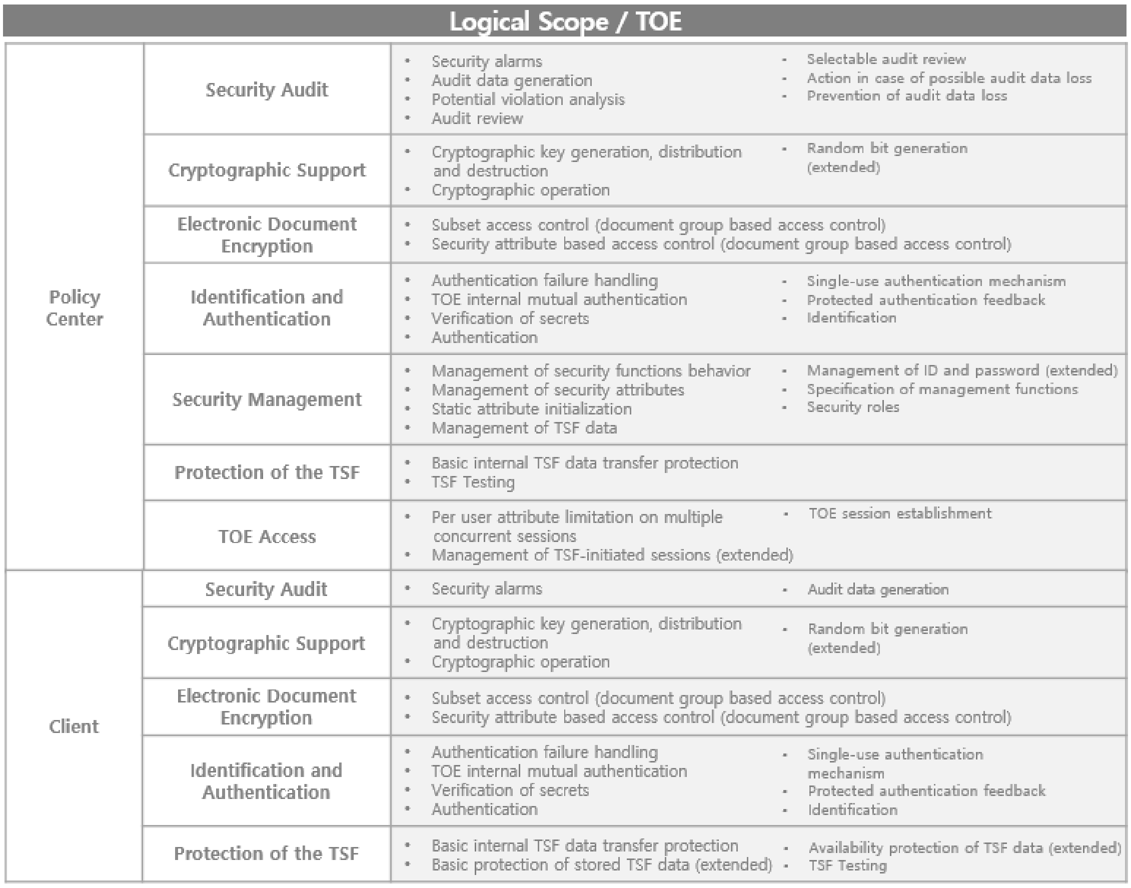
- The place where the Policy Center(TOE) among the TOE components are installed and operated shall be equipped with access control and protection facilities so that only authorized administrator can access.
- The authorized administrator of the TOE shall be non-malicious users, have

appropriately trained for the TOE management functions and accurately fulfill the duties in accordance with administrator guidance.

- The authorized administrator shall periodically checks a spare space of audit data storage in case of the audit data loss, and carries out the audit data backup (external log server or separate storage device, etc.) to prevent audit data loss.
- The authorized administrator of the TOE shall ensure the reliability and security of the operating system by removing all unnecessary services or means and performing the reinforcement on the latest vulnerabilities of the operating system in which the TOE is installed and operated.
- The developer who uses the TOE to interoperate with the user identification and authentication function in the operational environment of the business system shall ensure that the security functions of the TOE are securely applied in accordance with the requirements of the manual provided with the TOE.
- The audit record where the audit trail, such as the DBMS interacting with the TOE, is saved should be protected against unauthorized deletion or modification.
- The TOE shall accurately record the security related events using the reliable time stamp from the TOE operational environment.
- For communication between the web browser of the administrator PC and the web server which is the operation environment of the Policy Center(TOE), TLS 1.2 shall be used to guarantee the confidentiality and integrity of the transmitted data.

5. Architectural Information

The physical scope of the TOE consists of the Policy Center(TOE), Client(TOE), and guidance documents. The following security functions are provided by the TOE Logical scope and boundary of TOE is shown in [Figure 2]



Logical Scope / TOE

Policy Center	Security Audit	• Security alarms • Audit data generation • Potential violation analysis • Audit review	- Selectable audit review - Action in case of possible audit data loss - Prevention of audit data loss
	Cryptographic Support	• Cryptographic key generation, distribution and destruction • Cryptographic operation	- Random bit generation (extended)
	Electronic Document Encryption	• Subset access control (document group based access control) • Security attribute based access control (document group based access control)	
	Identification and Authentication	• Authentication failure handling • TOE internal mutual authentication • Verification of secrets • Authentication	- Single-use authentication mechanism - Protected authentication feedback - Identification
	Security Management	• Management of security functions behavior • Management of security attributes • Static attribute initialization • Management of TSF data	- Management of ID and password (extended) - Specification of management functions - Security roles
	Protection of the TSF	• Basic internal TSF data transfer protection • TSF Testing	
	TOE Access	• Per user attribute limitation on multiple concurrent sessions • Management of TSF-initiated sessions (extended)	- TOE session establishment
Client	Security Audit	• Security alarms	- Audit data generation
	Cryptographic Support	• Cryptographic key generation, distribution and destruction • Cryptographic operation	- Random bit generation (extended)
	Electronic Document Encryption	• Subset access control (document group based access control) • Security attribute based access control (document group based access control)	
	Identification and Authentication	• Authentication failure handling • TOE internal mutual authentication • Verification of secrets • Authentication	- Single-use authentication mechanism - Protected authentication feedback - Identification
	Protection of the TSF	• Basic internal TSF data transfer protection • Basic protection of stored TSF data (extended)	• Availability protection of TSF data (extended) • TSF Testing

[Figure 2] TOE Logical scope and boundary

6. Documentation

The following documentation is evaluated and provided with the TOE by the developer to the customer.

Identifier	Version	Date
ShadowCube V7.0 Administrator Operational Guidance V1.4.pdf	V1.4	Feb. 04, 2021
ShadowCube V7.0 User Guidance V1.4.pdf	V1.4	Feb. 04, 2021
ShadowCube V7.0 Preparative Procedure V1.5.pdf	V1.5	Feb. 04, 2021

[Table 4] Documentation

7. TOE Testing

The developer took a testing approach based on the security services provided by each TOE component based on the operational environment of the TOE. Each test case includes the following information:

- Test no. and conductor: Identifier of each test case and its conductor
- Test Purpose: Includes the security functions and modules to be tested
- Test Configuration: Details about the test configuration
- Test Procedure detail: Detailed procedures for testing each security function
- Expected result: Result expected from testing
- Actual result: Result obtained by performing testing
- Test result compared to the expected result: Comparison between the expected and actual result

The developer correctly performed and documented the tests according to the assurance component ATE_FUN.1.

The evaluator has installed the product using the same evaluation configuration and tools as the developer's test and performed all tests provided by the developer. The evaluator has confirmed that, for all tests, the expected results had been consistent with the actual results. In addition, the evaluator conducted penetration testing based upon test cases devised by the evaluator resulting from the independent search for potential vulnerabilities. The evaluator testing effort, the testing approach, configuration, depth, and results are summarized in the ETR [4].

8. Evaluated Configuration

The TOE is software consisting of the following components:

TOE: ShadowCube V7.0 (7.0.7)
- Policy Center 7.0.7.1409
- Client 7.0.7.1409

The Administrator can identify the complete TOE reference after installation using the product's Info check menu. And the guidance documents listed in this report chapter 6, [Table 4] were evaluated with the TOE

9. Results of the Evaluation

The evaluation facility provided the evaluation result in the ETR [4] which references Single Evaluation Reports for each assurance requirement and Observation Reports.

The evaluation result was based on the CC [1] and CEM [2].

As a result of the evaluation, the verdict PASS is assigned to all assurance components

9.1 Security Target Evaluation (ASE)

The ST Introduction correctly identifies the ST and the TOE, and describes the TOE in a narrative way at three levels of abstraction (TOE reference, TOE overview and TOE description), and these three descriptions are consistent with each other. Therefore the verdict PASS is assigned to ASE_INT.1.

The Conformance Claim properly describes how the ST and the TOE conform to the CC and how the ST conforms to PPs and packages. Therefore the verdict PASS is assigned to ASE_CCL.1.

The Security Objectives for the operational environment are clearly defined. Therefore the verdict PASS is assigned to ASE_OBJ.1.

The Extended Components Definition has been clearly and unambiguously defined, and it is necessary. Therefore the verdict PASS is assigned to ASE_ECD.1.

The Security Requirements is defined clearly and unambiguously, and they are internally consistent. Therefore the verdict PASS is assigned to ASE_REQ.1.

The TOE Summary Specification addresses all SFRs, and it is consistent with other narrative descriptions of the TOE. Therefore the verdict PASS is assigned to ASE_TSS.1.

Thus, the ST is sound and internally consistent, and suitable to be used as the basis for the TOE evaluation.

The verdict PASS is assigned to the assurance class ASE.

9.2 Life Cycle Support Evaluation (ALC)

The developer has clearly identified the TOE. Therefore the verdict PASS is assigned to ALC_CMC.1.

The configuration management document verifies that the configuration list includes the TOE and the evaluation evidence. Therefore the verdict PASS is assigned to ALC_CMS.1.

Also the evaluator confirmed that the correct version of the software is installed in device.

The verdict PASS is assigned to the assurance class ALC.

9.3 Guidance Documents Evaluation (AGD)

The procedures and steps for the secure preparation of the TOE have been documented and result in a secure configuration. Therefore the verdict PASS is assigned to AGD_PRE.1.

The operational user guidance describes for each user role the security functionality and interfaces provided by the TSF, provides instructions and guidelines for the secure use of the TOE, addresses secure procedures for all modes of operation, facilitates prevention and detection of insecure TOE states, or it is misleading or unreasonable. Therefore the verdict PASS is assigned to AGD_OPE.1.

Thus, the guidance documents are adequately describing the user can handle the TOE in a secure manner. The guidance documents take into account the various types of users (e.g. those who accept, install, administrate or operate the TOE) whose incorrect actions could adversely affect the security of the TOE or of their own data.

The verdict PASS is assigned to the assurance class AGD.

9.4 Development Evaluation (ADV)

The functional specifications specifies a high-level description of the SFR-enforcing and SFR-supporting TSFIs, in terms of descriptions of their parameters. Therefore the verdict PASS is assigned to ADV_FSP.1.

The verdict PASS is assigned to the assurance class ADV.

9.5 Test Evaluation (ATE)

The developer correctly performed and documented the tests in the test documentation. Therefore the verdict PASS is assigned to ATE_FUN.1.

By independently testing a subset of the TSFI, the evaluator confirmed that the TOE behaves as specified in the functional specification and guidance documentation. Therefore the verdict PASS is assigned to ATE_IND.1.

Thus, the TOE behaves as described in the ST and as specified in the evaluation evidence (described in the ADV class).

The verdict PASS is assigned to the assurance class ATE.

9.6 Vulnerability Assessment (AVA)

By penetrating testing, the evaluator confirmed that there are no exploitable vulnerabilities by attackers possessing basic attack potential in the operational environment of the TOE. Therefore the verdict PASS is assigned to AVA_VAN.1.

Thus, potential vulnerabilities identified, during the evaluation of the development and anticipated operation of the TOE or by other methods (e.g. by flaw hypotheses), don't allow attackers possessing basic attack potential to violate the SFRs.

The verdict PASS is assigned to the assurance class AVA.

9.7 Evaluation Result Summary

Assurance Class	Assurance Component	Evaluator Action Elements	Verdict		
			Evaluator Action Elements	Assurance Component	Assurance Class
ASE	ASE_INT.1	ASE_INT.1.1E	PASS	PASS	PASS
		ASE_INT.1.2E	PASS		
	ASE_CCL.1	ASE_CCL.1.1E	PASS	PASS	
	ASE_OBJ.1	ASE_OBJ.1.1E	PASS	PASS	
	ASE_ECD.1	ASE_ECD.1.1E	PASS	PASS	
		ASE_ECD.1.2E	PASS		
	ASE_REQ.1	ASE_REQ.1.1E	PASS	PASS	
	ASE_TSS.1	ASE_TSS.1.1E	PASS	PASS	
		ASE_TSS.1.2E	PASS		
ALC	ALC_CMS.1	ALC_CMS.1.1E	PASS	PASS	PASS
	ALC_CMC.1	ALC_CMC.1.1E	PASS	PASS	
AGD	AGD_PRE.1	AGD_PRE.1.1E	PASS	PASS	PASS
		AGD_PRE.1.2E	PASS	PASS	
	AGD_OPE.1	AGD_OPE.1.1E	PASS	PASS	
ADV	ADV_FSP.1	ADV_FSP.1.1E	PASS	PASS	PASS
		ADV_FSP.1.2E	PASS	PASS	
ATE	ATE_FUN.1	ATE_FUN.1.1E	PASS	PASS	PASS
	ATE_IND.1	ATE_IND.1.1E	PASS	PASS	
		ATE_IND.1.2E	PASS		
AVA	AVA_VAN.1	AVA_VAN.1.1E	PASS	PASS	PASS
		AVA_VAN.1.2E	PASS		
		AVA_VAN.1.3E	PASS		

[Table 5] Evaluation Result Summary

10. Recommendations

The TOE security functionality can be ensured only in the evaluated TOE operational environment with the evaluated TOE configuration, thus the TOE shall be operated by complying with the followings:

- The administrator should install and operate the TOE and DBMS in a physically secure environment accessible only by the authorized administrator, and should not allow remote management from the outside.
- Administrator and user should ensure that the security functions of the TOE are applied safely in accordance with the requirements of the manual.
- When operating the product, the administrator's password should be changed periodically.
- It is necessary to maintain the reliability and safety of the operating system by performing reinforcement work on the latest vulnerabilities of the operating system installed and operated by the TOE.
- The authorized administrator should maintain the secure state, such as applying the latest security patches to the operating system and DBMS, and removing unnecessary services, when operating the product.
- The authorized administrator shall periodically check the free space of the audit data storage in preparation for the loss of the audit records and perform the backup of the audit records so that the audit records are not deleted.
- The audit record where the audit trail, such as the DBMS interacting with the TOE, is saved should be protected against unauthorized deletion or modification.
- The manager should manage the PC so that only the authorized manager can access the system to prevent modification and deletion of the audit log from unauthorized users.

11. Security Target

ShadowCube V7.0 Security Target V1.9 is included in this report for reference

12. Acronyms and Glossary

CC	Common Criteria
EAL	Evaluation Assurance Level
PP	Protection Profile
SAR	Security Assurance Requirement
SFR	Security Functional Requirement
ST	Security Target
TOE	Target of Evaluation
TSF	TOE Security Functionality
TSFI	TSF Interface
Authorized Document User	The TOE user who may, in accordance with the SFRs, perform an operation
Authorized Administrator	Authorized user to securely operate and manage the TOE
Data Encryption Key (DEK)	Key that encrypts the data
Decryption	The act that restoring the ciphertext into the plaintext using the decryption key
Encryption	The act that converting the plaintext into the ciphertext using the encryption key
External Entity	An entity (person or IT object) that interact (or can interact) with the TOE from outside the TOE
Key Encryption Key (KEK)	Key that encrypts another cryptographic key
Encrypted User Document	Documents encrypted by the Client and of which the usage is controlled by the Client.

13. Bibliography

The certification body has used following documents to produce this report.

[1] Common Criteria for Information Technology Security Evaluation, Version 3.1 Revision 5, CCMB-2017-04-001 ~ CCMB-2017-04-003, April, 2017

[2] Common Methodology for Information Technology Security Evaluation, Version 3.1 Revision 5, CCMB-2017-04-004, April, 2017

[3] Korean National Protection Profile for Electronic Document Encryption V1.1, December 11, 2019

[4] ShadowCube V7.0 Evaluation Technical Report Summary V1.5, February 25, 2021

[5] ShadowCube V7.0 Security Target V1.9, February 4, 2021