

Protection Profile for QQQQ



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National Information Assurance Partnership

Revision History

Version	Date	Comment
Round 1	2015-04-23	First draft of version 1.0 for comment
1.0	2015-08-14	Release - first version released

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1 Introduction

1.1 Overview

The scope of this Protection Profile (PP) is to describe the security functionality of QQQQ products in terms of [CC] and to define functional and assurance requirements for such products. An operating system is software that manages computer hardware and software resources, and provides common services for application programs. The hardware it manages may be physical or virtual.

This is going to show some tests:

- Terms with abbrs like ASLR, or API, should be found a linked automatically.
- And components can be refered to by their name: [FQQ_QQQ.1](#)
- And so can requirements: [FQQ_QQQ.1.1](#) or by their unique identifier: [FQQ_QQQ.1.1](#)
- Or you can stop them ASLR
- This is how you do a picture:



Figure 1: Niap's Logo

- And this is how you reference it: [Figure 1](#)
- This is how you do an equation with an arbitrary counter:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \tag{1}$$

- And this is how you reference it: [1](#)
- The following content should be included if:
 - "this" is selected from [FQQ_QQQ.1.1](#)

Some text
- The following content should be included if:
 - the TOE implements "Widget Thing"

Someting dependent on a feature
- And here's the audit event table for mandatory requirements.

Requirement	Auditable Events	Additional Audit Record Contents
FQQ_QQQ.1	On failure of audit data capture due to lack of disk space or pre-defined limit.	None.
FQQ_QQQ.3	No events specified	
FQQ_QQQ.2	No events specified	
FQQ_QQQ.4	No events specified	
FQQ_QQQ.6	No events specified	
FMT_SMF.1/HOST	No events specified	
FAU_GEN.1	None.	None.
FAU_SAR.1	None.	None.
FAU_STG.1	None.	None.
FAU_STG_EXT.1	Failure of audit data capture due to lack of disk space or pre-defined limit. On failure of logging function, capture record of failure and record upon restart of logging function.	None.
FAU_ARP.1	No events specified	
FAU_SAA.1	No events specified	

1.2 Terms

The following sections list Common Criteria and technology terms used in this document.

1.2.1 Common Criteria Terms

Assurance	Grounds for confidence that a TOE meets the SFRs [CC] .
Common Criteria (CC)	Common Criteria for Information Technology Security Evaluation.
Common Evaluation Methodology (CEM)	Common Evaluation Methodology for Information Technology Security Evaluation.
Distributed TOE	A TOE composed of multiple components operating as a logical whole.
Operational Environment (OE)	Hardware and software that are outside the TOE boundary that support the TOE functionality and security policy.
Protection Profile (PP)	An implementation-independent set of security requirements for a category of products.
Protection Profile Configuration	A comprehensive set of security requirements for a product type that consists of at least one Base-PP and at least one PP-Module.
Protection Profile Module (PP-Module)	An implementation-independent statement of security needs for a TOE type complementary to one or more Base Protection Profiles.
Security Assurance Requirement (SAR)	A requirement to assure the security of the TOE.
Security Functional Requirement (SFR)	A requirement for security enforcement by the TOE.
Security Target (ST)	A set of implementation-dependent security requirements for a specific product.
TOE Security Functionality (TSF)	The security functionality of the product under evaluation.
TOE Summary Specification (TSS)	A description of how a TOE satisfies the SFRs in a ST.
Target of Evaluation (TOE)	The product under evaluation.

1.2.2 Technical Terms

Address Space Layout Randomization (ASLR)	An anti-exploitation feature which loads memory mappings into unpredictable locations. ASLR makes it more difficult for an attacker to redirect control to code that they have introduced into the address space of a process.
Administrator	An administrator is responsible for management activities, including setting policies that are applied by the enterprise on the operating system. This administrator could be acting remotely through a management server, from which the system receives configuration policies. An administrator can enforce settings on the system which cannot be overridden by non-administrator users.
Application (app)	Software that runs on a platform and performs tasks on behalf of the user or owner of the platform, as well as its supporting documentation.
Application Programming Interface (API)	A specification of routines, data structures, object classes, and variables that allows an application to make use of services provided by another software component, such as a library. APIs are often provided for a set of libraries included with the platform.
Credential	Data that establishes the identity of a user, e.g. a cryptographic key or password.
Critical Security Parameters (CSP)	Information that is either user or system defined and is used to operate a cryptographic module in processing encryption functions including cryptographic keys and authentication data, such as passwords, the disclosure or modification of which can compromise the security of a cryptographic module or the security of the information protected by the module.
DAR Protection	Countermeasures that prevent attackers, even those with physical access, from extracting data from non-volatile storage. Common techniques include data encryption and wiping.
Data Execution Prevention (DEP)	An anti-exploitation feature of modern operating systems executing on modern computer hardware, which enforces a non-execute permission on pages of memory. DEP prevents pages of memory from containing both data and instructions, which makes it more difficult for an attacker to introduce and execute code.
Developer	An entity that writes OS software. For the purposes of this document, vendors and developers are the same.
General Purpose	A class of OSES designed to support a wide-variety of workloads consisting of many concurrent applications or services. Typical characteristics for OSES in this class include support for third-party

Operating System	applications, support for multiple users, and security separation between users and their respective resources. General Purpose Operating Systems also lack the real-time constraint that defines Real Time Operating Systems (RTOS). RTOSes typically power routers, switches, and embedded devices.
Host-based Firewall	A software-based firewall implementation running on the OS for filtering inbound and outbound network traffic to and from processes running on the OS.
Operating System (OS)	Software that manages physical and logical resources and provides services for applications. The terms <i>TOE</i> and <i>OS</i> are interchangeable in this document.
Personally Identifiable Information (PII)	Any information about an individual maintained by an agency, including, but not limited to, education, financial transactions, medical history, and criminal or employment history and information which can be used to distinguish or trace an individual's identity, such as their name, social security number, date and place of birth, mother's maiden name, biometric records, etc., including any other personal information which is linked or linkable to an individual. [OMB]
Sensitive Data	Sensitive data may include all user or enterprise data or may be specific application data such as PII, emails, messaging, documents, calendar items, and contacts. Sensitive data must minimally include credentials and keys. Sensitive data shall be identified in the OS's TSS by the ST author.
User	A user is subject to configuration policies applied to the operating system by administrators. On some systems under certain configurations, a normal user can temporarily elevate privileges to that of an administrator. At that time, such a user should be considered an administrator.

1.3 Compliant Targets of Evaluation

1.3.1 TOE Boundary

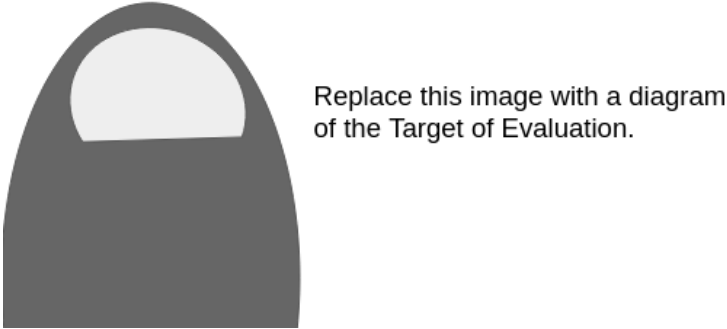


Figure 2: Figure 1: General TOE

1.3.2 TOE Platform

1.4 Use Cases

Requirements in this Protection Profile are designed to address the security problems in at least the following use cases. These use cases are intentionally very broad, as many specific use cases exist for an operating system. These use cases may also overlap with one another. An operating system's functionality may even be effectively extended by privileged applications installed onto it. However, these are out of scope of this PP.

[USE CASE 1] End User Devices

2 Conformance Claims

3 Security Problem Description

The security problem is described in terms of the threats that the OS is expected to address, assumptions about the operational environment, and any organizational security policies that the OS is expected to enforce.

3.1 Threats

T.NETWORK_ATTACK

An attacker is positioned on a communications channel or elsewhere on the network infrastructure. Attackers may engage in communications with applications and services running on or part of the OS with the intent of compromise.

Engagement may consist of altering existing legitimate communications.

T.NETWORK_EAVESDROP

An attacker is positioned on a communications channel or elsewhere on the network infrastructure. Attackers may monitor and gain access to data exchanged between applications and services that are running on or part of the OS.

T.LOCAL_ATTACK

An attacker may compromise applications running on the OS. The compromised application may provide maliciously formatted input to the OS through a variety of channels including unprivileged system calls and messaging via the file system.

T.LIMITED_PHYSICAL_ACCESS

An attacker may attempt to access data on the OS while having a limited amount of time with the physical device.

3.2 Assumptions

A.PLATFORM

The OS relies upon a trustworthy computing platform for its execution. This underlying platform is out of scope of this PP.

A.PROPER_USER

The user of the OS is not willfully negligent or hostile, and uses the software in compliance with the applied enterprise security policy. At the same time, malicious software could act as the user, so requirements which confine malicious subjects are still in scope.

A.PROPER_ADMIN

The administrator of the OS is not careless, willfully negligent or hostile, and administers the OS within compliance of the applied enterprise security policy.

4 Security Objectives

4.1 Security Objectives for the TOE

O.ACCOUNTABILITY

Conformant OSES ensure that information exists that allows administrators to discover unintentional issues with the configuration and operation of the operating system and discover its cause. Gathering event information and immediately transmitting it to another system can also enable incident response in the event of system compromise.

O.INTEGRITY

Conformant OSES ensure the integrity of their update packages. OSES are seldom if ever shipped without errors, and the ability to deploy patches and updates with integrity is critical to enterprise network security. Conformant OSES provide execution environment-based mitigations that increase the cost to attackers by adding complexity to the task of compromising systems.

O.MANAGEMENT

To facilitate management by users and the enterprise, conformant OSES provide consistent and supported interfaces for their security-relevant configuration and maintenance. This includes the deployment of applications and application updates through the use of platform-supported deployment mechanisms and formats, as well as providing mechanisms for configuration and application execution control.

O.PROTECTED_STORAGE

To address the issue of loss of confidentiality of credentials in the event of loss of physical control of the storage medium, conformant OSES provide data-at-rest protection for credentials. Conformant OSES also provide access controls which allow users to keep their files private from other users of the same system.

O.PROTECTED_COMMS

To address both passive (eavesdropping) and active (packet modification) network attack threats, conformant OSES provide mechanisms to create trusted channels for CSP and sensitive data. Both CSP and sensitive data should not be exposed outside of the platform.

4.2 Security Objectives for the Operational Environment

The following security objectives for the operational environment assist the OS in correctly providing its security functionality. These track with the assumptions about the environment.

OE.PLATFORM

The OS relies on being installed on trusted hardware.

OE.PROPER_USER

The user of the OS is not willfully negligent or hostile, and uses the software within compliance of the applied enterprise security policy. Standard user accounts are provisioned in accordance with the least privilege model. Users requiring higher levels of access should have a separate account dedicated for that use.

OE.PROPER_ADMIN

The administrator of the OS is not careless, willfully negligent or hostile, and administers the OS within compliance of the applied enterprise security policy.

4.3 Security Objectives Rationale

This section describes how the assumptions, threats, and organization security policies map to the security objectives.

Threat, Assumption, or OSP	Security Objectives	Rationale
T.NETWORK_ATTACK	O.PROTECTED_COMMS	The threat T.NETWORK_ATTACK is countered by O.PROTECTED_COMMS as this provides for integrity of transmitted data.
	O.INTEGRITY	The threat T.NETWORK_ATTACK is countered by O.INTEGRITY as this provides for integrity of software that is installed onto the system from the network.
	O.MANAGEMENT	The threat T.NETWORK_ATTACK is countered by O.MANAGEMENT as this provides for the ability to configure the OS to defend against network attack.
	O.ACCOUNTABILITY	The threat T.NETWORK_ATTACK is countered by O.ACCOUNTABILITY as this provides a mechanism for the OS to report behavior that may indicate a network attack has occurred.
T.NETWORK_EAVESDROP	O.PROTECTED_COMMS	The threat T.NETWORK_EAVESDROP is countered by O.PROTECTED_COMMS as this provides for confidentiality of transmitted data.
	O.MANAGEMENT	The threat T.NETWORK_EAVESDROP is countered by

		O.MANAGEMENT as this provides for the ability to configure the OS to protect the confidentiality of its transmitted data.
T.LOCAL_ATTACK	O.INTEGRITY	The objective O.INTEGRITY protects against the use of mechanisms that weaken the TOE with regard to attack by other software on the platform.
	O.ACCOUNTABILITY	The objective O.ACCOUNTABILITY protects against local attacks by providing a mechanism to report behavior that may indicate a local attack is occurring or has occurred.
T.LIMITED_PHYSICAL_ACCESS	O.PROTECTED_STORAGE	The objective O.PROTECTED_STORAGE protects against unauthorized attempts to access physical storage used by the TOE.
A.PLATFORM	OE.PLATFORM	The operational environment objective OE.PLATFORM is realized through A.PLATFORM.
A.PROPER_USER	OE.PROPER_USER	The operational environment objective OE.PROPER_USER is realized through A.PROPER_USER.
A.PROPER_ADMIN	OE.PROPER_ADMIN	The operational environment objective OE.PROPER_ADMIN is realized through A.PROPER_ADMIN.

5 Security Requirements

This chapter describes the security requirements which have to be fulfilled by the . Those requirements comprise functional components from Part 2 and assurance components from Part 3 of [CC]. The following notations are used:

- **Refinement** operation (denoted by **bold text**): is used to add details to a requirement, and thus further restricts a requirement.
- **Selection** (denoted by *italicized text*): is used to select one or more options provided by the [CC] in stating a requirement.
- **Assignment** operation (denoted by *italicized text*): is used to assign a specific value to an unspecified parameter, such as the length of a password. Showing the value in square brackets indicates assignment.
- **Iteration** operation: are identified with a number inside parentheses (e.g. "(1)")

5.1 Security Functional Requirements

The Security Functional Requirements included in this section are derived from Part 2 of the Common Criteria for Information Technology Security Evaluation, Version 3.1, Revision 4, with additional extended functional components.

5.1.1 QQQQ

FQQ_QQQ.1 QQQQQ

FQQ_QQQ.1.1 The TOE shall do either [selection: *this, that*].

Application Note:

Evaluation Activity ▼

TSS
Activities assoiated with the TSS.

Guidance
Activities assoiated with guidance

Tests
Activities assoiated with the TTests.

>

5.1.2 Security Management (FMT)

FMT_SMF.1/HOST Specification of Management Functions (EDR Management of Host Agent)

FMT_SMF.1.1/HOST The EDR shall be capable of performing the following functions that control behavior of the Host Agent:

Management Function	Administrator	SOC Analyst	Read-Only User
Configure the time frame for sending Host Agent data to the EDR [assignment: <i>list of configurable time frames</i>]	X	O	-
Assign a label or tag to categorize or group individual endpoint systems	X	O	-

Application Note: This requirement captures all the configuration functionality the EDR provides the administrator to configure the EDR Host Agents.

Chart legend: X = Mandatory, O = Optional, - = N/A

Evaluation Activity ▼

TSS
The evaluator shall verify the ST contains a list of roles and what functions they can perform. The evaluator shall verify the list matches the chart in the requirement.

Guidance
The evaluator shall review the operational guidance to verify that the EDR has documented capabilities to perform the management functions.

Tests
The evaluator shall perform the below tests:

- **Test 1:** *The evaluator shall modify the time frame for sending Host Agent data to the EDR and verify that an affected Host Agent is sending data at the intended interval.*
- **Test 2:** *The evaluator shall tag or categorize a group of individual endpoint systems and verify that the tag or categorization persists within the EDR management dashboard for other users.*

- **Test 3:** The evaluator shall attempt each function with each role and verify access conforms with the chart in the requirement.

5.1.3 Security Audit (FAU)

FAU_GEN.1 Audit Data Generation

- FAU_GEN.1.1 The shall be able to generate an audit record of the following auditable events:
- Start-up and shutdown of audit functions
 - All administrative actions
 - [Specifically defined auditable events in Table 1]
 - [selection: additional information defined in Table 2 additional information defined in Table 3, additional information defined in Table 4, additional information defined in in Table 5, no other information]**
- FAU_GEN.1.2 The shall record within each audit record at least the following information:
- Date and time of the event
 - Type of event
 - Subject and object identity (if applicable)
 - The outcome (success or failure) of the event
 - [Additional information defined in Table 1]
 - [selection: additional information defined in Table 2, additional information defined in Table 3, additional information defined in Table 4, additional information defined in in Table 5, no other information]**

Application Note: The author can include other auditable events directly in Table 1; they are not limited to the list presented. The author should update the table in [FAU_GEN.1.2](#) with any additional information generated. "Subject identity" in [FAU_GEN.1.2](#) could be a user id or an identifier specifying a , for example.

If 'additional information defined in Table 3' is selected, it is acceptable to include individual entries from Table 3 without including the entirety of Table 3. Appropriate entries from Tables 2, 4, and 5 should be included in the if the associated SFRs and selections are included.

The Table 1 entry for FDP_VNC_EXT.1 refers to configuration settings that attach s to virtualized network components. Changes to these configurations can be made during execution or when s are not running. Audit records must be generated for either case.

The intent of the audit requirement for FDP_PPR_EXT.1 is to log that the is connected to a physical device (when the device becomes part of the 's hardware view), not to log every time that the device is accessed. Generally, this is only once at startup. However, some devices can be connected and disconnected during operation (e.g., virtual USB devices such as CD-ROMs). All such connection/disconnection events must be logged.

Evaluation Activity ▼

TSS

The evaluator shall check the and ensure that it lists all of the auditable events and provides a format for audit records. Each audit record format type shall be covered, along with a brief description of each field. The evaluator shall check to make sure that every audit event type mandated by the PP is described in the .

Guidance

The evaluator shall also make a determination of the administrative actions that are relevant in the context of this PP. The evaluator shall examine the administrative guide and make a determination of which administrative commands, including subcommands, scripts, and configuration files, are related to the configuration (including enabling or disabling) of the mechanisms implemented in the that are necessary to enforce the requirements specified in the PP. The evaluator shall document the methodology or approach taken while determining which actions in the administrative guide are security-relevant with respect to this PP.

Tests

The evaluator shall test the 's ability to correctly generate audit records by having the generate audit records for the events listed and administrative actions. For administrative actions, the evaluator shall test that each action determined by the evaluator above to be security relevant in the context of this PP is auditable. When verifying the test results, the evaluator shall ensure the audit records generated during testing match the format specified in the administrative guide, and that the fields in each audit record have the proper entries.

Note that the testing here can be accomplished in conjunction with the testing of the security mechanisms directly.

See [Table 1: Auditable Events](#) for more information. Table 1: Auditable Events

		Additional
--	--	-------------------

Requirement	Auditable Events	Audit Record Contents
FQQ_QQQ.1	On failure of audit data capture due to lack of disk space or pre-defined limit.	None.
FQQ_QQQ.3	No events specified	
FQQ_QQQ.2	No events specified	
FQQ_QQQ.4	No events specified	
FQQ_QQQ.6	No events specified	
FMT_SMF.1/HOST	No events specified	
FAU_GEN.1	None.	None.
FAU_SAR.1	None.	None.
FAU_STG.1	None.	None.
FAU_STG_EXT.1	Failure of audit data capture due to lack of disk space or pre-defined limit. On failure of logging function, capture record of failure and record upon restart of logging function.	None.
FAU_ARP.1	No events specified	
FAU_SAA.1	No events specified	

The following audit events are included if:

- "additional information defined in Table 2" is selected from [FAU_GEN.1.1](#)

Table 2: Auditable Events

Requirement	Auditable Events	Additional Audit Record Contents
FQQ_QQQ.1	On number of turtles in the area.	None.
FQQ_QQQ.3	No events specified	
FQQ_QQQ.2	No events specified	
FQQ_QQQ.4	No events specified	
FQQ_QQQ.6	No events specified	
FMT_SMF.1/HOST	No events specified	
FAU_GEN.1	No events specified	
FAU_SAR.1	No events specified	
FAU_STG.1	No events specified	
FAU_STG_EXT.1	No events specified	
FAU_ARP.1	No events specified	
FAU_SAA.1	No events specified	

FAU_SAR.1 Audit Review

FAU_SAR.1.1 The shall provide [administrators] with the capability to read [all information] from the audit records.

FAU_SAR.1.2 The shall provide the audit records in a manner suitable for the user to interpret the information.

Evaluation Activity ▼

Guidance

The evaluator shall review the operational guidance for the procedure on how to review

the audit records.

Tests

The evaluator shall verify that the audit records provide all of the information specified in [FAU_GEN.1](#) and that this information is suitable for human interpretation. The assurance activity for this requirement is performed in conjunction with the assurance activity for [FAU_GEN.1](#).

FAU_STG.1 Protected Audit Trail Storage

FAU_STG.1.1 The shall protect the stored audit records in the audit trail from unauthorized deletion.

FAU_STG.1.2 The shall be able to [prevent] modifications to the stored audit records in the audit trail.

Application Note: The assurance activity for this SFR is not intended to imply that themust support an administrator's ability to designate individual audit records for deletion. That level of granularity is not required.

Evaluation Activity ▼

The evaluator shall ensure that the describes how the audit records are protected from unauthorized modification or deletion. The evaluator shall ensure that the describes the conditions that must be met for authorized deletion of audit records. The evaluator shall perform the following tests:

Tests

- **Test 1:** The evaluator shall access the audit trail as an unauthorized Administrator and attempt to modify and delete the audit records. The evaluator shall verify that these attempts fail.
- **Test 2:** The evaluator shall access the audit trail as an authorized Administrator and attempt to delete the audit records. The evaluator shall verify that these attempts succeed. The evaluator shall verify that only the records authorized for deletion are deleted.

FAU_STG_EXT.1 Off-Loading of Audit Data

FAU_STG_EXT.1.1 The shall be able to transmit the generated audit data to an external IT entity using a trusted channel as specified in FTP_ITC_EXT.1.

Evaluation Activity ▼

Protocols used for implementing the trusted channel must be selected in FTP_ITC_EXT.1.

TSS

The evaluator shall examine the to ensure it describes the means by which the audit data are transferred to the external audit server, and how the trusted channel is provided.

Guidance

The evaluator shall examine the operational guidance to ensure it describes how to establish the trusted channel to the audit server, as well as describe any requirements on the audit server (particular audit server protocol, version of the protocol required, etc.), as well as configuration of the needed to communicate with the audit server.

Tests

Testing of the trusted channel mechanism is to be performed as specified in the assurance activities for FTP_ITC_EXT.1.

The evaluator shall perform the following test for this requirement:

- **Test 1:** The evaluator shall establish a session between theand the audit server according to the configuration guidance provided. The evaluator shall then examine the traffic that passes between the audit server and the during several activities of the evaluator's choice designed to generate audit data to be transferred to the audit server. The evaluator shall observe that these data are not able to be viewed in the clear during this transfer, and that they are successfully received by the audit server. The evaluator shall record the particular software (name, version) used on the audit server during testing.

FAU_STG_EXT.1.2 The shall [selection: drop new audit data, overwrite previous audit records according to the following rule: [assignment: rule for overwriting previous audit records], [assignment: other action]] when the local storage space for audit data is full.

Application Note: An external log server, if available, might be used as alternative storage space in case the local storage space is full. An 'other action' could be defined in this case as 'send the new audit data to an external IT entity'.

Evaluation Activity ▼

TSS

The evaluator shall examine the to ensure it describes what happens when the local audit data store is full.

Guidance

The evaluator shall also examine the operational guidance to determine that it describes the relationship between the local audit data and the audit data that are sent to the audit log server. For example, when an audit event is generated, is it simultaneously sent to the external server and the local store, or is the local store used as a buffer and "cleared" periodically by sending the data to the audit server.

Tests

The evaluator shall perform operations that generate audit data and verify that this data is stored locally. The evaluator shall perform operations that generate audit data until the local storage space is exceeded and verifies that the complies with the behavior defined in the for [FAU_STG_EXT.1.2](#).

5.2 TOE Security Requirements Rationale

The following rationale provides justification for each security objective for theTOE, showing that the SFRs are suitable to meet and achieve the security objectives:

OBJECTIVE	ADDRESSED BY	RATIONALE
O.ACCOUNTABILITY	FAU_GEN.1	'cause FAU_GEN.1 is awesome
	FTP_ITC_EXT.1	Cause FTP reasons
O.INTEGRITY	FPT_SBOP_EXT.1	For reasons
	FPT_ASLR_EXT.1	ASLR For reasons
	FPT_TUD_EXT.1	For reasons
	FPT_TUD_EXT.2	For reasons
	FCS_COP.1/HASH	For reasons
	FCS_COP.1/SIGN	For reasons
	FCS_COP.1/KEYHMAC	For reasons
	FPT_ACF_EXT.1	For reasons
	FPT_SRP_EXT.1	For reasons
	FIA_X509_EXT.1	For reasons
	FPT_TST_EXT.1	For reasons
	FTP_ITC_EXT.1	For reasons
	FPT_W^X_EXT.1	For reasons
	FIA_AFL.1	For reasons
	FIA_UAU.5	For reasons
O.MANAGEMENT	FMT_MOF_EXT.1	For reasons
	FMT_SMF_EXT.1	For reasons
	FTA_TAB.1	For reasons
	FTP_TRP.1	For reasons
O.PROTECTED_STORAGE	FCS_STO_EXT.1, FCS_RBG_EXT.1, FCS_COP.1/ENCRYPT, FDP_ACF_EXT.1	Rationale for a big chunk
O.PROTECTED_COMMS	FCS_RBG_EXT.1, FCS_CKM.1, FCS_CKM.2, FCS_CKM_EXT.4, FCS_COP.1/ENCRYPT, FCS_COP.1/HASH, FCS_COP.1/SIGN, FCS_COP.1/HMAC, FDP_IFC_EXT.1, FIA_X509_EXT.1, FIA_X509_EXT.2, FTP_ITC_EXT.1	Rationale for a big chunk

5.3 Security Assurance Requirements

The Security Objectives in [Section 4 Security Objectives](#) were constructed to address threats identified in [Section 3.1 Threats](#). The Security Functional Requirements (s) in [Section 5.1 Security Functional Requirements](#) are a formal instantiation of the Security Objectives. The PP identifies the Security Assurance Requirements (s) to frame the extent to which the evaluator assesses the documentation applicable for the evaluation and performs independent testing.

This section lists the set of s from CC part 3 that are required in evaluations against this PP. Individual Assurance Activities to be performed are specified both in [Section 5 Security Requirements](#) as well as in this section.

The general model for evaluation of s against STs written to conform to thisPP is as follows:

After the has been approved for evaluation, the ITSEF will obtain the , supporting environmental IT, and the administrative/user guides for the OS. The ITSEF is expected to perform actions mandated by the Common Evaluation Methodology (CEM) for the ASE and ALC SARs. The ITSEF also performs the Assurance Activities contained within [Section 5 Security Requirements](#), which are intended to be an interpretation of the other CEM assurance requirements as they apply to the specific technology instantiated in the OS. The Assurance Activities that are captured in [Section 5 Security Requirements](#) also provide clarification as to what the developer needs to provide to demonstrate the OS is compliant with the PP.

5.3.1 Class ASE: Security Target

As per ASE activities defined in [\[CEM\]](#).

5.3.2 Class ADV: Development

The information about the is contained in the guidance documentation available to the end user as well as the portion of the . The developer must concur with the description of the product that is contained in the TSS as it relates to the functional requirements. The Assurance Activities contained in [Section 5.1 Security Functional Requirements](#) should provide the authors with sufficient information to determine the appropriate content for the TSS section.

ADV_FSP.1 Basic Functional Specification (ADV_FSP.1)

Developer action elements:

ADV_FSP.1.1 The developer shall provide a functional specification.

Content and presentation elements:

ADV_FSP.1.2 The developer shall provide a tracing from the functional specification to the SFRs.

Application Note: As indicated in the introduction to this section, the functional specification is comprised of the information contained in the AGD_OPE and AGD_PRE documentation. The developer may reference a website accessible to application developers and the evaluator. The assurance activities in the functional requirements point to evidence that should exist in the documentation and section; since these are directly associated with the SFRs, the tracing in element [ADV_FSP.1.2D](#) is implicitly already done and no additional documentation is necessary.

ADV_FSP.1.3 The functional specification shall describe the purpose and method of use for each SFR-enforcing and SFR-supporting TSFI.

ADV_FSP.1.4 The functional specification shall identify all parameters associated with each SFR-enforcing and SFR-supporting TSFI.

ADV_FSP.1.5 The functional specification shall provide rationale for the implicit categorization of interfaces as SFR-non-interfering.

ADV_FSP.1.6 The tracing shall demonstrate that the SFRs trace to TSFIs in the functional specification.

Evaluator action elements:

ADV_FSP.1.7 The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

ADV_FSP.1.8 The evaluator shall determine that the functional specification is an accurate and complete instantiation of the SFRs.

Evaluation Activity ▼

There are no specific assurance activities associated with these SARs, except ensuring the information is provided. The functional specification documentation is provided to support the evaluation activities described in [Section 5.1 Security Functional Requirements](#), and other activities described for AGD, ATE, and AVA SARs. The requirements on the content of the functional specification information is implicitly assessed by virtue of the other assurance activities being performed; if the evaluator is unable to perform an activity because there is insufficient interface information, then an adequate functional specification has not been provided.

5.3.3 Class AGD: Guidance Documentation

The guidance documents will be provided with the . Guidance must include a description of how the IT personnel verifies that the Operational Environment can fulfill its role for the security functionality. The documentation should be in an informal style and readable by the IT personnel. Guidance must be provided for every operational environment that the product supports as claimed in the . This guidance includes instructions to successfully install the in that environment; and Instructions to manage

the security of the as a product and as a component of the larger operational environment. Guidance pertaining to particular security functionality is also provided; requirements on such guidance are contained in the assurance activities specified with each requirement.

AGD_OPE.1 Operational User Guidance (AGD_OPE.1)

Developer action elements:

AGD_OPE.1.1 The developer shall provide operational user guidance.

Application Note: The operational user guidance does not have to be contained in a single document. Guidance to users, administrators and application developers can be spread among documents or web pages. Rather than repeat information here, the developer should review the assurance activities for this component to ascertain the specifics of the guidance that the evaluator will be checking for. This will provide the necessary information for the preparation of acceptable guidance.

Content and presentation elements:

AGD_OPE.1.2 The operational user guidance shall describe, for each user role, the user-accessible functions and privileges that should be controlled in a secure processing environment, including appropriate warnings.

Application Note: User and administrator are to be considered in the definition of user role.

AGD_OPE.1.3 The operational user guidance shall describe, for each user role, how to use the available interfaces provided by the in a secure manner.

AGD_OPE.1.4 The operational user guidance shall describe, for each user role, the available functions and interfaces, in particular all security parameters under the control of the user, indicating secure values as appropriate.

Application Note: This portion of the operational user guidance should be presented in the form of a checklist that can be quickly executed by IT personnel (or end-users, when necessary) and suitable for use in compliance activities. When possible, this guidance is to be expressed in the eXtensible Configuration Checklist Description Format (XCCDF) to support security automation. Minimally, it should be presented in a structured format which includes a title for each configuration item, instructions for achieving the secure configuration, and any relevant rationale.

AGD_OPE.1.5 The operational user guidance shall, for each user role, clearly present each type of security-relevant event relative to the user-accessible functions that need to be performed, including changing the security characteristics of entities under the control of the .

AGD_OPE.1.6 The operational user guidance shall identify all possible modes of operation of the (including operation following failure or operational error), their consequences, and implications for maintaining secure operation.

AGD_OPE.1.7 The operational user guidance shall, for each user role, describe the security measures to be followed in order to fulfill the security objectives for the operational environment as described in the .

AGD_OPE.1.8 The operational user guidance shall be clear and reasonable.

Evaluator action elements:

AGD_OPE.1.9 The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

Evaluation Activity ▼

Some of the contents of the operational guidance are verified by the assurance activities in [Section 5.1 Security Functional Requirements](#) and evaluation of the according to the [\[CEM\]](#). The following additional information is also required. If cryptographic functions are provided by the , the operational guidance shall contain instructions for configuring the cryptographic engine associated with the evaluated configuration of the . It shall provide a warning to the administrator that use of other cryptographic engines was not evaluated nor tested during the CC evaluation of the . The documentation must describe the process for verifying updates to the by verifying a digital signature – this may be done by the or the underlying platform. The evaluator will verify that this process includes the following steps: Instructions for obtaining the update itself. This should include instructions for making the update accessible to the (e.g., placement in a specific directory). Instructions for initiating the update process, as well as discerning whether the process was successful or unsuccessful. This includes generation of the hash/digital signature. The will likely contain security functionality that does not fall in the scope of evaluation under this PP. The operational guidance shall make it clear to an administrator which security functionality is covered by the evaluation activities.

AGD_PRE.1 Preparative Procedures (AGD_PRE.1)

Developer action elements:

AGD_PRE.1.1 The developer shall provide the , including its preparative procedures.

Application Note: As with the operational guidance, the developer should look to the assurance activities to determine the required content with respect to preparative procedures.

Content and presentation elements:

AGD_PRE.1.2 The preparative procedures shall describe all the steps necessary for secure acceptance of the delivered in accordance with the developer's delivery procedures.

AGD_PRE.1.3 The preparative procedures shall describe all the steps necessary for secure installation of the and for the secure preparation of the operational environment in accordance with the security objectives for the operational environment as described in the .

Evaluator action elements:

AGD_PRE.1.4 The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

AGD_PRE.1.5 The evaluator shall apply the preparative procedures to confirm that the can be prepared securely for operation.

Evaluation Activity ▼

As indicated in the introduction above, there are significant expectations with respect to the documentation—especially when configuring the operational environment to support functional requirements. The evaluator shall check to ensure that the guidance provided for the adequately addresses all platforms claimed for the in the .

5.3.4 Class ALC: Life-cycle Support

At the assurance level provided for OSs conformant to this PP, life-cycle support is limited to end-user-visible aspects of the life-cycle, rather than an examination of the OS vendor's development and configuration management process. This is not meant to diminish the critical role that a developer's practices play in contributing to the overall trustworthiness of a product; rather, it is a reflection on the information to be made available for evaluation at this assurance level.

ALC_CMC.1 Labeling of the TOE (ALC_CMC.1)**Developer action elements:**

ALC_CMC.1.1 The developer shall provide the and a reference for the .

Content and presentation elements:

ALC_CMC.1.2 The shall be labeled with a unique reference.

Application Note: Unique reference information includes:

- OS Name
- OS Version
- OS Description
- Software Identification (SWID) tags, if available

Evaluator action elements:

ALC_CMC.1.3 The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

Evaluation Activity ▼

The evaluator will check the to ensure that it contains an identifier (such as a product name/version number) that specifically identifies the version that meets the requirements of the . Further, the evaluator will check the AGD guidance and samples received for testing to ensure that the version number is consistent with that in the . If the vendor maintains a web site advertising the , the evaluator will examine the information on the web site to ensure that the information in the is sufficient to distinguish the product.

ALC_CMS.1 TOE CM Coverage (ALC_CMS.1)**Developer action elements:**

ALC_CMS.1.1 The developer shall provide a configuration list for the .

Content and presentation elements:

ALC_CMS.1.2 The configuration list shall include the following: the itself; and the evaluation evidence required by the SARs.

ALC_CMS.1.3 The configuration list shall uniquely identify the configuration items.

Evaluator action elements:

ALC_CMS.1.4 The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

Evaluation Activity ▼

The "evaluation evidence required by the SARs" in this PP is limited to the information in the coupled with the guidance provided to administrators and users under the AGD requirements. By ensuring that the is specifically identified and that this identification is consistent in the and in the AGD guidance (as done in the assurance activity for [ALC CMC.1](#)), the evaluator implicitly confirms the information required by this component. Life-cycle support is targeted aspects of the developer's life-cycle and instructions to providers of applications for the developer's devices, rather than an in-depth examination of the manufacturer's development and configuration management process. This is not meant to diminish the critical role that a developer's practices play in contributing to the overall trustworthiness of a product; rather, it's a reflection on the information to be made available for evaluation.

The evaluator will ensure that the developer has identified (in guidance documentation for application developers concerning the targeted platform) one or more development environments appropriate for use in developing applications for the developer's platform. For each of these development environments, the developer shall provide information on how to configure the environment to ensure that buffer overflow protection mechanisms in the environment(s) are invoked (e.g., compiler and linker flags). The evaluator will ensure that this documentation also includes an indication of whether such protections are on by default, or have to be specifically enabled. The evaluator will ensure that the is uniquely identified (with respect to other products from the vendor), and that documentation provided by the developer in association with the requirements in the is associated with the using this unique identification.

ALC_TSU_EXT.1 Timely Security Updates

Developer action elements:

ALC_TSU_EXT.1.1 The developer shall provide a description in the TSS of how timely security updates are made to the .

ALC_TSU_EXT.1.2 The developer shall provide a description in the TSS of how users are notified when updates change security properties or the configuration of the product.

Content and presentation elements:

ALC_TSU_EXT.1.3 The description shall include the process for creating and deploying security updates for the software.

ALC_TSU_EXT.1.4 The description shall include the mechanisms publicly available for reporting security issues pertaining to the .

Note: The reporting mechanism could include web sites, email addresses, as well as a means to protect the sensitive nature of the report (e.g., public keys that could be used to encrypt the details of a proof-of-concept exploit).

Evaluator action elements:

ALC_TSU_EXT.1.5 The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

Evaluation Activity ▼

The evaluator will verify that the TSS contains a description of the timely security update process used by the developer to create and deploy security updates. The evaluator will verify that this description addresses the entire application. The evaluator will also verify that, in addition to the OS developer's process, any third-party processes are also addressed in the description. The evaluator will also verify that each mechanism for deployment of security updates is described.

The evaluator will verify that, for each deployment mechanism described for the update process, the TSS lists a time between public disclosure of a vulnerability and public availability of the security update to the OS patching this vulnerability, to include any third-party or carrier delays in deployment. The evaluator will verify that this time is expressed in a number or range of days.

The evaluator will verify that this description includes the publicly available mechanisms (including either an email address or website) for reporting security issues related to the OS. The evaluator shall verify that the description of this mechanism includes a method for protecting the report either using a public key for encrypting email or a trusted channel for a website.

5.3.5 Class ATE: Tests

Testing is specified for functional aspects of the system as well as aspects that take advantage of design or implementation weaknesses. The former is done through the ATE_IND family, while the latter is through the AVA_VAN family. At the assurance level specified in this PP, testing is based on advertised functionality and interfaces with dependency on the availability of design information. One of the primary outputs of the evaluation process is the test report as specified in the following requirements.

ATE_IND.1 Independent Testing – Conformance (ATE_IND.1)

Developer action elements:

ATE_IND.1.1 The developer shall provide the for testing.

Content and presentation elements:

ATE_IND.1.2 The shall be suitable for testing.

Evaluator action elements:

ATE_IND.1.3 The evaluator *shall confirm* that the information provided meets all requirements for content and presentation of evidence.

ATE_IND.1.4 The evaluator shall test a subset of the to confirm that the operates as specified.

Application Note: The evaluator will test the OS on the most current fully patched version of the platform.

Evaluation Activity ▼

The evaluator will prepare a test plan and report documenting the testing aspects of the system, including any application crashes during testing. The evaluator shall determine the root cause of any application crashes and include that information in the report. The test plan covers all of the testing actions contained in the [CEM] and the body of this PP's Assurance Activities.

While it is not necessary to have one test case per test listed in an Assurance Activity, the evaluator must document in the test plan that each applicable testing requirement in the is covered. The test plan identifies the platforms to be tested, and for those platforms not included in the test plan but included in the , the test plan provides a justification for not testing the platforms. This justification must address the differences between the tested platforms and the untested platforms, and make an argument that the differences do not affect the testing to be performed. It is not sufficient to merely assert that the differences have no affect; rationale must be provided. If all platforms claimed in the are tested, then no rationale is necessary. The test plan describes the composition of each platform to be tested, and any setup that is necessary beyond what is contained in the AGD documentation. It should be noted that the evaluator is expected to follow the AGD documentation for installation and setup of each platform either as part of a test or as a standard pre-test condition. This may include special test drivers or tools. For each driver or tool, an argument (not just an assertion) should be provided that the driver or tool will not adversely affect the performance of the functionality by the and its platform. This also includes the configuration of the cryptographic engine to be used. The cryptographic algorithms implemented by this engine are those specified by this PP and used by the cryptographic protocols being evaluated (IPsec, TLS). The test plan identifies high-level test objectives as well as the test procedures to be followed to achieve those objectives. These procedures include expected results.

The test report (which could just be an annotated version of the test plan) details the activities that took place when the test procedures were executed, and includes the actual results of the tests. This shall be a cumulative account, so if there was a test run that resulted in a failure; a fix installed; and then a successful re-run of the test, the report would show a "fail" and "pass" result (and the supporting details), and not just the "pass" result.

5.3.6 Class AVA: Vulnerability Assessment

For the first generation of this protection profile, the evaluation lab is expected to survey open sources to discover what vulnerabilities have been discovered in these types of products. In most cases, these vulnerabilities will require sophistication beyond that of a basic attacker. Until penetration tools are created and uniformly distributed to the evaluation labs, the evaluator will not be expected to test for these vulnerabilities in the . The labs will be expected to comment on the likelihood of these vulnerabilities given the documentation provided by the vendor. This information will be used in the development of penetration testing tools and for the development of future protection profiles.

AVA_VAN.1 Vulnerability Survey (AVA_VAN.1)

Developer action elements:

AVA_VAN.1.1 The developer shall provide the for testing.

Content and presentation elements:

AVA_VAN.1.2 The shall be suitable for testing.

Evaluator action elements:

AVA_VAN.1.3 The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

AVA_VAN.1.4 The evaluator shall perform a search of public domain sources to identify potential vulnerabilities in the .

Application Note: Public domain sources include the Common Vulnerabilities and Exposures (CVE) dictionary for publicly-known vulnerabilities. Public domain sources also include sites which provide free checking of files for viruses.

AVA_VAN.1.5 The evaluator shall conduct penetration testing, based on the identified potential vulnerabilities, to determine that the is resistant to attacks performed by an attacker possessing Basic attack potential.

Evaluation Activity ▼

The evaluator will generate a report to document their findings with respect to this requirement. This report could physically be part of the overall test report mentioned in ATE_IND, or a separate document. The evaluator performs a search of public information to find vulnerabilities that have been found in similar applications with a particular focus on network protocols the application uses and document formats it parses. The evaluator documents the sources consulted and the vulnerabilities found in the report.

For each vulnerability found, the evaluator either provides a rationale with respect to its non-applicability, or the evaluator formulates a test (using the guidelines provided in ATE_IND) to confirm the vulnerability, if suitable. Suitability is determined by assessing the attack vector needed to take advantage of the vulnerability. If exploiting the vulnerability requires expert skills and an electron microscope, for instance, then a test would not be suitable and an appropriate justification would be formulated.

Appendix A - Optional Requirements

As indicated in the introduction to this PP, the baseline requirements (those that must be performed by the TOE) are contained in the body of this PP. This Appendix contains three other types of optional requirements that may be included in the ST, but are not required in order to conform to this PP. However, applied modules, packages and/or use cases may refine specific requirements as mandatory.

The first type ([A.1 Strictly Optional Requirements](#)) are strictly optional requirements that are independent of the TOE implementing any function. If the TOE fulfills any of these requirements or supports a certain functionality, the vendor is encouraged to include the SFRs in the ST, but are not required in order to conform to this PP.

The second type ([A.2 Objective Requirements](#)) are objective requirements that describe security functionality not yet widely available in commercial technology. The requirements are not currently mandated in the body of this PP, but will be included in the baseline requirements in future versions of this PP. Adoption by vendors is encouraged and expected as soon as possible.

The third type ([A.3 Implementation-Dependent Requirements](#)) are dependent on the TOE implementing a particular function. If the TOE fulfills any of these requirements, the vendor must either add the related SFR or disable the functionality for the evaluated configuration.

A.1 Strictly Optional Requirements

A.1.1 QQQQ

FQQ_QQQ.2 TQQQQQ

FQQ_QQQ.2.1 The TOE shall do something.

Application Note:

Evaluation Activity ▼

TSS
Activities associated with the TSS.

A.1.2 Security Audit (FAU)

FAU_ARP.1 Security Audit Automatic Response

FAU_ARP.1.1 The shall take **[assignment: list of actions]** upon detection of a potential security violation.

Application Note: In certain cases, it may be useful for Virtualization Systems to perform automated responses to certain security events. An example may include halting a which has taken some action to violate a key system security policy. This may be especially useful with headless endpoints when there is no human user in the loop.

The potential security violation mentioned in [FAU_ARP.1.1](#) refers to [FAU_SAA.1](#).

Evaluation Activity ▼

Tests
The evaluator shall generate a potential security violation as defined in [FAU_SAA.1](#) and verify that each action in the assignment in [FAU_ARP.1.1](#) is performed by the as a result. The evaluator shall perform this action for each security violation that is defined in [FAU_SAA.1](#).

FAU_SAA.1 Security Audit Analysis

FAU_SAA.1.1 The shall be able to apply a set of rules in monitoring the audited events and based upon these rules indicate a potential violation of the enforcement of the SFRs.

FAU_SAA.1.2 The shall enforce the following rules for monitoring audited events:

- a. accumulation or combination of **[assignment: subset of defined auditable events]** known to indicate a potential security violation
- b. **[assignment: any other rules]**

Application Note: The potential security violation described in [FAU_SAA.1](#) can be used as a trigger for automated responses as defined in [FAU_ARP.1](#).

Evaluation Activity ▼

Tests
The evaluator shall cause each combination of auditable events defined in

A.2 Objective Requirements

A.2.1 QQQQ

FQQ_QQQ.3 BQQQQQ

FQQ_QQQ.3.1

The TOE shall do [assignment: guidance on what things should be assignable].

Application Note: Notes. Notes. Notes.

Evaluation Activity ▼

Guidance

Activities assoiated with guidance

A.3 Implementation-Dependent Requirements

A.3.1 Widget Thing

If the TOE includes the widget thing, all of the following SFRs must be claimed:

- [FQQ_QQQ.6](#)

A.3.1.1 QQQQ

FQQ_QQQ.6 WQQQQQ

FQQ_QQQ.6.1

The TOE shall do something with regards to some implementation.

Application Note:

Evaluation Activity ▼

TSS

Activities assoiated with the TSS.

Appendix B - Selection-Based Requirements

As indicated in the introduction to this PP, the baseline requirements (those that must be performed by theTOE or its underlying platform) are contained in the body of this PP. There are additional requirements based on selections in the body of the PP: if certain selections are made, then additional requirements below must be included.

B.1 QQQQ

FQQ_QQQ.4 UQQQQQ

This is a selection-based component. Its inclusion depends upon selection from [FQQ_QQQ.1.1](#).

FQQ_QQQ.4.1 The TOE shall do something great.

Application Note:

Evaluation Activity ▼

TSS
Activities assoiated with the TSS.

Appendix C - Inherently Satisfied Requirements

This appendix lists requirements that should be considered satisfied by products successfully evaluated against this Protection Profile. However, these requirements are not featured explicitly as SFRs and should not be included in the . They are not included as standalone SFRs because it would increase the time, cost, and complexity of evaluation. This approach is permitted by [\[CC\]](#) Part 1, **8.2 Dependencies between components**.

This information benefits systems engineering activities which call for inclusion of particular security controls. Evaluation against the Protection Profile provides evidence that these controls are present and have been evaluated.

Requirement	Rationale for Satisfaction
FIA_UAU.1 - Timing of authentication	implicitly requires that the OS perform all necessary actions, including those on behalf of the user who has not been authenticated, in order to authenticate; therefore it is duplicative to include these actions as a separate assignment and test.
FIA_UID.1 - Timing of identification	implicitly requires that the OS perform all necessary actions, including those on behalf of the user who has not been identified, in order to authenticate; therefore it is duplicative to include these actions as a separate assignment and test.
FMT_SMR.1 - Security roles	specifies role-based management functions that implicitly defines user and privileged accounts; therefore, it is duplicative to include separate role requirements.
FPT_STM.1 - Reliable time stamps	explicitly requires that the OS associate timestamps with audit records; therefore it is duplicative to include a separate timestamp requirement.
FTA_SSL.1 - TSF-initiated session locking	defines requirements for managing session locking; therefore, it is duplicative to include a separate session locking requirement.
FTA_SSL.2 - User-initiated session locking	defines requirements for user-initiated session locking; therefore, it is duplicative to include a separate session locking requirement.
FAU_STG.1 - Protected audit trail storage	defines a requirement to protect audit logs; therefore, it is duplicative to include a separate protection of audit trail requirements.
FAU_GEN.2 - User identity association	explicitly requires that the OS record any user account associated with each event; therefore, it is duplicative to include a separate requirement to associate a user account with each event.
FAU_SAR.1 - Audit review	requires that audit logs (and other objects) are protected from reading by unprivileged users; therefore, it is duplicative to include a separate requirement to protect only the audit information.

Appendix D - Entropy Documentation and Assessment

This appendix describes the required supplementary information for the entropy source used by the OS.

The documentation of the entropy source should be detailed enough that, after reading, the evaluator will thoroughly understand the entropy source and why it can be relied upon to provide sufficient entropy. This documentation should include multiple detailed sections: design description, entropy justification, operating conditions, and health testing. This documentation is not required to be part of the TSS.

D.1 Design Description

Documentation shall include the design of the entropy source as a whole, including the interaction of all entropy source components. Any information that can be shared regarding the design should also be included for any third-party entropy sources that are included in the product.

The documentation will describe the operation of the entropy source to include, how entropy is produced, and how unprocessed (raw) data can be obtained from within the entropy source for testing purposes. The documentation should walk through the entropy source design indicating where the entropy comes from, where the entropy output is passed next, any post-processing of the raw outputs (hash, XOR, etc.), if/where it is stored, and finally, how it is output from the entropy source. Any conditions placed on the process (e.g., blocking) should also be described in the entropy source design. Diagrams and examples are encouraged.

This design must also include a description of the content of the security boundary of the entropy source and a description of how the security boundary ensures that an adversary outside the boundary cannot affect the entropy rate.

If implemented, the design description shall include a description of how third-party applications can add entropy to the RBG. A description of any RBG state saving between power-off and power-on shall be included.

D.2 Entropy Justification

There should be a technical argument for where the unpredictability in the source comes from and why there is confidence in the entropy source delivering sufficient entropy for the uses made of the RBG output (by this particular OS). This argument will include a description of the expected min-entropy rate (i.e. the minimum entropy (in bits) per bit or byte of source data) and explain that sufficient entropy is going into the OS randomizer seeding process. This discussion will be part of a justification for why the entropy source can be relied upon to produce bits with entropy.

The amount of information necessary to justify the expected min-entropy rate depends on the type of entropy source included in the product.

For developer provided entropy sources, in order to justify the min-entropy rate, it is expected that a large number of raw source bits will be collected, statistical tests will be performed, and the min-entropy rate determined from the statistical tests. While no particular statistical tests are required at this time, it is expected that some testing is necessary in order to determine the amount of min-entropy in each output.

For third-party provided entropy sources, in which the OS vendor has limited access to the design and raw entropy data of the source, the documentation will indicate an estimate of the amount of min-entropy obtained from this third-party source. It is acceptable for the vendor to “assume” an amount of min-entropy, however, this assumption must be clearly stated in the documentation provided. In particular, the min-entropy estimate must be specified and the assumption included in the ST. Regardless of type of entropy source, the justification will also include how the DRBG is initialized with the entropy stated in the ST, for example by verifying that the min-entropy rate is multiplied by the amount of source data used to seed the DRBG or that the rate of entropy expected based on the amount of source data is explicitly stated and compared to the statistical rate. If the amount of source data used to seed the DRBG is not clear or the calculated rate is not explicitly related to the seed, the documentation will not be considered complete.

The entropy justification shall not include any data added from any third-party application or from any state saving between restarts.

D.3 Operating Conditions

The entropy rate may be affected by conditions outside the control of the entropy source itself. For example, voltage, frequency, temperature, and elapsed time after power-on are just a few of the factors that may affect the operation of the entropy source. As such, documentation will also include the range of operating conditions under which the entropy source is expected to generate random data. It will clearly describe the measures that have been taken in the system design to ensure the entropy source continues to operate under those conditions. Similarly, documentation shall describe the conditions under which the entropy source is known to malfunction or become inconsistent. Methods used to detect failure or degradation of the source shall be included.

D.4 Health Testing

More specifically, all entropy source health tests and their rationale will be documented. This includes a description of the health tests, the rate and conditions under which each health test is performed (e.g., at start, continuously, or on-demand), the expected results for each health test, and rationale indicating why each test is believed to be appropriate for detecting one or more failures in the entropy source.

Appendix E - References

Identifier	Title
[CC]	Common Criteria for Information Technology Security Evaluation - <ul style="list-style-type: none">• Part 1: Introduction and General Model, CCMB-2012-09-001, Version 3.1 Revision 4, September 2012.• Part 2: Security Functional Components, CCMB-2012-09-002, Version 3.1 Revision 4, September 2012.• Part 3: Security Assurance Components, CCMB-2012-09-003, Version 3.1 Revision 4, September 2012.
[CEM]	Common Evaluation Methodology for Information Technology Security - Evaluation Methodology , CCMB-2012-09-004, Version 3.1, Revision 4, September 2012.
[CESG]	CESG - End User Devices Security and Configuration Guidance
[CSA]	Computer Security Act of 1987 , H.R. 145, June 11, 1987.
[OMB]	Reporting Incidents Involving Personally Identifiable Information and Incorporating the Cost for Security in Agency Information Technology Investments , OMB M-06-19, July 12, 2006.

Appendix F - Acronyms

Acronym	Meaning
AES	Advanced Encryption Standard
API	Application Programming Interface
API	Application Programming Interface
ASLR	Address Space Layout Randomization
CC	Common Criteria
CEM	Common Evaluation Methodology
CESG	Communications-Electronics Security Group
CMC	Certificate Management over CMS
CMS	Cryptographic Message Syntax
CN	Common Names
CRL	Certificate Revocation List
CSA	Computer Security Act
CSP	Critical Security Parameters
DAR	Data At Rest
DEP	Data Execution Prevention
DES	Data Encryption Standard
DHE	Diffie-Hellman Ephemeral
DNS	Domain Name System
DRBG	Deterministic Random Bit Generator
DSS	Digital Signature Standard
DSS	Digital Signature Standard
DT	Date/Time Vector
DTLS	Datagram Transport Layer Security
EAP	Extensible Authentication Protocol
ECDHE	Elliptic Curve Diffie-Hellman Ephemeral
ECDSA	Elliptic Curve Digital Signature Algorithm
EST	Enrollment over Secure Transport
FIPS	Federal Information Processing Standards
HMAC	Hash-based Message Authentication Code
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
IETF	Internet Engineering Task Force
IP	Internet Protocol
ISO	International Organization for Standardization
IT	Information Technology
ITSEF	Information Technology Security Evaluation Facility
NIAP	National Information Assurance Partnership
NIST	National Institute of Standards and Technology
OCSP	Online Certificate Status Protocol

OE	Operational Environment
OID	Object Identifier
OMB	Office of Management and Budget
OS	Operating System
PII	Personally Identifiable Information
PKI	Public Key Infrastructure
PP	Protection Profile
PP	Protection Profile
PP-Module	Protection Profile Module
RBG	Random Bit Generator
RFC	Request for Comment
RNG	Random Number Generator
RNGVS	Random Number Generator Validation System
S/MIME	Secure/Multi-purpose Internet Mail Extensions
SAN	Subject Alternative Name
SAR	Security Assurance Requirement
SFR	Security Functional Requirement
SHA	Secure Hash Algorithm
SIP	Session Initiation Protocol
ST	Security Target
SWID	Software Identification
TLS	Transport Layer Security
TOE	Target of Evaluation
TSF	TOE Security Functionality
TSS	TOE Summary Specification
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
USB	Universal Serial Bus
XCCDF	eXtensible Configuration Checklist Description Format
XOR	Exclusive Or
app	Application