

***U.S. Government Protection Profile***

***Intrusion Detection System Sensor***

***For***

***Basic Robustness Environments***



**Information  
Assurance  
Directorate**

**Version 1.3**

**July 25, 2007**

## Foreword

This publication, Basic Robustness Intrusion Detection System Sensor Protection Profile, is issued by the National Security Agency as part of its program to promulgate security standards for information systems.

### **Protection Profile Title:**

U.S. Government Protection Profile Intrusion Detection System Sensor for Basic Robustness Environments

### **Criteria Version:**

This Protection Profile “*U.S. Government Protection Profile Intrusion Detection System Sensor for Basic Robustness Environments*” (PP) was updated using Version 3.1 of the Common Criteria (CC).

Editor’s note: The purpose of this update was to bring the PP up to the new CC 3.1 standard without changing the authors’ original meaning or purpose of the documented requirements. The original PP was developed using version 2.x of the CC. The CC version 2.3 was the final version 2 update that included all international interpretations. CC version 3.1 used the final CC version 2.3 Security Functional Requirements (SFR)s as the new set of SFRs for version 3.1. Some minor changes were made to the SFRs in version 3.1, including moving a few SFRs to Security Assurance Requirements (SAR)s. There may be other minor differences between some SFRs in the version 2.3 PP and the new version 3.1 SFRs. These minor differences were not modified to ensure the author’s original intent was preserved.

The version 3.1 SARs were rewritten by the common criteria international community. The NIAP/CCEVS staff developed an assurance equivalence mapping between the version 2.3 and 3.1 SARs. The assurance equivalent version 3.1 SARs replaced the version 2.3 SARs in the PP.

Any issue that may arise when claiming compliance with this PP can be resolved using the observation report (OR) and observation decision (OD) process.

Further information, including the status and updates of this protection profile can be found on the CCEVS website: <http://www.niap-ccevs.org/cc-scheme/pp/>. Comments on this document should be directed to [ppcomments@missi.ncsc.mil](mailto:ppcomments@missi.ncsc.mil). The email should include the title of the document, the page, the section number, the paragraph number, and the detailed comment and recommendation.

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# Intrusion Detection System Sensor Protection Profile

## 1 PROTECTION PROFILE (PP) INTRODUCTION

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### 1.1 INTRODUCTION

This section contains document management and overview information necessary to allow a Protection Profile (PP) to be registered through a Protection Profile Registry. The identification provides the labeling and descriptive information necessary to identify, catalogue, register, and cross-reference a PP. The overview summarizes the profile in narrative form and provides sufficient information for a potential user to determine whether the PP is of interest. The overview can also be used as a stand-alone abstract for PP catalogues and registers. The Conventions section provides an explanation of how this document is organized. The Terms section gives a basic definition of terms, which are specific to this PP. Finally, the Related Profiles section identifies profiles directly related to this profile and may be of interest to those interested in this profile.

### 1.2 IDENTIFICATION

Title: U.S. Government Protection Profile Intrusion Detection System Sensor for Basic Robustness Environments

Sponsor: National Security Agency (NSA)

Common Criteria Identification – Common Criteria for Information Technology Security Evaluation, Version 3.1, September 2006

PP Version 1.3

Keywords: intrusion detection, intrusion detection system, analyzer, sensor, scanner

Evaluation Assurance Level (EAL) – EAL 2 Augmented with ALC\_FLR.2

## 1.3 OVERVIEW

The Common Criteria (CC) Intrusion Detection System Sensor Protection Profile specifies a set of security functional and assurance requirements for Information Technology (IT) products. An Intrusion Detection System (IDS) monitors an IT System for activity that may inappropriately affect the IT System's assets. An IT System may range from a computer system to a computer network. An IDS consists of Sensors, Scanners and Analyzers. Sensors and Scanners collect information regarding IT System activity and vulnerabilities, and they forward the collected information to Analyzers. Analyzers perform intrusion analysis and reporting of the collected information.

Intrusion Detection System Sensor Protection Profile-conformant products support the ability to real-time monitor a set of IT resources in order to identify events that may be indicative of potential vulnerabilities in or misuse of those IT resources. Intrusion Detection System Sensor Protection Profile-conformant products also provide the ability to protect themselves and their associated data from unauthorized access or modification and ensure accountability for authorized actions.

The Intrusion Detection System Sensor Protection Profile provides for a level of protection which is appropriate for IT environments that require detection of malicious and inadvertent attempts to gain inappropriate access to IT resources, where the IDS can be appropriately protected from hostile attacks. Though products that are Intrusion Detection System Sensor Protection Profile-conformant can be used to monitor a system or network in a hostile environment, they are not designed to resist direct, hostile attacks. The Intrusion Detection System Sensor Protection Profile does not fully address the threats posed by malicious administrative or system development personnel. This profile is also not intended to result in products that are foolproof and able to detect intrusion attempts by hostile and well-funded attackers. Intrusion Detection System Sensor Protection Profile-conformant products are suitable for use in both commercial and government environments.

The Intrusion Detection System Sensor Protection Profile was constructed to provide a target and metric for the development of Sensors. This protection profile identifies security functions and assurances that represent the lowest common set of requirements that should be addressed by a useful Sensor product.

The Intrusion Detection System Sensor Protection Profile is generally applicable to products regardless of whether they are embedded, stand-alone, centralized, or distributed. However, it addresses only security

requirements and not any special considerations of any particular product design.

It should be noted that just because a Sensor may be conformant with this Protection Profile, that Sensor should not be assumed to be interoperable with any other IDS component evaluated against a Protection Profile in the Intrusion Detection System family of Protection Profiles. There are no requirements for interoperability within the Protection Profiles.

STs that claim conformance to this PP shall meet a minimum standard of demonstrable-PP conformance as defined in section D3 of part 1

## 1.4 CONVENTIONS

The requirements in this document are divided into assurance requirements and two sets of functional requirements. The first set of functional requirements, which were drawn from the Common Criteria, is designed to address the core Sensor requirements for self-protection. The second set of requirements, which were invented and categorized by the short name, IDS, is designed to address the requirements for the Sensor's primary function, which is IDS collection of data.

The CC permits four functional component operations—assignment, refinement, selection, and iteration—to be performed on functional requirements. This PP will highlight the four operations in the following manner:

- assignment: allows the specification of an identified parameter. Indicated with bold text and italics if further operations are necessary by the Security Target author;
- refinement: allows the addition of details. Indicated with bold text and italics if further operations are necessary by the Security Target author;
- selection: allows the specification of one or more elements from a list. Indicated with underlined text; and
- iteration: allows a component to be used more than once with varying operations. Not used in this PP.

In addition, this PP has extended requirements. These new requirements are indicated in bold text and contain the text (EXT) in the title.

## 1.5 DOCUMENT ORGANIZATION

Section 1 provides the introductory material for the protection profile.

Section 2 describes the Target of Evaluation in terms of its envisaged usage and connectivity.

Section 3 defines the expected TOE security environment in terms of the threats to its security, the security assumptions made about its use, and the security policies that must be followed.

Section 4 identifies the security objectives derived from these threats and policies.

Section 5 identifies and defines the security functional requirements from the CC that must be met by the TOE and the IT environment in order for the functionality-based objectives to be met. This section also identifies the security assurance requirements for EAL2 augmented.

Section 6 provides a rationale to demonstrate that the Information Technology Security Objectives satisfy the policies and threats. Arguments are provided for the coverage of each policy and threat. The section then explains how the set of requirements are complete relative to the objectives, and that each security objective is addressed by one or more component requirement. Arguments are provided for the coverage of each objective.

Section 7, Appendices, includes the appendices that accompany the PP and provides clarity and/or explanation for the reader.

Appendix A, References, provides background material for further investigation by users of the PP.

Appendix B, Glossary, provides a listing of definitions of terms.

Appendix C, Acronyms, provides a listing of acronyms used throughout the document.

Appendix D, Robustness Environment Characterization, contains a discussion characterizing the level of robustness TOEs compliant with the PP can achieve. The PPRB created a discussion that provides a definition of factors for TOE environments as well as an explanation of how a given level of robustness is categorized.



## **1.6 RELATED PROTECTION PROFILES**

U.S. Government Protection Profile Intrusion Detection System Analyzer  
for Basic Robustness Environments

U.S. Government Protection Profile Intrusion Detection System Sensor for  
Basic Robustness Environments

U.S. Government Protection Profile Intrusion Detection System System for  
Basic Robustness Environments

## 2 TARGET OF EVALUATION DESCRIPTION

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This Protection Profile specifies the minimum security requirements for a Target of Evaluation (TOE) that is a Sensor. A Sensor collects information indicative of inappropriate activity that may have resulted from misuse, access, or malicious activity of IT System assets. The information collected may be obtained from a variety of sources located on an IT System. The Sensor can be a function integrated into a larger set of functions, such as an audit mechanism, which records events as they happen within an operating system. Alternately, the Sensor could be entirely independent, such as a packet sniffer that captures all network traffic for filtering and analysis.

In general, the Sensor is expected to collect relevant information from one or more sources, and to manage that information until it can be delivered to analyses functions. The Sensor is not required to perform any analysis on the information that it collects. An Analyzer is responsible for performing analysis functions.

A Sensor collects information indicative of inappropriate activity that may have resulted from misuse, access, or malicious activity of IT System assets. The Sensor must be able to:

- Collect data about all events as they occur on an IT System. Events may include authentication events; data access events; configuration access events; service requests; network traffic; data introduction; and, start-up and shutdown of audit functions.
- Protect itself and its data from tampering.
- Forward all collected data to an authorized Analyzer for data reduction and analysis.
- Be configured by an authorized user.
- Produce an audit trail (e.g., configuration changes, Sensor and data accesses).

A Sensor is a component of an IDS. Any IT System that needs to be aware of vulnerabilities and cyber attacks should deploy an IDS with one or more Sensors. The Sensor monitors itself as well as its target IT System. The IT System must provide adequate protection for the Sensor so that the Sensor operates in a non-hostile environment. The following diagrams illustrate examples of how an IDS (represented by a star) may be utilized by IT Systems ranging from a computer system to a computer network. Figure-1 illustrates that an IDS may monitor and exist in a computer system that is not necessarily part of a larger network. Figure-2 illustrates that an IDS may monitor and exist within a computer network.

The arrows represent the monitoring functionality of the IDS as opposed to the implementation of the computer network.



Figure-1. Computer System

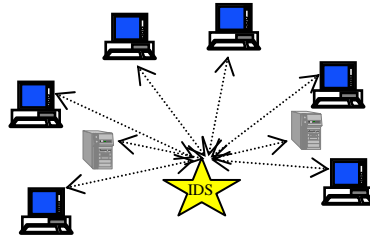


Figure-2. Computer Network

This PP makes a distinction between the Sensor and TOE. The term Sensor is used when the PP is referring to the ID sensing mechanism. When the term TOE is used, the PP is referring to the Sensor and the mechanisms necessary to ensure accountability and protection for the Sensor.

### **3 TOE SECURITY ENVIRONMENT**

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The TOE described in this PP is intended to operate in environments having a basic level of robustness as defined in the Glossary in Appendix B.

Basic robustness allows processing of data at a single sensitivity level in an environment where users are cooperative and threats are minimal. Authorized users of the TOE are cleared for all information managed by the IDS component, but may not have the need-to-know authorization for all of the data. Hence, the risk that significant damage will be done due to compromise of data is low.

Entities in the IT environment on which the TOE depends for security functions must be of at least the same level of robustness as the TOE. It is necessary for such an environment that the underlying operating system on which the IDS component is installed be evaluated against a basic robustness protection profile for operating systems.

The TOE in and of itself is not of sufficient robustness to store and protect information of such criticality that the integrity or secrecy is critical to the survival of the enterprise.

#### **3.1 ASSUMPTIONS**

This section contains assumptions regarding the security environment and the intended usage of the TOE.

##### **3.1.1 Intended Usage Assumptions**

A.ACCESS The TOE has access to all the IT System data it needs to perform its functions.

##### **3.1.2 Physical Assumptions**

A.PROTECT The TOE hardware and software critical to security policy enforcement will be protected from unauthorized physical modification.

A.LOCATE The processing resources of the TOE will be located within controlled access facilities, which will prevent unauthorized physical access.

### **3.1.3 Personnel Assumptions**

A.MANAGE There will be one or more competent individuals assigned to manage the TOE and the security of the information it contains.

A.NOEVIL The authorized administrators are not careless, willfully negligent, or hostile, and will follow and abide by the instructions provided by the TOE documentation.

A.NOTRST The TOE can only be accessed by authorized users.

## **3.2 THREATS**

The following are threats identified for the TOE and the IT System the TOE monitors. The TOE itself has threats and the TOE is also responsible for addressing threats to the environment in which it resides. The assumed level of expertise of the attacker for all the threats is unsophisticated.

### **3.2.1 TOE Threats**

T.COMINT An unauthorized user may attempt to compromise the integrity of the data collected by the TOE by bypassing a security mechanism.

T.COMDIS An unauthorized user may attempt to disclose the data collected by the TOE by bypassing a security mechanism.

T.LOSSOF An unauthorized user may attempt to remove or destroy data collected by the TOE.

T.NOHALT An unauthorized user may attempt to compromise the continuity of the Sensor's collection functionality by halting execution of the TOE.

T.PRIVIL An unauthorized user may gain access to the TOE and exploit system privileges to gain access to TOE security functions and data.

T.IMPCON The TOE may be susceptible to improper configuration by any user, causing potential intrusions to go undetected.

T.INFLUX An unauthorized user may cause malfunction of the TOE by creating an influx of data that the TOE cannot handle.

### 3.2.2 IT System Threats

The following identifies threats to the IT System that may be indicative of vulnerabilities in or misuse of IT resources.

T.MISUSE Unauthorized accesses and activity indicative of misuse may occur on an IT System.

T.INADVE Inadvertent activity and access may occur on an IT System.

T.MISACT Malicious activity, such as introductions of Trojan horses and viruses, may occur on an IT System.

### 3.3 ORGANIZATIONAL SECURITY POLICIES

An organizational security policy is a set of rules, practices, and procedures imposed by an organization to address its security needs. This section identifies the organizational security policies applicable to the Intrusion Detection System Sensor Protection Profile.

P.DETECT All events that are indicative of inappropriate activity that may have resulted from misuse, access, or malicious activity of IT System assets must be collected.

P.MANAGE The TOE shall be manageable only by authorized users.

P.ACCESS All data collected by the TOE shall only be used for authorized purposes.

P.ACCACT Users of the TOE shall be accountable for their actions within the IDS.

P.INTGTY Data collected by the TOE shall be protected from modification.

P. PROTCT The TOE shall be protected from unauthorized accesses and disruptions of collection activities.

## **4 SECURITY OBJECTIVES**

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This section identifies the security objectives of the TOE and its supporting environment. The security objectives identify the responsibilities of the TOE and its environment in meeting the security needs.

### **4.1 INFORMATION TECHNOLOGY (IT) SECURITY OBJECTIVES**

The following are the TOE security objectives:

- O.PROTECT The TOE must protect itself from unauthorized modifications and access to its functions and data.
- O.IDACTS The Sensor must collect and store information about all events that are indicative of inappropriate activity that may have resulted from misuse, access, or malicious activity of IT System assets and the IDS.
- O.EADMIN The TOE must include a set of functions that allow effective management of its functions and data.
- O.ACCESS The TOE must allow authorized users to access only appropriate TOE functions and data.
- O.IDAUTH The TOE must be able to identify and authenticate authorized users prior to allowing access to TOE functions and data.
- O.OFLOWS The TOE must appropriately handle potential audit and Sensor data storage overflows.
- O.AUDITS The TOE must record audit records for data accesses and use of the Sensor functions.
- O.INTEGR The TOE must ensure the integrity of all audit and Sensor data.
- O.EXPORT When the TOE makes its Sensor data available to other IDS components, the TOE will ensure the confidentiality of the Sensor data.

## **4.2 SECURITY OBJECTIVES FOR THE ENVIRONMENT**

The TOEs operating environment must satisfy the following objectives.

OE.AUDIT\_PROTECTION The IT Environment will provide the capability to protect audit information.

OE.AUDIT\_SORT The IT Environment will provide the capability to sort the audit information

OE.TIME The IT Environment will provide reliable timestamps to the TOE.

OE.INSTAL Those responsible for the TOE must ensure that the TOE is delivered, installed, managed, and operated in a manner which is consistent with IT security.

OE. PHYCAL Those responsible for the TOE must ensure that those parts of the TOE critical to security policy are protected from any physical attack.

OE.CREDENT Those responsible for the TOE must ensure that all access credentials are protected by the users in a manner which is consistent with IT security.

OE.PERSON Personnel working as authorized administrators shall be carefully selected and trained for proper operation of the Sensor.

OE.INTROP The TOE is interoperable with the IT System it monitors and other IDS components within its IDS.



## 5 IT SECURITY REQUIREMENTS

This section defines the functional requirements for the TOE. Functional requirements in this PP were drawn from Part 2 of the CC. These requirements are relevant to supporting the secure operation of the TOE. Functional requirements pertaining to the Sensor collection mechanisms were invented and are identified by the short name IDS.

The functional security requirements for the PP consist of the following components, summarized in Table 1 TOE Functional Components.

<b>Functional Components</b>	
FAU_GEN.1	Audit data generation
FAU_SAR.1	Audit review
FAU_SAR.2	Restricted audit review
FAU_SAR.3	Selectable audit review
FAU_SEL.1	Selective audit
FAU_STG.2	Guarantees of audit data availability
FAU_STG.4	Prevention of audit data loss
FIA_UAU.1	Timing of authentication
FIA_ATD.1	User attribute definition
FIA_UID.1	Timing of identification
FMT_MOF.1	Management of security functions behaviour
FMT_MTD.1	Management of TSF data
FMT_SMR.1	Security roles
FPT_ITA.1	Inter-TSF availability within a defined availability metric
FPT_ITC.1	Inter-TSF confidentiality during transmission
FPT_ITI.1	Inter-TSF detection of modification
FPT_STM.1	Reliable time stamps
IDS_COL.1	Sensor Data Collection
IDS_RDR.1	Restricted Data Review
IDS_STG.1	Guarantee of Sensor Data Availability
IDS_STG.2	Prevention of Sensor data loss

**Table 1 TOE Functional Components**

## 5.1 SECURITY AUDIT (FAU)

### 5.1.1 FAU\_GEN.1 Audit data generation

**FAU\_GEN.1.1** The TSF shall be able to generate an audit record of the following auditable events:

- a) Start-up and shutdown of the audit functions;
- b) All auditable events for the basic level of audit; and
- c) **Access to the Sensor and access to the TOE and Sensor data.**  
FAU\_GEN.1.1

Application Note: The auditable events for the basic level of auditing are included in Table 2 Auditable Events.

Component	Event	Details
FAU_GEN.1	Start-up and shutdown of audit functions	
FAU_GEN.1	Access to Sensor	
FAU_GEN.1	Access to the TOE Sensor data	<b>Object IDS, Requested access</b>
FAU_SAR.1	Reading of information from the audit records	
FAU_SAR.2	Unsuccessful attempts to read information from the audit records	
FAU_SEL.1	All modifications to the audit configuration that occur while the audit collection functions are operating	
FIA_UAU.1	All use of the authentication mechanism	<b>User identity, location</b>
FIA_UID.1	All use of the user identification mechanism	<b>User identity, location</b>
FMT_MOF.1	All modifications in the behavior of the functions of the TSF	
FMT_MDT.1	All modifications to the values of TSF data	
FMT_SMR.1	Modifications to the group of users that are part of a role	<b>User identity</b>

**Table 2 Auditable Events**

Application Note: The IDS\_COL requirement in this PP addresses the Sensor data.

**FAU\_GEN.1.2** The TSF shall record within each audit record at least the following information:

- a) Date and time of the event, type of event, subject identity, and the outcome (success or failure) of the event; and

- b) **For each audit event type, based on the auditable event definitions of the functional components included in the PP/ST, the additional information specified in the Details column of Table 2 Auditable Events.**  
FAU\_GEN.1.2

### 5.1.2 FAU\_SAR.1 Audit review

**FAU\_SAR.1.1** The TSF shall provide [*assignment: authorised users*] with the capability to read [*assignment: list of audit information*] from the audit records.<sup>FAU\_SAR.1.1</sup>

Application Note: This requirement applies to authorised users of the TOE. The requirement is left open for the writers of the ST to define which authorised users may access what audit data.

**FAU\_SAR.1.2** The TSF shall provide the audit records in a manner suitable for the user to interpret the information.<sup>FAU\_SAR.1.2</sup>

### 5.1.3 FAU\_SAR.2 Restricted audit review

**FAU\_SAR.2.1** The TSF shall prohibit all users read access to the audit records, except those users that have been granted explicit read-access.<sup>FAU\_SAR.2.1</sup>

### 5.1.4 FAU\_SAR.3 Selectable audit review

**FAU\_SAR.3.1** The TSF shall provide the ability to perform sorting of audit data based on date and time, subject identity, type of event, and success or failure of related event.  
FAU\_SAR.3.1

### 5.1.5 FAU\_SEL.1 Selective audit

**FAU\_SEL.1.1** The TSF shall be able to include or exclude auditable events from the set of audited events based on the following attributes:

- a) event type;
- b) [*assignment: list of additional attributes that audit selectivity is based upon*].<sup>FAU\_SEL.1.1</sup>

Application Note: The ST must state any additional attributes that are available for audit selectivity.

### 5.1.6 FAU\_STG.2 Guarantees of audit data availability

FAU\_STG.2.1 The TSF shall protect the stored audit records from unauthorised deletion.  
FAU\_STG.2.1

FAU\_STG.2.2 The TSF shall be able to detect modifications to the audit records.<sup>FAU\_STG.2.2</sup>

FAU\_STG.2.3 The TSF shall ensure that *[assignment: metric for saving audit records]* audit records will be maintained when the following conditions occur: *[selection: audit storage exhaustion, failure, attack]*.<sup>FAU\_STG.2.3</sup>

### 5.1.7 FAU\_STG.4 Prevention of audit data loss

FAU\_STG.4.1 The TSF shall *[selection: 'prevent auditable events, except those taken by the authorised user with special rights', 'overwrite the oldest stored audit records']* and send an alarm if the audit trail is full.<sup>FAU\_STG.4.1</sup>

Application Note: The ST must define what actions the TOE takes if the audit trail becomes full. Anything that causes the Sensor to stop collecting Sensor data may not be the best solution, as this will only affect the Sensor and not the system on which it is collecting Sensor data (e.g., shutting down the Sensor).

## 5.2 IDENTIFICATION AND AUTHENTICATION (FIA)

### 5.2.1 FIA\_UAU.1 Timing of authentication

FIA\_UAU.1.1 The TSF shall allow *[assignment: list of TSF mediated actions]* on behalf of the user to be performed before the user is authenticated.<sup>FIA\_UAU.1.1</sup>

Application Note: The ST must define any mediated actions that are permitted before a user is authenticated. Actions must be limited to aiding a user in accessing the TOE. An acceptable action before authentication is using the help facility.

FIA\_UAU.1.2 The TSF shall require each user to be successfully authenticated before allowing any other TSF-mediated actions on behalf of that user.<sup>FIA\_UAU.1.2</sup>

## 5.2.2 FIA\_AFL.1 Authentication failure handling

**FIA\_AFL.1.1** The TSF shall detect when a **settable, non-zero number** of unsuccessful authentication attempts occur related to **external IT products attempting to authenticate**.<sup>FIA\_AFL.1.1</sup>

**FIA\_AFL.1.2** When the defined number of unsuccessful authentication attempts has been met or surpassed, the TSF shall **prevent the offending external IT product from successfully authenticating until an authorised administrator takes some action to make authentication possible for the external IT product in question**.<sup>FIA\_AFL.1.2</sup>

## 5.2.3 FIA\_ATD.1 User attribute definition

**FIA\_ATD.1.1** The TSF shall maintain the following list of security attributes belonging to individual users:

- a) User identity;
- b) Authentication data;
- c) Authorisations; and
- d) *[assignment: any other security attributes]*.<sup>FIA\_ATD.1.1</sup>

Application Note: At a minimum, there must be sufficient user information for identification and authentication purposes. That information includes maintaining any authorisations a user may possess.

## 5.2.4 FIA\_UID.1 Timing of identification

**FIA\_UID.1.1** The TSF shall allow *[assignment: list of TSF-mediated actions]* on behalf of the user to be performed before the user is identified.<sup>FIA\_UID.1.1</sup>

Application Note: The ST must define any mediated actions that are permitted before a user is identified. Actions must be limited to aiding a user in accessing the TOE. An acceptable action before identification is using the help facility.

**FIA\_UID.1.2** The TSF shall require each user to be successfully identified before allowing any other TSF-mediated actions on behalf of that user.<sup>FIA\_UID.1.2</sup>

## 5.3 SECURITY MANAGEMENT (FMT)

### 5.3.1 FMT\_MOF.1 Management of security functions behaviour

**FMT\_MOF.1.1** The TSF shall restrict the ability to modify the behaviour of the functions **Sensor data collection and review** to **authorised Sensor administrators**.<sup>FMT\_MOF.1.1</sup>

Application Note: The TOE may have administrative roles for the operating system that do not have permissions to change the configuration options of the Sensor.

### 5.3.2 FMT\_MTD.1 Management of TSF data

**FMT\_MTD.1.1** The TSF shall restrict the ability to query and add Sensor and audit data, and shall restrict the ability to query and modify all other TOE data to *[assignment: the authorised identified roles]*.<sup>FMT\_MTD.1.1</sup>

Application Note: The ST should define which roles are permitted to access the Sensor data and all other TOE data. The ST may define any number of roles to meet this requirement.

### 5.3.3 FMT\_SMR.1 Security roles

**FMT\_SMR.1.1** The TSF shall maintain the **following** roles: **authorised administrator, authorised Sensor administrators, and** *[assignment: other authorised identified roles]*.<sup>FMT\_SMR.1.1</sup>

**FMT\_SMR.1.2** The TSF shall be able to associate users with roles.<sup>FMT\_SMR.1.2</sup>

## 5.4 PROTECTION OF THE TOE SECURITY FUNCTIONS (FPT)

### 5.4.1 FPT\_ITA.1 Inter-TSF availability within a defined availability metric

**FPT\_ITA.1.1** The TSF shall ensure the availability of **audit and Sensor data** provided to a remote trusted IT product within *[assignment: a defined availability metric]* given the following conditions *[assignment: conditions to ensure availability]*.<sup>FPT\_ITA.1.1</sup>

Application Note: The ST should state what the TOE does to promote availability to the audit and Sensor data.

**5.4.2** FPT\_ITC.1 **Inter-TSF confidentiality during transmission**

**FPT\_ITC.1.1** The TSF shall protect all TSF data transmitted from the TSF to a remote trusted IT product from unauthorised disclosure during transmission. <sup>FPT\_ITC.1.1</sup>

**5.4.3** FPT\_ITI.1 **Inter-TSF detection of modification**

**FPT\_ITI.1.1** The TSF shall provide the capability to detect modification of all TSF data during transmission between the TSF and a remote trusted IT product within the following metric: *[assignment: a defined modification metric]*. <sup>FPT\_ITI.1.1</sup>

**FPT\_ITI.1.2** The TSF shall provide the capability to verify the integrity of all TSF data transmitted between the TSF and a remote trusted IT product and perform *[assignment: action to be taken]* if modifications are detected. <sup>FPT\_ITI.1.2</sup>

**5.4.4** FPT\_STM.1 **Reliable time stamps**

**FPT\_STM.1.1** The TSF shall be able to provide reliable time stamps for its own use. <sup>FPT\_STM.1.1</sup>

**5.5** **IDS COMPONENT REQUIREMENTS (IDS)**

**5.5.1** IDS\_COL.1 **Sensor Data Collection (EXT)**

**IDS\_COL.1.1** **The Sensor shall be able to collect the following events from the targeted IT System resource(s):**

- a) **[selection: Start-up and shutdown, identification and authentication events, data accesses, service requests, network traffic, security configuration changes, data introduction]; and**
- b) **[assignment: *other specifically defined events*]. (EXT)** <sup>IDS\_COL.1.1</sup>

**IDS\_COL.1.2** **At a minimum, the Sensor shall collect the following information:**

- a) **Date and time of the event, type of event, subject identity, and the outcome (success or failure) of the event; and**

b) **The additional information specified in the *Details* column of Table 3 Sensor Events. (EXT)** <sup>IDS\_COL.1.2</sup>

Component	Event	Details
IDS_COL.1	Start-up and shutdown	none
IDS_COL.1	Identification and authentication events	User identity, location, source address, destination address
IDS_COL.1	Data accesses	Object IDS, requested access, source address, destination address
IDS_COL.1	Service Requests	Specific service, source address, destination address
IDS_COL.1	Network traffic	Protocol, source address, destination address
IDS_COL.1	Security configuration changes	Source address, destination address
IDS_COL.1	Data introduction	Object IDS, location of object, source address, destination address

**Table 3 Sensor Events**

Application Note: In the case where the Sensor is collecting host-based events, for the identification and authentication event, the source address could be a subject IDS on a local machine and the destination is defined by default. For the data access and data introduction events, the source address could be filename and the destination address may be target location for the file.

**5.5.2 IDS\_RDR.1 Restricted Data Review (EXT)**

**IDS\_RDR.1.1 The Sensor shall provide [assignment: *authorised users*] with the capability to read [assignment: *list of Sensor data*] from the Sensor data. (EXT)** <sup>IDS\_RDR.1.1</sup>

Application Note: This requirement applies to authorised users of the Sensor. The requirement is left open for the writers of the ST to define which authorised users may access what Sensor data.

**IDS\_RDR.1.2 The Sensor shall provide the Sensor data in a manner suitable for the user to interpret the information. (EXT)** <sup>IDS\_RDR.1.2</sup>

**IDS\_RDR.1.3 The Sensor shall prohibit all users read access to the Sensor data, except those users that have been granted explicit read-access. (EXT)** <sup>IDS\_RDR.1.3</sup>

**5.5.3 IDS\_STG.1 Guarantee of Sensor Data Availability (EXT)**

**IDS\_STG.1.1 The Sensor shall protect the stored Sensor data from unauthorised deletion. (EXT)** <sup>IDS\_STG.1.1</sup>

**IDS\_STG.1.2 The Sensor shall protect the stored Sensor data from modification. (EXT)** <sup>IDS\_STG.1.2</sup>



Application Note: Authorised deletion of data is not considered a modification of Sensor data in this context. This requirement applies to the actual content of the Sensor Data, which should be protected from any modifications.

**IDS\_STG.1.3 The Sensor shall ensure that [assignment: *metric for saving Sensor data*] Sensor data will be maintained when the following conditions occur: [selection: *Sensor data storage exhaustion, failure, attack*]. (EXT)<sup>IDS\_STG.1.3</sup>**

Application Note: The ST needs to define the amount of Sensor data that could be lost under the identified scenarios.

#### **5.5.4 IDS\_STG.2 Prevention of Sensor data loss (EXT)**

**IDS\_STG.2.1 The Sensor shall [selection: 'ignore Sensor data', 'prevent Sensor data, except those taken by the authorised user with special rights', 'overwrite the oldest stored Sensor data '] and send an alarm if the storage capacity has been reached. (EXT)<sup>IDS\_STG.2.1</sup>**

Application Note: The ST must define what actions the Sensor takes if the storage capacity has been reached. Anything that causes the Sensor to stop collecting events may not be the best solution, as this will only affect the Sensor and not the system on which it is collecting data (e.g., shutting down the Sensor).

## 5.6 ASSURANCE REQUIREMENTS

This chapter defines the assurance requirements for the TOE. Assurance requirements are taken from the CC Part 3 and are EAL2 augmented with ALC\_FLR.2. Table 4 Assurance Requirements summarizes the components.

Assurance Class	Assurance Components	Assurance Components Description
<b>Development</b>	ADV_ARC.1	Architectural Design with domain separation and non-bypassability
	ADV_FSP.2	Security-enforcing Functional Specification
	ADV_TDS.1	Basic design
<b>Guidance Documents</b>	AGD_OPE.1	Operational user guidance
	AGD_PRE.1	Preparative User guidance
<b>Life Cycle Support</b>	ALC_CMC.2	Use of a CM system
	ALC_CMS.2	Parts of the TOE CM coverage
	ALC_DEL.1	Delivery procedures
	<b>ALC_FLR.2</b>	<b>Flaw Reporting Procedures</b>
<b>Tests</b>	ATE_COV.1	Evidence of coverage
	ATE_FUN.1	Functional testing
	ATE_IND.2	Independent testing - conformance
<b>Vulnerability Assessment</b>	AVA_VAN.2	Vulnerability analysis

Table 4 Assurance Requirements

### Class ADV: Development

#### 5.6.1 ADV\_ARC.1 Security architecture description

Dependencies:     ADV\_FSP.1 Basic functional specification  
                          ADV\_TDS.1 Basic design

Developer action elements:

- ADV\_ARC.1.1D The developer shall design and implement the TOE so that the security features of the TSF cannot be bypassed.
- ADV\_ARC.1.2D The developer shall design and implement the TSF so that it is able to protect itself from tampering by untrusted active entities.
- ADV\_ARC.1.3D The developer shall provide a security architecture description of the TSF.

Content and presentation elements:

- ADV\_ARC.1.1C The security architecture description shall be at a level of detail commensurate with the description of the SFR-enforcing abstractions described in the TOE design document.
- ADV\_ARC.1.2C The security architecture description shall describe the security domains maintained by the TSF consistently with the SFRs.
- ADV\_ARC.1.3C The security architecture description shall describe how the TSF initialization process is secure.
- ADV\_ARC.1.4C The security architecture description shall demonstrate that the TSF protects itself from tampering.
- ADV\_ARC.1.5C The security architecture description shall demonstrate that the TSF prevents bypass of the SFR-enforcing functionality.

Evaluator action elements:

- ADV\_ARC.1.1E The evaluator *shall confirm* that the information provided meets all requirements for content and presentation of evidence.

## 5.6.2 ADV\_FSP.2 Security-enforcing functional specification

Dependencies: ADV\_TDS.1 Basic design

Developer action elements:

ADV\_FSP.2.1D The developer shall provide a functional specification.

ADV\_FSP.2.2D The developer shall provide a tracing from the functional specification to the SFRs.

Content and presentation elements:

ADV\_FSP.2.1C The functional specification shall completely represent the TSF.

ADV\_FSP.2.2C The functional specification shall describe the purpose and method of use for all TSFI.

ADV\_FSP.2.3C The functional specification shall identify and describe all parameters associated with each TSFI.

ADV\_FSP.2.4C For each SFR-enforcing TSFI, the functional specification shall describe the SFR-enforcing actions associated with the TSFI.

ADV\_FSP.2.5C For SFR-enforcing TSFIs, the functional specification shall describe direct error messages resulting from processing associated with the SFR-enforcing actions.

ADV\_FSP.2.6C The tracing shall demonstrate that the SFRs trace to TSFIs in the functional specification.

Evaluator action elements:

ADV\_FSP.2.1E The evaluator *shall confirm* that the information provided meets all requirements for content and presentation of evidence.

ADV\_FSP.2.2E The evaluator *shall determine* that the functional specification is an accurate and complete instantiation of the SFRs.

### 5.6.3 ADV\_TDS.1 Basic design

Dependencies: ADV\_FSP.2 Security-enforcing functional specification

Developer action elements:

ADV\_TDS.1.1D The developer shall provide the design of the TOE.

ADV\_TDS.1.2D The developer shall provide a mapping from the TSFI of the functional specification to the lowest level of decomposition available in the TOE design.

Content and presentation elements:

ADV\_TDS.1.1C The design shall describe the structure of the TOE in terms of subsystems.

ADV\_TDS.1.2C The design shall identify all subsystems of the TSF.

ADV\_TDS.1.3C The design shall describe the behavior of each SFR-supporting or SFR-non-interfering TSF subsystem in sufficient detail to determine that it is not SFR-enforcing.

ADV\_TDS.1.4C The design shall summarize the SFR-enforcing behavior of the SFR-enforcing subsystems.

ADV\_TDS.1.5C The design shall provide a description of the interactions among SFR-enforcing subsystems of the TSF, and between the SFR-enforcing subsystems of the TSF and other subsystems of the TSF.

ADV\_TDS.1.6C The mapping shall demonstrate that all behavior described in the TOE design is mapped to the TSFIs that invoke it.

Evaluator action elements:

ADV\_TDS.1.1E The evaluator *shall confirm* that the information provided meets all requirements for content and presentation of evidence.

ADV\_TDS.1.2E The evaluator *shall determine* that the design is an accurate and complete instantiation of all security functional requirements.

## **Class AGD: Guidance documents**

### **5.6.4 AGD\_OPE.1 Operational user guidance**

Dependencies: ADV\_FSP.1 Basic functional specification

Developer action elements:

AGD\_OPE.1.1D The developer shall provide operational user guidance.

Content and presentation elements:

AGD\_OPE.1.1C 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.

AGD\_OPE.1.2C The operational user guidance shall describe, for each user role, how to use the available interfaces provided by the TOE in a secure manner.

AGD\_OPE.1.3C 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.

AGD\_OPE.1.4C 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 TSF.

AGD\_OPE.1.5C The operational user guidance shall identify all possible modes of operation of the TOE (including operation following failure or operational error), their consequences and implications for maintaining secure operation.

AGD\_OPE.1.6C 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 ST.

AGD\_OPE.1.7C The operational user guidance shall be clear and reasonable.

Evaluator action elements:

AGD\_OPE.1.1E The evaluator *shall confirm* that the information provided meets all requirements for content and presentation of evidence.

### 5.6.5 AGD\_PRE.1 Preparative procedures

Dependencies: No dependencies.

Developer action elements:

AGD\_PRE.1.1D The developer shall provide the TOE including its preparative procedures.

Content and presentation elements:

AGD\_PRE.1.1C The preparative procedures shall describe all the steps necessary for secure acceptance of the delivered TOE in accordance with the developer's delivery procedures.

AGD\_PRE.1.2C The preparative procedures shall describe all the steps necessary for secure installation of the TOE and for the secure preparation of the operational environment in accordance with the security objectives for the operational environment as described in the ST.

Evaluator action elements:

AGD\_PRE.1.1E The evaluator *shall confirm* that the information provided meets all requirements for content and presentation of evidence.

AGD\_PRE.1.2E The evaluator shall apply the preparative procedures to confirm that the TOE can be prepared securely for operation.

**Class ALC: Life-cycle support**

### **5.6.6 ALC\_CMC.2 Use of a CM system**

Dependencies: ALC\_CMS.1 TOE CM coverage

Developer action elements:

ALC\_CMC.2.1D The developer shall provide the TOE and a reference for the TOE.

ALC\_CMC.2.2D The developer shall provide the CM documentation.

ALC\_CMC.2.3D The developer shall use a CM system.

Content and presentation elements:

ALC\_CMC.2.1C The TOE shall be labeled with its unique reference.

ALC\_CMC.2.2C The CM documentation shall describe the method used to uniquely identify the configuration items.

ALC\_CMC.2.3C The CM system shall uniquely identify all configuration items.

Evaluator action elements:

ALC\_CMC.2.1E The evaluator *shall confirm* that the information provided meets all requirements for content and presentation of evidence.

### **5.6.7 ALC\_CMS.2 Parts of the TOE CM coverage**

Dependencies: No dependencies.

Developer action elements:

ALC\_CMS.2.1D The developer shall provide a configuration list for the TOE.



**Content and presentation elements:**

- ALC\_CMS.2.1C The configuration list shall include the following: the TOE itself; the evaluation evidence required by the SARs; and the parts that comprise the TOE.
- ALC\_CMS.2.2C The configuration list shall uniquely identify the configuration items.
- ALC\_CMS.2.3C For each TSF relevant configuration item, the configuration list shall indicate the developer of the item.

**Evaluator action elements:**

- ALC\_CMS.2.1E The evaluator *shall confirm* that the information provided meets all requirements for content and presentation of evidence.

**5.6.8 ALC\_DEL.1 Delivery procedures**

Dependencies: No dependencies.

**Developer action elements:**

- ALC\_DEL.1.1D The developer shall document procedures for delivery of the TOE or parts of it to the consumer.
- ALC\_DEL.1.2D The developer shall use the delivery procedures.

**Content and presentation elements:**

- ALC\_DEL.1.1C The delivery documentation shall describe all procedures that are necessary to maintain security when distributing versions of the TOE to the consumer.

**Evaluator action elements:**

- ALC\_DEL.1.1E The evaluator *shall confirm* that the information provided meets all requirements for content and presentation of evidence.

## **5.6.9 ALC\_FLR.2 Flaw reporting procedures**

Dependencies: No dependencies.

Developer action elements:

ALC\_FLR.2.1D The developer shall document flaw remediation procedures addressed to TOE developers.

ALC\_FLR.2.2D The developer shall establish a procedure for accepting and acting upon all reports of security flaws and requests for corrections to those flaws.

ALC\_FLR.2.3D The developer shall provide flaw remediation guidance addressed to TOE users.

Content and presentation elements:

ALC\_FLR.2.1C The flaw remediation procedures documentation shall describe the procedures used to track all reported security flaws in each release of the TOE.

ALC\_FLR.2.2C The flaw remediation procedures shall require that a description of the nature and effect of each security flaw be provided, as well as the status of finding a correction to that flaw.

ALC\_FLR.2.3C The flaw remediation procedures shall require that corrective actions be identified for each of the security flaws.

ALC\_FLR.2.4C The flaw remediation procedures documentation shall describe the methods used to provide flaw information, corrections and guidance on corrective actions to TOE users.

ALC\_FLR.2.5C The flaw remediation procedures shall describe a means by which the developer receives from TOE users reports and enquiries of suspected security flaws in the TOE.

ALC\_FLR.2.6C The procedures for processing reported security flaws shall ensure that any reported flaws are remediated and the remediation procedures issued to TOE users.

ALC\_FLR.2.7C The procedures for processing reported security flaws shall provide safeguards that any corrections to these security flaws do not introduce any new flaws.

ALC\_FLR.2.8C The flaw remediation guidance shall describe a means by which TOE users report to the developer any suspected security flaws in the TOE.

Evaluator action elements:

ALC\_FLR.2.1E The evaluator *shall confirm* that the information provided meets all requirements for content and presentation of evidence.

### Class ATE: Tests

#### 5.6.10 ATE\_COV.1 Evidence of coverage

Dependencies:     ADV\_FSP.2 Security-enforcing functional specification  
                    ATE\_FUN.1 Functional testing

Developer action elements:

ATE\_COV.1.1D The developer shall provide evidence of the test coverage.

Content and presentation elements:

ATE\_COV.1.1C The evidence of the test coverage shall show the correspondence between the tests in the test documentation and the TSFIs in the functional specification.

Evaluator action elements:

ATE\_COV.1.1E The evaluator *shall confirm* that the information provided meets all requirements for content and presentation of evidence.

### **5.6.11 ATE\_FUN.1 Functional testing**

Dependencies: ATE\_COV.1 Evidence of coverage

Developer action elements:

ATE\_FUN.1.1D The developer shall test the TSF and document the results.

ATE\_FUN.1.2D The developer shall provide test documentation.

Content and presentation elements:

ATE\_FUN.1.1C The test documentation shall consist of test plans, expected test results and actual test results.

ATE\_FUN.1.2C The test plans shall identify the tests to be performed and describe the scenarios for performing each test. These scenarios shall include any ordering dependencies on the results of other tests.

ATE\_FUN.1.3C The expected test results shall show the anticipated outputs from a successful execution of the tests.

ATE\_FUN.1.4C The actual test results shall be consistent with the expected test results.

Evaluator action elements:

ATE\_FUN.1.1E The evaluator *shall confirm* that the information provided meets all requirements for content and presentation of evidence.

### **5.6.12 ATE\_IND.2 Independent testing - sample**

Dependencies: ADV\_FSP.2 Security-enforcing functional specification  
AGD\_OPE.1 Operational user guidance  
AGD\_PRE.1 Preparative procedures  
ATE\_COV.1 Evidence of coverage  
ATE\_FUN.1 Functional testing

Developer action elements:

ATE\_IND.2.1D The developer shall provide the TOE for testing.

Content and presentation elements:

ATE\_IND.2.1C The TOE shall be suitable for testing.

ATE\_IND.2.2C The developer shall provide an equivalent set of resources to those that were used in the developer's functional testing of the TSF.

Evaluator action elements:

ATE\_IND.2.1E The evaluator *shall confirm* that the information provided meets all requirements for content and presentation of evidence.

ATE\_IND.2.2E The evaluator *shall execute* a sample of tests in the test documentation to verify the developer test results.

ATE\_IND.2.3E The evaluator *shall test* a subset of the TSF to confirm that the TSF operates as specified.

**Class AVA: Vulnerability assessment**

**5.6.13 AVA\_VAN.2 Vulnerability analysis**

Dependencies:     ADV\_ARC.1 Security architecture description  
                  ADV\_FSP.1 Basic functional specification  
                  ADV\_TDS.1 Basic design  
                  AGD\_OPE.1 Operational user guidance  
                  AGD\_PRE.1 Preparative procedures

Developer action elements:

AVA\_VAN.2.1D The developer shall provide the TOE for testing.

Content and presentation elements:

AVA\_VAN.2.1C The TOE shall be suitable for testing.

Evaluator action elements:

AVA\_VAN.2.1E The evaluator *shall confirm* that the information provided meets all requirements for content and presentation of evidence.

AVA\_VAN.2.2E The evaluator *shall perform* a search of public domain sources to identify potential vulnerabilities in the TOE.

AVA\_VAN.2.3E The evaluator *shall perform* an independent vulnerability analysis of the TOE using the guidance documentation, functional specification, TOE design and security architecture description to identify potential vulnerabilities in the TOE.

AVA\_VAN.2.4E The evaluator *shall conduct* penetration testing, based on the identified potential vulnerabilities, to determine that the TOE is resistant to attacks performed by an attacker possessing Basic attack potential.

Application Note: The TOE version used as the basis for testing should include a reference to the specific signature set in place when this activity is conducted.

## 6 RATIONALE

This section provides the rationale for the selection of the IT security requirements, objectives, assumptions, and threats. In particular, it shows that the IT security requirements are suitable to meet the security objectives, which in turn are shown to be suitable to cover all aspects of the TOE security environment.

### 6.1 RATIONALE FOR IT SECURITY OBJECTIVES

This section provides a rationale for the existence of each assumption, threat, and policy statement that compose the Intrusion Detection System Sensor Protection Profile. Table 5 Security Environment vs. Objectives demonstrates the mapping between the assumptions, threats, and policies to the security objectives is complete. The following discussion provides detailed evidence of coverage for each assumption, threat, and policy.

	O.PROTCT	O.IDACTS	O.EADMIN	O.ACCESS	O.IDAUTH	O.OFLOWS	O.AUDITS	O.INTEGR	O.EXPORT	OE.INSTAL	OE.PHYCAL	OE.CREDEN	OE.PERSON	OE.INTROP	OE.TIME	OE.AUDIT_P ROTECTION	OE.AUDIT_S ORT
A.ACCESS														X			
A.PROTCT											X						
A.LOCATE											X						
A.MANAGE													X				
A.NOEVIL										X	X	X					
A.NOTRUST											X	X					
T.COMINT	X			X	X			X									
T.COMDIS	X			X	X				X								
T.LOSSOF	X			X	X			X									
T.NOHALT		X		X	X												
T.PRIVIL	X			X	X												
T.IMPCON			X	X	X					X							
T.INFLUX						X											
T.MISUSE		X					X										
T.INADVE		X					X										
T.MISACT		X					X										
P.DETECT		X					X								X		
P.MANAGE	X		X	X	X					X		X	X				
P.ACCESS	X			X	X											X	
P.ACCACT					X		X								X		X
P.INTEGR								X									
P.PROTCT						X					X						

Table 5 Security Environment vs. Objectives

**A.ACCESS** The TOE has access to all the IT System data it needs to perform its functions.

The OE.INTROP objective ensures the TOE has the needed access.

**A.PROTCT** The TOE hardware and software critical to security policy enforcement will be protected from unauthorized physical modification.

The OE.PHYCAL provides for the physical protection of the TOE hardware and software.

**A.LOCATE** The processing resources of the TOE will be located within controlled access facilities, which will prevent unauthorized physical access.

The OE.PHYCAL provides for the physical protection of the TOE.

**A.MANAGE** There will be one or more competent individuals assigned to manage the TOE and the security of the information it contains.

The OE.PERSON objective ensures all authorized administrators are qualified and trained to manage the TOE.

**A.NOEVIL** The authorized administrators are not careless, willfully negligent, or hostile, and will follow and abide by the instructions provided by the TOE documentation.

The OE.INSTAL objective ensures that the TOE is properly installed and operated and the OE.PHYCAL objective provides for physical protection of the TOE by authorized administrators. The OE.CREDEN objective supports this assumption by requiring protection of all authentication data.

**A.NOTRST** The TOE can only be accessed by authorized users.

The OE.PHYCAL objective provides for physical protection of the TOE to protect against unauthorized access. The OE.CREDEN objective supports this assumption by requiring protection of all authentication data.

**T.COMINT** An unauthorized user may attempt to compromise the integrity of the data collected by the TOE by bypassing a security mechanism.

The O.IDAUTH objective provides for authentication of users prior to any TOE data access. The O.ACCESS objective builds upon the O.IDAUTH objective by only permitting authorized users to access TOE data. The O.INTEGR objective ensures no TOE data will be modified. The O.PROTCT objective addresses this threat by providing TOE self-protection.



**T.COMDIS** An unauthorized user may attempt to disclose the data collected by the TOE by bypassing a security mechanism.

The O.IDAUTH objective provides for authentication of users prior to any TOE data access. The O.ACCESS objective builds upon the O.IDAUTH objective by only permitting authorized users to access TOE data. The O.EXPORT objective ensures that confidentiality of TOE data will be maintained. The O.PROTCT objective addresses this threat by providing TOE self-protection.

**T.LOSSOF** An unauthorized user may attempt to remove or destroy data collected by the TOE.

The O.IDAUTH objective provides for authentication of users prior to any TOE data access. The O.ACCESS objective builds upon the O.IDAUTH objective by only permitting authorized users to access TOE data. The O.INTEGR objective ensures no TOE data will be deleted. The O.PROTCT objective addresses this threat by providing TOE self-protection.

**T.NOHALT** An unauthorized user may attempt to compromise the continuity of the TOE's collection functionality by halting execution of the TOE.

The O.IDAUTH objective provides for authentication of users prior to any TOE function accesses. The O.ACCESS objective builds upon the O.IDAUTH objective by only permitting authorized users to access TOE functions. The O.IDACTS objective addresses this threat by requiring the TOE to collect all events, including those attempts to halt the TOE.

**T.PRIVIL** An unauthorized user may gain access to the TOE and exploit system privileges to gain access to TOE security functions and data.

The O.IDAUTH objective provides for authentication of users prior to any TOE function accesses. The O.ACCESS objective builds upon the O.IDAUTH objective by only permitting authorized users to access TOE functions. The O.PROTCT objective addresses this threat by providing TOE self-protection.

**T.IMPCON** The TOE may be susceptible to improper configuration by any user causing potential intrusions to go undetected.

The O.INSTAL objective states the authorized administrators will configure the TOE properly. The O.EADMIN objective ensures the TOE has all the necessary administrator functions to manage the product. The O.IDAUTH objective provides for authentication of users prior to any TOE function accesses. The O.ACCESS objective builds upon the O.IDAUTH objective by only permitting authorized users to access TOE functions.

**T.INFLUX** An unauthorized user may cause malfunction of the TOE by creating an influx of data that the TOE cannot handle.

The O.OFLOWS objective counters this threat by requiring the TOE handle data storage overflows.

**T.MISUSE** Unauthorized accesses and activity indicative of misuse may occur on an IT System.

The O.AUDITS and O.IDACTS objectives address this threat by requiring collection of audit and Sensor data.

**T.INADVE** Inadvertent activity and access may occur on an IT System.

The O.AUDITS and O.IDACTS objectives address this threat by requiring collection of audit and Sensor data.

**T.MISACT** Malicious activity, such as introductions of Trojan horses and viruses, may occur on an IT System.

The O.AUDITS and O.IDACTS objectives address this threat by requiring collection of audit and Sensor data.

**P.DETECT** All events that are indicative of inappropriate activity that may have resulted from misuse, access, or malicious activity of IT System assets must be collected.

The O.AUDITS and O.IDACTS objectives requires collection of audit and Sensor data.

**P.MANAGE** The TOE shall only be managed by authorized users.

The O.PERSON objective ensures competent administrators will manage the TOE and the O.EADMIN objective ensures there is a set of functions for administrators to use. The O.INSTAL objective supports the O.PERSON objective by ensuring administrator follow all provided documentation and maintain the security policy. The O.IDAUTH objective provides for authentication of users prior to any TOE function accesses. The O.ACCESS objective builds upon the O.IDAUTH objective by only permitting authorized users to access TOE functions. The O.CREDEN objective requires administrators to protect all authentication data. The O.PROTCT objective provides for TOE self-protection.

**P.ACCESS** All data collected by the IDS shall only be used for authorized purposes.

The O.IDAUTH objective provides for authentication of users prior to any TOE function accesses. The O.ACCESS objective builds upon the

O.IDAUTH objective by only permitting authorized users to access TOE functions. The O.PROTCT objective provides for TOE self-protection.

**P.ACCACT** Users of the TOE shall be accountable for their actions within the IDS.

The O.AUDITS objective implements this policy by requiring auditing of all data accesses and use of TOE functions. The O.IDAUTH objective supports this objective by ensuring each user is uniquely identified and authenticated.

**P.INTGTY** Data collected by the TOE shall be protected from modification.

The O.INTEGR objective ensures the protection of data from modification.

**P. PROTCT** The TOE shall be protected from unauthorized accesses and disruptions of collection activities.

The O.OFLOWS objective requires the TOE handle disruptions. The O.PHYCAL objective protects the TOE from unauthorized physical modifications.

## 6.2 RATIONALE FOR SECURITY OBJECTIVES FOR THE ENVIRONMENT

The purpose for the environmental objectives is to provide protection for the TOE that cannot be addressed through IT measures. The defined objectives provide for physical protection of the TOE, proper management of the TOE, and interoperability requirements on the TOE. Together with the IT security objectives, these environmental objectives provide a complete description of the responsibilities of TOE in meeting security needs.

## 6.3 RATIONALE FOR SECURITY REQUIREMENTS

This section demonstrates that the functional components selected for the Intrusion Detection System Sensor Protection Profile provide complete coverage of the defined security objectives. The mapping of components to security objectives is depicted in the following table.

	O.PROTCT	O.IDACTS	O.EADMIN	O.ACCESS	O.IDAUTH	O.OFLOWS	O.AUDITS	O.INTEGR	O.EXPORT	OE.TIME	OE.AUDIT_PROTECTION	OE.AUDIT_SORT
FAU_GEN.1							X					

	O.PROTECT	O.IDACTS	O.EADMIN	O.ACCESS	O.IDAUTH	O.OFLOWS	O.AUDITS	O.INTEGR	O.EXPORT	OE.TIME	OE.AUDIT_PROTECTION	OE.AUDIT_SORT
FAU_SAR.1			X									
FAU_SAR.2				X	X							
FAU_SAR.3			X									X
FAU_SEL.1			X				X					
FAU_STG.2	X			X	X	X		X			X	
FAU_STG.4						X	X					
FIA_UAU.1				X	X							
FIA_ATD.1					X							
FIA_UID.1				X	X							
FMT_MOF.1	X			X	X							
FMT_MTD.1	X			X	X			X				
FMT_SMR.1					X							
FPT_ITA.1									X			
FPT_ITC.1								X	X			
FPT_ITL.1								X	X			
ADV_ARC.1	X		X		X		X	X				
FPT_STM.1							X			X		
IDS_COL.1		X										
IDS_RDR.1			X	X	X							
IDS_STG.1	X			X	X	X		X				
IDS_STG.2						X						

**Table 6 Requirements vs. Objectives Mapping**

The following discussion provides detailed evidence of coverage for each security objective.

**O.PROTECT** The TOE must protect itself from unauthorized modifications and access to its functions and data.

The TOE is required to protect the audit data from deletion as well as guarantee the availability of the audit data in the event of storage exhaustion, failure or attack [FAU\_STG.2]. The Sensor is required to protect the Sensor data collected from an IT System from any modification and unauthorized deletion, as well as guarantee the availability of the data in the event of storage exhaustion, failure or attack [IDS\_STG.1]. The TOE is required to provide the ability to restrict managing the behavior of

functions of the TOE to authorized users of the TOE [FMT\_MOF.1]. Only authorized administrators of the Sensor may query and add Sensor and audit data, and authorized administrators of the TOE may query and modify all other TOE data [FMT\_MTD.1]. The TOE must ensure that all functions are invoked and succeed before each function may proceed [ADV\_ARC.1]. The TSF must be protected from interference that would prevent it from performing its functions [ADV\_ARC.1].

**O.IDACTS** The Sensor must collect and store information about all events that are indicative of inappropriate activity that may have resulted from misuse, access, or malicious activity of IT System assets and the IDS.

The Sensor is required to collect events indicative of inappropriate activity that may have resulted from misuse, access, or malicious activity of IT System assets of an IT System. These events must be defined in the ST [IDS\_COL.1].

**O.EADMIN** The TOE must include a set of functions that allow effective management of its functions and data.

The TOE must provide the ability to review and manage the audit trail of a Sensor [FAU\_SAR.1, FAU\_SEL.1]. The Sensor must provide the ability for authorized administrators to view the Sensor data collected from an IT System [IDS\_RDR.1]. The TOE must ensure that all functions are invoked and succeed before each function may proceed [ADV\_ARC.1]. The TSF must be protected from interference that would prevent it from performing its functions [ADV\_ARC.1].

**O.ACCESS** The TOE must allow authorized users to access only appropriate TOE functions and data.

The TOE is required to restrict the review of audit data to those granted with explicit read-access [FAU\_SAR.2]. The Sensor is required to restrict the review of collected Sensor data to those granted with explicit read-access [IDS\_RDR.1]. The TOE is required to protect the audit data from deletion as well as guarantee the availability of the audit data in the event of storage exhaustion, failure or attack [FAU\_STG.2]. The Sensor is required to protect the Sensor data collected from an IT System from any modification and unauthorized deletion [IDS\_STG.1]. Users authorized to access the TOE are defined using an identification and authentication process [FIA\_UID.1, FIA\_UAU.1]. The TOE is required to provide the ability to restrict managing the behavior of functions of the TOE to authorized users of the TOE [FMT\_MOF.1]. Only authorized administrators of the Sensor may query and add Sensor and audit data, and authorized administrators of the TOE may query and modify all other TOE data [FMT\_MTD.1].

**O.IDAUTH** The TOE must be able to identify and authenticate authorized users prior to allowing access to TOE functions and data.

The TOE is required to restrict the review of audit data to those granted with explicit read-access [FAU\_SAR.2]. The Sensor is required to restrict the review of collected Sensor data to those granted with explicit read-access [IDS\_RDR.1]. The TOE is required to protect the stored audit records from unauthorized deletion [FAU\_STG.2]. The Sensor is required to protect the Sensor data collected from an IT System from any modification and unauthorized deletion, as well as guarantee the availability of the data in the event of storage exhaustion, failure or attack [IDS\_STG.1]. Security attributes of subjects use to enforce the authentication policy of the TOE must be defined [FIA\_ATD.1]. Users authorized to access the TOE are defined using an identification and authentication process [FIA\_UID.1, FIA\_UAU.1]. The TOE is required to provide the ability to restrict managing the behavior of functions of the TOE to authorized users of the TOE [FMT\_MOF.1]. Only authorized administrators of the Sensor may query and add Sensor and audit data, and authorized administrators of the TOE may query and modify all other TOE data [FMT\_MTD.1]. The TOE must be able to recognize the different administrative and user roles that exist for the TOE [FMT\_SMR.1]. The TOE must ensure that all functions are invoked and succeed before each function may proceed [ADV\_ARC.1]. The TSF must be protected from interference that would prevent it from performing its functions [ADV\_ARC.1].

**O.OFLOWS** The TOE must appropriately handle potential audit and Sensor data storage overflows.

The TOE is required to protect the audit data from deletion as well as guarantee the availability of the audit data in the event of storage exhaustion, failure or attack [FAU\_STG.2]. The TOE must prevent the loss of audit data in the event the its audit trail is full [FAU\_STG.4]. The Sensor is required to protect the Sensor data collected from an IT System from any modification and unauthorized deletion, as well as guarantee the availability of the data in the event of storage exhaustion, failure or attack [IDS\_STG.1]. The Sensor must prevent the loss of audit data in the event the its audit trail is full [IDS\_STG.2].

**O.AUDITS** The TOE must record audit records for data accesses and use of the Sensor functions.

Security-relevant events must be defined and auditable for the TOE [FAU\_GEN.1]. The TOE must provide the capability to select which security-relevant events to audit [FAU\_SEL.1]. The TOE must prevent the loss of collected data in the event the its audit trail is full [FAU\_STG.4]. The TOE must ensure that all functions are invoked and succeed before

each function may proceed [ADV\_ARC.1]. The TSF must be protected from interference that would prevent it from performing its functions [ADV\_ARC.1]. Time stamps associated with an audit record must be reliable [FPT\_STM.1].

**O.INTEGR** The TOE must ensure the integrity of all audit and Sensor data.

The TOE is required to protect the audit data from deletion as well as guarantee the availability of the audit data in the event of storage exhaustion, failure or attack [FAU\_STG.2]. The Sensor is required to protect the Sensor data collected from an IT System from any modification and unauthorized deletion [IDS\_STG.1]. Only authorized administrators of the Sensor may query or add audit and Sensor data [FMT\_MTD.1]. The Sensor must protect the collected data from modification and ensure its integrity when the data is transmitted to another IT product [FPT\_ITC.1, FPT\_ITI.1]. The TOE must ensure that all functions to protect the data are not bypassed [ADV\_ARC.1]. The TSF must be protected from interference that would prevent it from performing its functions [ADV\_ARC.1].

**O.EXPORT** When the TOE makes its Sensor data available to other IDS components, the TOE will ensure the confidentiality of the Sensor data.

The TOE must make the collected data available to other IT products [FPT\_ITA.1]. The TOE must protect the collected data from modification and ensure its integrity when the data is transmitted to another IT product [FPT\_ITC.1, FPT\_ITI.1].

**OE.AUDIT\_PROTECTION** The IT Environment will provide the capability to protect audit information.

The TOE is required to protect the audit data from deletion as well as guarantee the availability of the audit data in the event of storage exhaustion, failure or attack [FAU\_STG.2].

**OE.AUDIT\_SORT** The IT Environment will provide the capability to sort audit information.

The IT environment must provide the ability to review and manage the audit trail of the System to include sorting the audit data [FAU\_SAR.3,].

**OE.TIME** The IT Environment will provide reliable time stamp to the TOE. Time stamps associated with an audit record must be reliable [FPT\_STM.1].

## 6.4 RATIONALE FOR ASSURANCE REQUIREMENTS

EAL2 was chosen to provide a low to moderate level of assurance that is consistent with good commercial practices. As such minimal additional tasks are placed upon the vendor assuming the vendor follows reasonable software engineering practices and can provide support to the evaluation for design and testing efforts. The chosen assurance level is appropriate with the threats defined for the environment. While the Sensor may monitor a hostile environment, it is expected to be in a non-hostile position and embedded in or protected by other products designed to address threats that correspond with the intended environment. At EAL2, the Sensor will have incurred a search for obvious flaws to support its introduction into the non-hostile environment.

## 6.5 RATIONALE FOR EXTENDED REQUIREMENTS

A family of IDS requirements was created to specifically address the data collected and analyzed by an IDS. The audit family of the CC (FAU) was used as a model for creating these requirements. The purpose of this family of requirements is to address the unique nature of IDS data and provide for requirements about collecting, reviewing and managing the data. These requirements have no dependencies since the stated requirements embody all the necessary security functions.

## 6.6 RATIONALE FOR SATISFYING ALL DEPENDENCIES

The Intrusion Detection System Sensor Protection Profile does satisfy all the requirement dependencies of the Common Criteria. Table 7 Requirement Dependencies lists each requirement from the Intrusion Detection System Sensor Protection Profile with a dependency and indicates whether the dependent requirement was included. As the table indicates, all dependencies have been met.

Functional Component	Dependency	Included
FAU_GEN.1	FPT_STM.1	YES
FAU_SAR.1	FAU_GEN.1	YES
FAU_SAR.2	FAU_SAR.1	YES
FAU_SAR.3	FAU_SAR.1	YES
FAU_SEL.1	FAU_GEN.1 and FMT_MTD.1	YES
FAU_STG.2	FAU_GEN.1	YES
FAU_STG.4	FAU_STG.2	YES
FIA_UAU.1	FIA_UID.1	YES
FMT_MOF.1	FMT_SMR.1	YES
FMT_MTD.1	FMT_SMR.1	YES
FMT_SMR.1	FIA_UID.1	YES

**Table 7 Requirement Dependencies**



## **7 APPENDICES**

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### **A: References**

- [1] *Common Criteria for Information Technology Security Evaluation*, CCIMB-99-031, Version 2.1, August 1999.
- [1a] *Common Criteria for Information Technology Security Evaluation*, CCMB-206-09-001 thru 003, Version 3.1, September 2006
- [2] *NSA Glossary of Terms Used in Security and Intrusion Detection*, Greg Stocksdale, NSA Information Systems Security Organization, April 1998.

## B: Glossary

This section describes terms that are used throughout the IDSSPP and other Protection Profiles in the Intrusion Detection System family. The same terms section is used among all Protection Profiles to maintain consistency. When possible, terms are defined as they exist in the *Common Criteria for Information Technology Security Evaluation* or the *NSA Glossary of Terms Used in Security and Intrusion Detection<sub>2</sub>* provided by the NSA Information Systems Security Organization. The definitions were modified only to provide consistency with the IDSSPP. For example, occurrences of *computer system* or *network* were replaced with IT System. The authors of the IDSSPP defined all other terms as necessary.

**Analyzer data** – Data collected by the Analyzer functions

**Analyzer functions** – The active part of the Analyzer responsible for performing intrusion analysis of information that may be representative of vulnerabilities in and misuse of IT resources, as well as reporting of conclusions.

**Assets** - Information or resources to be protected by the countermeasures of a TOE.

**Attack** - An attempt to bypass security controls on an IT System. The attack may alter, release, or deny data. Whether an attack will succeed depends on the vulnerability of the IT System and the effectiveness of existing countermeasures.

**Audit** - The independent examination of records and activities to ensure compliance with established controls, policy, and operational procedures, and to recommend indicated changes in controls, policy, or procedures.

**Audit Trail** - In an IT System, a chronological record of system resource usage. This includes user login, file access, other various activities, and whether any actual or attempted security violations occurred, legitimate and unauthorized.

**Authentication** - To establish the validity of a claimed user or object.

**Authorized Administrator** – A subset of authorized users that manage an IDS component

**Authorized User** - A user that is allowed to perform IDS functions and access data

**Availability** - Assuring information and communications services will be ready for use when expected.

**Compromise** - An intrusion into an IT System where unauthorized disclosure, modification or destruction of sensitive information may have occurred.

**Confidentiality** - Assuring information will be kept secret, with access limited to appropriate persons.

**Evaluation** - Assessment of a PP, a ST or a TOE, against defined criteria.

**IDS component** - a Sensor, Scanner, or Analyzer.

**Information Technology (IT) System** - May range from a computer system to a computer network

**Integrity** - Assuring information will not be accidentally or maliciously altered or destroyed.

**Intrusion** - Any set of actions that attempt to compromise the integrity, confidentiality or availability of a resource.

**Intrusion Detection** - Pertaining to techniques which attempt to detect intrusion into an IT System by observation of actions, security logs, or audit data. Detection of break-ins

or attempts either manually or via software expert systems that operate on logs or other information available on the network.

**Intrusion Detection System (IDS)** - A combination of Sensors, Scanners, and Analyzers that monitor an IT System for activity that may inappropriately affect the IT System's assets and react appropriately.

**Intrusion Detection System Analyzer (Analyzer)** – The component of an IDS that accepts data from Sensors, Scanners and other IT System resources, and then applies analytical processes and information to derive conclusions about intrusions (past, present, or future).

**Intrusion Detection System Scanner (Scanner)** – The component of an IDS that collects static configuration information that might be indicative of the potential for a future intrusion or the occurrence of a past intrusion of an IT System.

**Intrusion Detection System Sensor (Sensor)** - The component of an IDS that collects real-time events that may be indicative of vulnerabilities in or misuse of IT resources.

**IT Product** - A package of IT software, firmware and/or hardware, providing functionality designed for use or incorporation within a multiplicity of systems.

**Network** - Two or more machines interconnected for communications.

**Packet** - A block of data sent over the network transmitting the identities of the sending and receiving stations, error-control information, and message.

**Packet Sniffer** - A device or program that monitors the data traveling between computers on a network

**Protection Profile (PP)** - An implementation-independent set of security requirements for a category of TOEs that meet specific consumer needs.

**Scanner data** – Data collected by the Scanner functions

**Scanner functions** – The active part of the Scanner responsible for collecting configuration information that may be representative of vulnerabilities in and misuse of IT resources (i.e., Scanner data)

**Security** - A condition that results from the establishment and maintenance of protective measures that ensure a state of inviolability from hostile acts or influences.

**Sensor data** – Data collected by the Sensor functions

**Sensor functions** – The active part of the Sensor responsible for collecting information that may be representative of vulnerabilities in and misuse of IT resources (i.e., Sensor data)

**Security Policy** - The set of laws, rules, and practices that regulate how an organization manages, protects, and distributes sensitive information.

**Security Target (ST)** - A set of security requirements and specifications to be used as the basis for evaluation of an identified TOE.

**Target of Evaluation (TOE)** - An IT product of system and its associated administrator and user guidance documentation that is the subject of an evaluation.

**Threat** - The means through which the ability or intent of a threat agent to adversely affect an automated system, facility, or operation can be manifest. A potential violation of security

**TOE Security Functions (TSF)** - A set consisting of all hardware, software, and firmware of the TOE that must be relied upon for the correct enforcement of the TSP.

**TOE Security Policy (TSP)** - A set of rules that regulate how assets are managed, protected, and distributed within a TOE.

**Trojan Horse** - An apparently useful and innocent program containing additional hidden code which allows the unauthorized collection, exploitation, falsification, or destruction of data.

**TSF data** - Data created by and for the TOE, that might affect the operation of the TOE.

**TSF Scope of Control (TSC)** - The set of interactions that can occur with or within a TOE and are subject to the rules of the TSP.

**User** – Any entity (human user or external IT entity) outside the TOE that interacts with the TOE.

**Virus** - A program that can "infect" other programs by modifying them to include a, possibly evolved, copy of itself.

**Vulnerability** - Hardware, firmware, or software flaw that leaves an IT System open for potential exploitation. A weakness in automated system security procedures, administrative controls, physical layout, internal controls, and so forth, that could be exploited by a threat to gain unauthorized access to information or disrupt critical processing.

## **C: Acronyms**

CC	Common Criteria
CM	Configuration Management
EAL	Evaluation Assurance Level
IDS	Intrusion Detection System
IT	Information Technology
PP	Protection Profile
ST	Security Target
TOE	Target of Evaluation
TSC	TSF Scope of Control
TSF	TOE Security Functions

## **D: Robustness Environment Characterization**

### **General Environmental Characterization**

In trying to specify the environments in which TOEs with various levels of robustness are appropriate, it is useful to first discuss the two defining factors that characterize that environment: value of the resources and authorization of the entities to those resources.

In general terms, the environment for a TOE can be characterized by the authorization (or lack of authorization) the least trustworthy entity has with respect to the highest value of TOE resources (i.e. the TOE itself and all of the data processed by the TOE).

Note that there are an infinite number of combinations of entity authorization and value of resources; this conceptually “makes sense” because there are an infinite number of potential environments, depending on how the resources are valued by the organization, and the variety of authorizations the organization defines for the associated entities. In the next section, these two environmental factors will be related to the robustness required for selection of an appropriate TOE.

### **Value of Resources**

Value of the resources associated with the TOE includes the data being processed or used by the TOE, as well as the TOE itself (for example, a real-time control processor). “Value” is assigned by the using organization. For example, in the DoD low-value data might be equivalent to data marked “For Official Use Only”, while high-value data may be those classified Top Secret. In a commercial enterprise, low-value data might be the internal organizational structure as captured in the corporate on-line phone book, while high-value data might be corporate research results for the next generation product. Note that when considering the value of the data one must also consider the value of data or resources that are accessible through exploitation of the TOE. For example, a firewall may have “low value” data itself, but it might protect an enclave with high value data. If the firewall was being depended upon to protect the high value data, then it must be treated as a high-value-data TOE.

### **Authorization of Entities**

Authorization that entities (users, administrators, other IT systems) have with respect to the TOE (and thus the resources of that TOE, including the TOE itself) is an abstract concept reflecting a combination of the trustworthiness of an entity and the access and privileges granted to that entity with respect to the resources of the TOE. For instance, entities that have total authorization to all data on the TOE are at one end of this spectrum; these entities may have privileges that allow them to read, write, and modify anything on the TOE, including all TSF data. Entities at the other end of the spectrum are those that are authorized to few or no TOE resources. For example, in the case of a router, non-administrative entities may have their packets routed by the TOE, but that is the extent of their authorization to the TOE's resources. In

the case of an OS, an entity may not be allowed to log on to the TOE at all (that is, they are not valid users listed in the OS's user database).

It is important to note that authorization **does not** refer to the **access** that the entities actually have to the TOE or its data. For example, suppose the owner of the system determines that no one other than employees was authorized to certain data on a TOE, yet they connect the TOE to the Internet. There are millions of entities that are not **authorized** to the data (because they are not employees), but they actually have connectivity to the TOE through the Internet and thus can attempt to access the TOE and its associated resources.

Entities are characterized according to the value of resources to which they are authorized; the extent of their authorization is implicitly a measure of how trustworthy the entity is with respect to compromise of the data (that is, compromise of any of the applicable security policies; e.g., confidentiality, integrity, availability). In other words, in this model the greater the extent of an entity's authorization, the more trustworthy (with respect to applicable policies) that entity is.

### **Selection of Appropriate Robustness Levels**

Robustness is a characteristic of a TOE defining how well it can protect itself and its resources; a more robust TOE is better able to protect itself. This section relates the defining factors of IT environments, authorization, and value of resources to the selection of appropriate robustness levels.

When assessing any environment with respect to Information Assurance the critical point to consider is the likelihood of an attempted security policy compromise, which was characterized in the previous section in terms of entity authorization and resource value. As previously mentioned, robustness is a characteristic of a TOE that reflects the extent to which a TOE can protect itself and its resources. It follows that as the likelihood of an attempted resource compromise increases, the robustness of an appropriate TOE should also increase.

It is critical to note that several combinations of the environmental factors will result in environments in which the likelihood of an attempted security policy compromise is similar. Consider the following two cases:

The first case is a TOE that processes only low-value data. Although the organization has stated that only its employees are authorized to log on to the system and access the data, the system is connected to the Internet to allow authorized employees to access the system from home. In this case, the least trusted entities would be unauthorized entities (e.g. non-employees) exposed to the TOE because of the Internet connectivity. However, since only low-value data are being processed, the likelihood that unauthorized entities would find it worth their while to attempt to compromise the data on the system is low and selection of a basic robustness TOE would be appropriate.

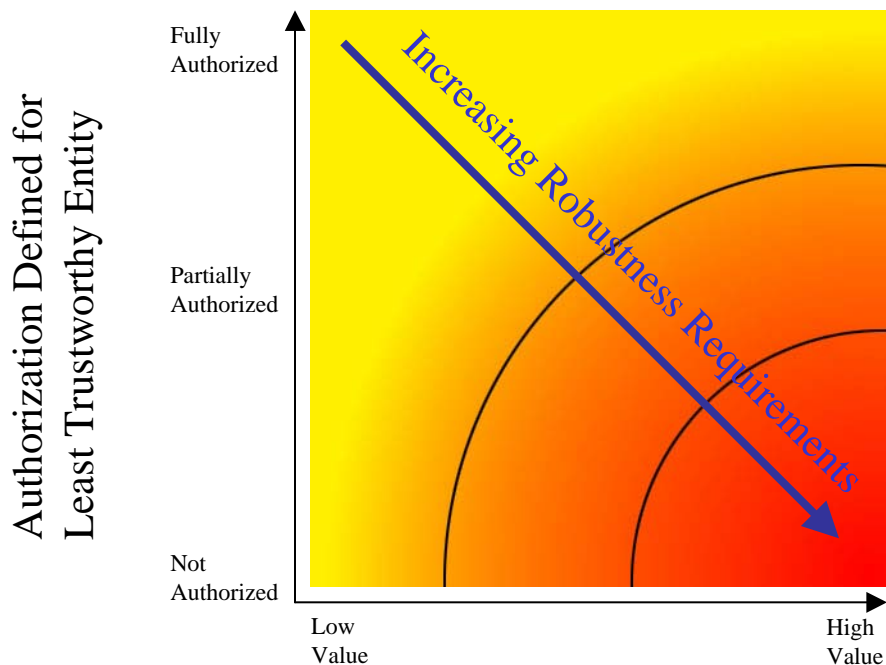
The second case is a TOE that processes high-value (e.g., classified) information. The organization requires that the TOE be stand-alone, and that every user with physical and logical access to the TOE undergo an investigation so that they are authorized to the highest value data on the TOE. Because of the extensive checks done during this investigation, the organization is assured that only highly trusted users are authorized to use the TOE. In this case, even though high value information is being processed, it is unlikely that a compromise of that data will be attempted because of the authorization and trustworthiness of the users and once again, selection of a basic robustness TOE would be appropriate.

The preceding examples demonstrated that it is possible for radically different combinations of entity authorization/resource values to result in a similar likelihood of an attempted compromise. As mentioned earlier, the robustness of a system is an indication of the protection being provided to counter compromise attempts. Therefore, a basic robustness system should be sufficient to counter compromise attempts where the likelihood of an attempted compromise is low. The following chart depicts the “universe” of environments characterized by the two factors discussed in the previous section: on one axis is the authorization defined for the least trustworthy entity, and on the other axis is the highest value of resources associated with the TOE.

As depicted in the following figure, the robustness of the TOEs required in each environment steadily increases as one goes from the upper left of the chart to the lower right; this corresponds to the need to counter increasingly likely attack attempts by the least trustworthy entities in the environment. Note that the shading of the chart is intended to reflect- the notion that different environments engender similar levels of “likelihood of attempted compromise”, signified by a similar color. Further, the delineations between such environments are not stark, but rather are finely grained and gradual.

While it would be possible to create many different "levels of robustness" at small intervals along the “Increasing Robustness Requirements” line to counter the increasing likelihood of attempted compromise due to those attacks, it would not be practical nor particularly useful. Instead, in order to implement the robustness strategy where there are only three robustness levels: Basic, Medium, and High, the graph is divided into three sections, with each section corresponding to a set of environments where the likelihood of attempted compromise is roughly similar. This is graphically depicted in the following chart.

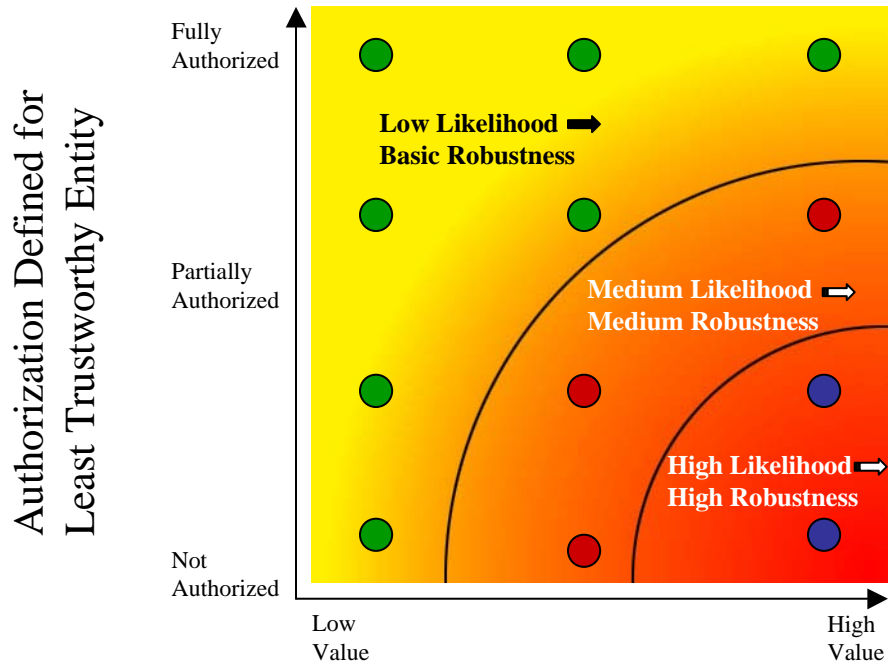




### Highest Value of Resources Associated with the TOE

In this second representation of environments and the robustness plane below, the “dots” represent given instantiations of environments; like-colored dots define environments with a similar likelihood of attempted compromise. Correspondingly, a TOE with a given robustness should provide sufficient protection for environments characterized by like-colored dots. In choosing the appropriateness of a given robustness level TOE PP for an environment, then, the user must first consider the lowest authorization for an entity as well as the highest value of the resources in that environment. This should result in a “point” in the chart above, corresponding to the likelihood that that entity will attempt to compromise the most valuable resource in the environment. The appropriate robustness level for the specified TOE to counter this likelihood can then be chosen.

The difficult part of this activity is differentiating the authorization of various entities, as well as determining the relative values of resources; (e.g., what constitutes “low value” data vs. “medium value” data). Because every organization will be different, a rigorous definition is not possible. In Section 3 of this PP, the targeted threat level for a Basic robustness TOE is characterized. This information is provided to help organizations using this PP -ensure that the functional requirements specified by this Basic robustness PP are appropriate for their intended application of a compliant TOE.



Highest Value of Resources  
Associated with the TOE