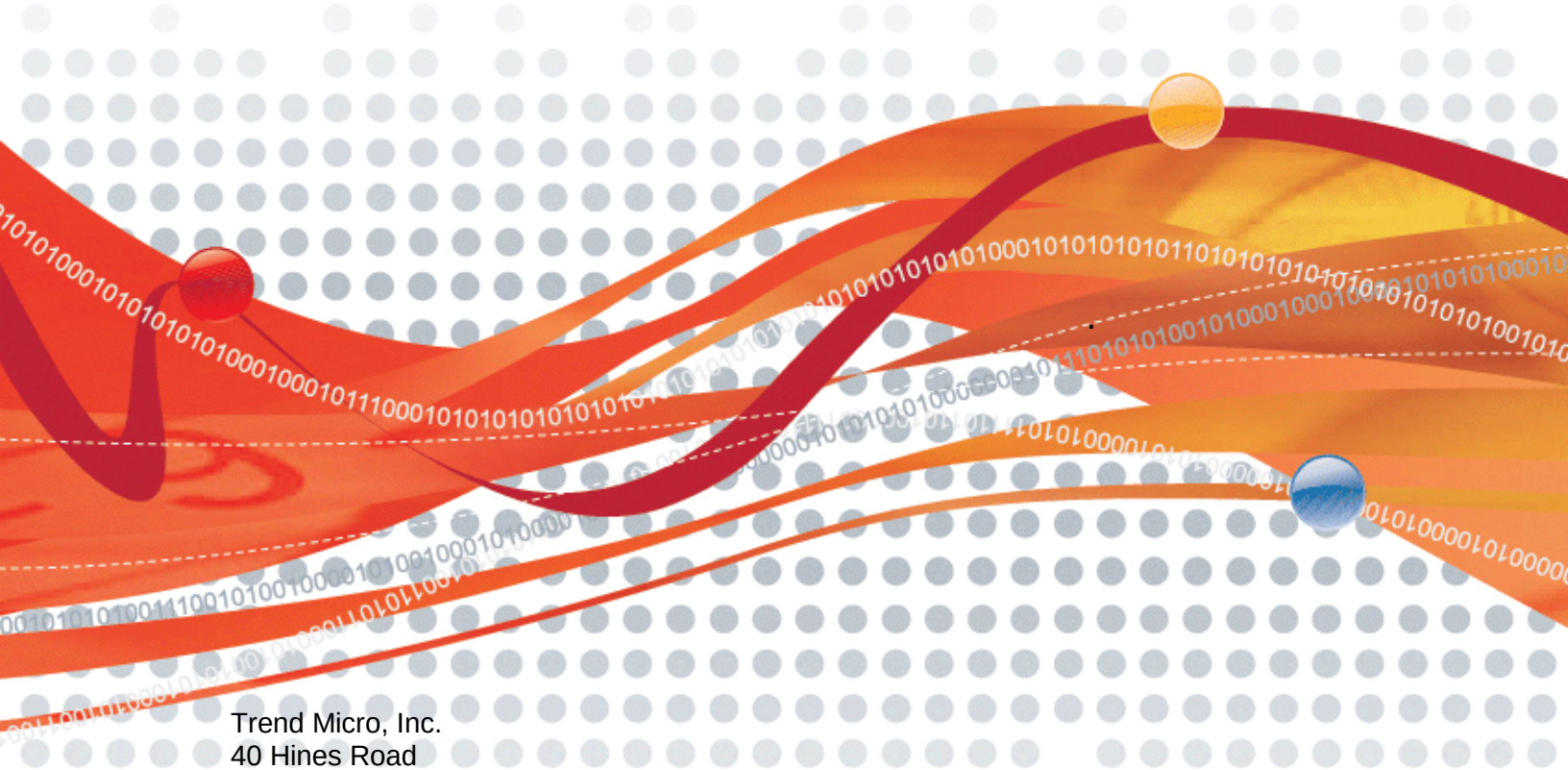
Deep Security 9.5
Security Target (EAL2+)
Revision: 21.0

Issued: 13 Mar 2015



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Endpoint Security

Revision History

Rev. #	Description	By	Date of Issue
1.0	First version for DS 9.5, based on the ST approved for DS 8.0 SP1	Marion Chase	21-Jun-2013
2.0	Updated following comments from Justin	Marion Chase	24-Jun-2013
3.0	Updated with CC version, removed PP conformance claim	Marion Chase	25-Jun-2013
4.0	Updated in response to S4CQ_TrendMicro_DS95_OR1_v1.0	Marion Chase	5-Sept-2013
5.0	Updated in response to S4CQ_TrendMicro_DS95_OR1_v1.1	Marion Chase	30-Sept-2013
6.0	Mentioned the Supported Linux Kernels document as part of Installation Guidance	Marion Chase	5-Dec-2013
7.0	Mention Web Reputation functionality	Daniel Smith	2-May-2014
8.0	Diagram updates	Daniel Smith	9-May-2014
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11.0	Updated TOE build versions, updated table 6-4 with new cert numbers	Marion Chase	20-Oct-2014
12.0	Added Microsoft SQL Server option to TOE	Marion Chase	22-Oct-2014
13.0	Correction to SUSE 11 build version number, and added ESX 5.1 option for vShield environment to TOE	Marion Chase	22-Oct-2014
14.0	Corrections to FCS_COP table: add SHA1 to Message Digest, added RSA certificate numbers, added AES and message digest certificate numbers for DSM	Marion Chase	2-Dec-2014
15.0	Added new certificate numbers for DSM to FCS_COP table	Marion Chase	18-Dec-2014
16.0	Updated the Product build numbers to the 9.5 SP1 GA versions. Added Application notes about Shutdown events.	Marion Chase	6-Feb-2015
17.0	Minor corrections and typos	Marion Chase	10-Feb-2015
18.0	Update to build version number in ST reference	Marion Chase	17-Feb-2015
19.0	Update table 6-4 and minor correction in 7.1.4	Marion Chase	2-Mar-2015
20.0	Updated figure 1-1and its description	Marion Chase	9-Mar-2015
21.0	Added application note to confirm TOE DSM OS in section 1.4	Marion Chase	13-Mar-2015

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Conventions and Terminology

Through this document, operations performed in Common Criteria requirements are highlighted *like this*.

Acronyms and Abbreviations

Acronym	Meaning
Agent	Deep Security Agent
Appliance	Deep Security Virtual Appliance
CC	Common Criteria for Information Technology Security Evaluation
CCS	Canadian Common Criteria Scheme
CEM	Common Methodology for Information Technology Security Evaluation
EAL	Evaluation Assurance Level
IT	Information Technology
Manager	Deep Security Manager
PP	Protection Profile
SAR	Security Assurance Requirements
SFP	Security Function Policy
SFR	Security Functional Requirements
SOF	Strength of Function
ST	Security Target
TBD	To Be Determined
TOE	Target of Evaluation
TSC	TSF Scope of Control
TSF	TOE Security Function
TSFI	TOE Security Function Interface
TSP	TOE Security Policy
VMware ESX	vSphere ™ ESXi from VMware Inc.

Document Organization

Section 1 provides the introductory material and identification information for the Security Target and a TOE overview and description
Section 2 provides a conformance claims for the ST
Section 3 provides a discussion of the expected environment for the TOE. This section also defines the set of threats that are to be addressed by either the technical countermeasures implemented in the TOE hardware or software or through the environmental controls.
Section 4 defines the security objectives for both the TOE and the TOE environment.
Section 5 contains definitions for extended SFRs.
Section 6 contains the functional and assurance requirements derived from the Common Criteria Parts 2 and 3, respectively, that must be satisfied by the TOE. This section also provides the rationale for the security objectives, requirements, and the TOE summary specifications as to their consistency, completeness, and suitability.
Section 7 describes the details specific to the TOE implementation of the security measures described in this document.

1 Introduction

This document for Deep Security 9.5 SP1 is based on the ST for Deep Security 8.0 SP1.

1.1 ST Reference

Title:	Trend Micro Deep Security 9.5 Security Target (EAL2+)
ST Version:	20.0
TOE Identification:	Trend Micro **Deep Security 9.5 SP1** Components: ▪ Deep Security Manager version 9.5.5600 ▪ Deep Security Agent version 9.5.3-2754 (for all supported platforms)Deep Security Virtual Appliance version 9.5.3-2754 ▪ Deep Security Virtual Appliance Filter Driver 9.5.3-2750
Author:	Marion Chase
Vetting Status:	Official Release

1.2 TOE Overview

The subject of this evaluation described in this ST is the Trend Micro Deep Security 9.5 SP1, which is a product release from the Deep Security 9 product family. Throughout this document it will also be referred to as Deep Security 9.5 or the Target of Evaluation (TOE).

Trend Micro Deep Security is a software intrusion detection and prevention software system that protects customers' IT system servers and applications. This solution can identify suspicious activity and behavior, and take proactive or preventive measures to ensure the security of the machines on which it is deployed. Several protection features are combined in centrally managed software agents, adding a comprehensive suite of protection functionality to the intrusion detection and prevention system.

Deep Security provides the ability to protect itself and associated data from unauthorized access or modification and provides an audit trail to ensure accountability for authorized actions.

The **Deep Security Agent** component can be deployed on physical servers or virtual machines, while the **Deep Security Virtual Appliance** can be deployed on VMware ESXi cloud computing hosts, providing protection services to virtual machines in that environment without requiring the presence of an in-guest Agent. The Appliance protects short lived and reverted virtual machines, as well as virtual machines and other appliances whose operating systems are not directly accessible, even those machines being managed by other administrators. Virtual machines running in this environment can also be protected by the Deep Security Agent in a coordinated approach.

The **Deep Security Virtual Appliance Filter Driver** is required in vShield Manager environments for IDS/IPS functionality. In newer NSX Manager environments this functionality is provided by VMWare and the DSVAFD is not required.

Trend Micro Deep Security provides the following protection modules:

- Anti-Malware
- Web Reputation
- Stateful firewall
- Intrusion Prevention:
  - Intrusion detection and prevention (IDS/IPS)
  - Web application protection
  - Application control
- File and system integrity monitoring
- Log inspection

Anti-Malware
The Deep Security Agent provides standard Anti-Malware capabilities. Deep Security Anti-Malware for Virtual Machines employs agent-less scanning technology for detecting malicious files on Virtual Machines in a VMware ESX environment. File writes and reads are remotely scanned by the appliance for malware. The Anti-Malware module is available in both the Agent and Appliance for VMware ESX. The exact functionality available varies by operating system.

Web Reputation
Web Reputation allows blocking access to URLs that are known to serve malicious or risky content by consulting Trend's constantly-updated database. This capability is provided by the Agent.

Stateful Firewall
The Deep Security Firewall module is enterprise-grade, bi-directional, and stateful. It is used to limit communication by source and destination port, IP, MAC addresses, and is protocol-aware. By limiting traffic, the attack surface of systems is reduced, and the risk of unauthorized access to the system is also reduced. The stateful firewall is available in both the Agent and Appliance for VMware ESX.

Intrusion Prevention
The high-performance deep packet inspection engine intelligently examines the content of network traffic entering and leaving hosts. The traffic is inspected for protocol deviations, content that signals an attack, or policy violations.
Intrusion Prevention protects operating systems, commercial off-the-shelf applications, and custom web applications against attacks such as SQL injection and cross-site scripting. Detailed events provide valuable information, including the source of the attack, the time, and what the potential intruder was attempting to exploit. The Intrusion Prevention module is available in both the Agent and Appliance for VMware ESX.

Integrity Monitoring
Integrity Monitoring is the ability to monitor critical operating system and application elements (files, directories, registry keys and values, etc.) for changes such as content, ownership, permissions and generate alerts to provide visibility into the changes that have occurred. This capability is provided by the Agent and Appliance for VMware ESX.

Log Inspection & Collection
Log Inspection & Collection provides the ability to collect and analyze operating system and application logs for important security events. Log Monitoring enables administrators' visibility into suspicious activity occurring in their environment and is a critical component to any forensic or auditing activities. This capability is provided by the Agent.

1.3 TOE Description

Deep Security 9.5 is comprised of a centralized management server with a browser-based management console called the Deep Security Manager and small traffic filtering engines called Deep Security Agents available for various operating systems. In VMware ESX environments Anti-Malware, Firewall and Intrusion Prevention, Integrity Monitoring and Web reputation capabilities can be provided in an agent-less mode with the Deep Security Virtual Appliance. The Virtual Appliance uses VMware's APIs and is supported on VMware vSphere 5.5.

The Deep Security Manager is deployed simply by downloading and installing the application on the designated management computer.

Deep Security Agents are deployed by downloading the software packages and installing on the physical or virtual machines to be protected, then using the Manager to activate them.

The Deep Security Manager contains functionality which assists the administrator to prepare and deploy the Deep Security Virtual Appliance, before the Appliance can be installed and activated. Deep Security Manager is also responsible for deploying the Deep Security Virtual Appliance Filter Driver in vShield Manager environments.

The deployed Agents/Appliances implement Security Policies defined by an Administrator using the Deep Security Manager.

Security Policies are made up of sets of rules selectively applied to network traffic based on a variety of conditions such as application type, interface type, protocol, and direction of traffic flow.

The system can be configured to send alert notifications when particular rules are triggered or when other system events occur. An administrator uses the Deep Security Manager to define and distribute Security Policies to the Agents/Appliances over the network.

The Deep Security Manager is also configured to use at least one Deep Security Agent acting as a Relay to automatically retrieve Deep Security Rule Updates and Anti-Malware components over the internet from Trend Micro Smart Protection Network and distribute them to some or all the Agents/Appliances across your network.

For additional security, the administrator can manage the methods and timing of the communications between the Deep Security Manager and individual Agents/Appliances.

1.3.1 Deep Security Manager

Deep Security Manager
Deep Security Manager is a powerful, centralized web-based management system that allows Administrators to create and manage comprehensive security policies and track threats and preventive actions taken in response to them. All of this can be done in real-time, from the desktop.

Security Policies
Security Policies are templates that specify the security rules to be configured and enforced automatically for one or more Computers. These compact, manageable rule sets make it simple to provide comprehensive security without the need to manage thousands of rules. Default Security Policies provide the necessary rules for a wide range of common Computer configurations, ensuring rapid deployment.

Multi-Level Policy Inheritance
Deep Security supports multiple levels of Security Policy inheritance. A newly created policy can be configured to inherit all or some of its settings from a parent policy. This lets the user create a tree structure of security policies which get progressively more granular and detailed.

Dashboard
The customizable, web-based UI (User Interface) makes it easy to quickly navigate and drill down to specific information. It provides:

- Extensive system, event and Computer reporting, with drill-down capabilities
- Graphs of key metrics with trends, with drill-down
- Detailed event logs, with drill-down
- Ability to save multiple personalized dashboard layouts

Built-in Security
Role-based access allows multiple Users, each with different sets of access and editing rights, to edit and monitor different aspects of the system and receive information appropriate to them. Digital signatures are used to authenticate system components and verify the integrity of rules. Session encryption protects the confidentiality of information exchanged between components.

Multi-Tenancy
Multi-Tenancy lets the administrator create independent instances of Deep Security within their enterprise. The administrator can create Deep Security Tenancies for individual departments or lines of business within their organization. Each Tenant has access to all the functionality of Deep Security except settings for Manager node management and system information. Tenants can be made responsible for the creation and management their own assets, Users, Policies and Rules independently of other Tenants. No Tenant's assets or security components are visible to any other Tenants. Although it operates on the same process, each Tenancy is independent and isolated from every other Tenancy.

1.3.2 Deep Security Agent, Deep Security Virtual Appliance and Deep Security Filter Driver

The Deep Security Agent ("the Agent") is a high performance, small footprint, software component that sits directly on a Computer, and defends it by monitoring incoming and outgoing network traffic for protocol deviations or contents that might signal an attack. When necessary, the Agent intervenes and neutralizes the threat by either blocking or correcting traffic.

The Deep Security Virtual Appliance (DSVA) performs the same functions as the Agent, but is specifically designed for VMware vSphere ESXi 5.x environments and protects Virtual Machines (VMs) on the same ESX Server, each with its own individual security policy.

The Deep Security Virtual Appliance Filter Driver is a special driver installed in the VMWare ESXi hypervisor to provide network packet data to the Deep Security Virtual Appliance. This driver is required in vShield Manager environments but in NSX Manager environments the functionality is provided by VMware and the driver is not required.

Anti-Malware Configurations
Anti-malware configurations specify:

- The applicable real-time policies that apply during different periods of the day/week
- The policy for full scheduled or manual scans
- Exclusions of file types and directories
- Real-time behaviour (scanning reads and/or writes) and applicable actions

Web Reputation Configurations
Web reputation configurations specify:

- Whether or not web reputation functionality is on or off
- URLs that are always allowed to be accessed
- Additional URLs to block access to

Stateful Firewall Rules
Some of the primary features and capabilities of the Deep Security Firewall include:

- Virtual machine isolation: Allows VM's to be isolated virtual environments, providing virtual segmentation without the need to modify virtual switch configurations or network architecture
- Fine-grained filtering: Firewall rules filter traffic based on source and destination IP address, port, MAC address, etc. Different rules can be applied to different network interfaces. For end-user systems, the firewall is location aware, and is able to limit interface use such that only a single interface can be used at one time.
- Reconnaissance detection: Detect reconnaissance activities such as port scans.
- Flexible control: The stateful firewall is flexible, allowing complete bypass of inspection, when appropriate, in a controlled manner.

Intrusion Prevention Rules
Intrusion Detection and Prevention rules fall into several categories:

- Vulnerability rules shield a known vulnerability – for example, those disclosed on Microsoft Tuesday – from any number of exploits and exploit variants. Trend Micro Deep Security includes protection for over 100 applications and operating systems, including database, web, email, and FTP servers running on Windows or Linux. Rules that shield newly discovered vulnerabilities are automatically delivered, often within hours, and can be pushed-out to thousands of servers and end-user systems within minutes, without the need for disruptive system restarts.
- Smart rules provide broad protection, and low-level insight, for servers and end-user systems. For operating systems and applications, the rules limit variations of elements of traffic, limiting the ability of attackers to investigate possible attack vectors since many attacks are based on exceeding expected characteristics. For servers and end-user systems, smart rules also provide tremendous insight into application activity and unexpected traffic (HTTP on an unexpected port, use of a web browser on a server, etc.).
- Application Control rules provide increased visibility into, or control over, the applications that are accessing the network. These rules are also used to identify malicious software accessing the network.

Integrity Monitoring Rules
Integrity Monitoring includes:

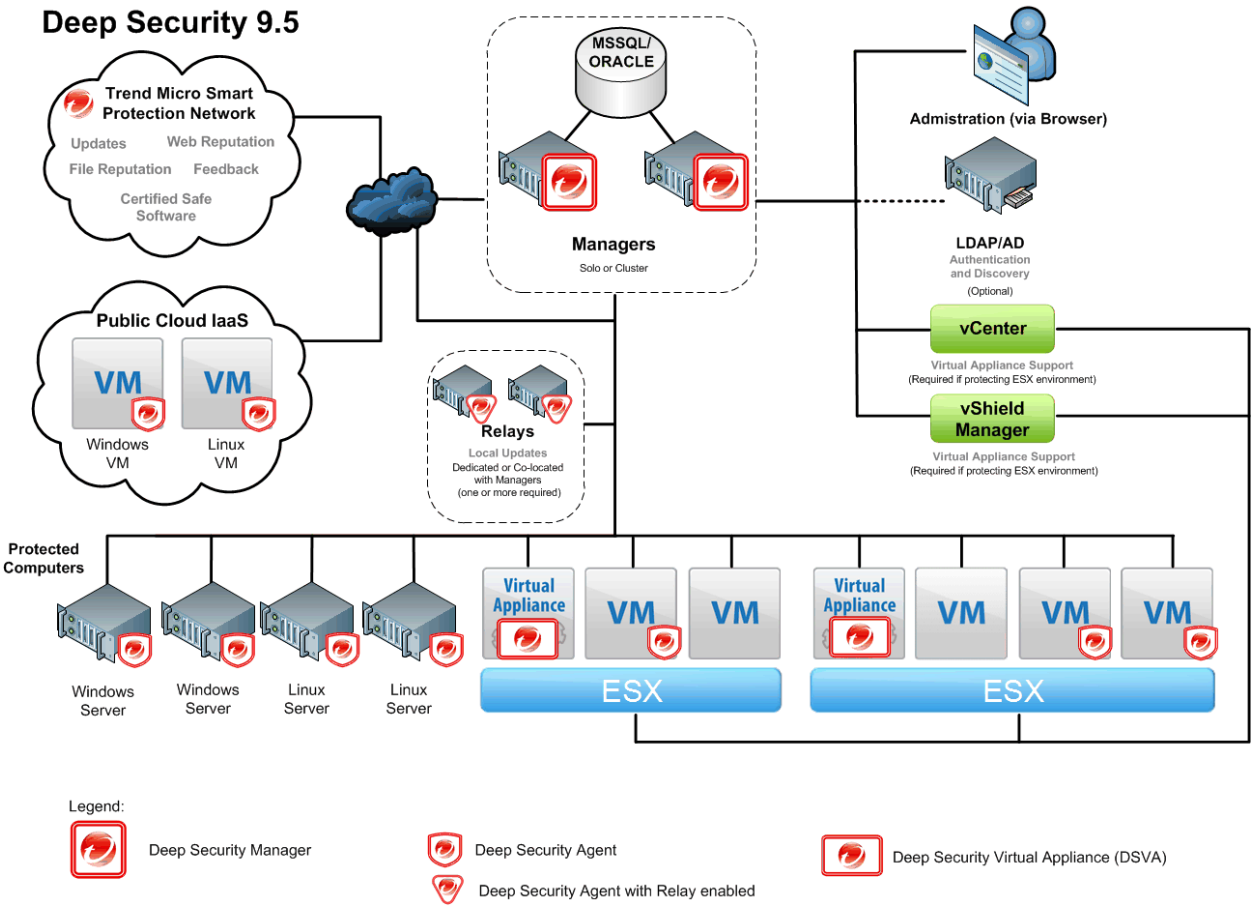
- Extensive file property checking whereby files and directories are monitored for changes to contents or attributes (ownership, permissions, size, etc.). Addition, modification, or deletion of Windows registry keys and values, access control lists, or web site files are further examples of what can be monitored.
- Auditable reporting is generated within Deep Security Manager, along with alert generations, and automated report creation and delivery.
- Security Policies allow Integrity Monitoring rules to be configured for groups of systems, or individual systems. For example, all Windows 2003 servers use the same operating system rules which are configured in a single Security Policy which is used by several servers. However, each server has unique requirements which are addressed at the individual Host configuration level.

- Flexible, practical monitoring optimizes monitoring activities. The intuitive rule creation and modification interface includes the ability to include or exclude files using wildcards filenames, control over inspection of sub-directories, and other features.

Log Inspection Rules
Log Inspection rules optimize the identification of important security events buried in multiple log entries. These events can be sent to a security information and event management (SIEM) system, or centralized logging server for correlation, reporting, and archiving. All events are also securely collected centrally at Deep Security Manager. Log Inspection enables:

- Suspicious behaviour detection.
- Collecting events across heterogeneous environments containing different operating systems and diverse applications
- Insight and knowledge of important events such as error and informational events (disk full, service start/shutdown, etc.), including administrator activity (administrator login/logout, account lockout, policy change, etc.).

Figure 1-1 Deep Security 9.5 Overview



The TOE includes only Deep Security components represented by Trend Micro icons. In Figure 1-1, these components are: the Deep Security Manager (Manager) installed on a server in the Manager Cluster, the Deep Security Agent (Agent) installed on physical servers or on virtual machines (VMs), and Deep Security Virtual Appliance (Virtual Appliance) installed in a VMware ESX server environment. The Deep Security Agent acting as a Relay is installed on physical servers or virtual machines (VMs) and provides a lightweight web server to relay component updates and new software from Trend Micro Smart Protection Network.

Trend Micro Smart Protection Network includes Updates that supply the source of new pattern files.

Figure 1-1 demonstrates the relationship of the components in the TOE to the supporting components required for the operation of Deep Security.

The connection to an LDAP or Active Directory (LDAP/AV) server is optional for administration and computer discovery.

The components represented by green and blue boxes are part of the VMware vSphere line of products and are required if you are deploying protection using Deep Security Virtual Appliances. vCenter is the central management console for vSphere and provides the connection point for Deep Security Manager to discover and manage Virtual Machines, Virtual Appliances and the components installed in the ESX environment. vShield Manager - now being replaced by NSX Manager in newer VMware releases - is a required component for agent-less Anti-Malware protection of Virtual Machines. Deep Security Manager connects to vShield Manager/NSX Manager to initialize Anti-Malware protection. ESX/ESXi is the hypervisor component in the vSphere line of products and is used to host Virtual Machines and Virtual Appliances.

Figure 1-2 below looks closer at the elements of the TOE and defines the boundary.

1.4 Required Non TOE hardware/software/firmware

Deep Security Manager software is available for installation on a computer using one of the following operating systems: Microsoft Windows Server 2012, Server 2008 or Server 2003, or Linux Red Hat 5 or Red Hat 6.

Note: To install the Deep Security Manager in the TOE configuration requires a computer with Windows Server 2012 (see section 1.5.4).

The Deep Security Manager also requires the use of a Database. The Deep Security Manager supports the use of either an Oracle or Microsoft SQL Server database for storing configuration and audit data. The Database is outside the TOE boundary.

To install the Deep Security Agent requires a physical or virtual machine with a Windows or Linux operating system.

The Deep Security Virtual Appliance can only be installed in a VMWare ESX environment. The requirements are:

- Operating System: VMware vCenter 5.5 and ESXi 5.5
- Additional VMware Utilities: VMware Tools, VMware vShield Manager 5.1 or NSX Manager 6.0, VMware vShield Endpoint Security 1.0 (including VMware Endpoint Thin Agents for each virtual machine.)
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The Deep Security Virtual Appliance Filter Driver can only be installed in a VMWare ESX environment. The requirements are:

- Operating System: VMware vCenter 5.5 and ESXi 5.5 or ESXi 5.1
- Additional VMware Utilities: VMware vShield Manager 5.1

VMware vShield Endpoint Security (EPSEC) provides the Thin Agent used to interact with the Deep Security Virtual Appliance when providing agent-less anti-malware protection for each virtual machine.
This is the thin client VMware uses to "interact" with the security appliances provided by their partners, and contains the driver for virtual machines to offload file events.

The TOE also requires an IT infrastructure that includes

- Deep Security Manager access to Trend Micro Smart Protection Network via the internet
- Connection between the Deep Security Manager and Agent/Appliance components via network or internet

See Section 1.5.4 for more details of the TOE environment configuration.

Full details of the supported operating systems and system requirements are available in the Deep Security 9.5 Installation Guide and Deep Security 9.5 Supported Linux Kernels document.

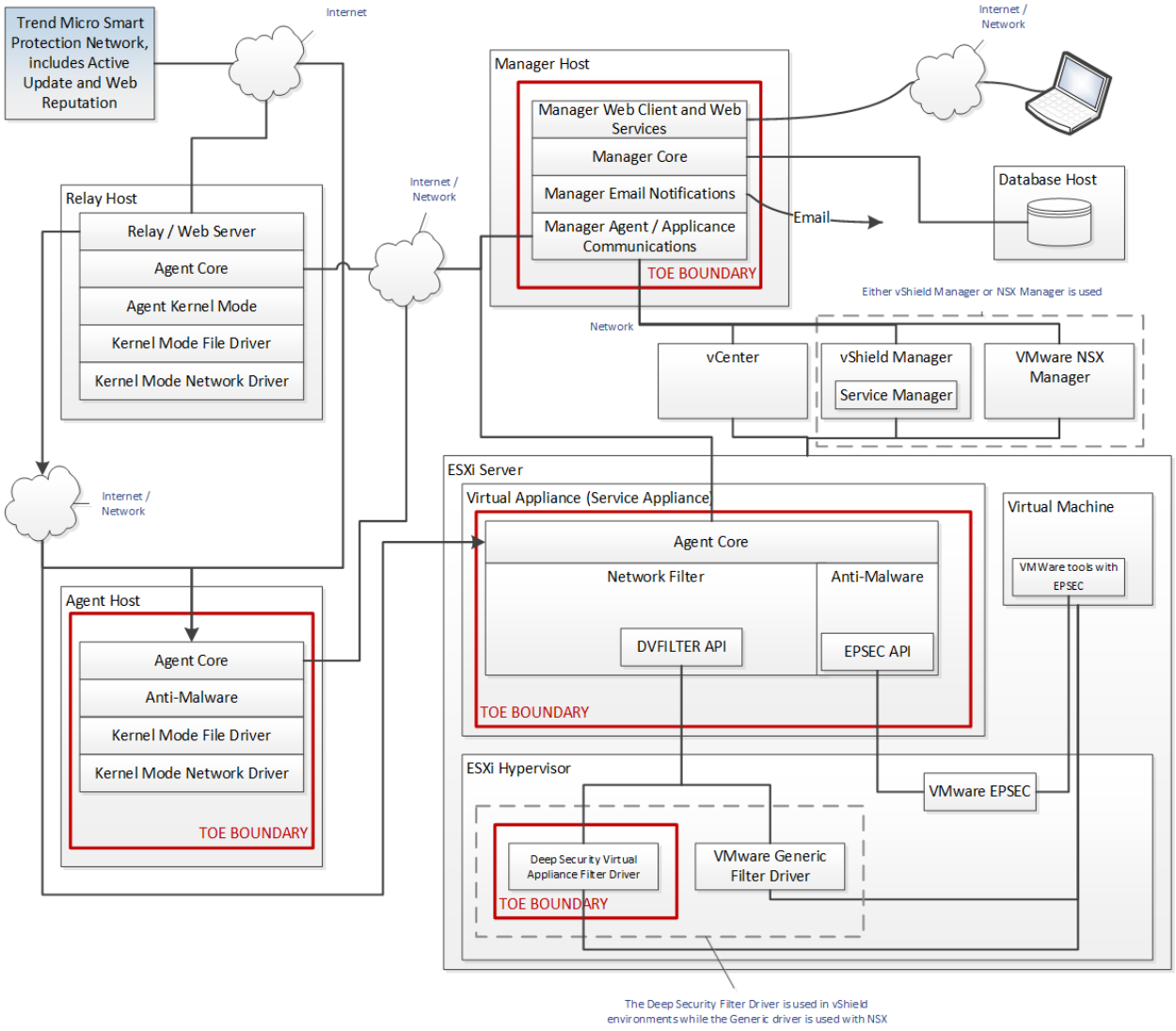
1.5 TOE Boundary

1.5.1 Physical Boundary

The TOE physical boundary encompasses only the software components of both the Deep Security Manager and the Deep Security Agents/Appliances. The Deep Security 9.5 Installation Guide gives details of the software components contained in the TOE and how to deploy them.

The Deep Security 9.5 Administrator's Guide gives details of how to configure the TOE and its interfaces after installation.

Figure 1-2 TOE physical boundary



1.5.2 Logical Boundary

The logical TOE boundary is defined by the security functions performed by the TOE and include the following:

- SF.AUDIT (Audit)
- SF.RBAC (Role Based Access Control)
- SF.I&A (Identification and Authentication)
- SF.SECCOM (secure intra-TOE communication)
- SF.IDPS (Intrusion detection and prevention)
- SF.AV (Anti-Virus)

These descriptions are outlined below and expanded upon in the Statement of TOE IT Security Functions found in section 7.1 of this document.

SF.AUDIT

Deep Security 9.5 maintains information regarding the administration and management of its security functions as part of the audit records. SF.AUDIT is responsible for the generation, storage and reviewing of these audit records.

SF.RBAC

Deep Security 9.5 restricts Authorised TOE administrators' access to the system using role based access control. All TOE administrators are assigned roles at creation. Authorised TOE administrators can only access the TOE through the administrative interface. They have full access to the functions permitted by their roles.

SF.I&A

The identification and authentication mechanism used by Deep security 9.5 is based on user ID and password. For each user being created, the creator is required to assign them with a user id, an initial password and a role.

SF.SECCOM

All communications between the Deep Security Agents/Appliances and the Deep Security Manager are protected from disclosure or modification. This is achieved by deploying symmetric encryption algorithms for protection of the communication channel.

SF.IDPS

The TOE provides intrusion detection and prevention functions. The intrusion detection and protection functionality includes Firewall and Intrusion Prevention capabilities. The TOE also provides Integrity Monitoring and Log Inspection functionality for detection of changes on the protected computers. System data is collected and analyzed by Deep Security Agents/Appliances and is passed to the Deep Security Manager for review and storage.

SF.AV

The TOE provides anti-virus functions. Data is collected and analyzed by Deep Security Virtual Appliances and is passed to the Deep Security Manager for review and storage.

1.5.3 Excluded Functionality

The following features of the TOE are excluded in the Common Criteria Evaluated Configuration of the TOE:

- Command Line Interface to Deep Security Agent (for installation and troubleshooting only)
- SOAP Application Programming Interface to the Deep Security Manager (disabled by default) and REST status monitoring APIs (disabled by default)
- Command Line Interface to Deep Security Manager (for installation and trouble-shooting only)
- Console Access to Deep Security Virtual Appliance (for installation and trouble-shooting only)

1.5.4 TOE Environment Configuration

The TOE environment contains the following elements:

Deep Security Manager

- Memory: 8 GB, which includes:
    - 4GB heap memory
    - 1.5GB JVM overhead
    - 2GB operating system overhead
- Disk Space: Minimum 1.5 GB (5 GB recommended)
- Deep Security Manager running on the following Operating Systems:
    - Windows Server 2012 (64 bit)
- Database: Oracle 10g or 11g Edition, or Microsoft SQL Server 2014 or 2012

Deep Security Agent

- Memory:
    - with Anti-Malware protection: 512MB
    - without Anti-Malware protection: 128MB
- Disk Space: 500MB (1GB recommended with Anti-Malware protection enabled)
- Agents running on the following Operating Systems:
    - Windows Server 2012
    - Windows Server 2012 running in a VMware ESX5.5 Virtual Machine
    - Linux Red Hat Enterprise Edition 6
    - Linux SUSE 11

Deep Security Virtual Appliance

- Memory: 2GB
- Disk Space: 20GB
- DSVA running on the following Operating System:
    - VMware ESX 5.5 (NSX environment or vShield environment)
    - VMware ESX 5.1 (vShield environment)

2 Conformance Claims

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2.1 CC Conformance Claim

2.1.1 CC Version: 3.1.4

General Status: Ready for release
Keywords: Commercial-off-the-shelf (COTS), intrusion detection, intrusion detection system (IDS), intrusion prevention, intrusion prevention system (IPS), log inspection, integrity monitoring, anti-virus(AV), sensor, scanner, analyzer.

2.1.2 CC Conformance

The Trend Micro Deep Security 9.5 is conformant to Common Criteria for Information Technology Security Evaluation Part 2: Security functional components (Version 3.1.4, September 2012) extended.

The Trend Micro Deep Security 9.5 is conformant to Common Criteria for Information Technology Security Evaluation Part 3: Security assurance components (Version 3.1.4, September 2012).

The Deep Security 9.5 is being evaluated to Evaluation Assurance Level 2 augmented with ALC_FLR.1 (EAL2+) under the Canadian Common Criteria Scheme (CCS) using the Common Methodology for Information Technology Security Evaluation, Evaluation methodology, Version 3.1.4, September 2012.

2.1.3 Assurance Requirements Rationale

EAL2+ was chosen to provide a level of assurance that is consistent with good commercial practices. The chosen assurance level is appropriate with the threats defined for the environment. While the System 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 System will have incurred a search for obvious flaws to support its introduction into the non-hostile environment, and reasonable assurance is provided to ensure the secure operation of the system.

The SARs are described in Section 6.2.

3 Security Problem Definition

The TOE security environment consists of the threats to security, organizational security policies, and security assumptions as they relate to the TOE. All these are described in detail in this section.

3.1 Threats to Security

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.

3.1.1 TOE Threats

T.COMINT	An unauthorized user may attempt to compromise the integrity of the data collected and produced by the TOE by bypassing a security mechanism.
T.COMDIS	An unauthorized user may attempt to disclose the data collected and produced by the TOE by bypassing a security mechanism.
T.LOSSOF	An unauthorized user may attempt to remove or destroy data collected and produced by the TOE.
T.NOHALT	An unauthorized user may attempt to compromise the continuity of the System's collection and analysis functions 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	An unauthorized user may inappropriately change the configuration of the TOE 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.
T.FACCNT	Unauthorized attempts to access TOE data or security functions may go undetected.

3.1.2 IT System Threats

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

T.SCNCFG	Improper security configuration settings may exist in the IT System the TOE monitors.
T.SCNMLC	Users could execute malicious code on an IT System that the TOE monitors which causes modification of the IT System protected data or undermines the IT System security functions.
T.SCNVUL	Vulnerabilities may exist in the IT System the TOE monitors.
T.FALACT	The TOE may fail to react to identified or suspected vulnerabilities or inappropriate activity.
T.FALREC	The TOE may fail to recognize vulnerabilities or inappropriate activity based on IDS data received from each data source.
T.FALASC	The TOE may fail to identify vulnerabilities or inappropriate activity based on association of IDS data received from all data sources.
T.MISUSE	Unauthorized accesses and activity indicative of misuse may occur on an IT System the TOE monitors.
T.INADVE	Inadvertent activity and access may occur on an IT System the TOE monitors.
T.MISACT	Malicious activity, such as introductions of Trojan horses and viruses, may occur on an IT System the TOE monitors.

3.2 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 ST.

P.DETECT	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 or 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.ANALYZ	Analytical processes and information to derive conclusions about intrusions (past, present, or future) must be applied to IDS data and appropriate response actions taken.
P.MANAGE	The TOE shall only be managed by authorized users.
P.ACCESS	All data collected and produced 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 and produced by the TOE shall be protected from modification.
P. PROTCT	The TOE shall be protected from unauthorized accesses and disruptions of TOE data and functions.

3.3 Security Assumptions

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

3.3.1 Intended Usage Assumptions

A.ACCESS	The TOE has access to all the IT System data it needs to perform its functions.
A.DYNMIC	The TOE will be managed in a manner that allows it to appropriately address changes in the IT System the TOE monitors.
A.ASCOPE	The TOE is appropriately scalable to the IT System the TOE monitors.

3.3.2 Physical Assumptions

A.PROTCT	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.

Note: The assumptions A.LOCATE refer specifically to physical access to the Deep Security Manager component of the TOE. For IT System computers being protected by the TOE, it is assumed that they are physically protected in a manner appropriate to the security risk and defined usage of each computer.

3.3.3 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, wilfully 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.

Note: Users with Administrator rights on the Computers being protected by the TOE are not considered to be managers of the TOE. However, as authorized administrators of the IT system computers being monitored, they are considered to be covered by the Personnel Assumptions A.NOEVIL and A.NOTRST.

4 Security Objectives

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 IT Security Objectives for the TOE

The following are the TOE security objectives:

O.PROTCT	The TOE must protect itself from unauthorized modifications and access to its functions and data.
O.IDSCAN	The Scanner must collect and store 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.
O.IDSENS	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.IDANLZ	The Analyzer must accept data from IDS Sensors or IDS Scanners and then apply analytical processes and information to derive conclusions about intrusions (past, present, or future).
O.RESPON	The TOE must respond appropriately to analytical conclusions.
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 users prior to allowing access to TOE functions and data.
O.OFLOWS	The TOE must appropriately handle potential audit and System data storage overflows.
O.AUDITS	The TOE must record audit records for data accesses and use of the System functions.
O.INTEGR	The TOE must ensure the integrity of all audit and System data.
O.EXPORT	When any IDS component makes its data available to another IDS component, the TOE will ensure the confidentiality of the System data.
O.VIRUS	The TOE will detect and take action against known viruses introduced to the protected computer via network traffic or removable media.
O.AUDIT_SORT	The TOE will provide the capability to sort the audit information
O.AUDIT_PROTECTION	The TOE will provide the capability to protect audit information.

4.2 Security Objectives for the Environment

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.CREDEN	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 System.
OE.INTROP	The TOE is interoperable with the IT System it monitors.
OE.TIME	The IT system must be configured to provide a reliable time source.

5 Extended Components Definition

5.1 Extended Security Functional Components for IDS

The functionality in this extended class addresses the requirements provided by the Deep Security system to detect, analyse and react to possible intrusions on computers protected by Deep Security Agents or Deep Security Virtual Appliances.

The Extended SFR claims in this section are based on the Intrusion Detection System (Extended Requirements) class (IDS) from the **U.S. Government Protection Profile Intrusion Detection System System for Basic Robustness Environments**. Version 1.7, July 25, 2007.

Table 5-1 Extended Security Functional Requirements for IDS

Security Functional Requirement	Name
IDS_SDC.1	System Data Collection (EXT)
IDS_ANL.1	Analyser Analysis (EXT)
IDS_RCT.1	Analyser react (EXT)
IDS_RDR.1	Restricted data review (EXT)
IDS_STG.1	Guarantee of System Data Availability (EXT)
IDS_STG.2	Prevention of System data loss (EXT)

5.1.1 Intrusion Detection System component requirements (IDS)

System Data Collection (IDS_SDC.1, EXT)

IDS_SDC.1.1 The System shall be able to collect the following information 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, detected malicious code, access control configuration, service configuration, authentication configuration., accountability policy configuration, detected known vulnerabilities]; and

b) [assignment: *other specifically defined events*]. (EXT)

IDS_SDC.1.2 At a minimum, the System shall collect and record 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 5-2 System Events. (EXT)

Table 5-2 IDS System Events

Component	Event	Details
IDS_SDC.1	Start-up and shutdown	none
IDS_SDC.1	Identification and authentication events	User identity, location, source address, destination address
IDS_SDC.1	Data accesses	Object IDS, requested access, source address, destination address
IDS_SDC.1	Service Requests	Specific service, source address, destination address
IDS_SDC.1	Network traffic	Protocol, source address, destination address
IDS_SDC.1	Security configuration	Source address, destination address
IDS_SDC.1	Data introduction	Object IDS, location of object, source address, destination address
IDS_SDC.1	Start-up and shutdown of audit functions	none
IDS_SDC.1	Detected malicious code	Location, identification of code
IDS_SDC.1	Access control configuration	Location, access settings
IDS_SDC.1	Service configuration	Service identification (name or port), interface, protocols
IDS_SDC.1	Authentication configuration	Account names for cracked passwords, account policy parameters
IDS_SDC.1	Accountability policy configuration	Accountability policy configuration parameters
IDS_SDC.1	Detected known vulnerabilities	Identification of the known vulnerability

Analyser analysis (IDS_ANL.1, EXT)

IDS_ANL.1.1 The System shall perform the following analysis function(s) on all IDS data received:
a) [selection: *statistical, signature, integrity*]; and
b) [assignment: *other analytical functions*]. (EXT)

IDS_ANL.1.2 The System shall record within each analytical result at least the following information:
a) Date and time of the result, type of result, identification of data source; and
b) [assignment: *other security relevant information about the result*]. (EXT)

Analyser react (IDS_RCT.1, EXT)

IDS_RCT.1.1 The System shall send an alarm to [assignment: *alarm destination*] and take [assignment: *appropriate actions*] when an intrusion is detected. (EXT)

Restricted Data Review (IDS_RDR.1, EXT)

IDS_RDR.1.1 The System shall provide [assignment: *authorised users*] with the capability to read [assignment: *list of System data*] from the System data. (EXT)

IDS_RDR.1.2 The System shall provide the System data in a manner suitable for the user to interpret the information. (EXT)

IDS_RDR.1.3 The System shall prohibit all users read access to the System data, except those users that have been granted explicit read-access. (EXT)

Guarantee of System Data Availability (IDS_STG.1, EXT)

IDS_STG.1.1 The System shall protect the stored System data from unauthorised deletion. (EXT)

IDS_ STG.1.2 The System shall protect the stored System data from modification. (EXT)

IDS_ STG.1.3 The System shall ensure that [assignment: *metric for saving System data*] System data will be maintained when the following conditions occur: [selection: *System data storage exhaustion, failure, attack*]. (EXT)

Prevention of System data loss (IDS_STG.2, EXT)

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

5.2 Extended Security Functional Components for AV

This section defines extended security functionality for Anti-Virus (anti-malware) provided by Deep Security.

The functionality in this extended class addresses the requirements provided by the Deep Security Agent and Deep Security Virtual Appliance components of the TOE to detect and act upon viruses discovered.

The Extended SFR claims in this section are based on the Anti-Virus (Extended Requirements) class (FAV) from the **U.S. Government Protection Profile Anti-Virus Applications for Workstations in Basic Robustness Environments**. Version 1.2, July 25, 2007.

Table 5-3 TOE Extended Security Functional Requirements for AV

Security Functional Requirement	Name
Extended Security Functional Requirements for the TOE	
FAV_ACT_(EXT).1	Anti-Virus actions
FAV_ALR_(EXT).1	Anti-Virus Alerts
FAV_SCN_(EXT).1	Anti-Virus Scanning

5.2.1 Anti-Virus component requirements (FAV)

Anti-Virus Actions (FAV_ACT.1, EXT)

FAV_ACT_(EXT).1.1 Upon detection of a file-based virus, the TSF shall perform the actions specified by the authorized administrator. Actions are administratively configurable on a per-Appliance basis and consist of:

a) Clean the virus from the file,
b) Quarantine the file,
c) Delete the file
d) [selection: [assignment: *list of other actions*], *no other actions*].

Anti-Virus Alerts (FAV_ALR.1, EXT)

FAV_ALR_(EXT).1.1 The System shall be able to collect an audit event from a computer indicating detection of a virus. The event shall identify the computer originating the audit event, the virus that was detected and the action taken by the TOE.

FAV_ALR_(EXT).1.2 The System shall send an alarm to [assignment: *alarm destination*] and take [assignment: *appropriate actions*] when a virus is detected.

Anti-Virus Scanning (FAV_SCN.1, EXT)

FAV_SCN_(EXT).1.1 The TSF shall perform real-time, scheduled, and on-demand scans for file-based viruses based upon known signatures.

FAV_SCN_(EXT).1.2 The TSF shall perform scheduled scans at the time and frequency configured by the authorized administrator.

5.3 Extended Security Requirements Rationale

5.3.1 Extended Security Objectives Rationale

The Extended Security Objectives to collect and analyse IDS system data O.IDSCAN, O.IDSENS, and O.IDANLZ are included with the Security Objectives described in Section 6.3.

The Extended Security Objective O.VIRUS is included with the Security Objectives described in Section 6.3.

5.3.2 Extended Security Functional Requirements Rationale

The family of IDS requirements was created to specifically address the data collected and analyzed by an Intrusion Defense System. It addresses the functionality provided by the Deep Security system to detect, analyse and react to possible intrusions on computers protected by Deep Security Agents or Deep Security Virtual Appliances, 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.

This extended class of FAV requirements was created specifically address Deep Security's anti-virus functionality to detect, analyze and react to possible malware detected on computers protected by the Deep Security Agents or Deep Security Virtual Appliances.

Since the Anti-Virus functionality is completely integrated with the Deep Security IDS system for Data Collection and Alerts, there is some overlap of FAV functionality with the IDS_SDC.1 and IDS_RCT.1 described in Section 6. Anti-Virus event data is also protected by the IDS_STG functions described in Section 6. The rationale for the Extended SFRs is described in Section 6.3.3.

5.3.3 Extended Security Functions Rationale

The rationale for the IDS Extended Security Functions SF.IDPS is described in section 6.3.6.

Although the IDS requirements do contain measures to address the threat of malicious activity in the form of viruses (T.MISACT) entering the System via network traffic, the additional explicitly stated requirements for Anti-Virus address the threat of file-based viruses that may enter the system by other means, such as removable media.

The Extended Security Functions Rationale for SF.AV is included in the TOE Security Functions Rationale described in Section 6.3.6

6 Security Requirements

6.1 Security Functional Requirements

Table 6-1 TOE Security Functional Requirements

Security Functional Requirement	Name
Security Functional Requirements for the TOE	
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_SMF.1	Specification of Management Functions
FMT_SMR.1	Security roles
FPT_ITT.1	Basic internal TSF data transfer protection
FCS_COP.1	Cryptographic Operation
IDS_SDC.1	System Data Collection
IDS_ANL.1	Analyzer analysis
IDS_RCT.1	Analyzer react
IDS_RDR.1	Restricted Data Review
IDS_STG.1	Guarantee of System Data Availability
IDS_STG.2	Prevention of System data loss
FAV_ACT_(EXT).1	Anti-Virus actions
FAV_ALR_(EXT).1	Anti-Virus Alerts

Security Functional Requirement	Name
FAV_SCN_(EXT).1	Anti-Virus Scanning

6.1.1 Security audit (FAU)

Audit data generation (FAU_GEN.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 *not specified* level of audit; and
c) *Access to the System and access to the TOE and System data.* [FAU_GEN.1.1]

Application Note: The auditable events in b) above are described in Table 6-2. The System Data in c) above is defined as TSF configuration data as well as events collected by the IDS system and the Anti-Virus system.

Table 6-2 Auditable Events

Component	Audited Events	Details
FAU_GEN.1	Start-up and shutdown of audit functions	
FAU_GEN.1	Access to System	
FAU_GEN.1	Access to the TOE	Object IDs, Requested access
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	User identity, location
FIA_UID.1	All use of the user identification mechanism	User identity, location
FMT_MOF.1	All modifications in the behaviour of the functions of the TSF	
FMT_MTD.1	All modifications to the values of TSF data	
FMT_SMR.1	Modifications to the group of users that are part of a role	User identity
FMT_SMF.1	Use of the management functions	Where modified: data storage parameters, user identification and authentication attributes, user role attributes

Application Note: The IDS_SDC and IDS_ANL requirements in this ST address the recording of results from IDS scanning, sensing, and analysing tasks (i.e. System data). The FAV_ALR requirement in this ST addresses the recording of results from Anti-Virus scanning and analyzing tasks (i.e. System data)

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 (if applicable), 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 ST, *the additional information specified in the Details column of* Table 6-2 *Auditable Events.* [FAU_GEN.1.2]

Audit review (FAU_SAR.1)

The TSF shall provide *authorized administrators* with the capability to read *audit information which they have been granted access to* from the audit records.[FAU_SAR.1.1]
The TSF shall provide the audit records in a manner suitable for the user to interpret the information.[FAU_SAR.1.2]

Application Note: Administrators with the default configuration roles named "Full Access" and "Auditor" are granted access to all TOE audit records.

Restricted audit review (FAU_SAR.2)

The TSF shall prohibit all users read access to the audit records, except those users that have been granted explicit read-access. [FAU_SAR.2.1]

Selectable audit review (FAU_SAR.3)

The TSF shall provide the ability to perform *sorting* of audit data based on *date and time, type of event, event ID, event name, target system identity and event originator.*[FAU_SAR.3.1]

Selective audit (FAU_SEL.1)

The TSF shall be able to select the set of events to be audited from the set of all auditable events based on the following attributes:
a) event type;
b) *no other attributes*.[FAU_SEL.1.1]

Guarantees of audit data availability (FAU_STG.2)

The TSF shall protect the stored audit records from unauthorised deletion.[FAU_STG.2.1]
The TSF shall be able to *prevent* modifications to the audit records.[FAU_STG.2.2]
The TSF shall ensure that *the previously recorded* audit records will be maintained when the following conditions occur: *failure and attack.*[FAU_STG.2.3]

Prevention of audit data loss (FAU_STG.4)

The TSF shall *prevent auditable events, except those taken by the authorised user with special rights* and send an alarm if the audit trail is full.[FAU_STG.4.1]

Application Note: Auditable events in general shall be prevented by the TOE upon detection of a full audit trail. For unpreventable events, the TOE shall record them by saving the events in temporary storage until space is made available and the events can be written to the database.

6.1.2 Identification and authentication (FIA)

User attribute definition (FIA_ATD.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) *no other attributes.*[FIA_ATD.1.1]

Timing of authentication (FIA_UAU.1)

The TSF shall allow *limited actions* (see Table 6-3) on behalf of the user to be performed before the user is authenticated. FIA_UAU.2.1
The TSF shall require each user to be successfully authenticated before allowing any other TSF-mediated actions on behalf of that user.FIA_UAU.2.2

Timing of identification (FIA_UID.1)

The TSF shall allow *limited actions* (see Table 6-3) on behalf of the user to be performed before the user is identified. FIA_UID.1.1
The TSF shall require each user to be successfully identified before allowing any other TSF-mediated actions on behalf of that user. FIA_UID.1.2

Table 6-3 URLs Accessible Without Authentication/Identification

URL	Description
/SignIn.screen	The Authentication Page
/Error.screen	The Error Screen
/index.jsp	The welcome page that redirects to SignIn.screen
/file_not_found.jsp	The 404 page not found screen
/upload_too_large.jsp	The 413 page upload too big
*.gif, *.jpg, *.png, *.ico, *.css, *.js, *.xsd, *.html	Non-secure web application resources
*.csa, *.jsa	Compressed/Pre-build non-secure resources
/vib/*	VIB Files
/appliance/*	DSVA Files
/dsa/*	Agent Software
/software/*	Agent Software Installers
/rest/authentication/login, /rest/authentication/login/primary /rest/authentication/login/sso	The REST Authentication API
/rest/apiVersion	REST API version number
/rest/managerInfo/productGUID	REST API to retrieve manager's unique ID

6.1.3 Security management (FMT)

Management of security functions behaviour (FMT_MOF.1)

The TSF shall restrict the ability to *modify the behaviour of* the functions *of System data collection, analysis and reaction* to *authorised System administrators.* FMT_MOF.1.1

Management of TSF data (FMT_MTD.1a)

The TSF shall restrict the ability to query *and add System and audit data, and shall restrict the ability to query and modify all other TOE data* to the *Full Access role*. FMT_MTD.1.1

Application Note: The TOE allows additional roles to be defined (by authorized administrators with sufficient privileges) that grant the ability to query and modify a sub-set of System data.

Application Note: "Audit data" refers to auditable events generated in the FAU_GEN requirement of this ST. "System data" refers to TSF configuration data and to events collected by the IDS_SDC, IDS_ANL and FAV_ALR requirements.

Management of TSF data (FMT_MTD.1b)

The TSF shall restrict the ability to *query audit data and all other TOE data* to the *Full Access role* and *Auditor role.* FMT_MTD.1.1

Application Note: By default, the "Full Access" and "Auditor" roles have read-only access to all of the audit records. The default configuration "Auditor" role has the ability to query audit data and other TOE data but not to modify it as in FMT_MTD.1a. The TOE allows other roles to be defined (by authorized administrators with sufficient privileges) that grant the ability to query a sub-set of System data.

Specification of Management Functions (FMT_SMF.1)

The TSF shall be capable of performing the following management functions: *data storage parameters, user identification and authentication attributes, user role attributes.* FMT_SMF.1.1

Security roles (FMT_SMR.1)

The TSF shall maintain the roles *Full Access and Auditor roles.* FMT_SMR.1.1
The TSF shall be able to associate users with roles. FMT_SMR.1.2

Application Note: The TOE only allows management functions to be performed through Deep Security Manager during its operation, hence the "authorised administrator", "authorised System administrator" roles listed in this SFR are equivalent with regard to the TOE, and in the default configuration this role is named "Full Access" by the TOE.

6.1.4 Protection of the TOE Security Functions (FPT)

Basic internal TSF data transfer protection (FPT_ITT.1)

The TSF shall protect TSF data from *disclosure and modification* when it is transmitted between separate parts of the TOE. FPT_ITT.1.1

6.1.5 Cryptographic support (FCS)

Application Note: FCS_CKM functions are not listed as dependencies, following the guidance of CCS Instruction Number 4, version 1.10.

Cryptographic operation (FCS_COP.1)

The TSF shall perform *[the cryptographic operations listed in the Cryptographic Operations column of* Table 6-4*]* in accordance with a specified cryptographic algorithm *[the cryptographic algorithms listed in the Cryptographic Algorithm column of* Table 6-4*]* and cryptographic key sizes *[the cryptographic key sizes listed in the Key Sizes (bits) column of* Table 6-4*]* that meet the following: *[the list of standards in the Standards column of*Table 6-4*].* FCS_COP.1.1

Table 6-4 Cryptographic Operations

Cryptographic Operations	Cryptographic Algorithm	Key Size (bits)	Standard	Deep Security Component	Certificate #
Symmetric Encryption and Decryption	AES-256	256	FIPS 197	DSM	3159
				DSA	3004
				DSVA	3005
Message Digest	SHA-1, SHA-256	N/A	FIPS 180-3	DSM	2615
				DSA	2515
				DSVA	2516

6.1.6 IDS component requirements (IDS)

System Data Collection (IDS_SDC.1, EXT)

The System shall be able to collect the following information from the targeted IT System resource(s):

a) *Start-up and shutdown, network traffic, detected malicious code, detected known vulnerabilities,* and

b) *no other events.* (EXT IDS_SDC.1.1

At a minimum, the System shall collect and record 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 6-5 IDS Events. (EXT) IDS_SDC.1.2

Table 6-5 IDS Events

Component	Event	Details
IDS_SDC.1	Start-up, shutdown and host system reboot	None *[See Application Note2 below]*
IDS_SDC.1	Network traffic	Protocol, source address, destination address
IDS_SDC.1	Start-up and shutdown of audit functions	None
IDS_SDC.1	Detected malicious code	Location, identification of code
IDS_SDC.1	Detected known vulnerabilities	Identification of the known vulnerability

Application Note: Note that while the IDS_SDC.1 requirement indicates additional information content, that content is dependent upon the data that is collected. The specific data collected depends on the TOE configuration and the data collection functionality available on specific Operating Systems or platforms.

Application Note2: On Windows 2012 systems there is a known bug that prevents graceful shutdown of services that require more than 5 seconds after the Operating System notifies the services of a shutdown operation. Deep Security has no control when its services are forced to shut down and in that situation the shutdown event may not be recorded. On other Operating systems that permit the graceful shutdown of Deep Security services the shutdown events will be recorded by Deep Security.

Analyser analysis (IDS_ANL.1, EXT)

The System shall perform the following analysis function(s) on all IDS data received:
a) *statistical, signature, integrity;* and
b) *other analytical functions.* (EXT) IDS_ANL.1.1

Other analytical functions:
a) Monitor requested URLs (web reputation)

The System shall record within each analytical result at least the following information:
a) Date and time of the result, type of result, identification of data source; and
b) *action taken, Data destination.* (EXT) IDS_ANL.1.2

Analyser react (IDS_RCT.1, EXT)

The System shall send an alarm to *the authorized administrator* and *record the attempt as system data record and (if configured to do so) terminate the attempt* when an intrusion is detected. (EXT) IDS_RCT.1.1

Restricted Data Review (IDS_RDR.1, EXT)

The System shall provide *users assigned the Full Access and auditor roles* with the capability to read *all data* from the System data. (EXT) IDS_RDR.1.1
The System shall provide the System data in a manner suitable for the user to interpret the information. IDS_RDR.1.2 (EXT)
The System shall prohibit all users read access to the System data, except those users that have been granted explicit read-access. (EXT) IDS_RDR.1.3

Application Note: Users with the default configuration "Full Access" or "Auditor" roles have the capability to read all System Data and Audit Data. The TOE allows other roles to be defined (by authorized administrators with sufficient privileges) that restrict the review to a sub-set of the System data.

Guarantee of System Data Availability (IDS_STG.1, EXT)

The System shall protect the stored System data from unauthorised deletion. (EXT) IDS_STG.1.1
The System shall protect the stored System data from modification. (EXT) IDS_STG.1.2
The System shall ensure that *the most recent* System data will be maintained when the following conditions occur: *System data storage exhaustion*. (EXT) IDS_STG.1.3

Application Note: Once collected by the Deep Security Manager, IDS System Data is stored securely in the database, which is protected in part by the hosting IT environment. Action in the event of storage exhaustion is the same as for Audit Events in FAU_STG.2 and FAU_STG.4. See section 6.3.

Before collection by the Deep Security Manager, IDS System Data is stored temporarily on the host computers being protected by Deep Security Agents / Appliances. This data is protected in part by the hosting IT environment, and can only be deleted by an authorised user with administrative privileges on the host computer. If the temporary storage on the host computer becomes exhausted before the System Data can be collected by the Deep Security Manager, then the oldest events in the temporary storage will be overridden by newer events.

Prevention of System data loss (IDS_STG.2, EXT)

The System shall *ignore System data* and send an alarm if the storage capacity has been reached. (EXT) IDS_STG.2.1

Application Note: Once collected by the Deep Security Manager, IDS System Data is stored securely in the database, and is protected in the same way as for FAU_STG.4.An alarm is sent if the storage capacity has been reached.

Collection of System Data from the Agents/Appliances will be paused until database storage capacity is made available.

6.1.7 Anti-Virus component requirements (FAV)

Application Note: The FAV functionality is only available on computers that are protected by the Deep Security Virtual Appliance (DSVA) component.

Anti-Virus Actions (FAV_ACT.1, EXT)

Upon detection of a file-based virus, the TSF shall perform the actions specified by the authorized administrator. Actions are administratively configurable on a per-DSVA basis and consist of:

a) Clean the virus from the file,
b) Quarantine the file,
c) Delete the file
d) *[no other actions].* FAV_ACT_(EXT).1.1

Anti-Virus Alerts (FAV_ALR.1, EXT)

The System shall be able to collect an audit event from a computer indicating detection of a virus. The event shall identify the computer originating the audit event, the virus that was detected and the action taken by the TOE.
FAV_ALR_(EXT).1.1

The System shall send an alarm to *the authorized administrator* and *record the attempt as system data record*
FAV_ALR_(EXT).1.2

Table 6-6 FAV Events

Component	Event	Details
FAV_ACT_(EXT).1	Action taken in response to detection of a virus	Virus detected, action taken, file or process identifier

Application Note: The anti-virus event data collection and administrator alarms are handled by the same mechanisms as the IDS system provided by the IDS_SDC, IDS_RCT and IDS_RDR requirements.

Anti-Virus Scanning (FAV_SCN.1, EXT)

The System shall perform real-time, scheduled, and on-demand scans for file-based viruses based upon known signatures. FAV_SCN_(EXT).1.1

The System shall perform scheduled scans at the time and frequency configured by the authorized administrator. FAV_SCN_(EXT).1.2

6.2 Security Assurance Requirements

This product claims CC Version 3.1.4 Part 3 conformant and claims Evaluation Assurance Level 2 augmented with ALC_FLR.1 (EAL2+). The security assurance requirements are listed in Table 6-7.

Table 6-7 Security Assurance Requirements

Assurance component ID	Assurance component name
ADV_ARC.1	Security Architecture Description
ADV_FSP.2	Security-enforcing Functional Specification
ADV_TDS.1	Basic Design
AGD_OPE.1	Operational User Guidance
AGD_PRE.1	Preparative Procedures
ALC_CMC.2	Use of a CM system
ALC_CMS.2	Parts of the TOE CM coverage
ALC_DEL.1	Delivery Procedures
ALC_FLR.1	Basic Flaw Remediation
ATE_COV.1	Evidence of coverage
ATE_FUN.1	Functional testing
ATE_IND.2	Independent testing – sample
AVA_VAN.2	Vulnerability analysis

6.3 Security Requirements Rationale

This section provides the rationale for the selection of the IT security functions, 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. This is achieved using a set of cross-referencing tables; each covering two adjacent sets of requirements.
This section also provides the rationale for choosing the IT Assurance Requirements and Measures.

6.3.1 Rationale for IT Security Objectives

This section provides a rationale for the existence of each assumption, threat, and policy statement that compose the ST. Table 6-8 Security Environment vs. Objectives demonstrates the mapping between the assumptions, threats, and polices to the security objectives is complete. The following discussion provides detailed evidence of coverage for each assumption, threat, and policy.

Table 6-8 Security Environment vs. Objectives

Objectives / Threats, Assumptions		TOE														ENVIRONMENT					
		O.PROTCT	O.IDSCAN	O.IDSENS	O.IDANLZ	O.RESPON	O.EADMIN	O.ACCESS	O.IDAUTH	O.OFLOWS	O.AUDITS	O.INTEGR	O.EXPORT	O.VIRUS	O.AUDIT_SORT	O.AUDIT_PROTECTION	OE.INSTAL	OE.PHYCAL	OE.CREDEN	OE.PERSON	OE.INTROP	OE.TIME
Assumptions	A.ACCESS																				✓	
	A.DYNMIC																			✓	✓	
	A.ASCOPE																				✓	
	A.PROTCT																	✓				
	A.LOCATE																	✓				
	A.MANAGE																			✓		
	A.NOEVIL																✓	✓	✓			
	A.NOTRST																	✓	✓			
Threats	T.COMINT	✓						✓	✓			✓										
	T.COMDIS	✓						✓	✓				✓									
	T.LOSSOF	✓						✓	✓			✓										
	T.NOHALT		✓	✓	✓			✓	✓													
	T.PRIVIL	✓						✓	✓													
	T.IMPCON						✓	✓	✓								✓					

	Objectives	TOE														ENVIRONMENT					
	T.INFLUX									✓											
	T.FACCNT										✓										
	T.SCNCFG		✓																		
	T.SCNMLC		✓										✓								
	T.SCNVUL		✓																		
	T.FALACT					✓															
	T.FALREC				✓																
	T.FALASC				✓																
	T.MISUSE			✓							✓			✓							
	T.INADVE			✓							✓										
	T.MISACT			✓							✓			✓							
OSPs	P.DETECT		✓	✓							✓			✓							✓
	P.ANALYZ				✓																
	P.MANAGE	✓					✓	✓	✓						✓		✓		✓	✓		
	P.ACCESS	✓						✓	✓							✓						
	P.ACCACT								✓		✓				✓							✓
	P.INTGTY											✓										
	P.PROTCT									✓							✓					

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.DYNMIC The TOE will be managed in a manner that allows it to appropriately address changes in the IT System the TOE monitors.
The OE.INTROP objective ensures the TOE has the proper access to the IT System. The OE.PERSON objective ensures that the TOE will be managed appropriately.

A.ASCOPE The TOE is appropriately scalable to the IT System the TOE monitors.
The OE.INTROP objective ensures the TOE has the necessary interactions with the IT System it monitors.

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, wilfully 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 and produced 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 and produced 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 and produced 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 System's collection and analysis functions 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.IDSCAN, O.IDSENS, and O.IDANLZ objectives address this threat by requiring the TOE to collect and analyze System data, which includes 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	An unauthorized user may inappropriately change the configuration of the TOE causing potential intrusions to go undetected. The OE.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.FACCNT	Unauthorized attempts to access TOE data or security functions may go undetected. The O.AUDITS objective counters this threat by requiring the TOE to audit attempts for data accesses and use of TOE functions.
T.SCNCFG	Improper security configuration settings may exist in the IT System the TOE monitors. The O.IDSCAN objective counters this threat by requiring a TOE that contains a Scanner, collect and store static configuration information that might be indicative of a configuration setting change. The ST will state whether this threat must be addressed by a Scanner.
T.SCNMLC	Users could execute malicious code on an IT System that the TOE monitors which causes modification of the IT System protected data or undermines the IT System security functions. The O.IDSCAN and O.VIRUS objectives counters this threat by requiring a TOE that contains a Scanner, collect and store static configuration information that might be indicative of malicious code. The ST will state whether this threat must be addressed by a Scanner.
T.SCNVUL	Vulnerabilities may exist in the IT System the TOE monitors. The O.IDSCAN objective counters this threat by requiring a TOE that contains a Scanner, collect and store static configuration information that might be indicative of a vulnerability. The ST will state whether this threat must be addressed by a Scanner.
T.FALACT	The TOE may fail to react to identified or suspected vulnerabilities or inappropriate activity. The O.RESPON objective ensures the TOE reacts to analytical conclusions about suspected vulnerabilities or inappropriate activity.
T.FALREC	The TOE may fail to recognize vulnerabilities or inappropriate activity based on IDS data received from each data source.

	The O.IDANLZ objective provides the function that the TOE will recognize vulnerabilities or inappropriate activity from a data source.
T.FALASC	The TOE may fail to identify vulnerabilities or inappropriate activity based on association of IDS data received from all data sources. The O. IDANLZ objective provides the function that the TOE will recognize vulnerabilities or inappropriate activity from multiple data sources.
T.MISUSE	Unauthorized accesses and activity indicative of misuse may occur on an IT System the TOE monitors. The O.AUDITS, O.IDSENS and O.VIRUS objectives address this threat by requiring a TOE that contains a Sensor, collect audit and Sensor data.
T.INADVE	Inadvertent activity and access may occur on an IT System the TOE monitors. The O.AUDITS and O.IDSENS objectives address this threat by requiring a TOE, that contains a Sensor, collect audit and Sensor data.
T.MISACT	Malicious activity, such as introductions of Trojan horses and viruses, may occur on an IT System the TOE monitors. The O.AUDITS, O.IDSENS and O.VIRUS objectives address this threat by requiring a TOE that contains a Sensor, collect audit and Sensor data.
P.DETECT	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 or 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, O.IDSENS, O.IDSCAN and O.VIRUS objectives address this policy by requiring collection of audit, Sensor, and Scanner data. OE.TIME supports this policy by providing the audit functions with reliable time stamps.
P.ANALYZ	Analytical processes and information to derive conclusions about intrusions (past, present, or future) must be applied to IDS data and appropriate response actions taken. The O.IDANLZ objective requires analytical processes be applied to data collected from Sensors and Scanners.
P.MANAGE	The TOE shall only be managed by authorized users. The OE.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 OE.INSTAL objective supports the OE.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 OE.CREDEN objective requires administrators to protect all authentication data. The O.PROTCT objective addresses this policy by providing TOE self protection. The O.AUDIT_SORT objective provides the ability for authorized users to sort audit data to improve effective and appropriate management response to different types of system events.
P.ACCESS	All data collected and produced by the TOE 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 addresses this policy by providing TOE self-protection. The O.AUDIT_PROTECTION objective supports this policy by ensuring that there will be no back door for accessing the audit data using meanings outside the TSC.
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. OE.TIME supports this policy by providing the audit functions with reliable time stamps. O.AUDIT_SORT supports this objective by providing the ability to sort audit records by user identification.
P.INTGTY	Data collected and produced 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 TOE data and functions. The O.OFLOWS objective counters this policy by requiring the TOE handle disruptions. The OE.PHYCAL objective protects the TOE from unauthorized physical modifications.

6.3.2 Rationale for Security Objectives in 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.

In particular, the environment contains a Database, which should be managed according to best practices for database security in a production environment.

6.3.3 Security Functional Requirements Rationale

This section demonstrates that the functional components selected for the ST provide complete coverage of the defined security objectives. The mapping of components to security objectives is depicted in the following table.

Table 6-9 Requirements vs. Objectives Mapping

Objectives / Requirements		TOE														
		O.PROTCT	O.IDSCAN	O.IDSENS	O.IDANLZ	O.RESPON	O.EADMIN	O.ACCESS	O.IDAUTH	O.OFLOWS	O.AUDITS	O.INTEGR	O.EXPORT	O.VIRUS	O.AUDIT_SORT	O.AUDIT_PROTECTION
TOE	FAU_GEN.1										✓					
	FAU_SAR.1						✓									
	FAU_SAR.2							✓	✓							
	FAU_SAR.3						✓								✓	
	FAU_SEL.1						✓				✓					
	FAU_STG.2	✓						✓	✓	✓		✓				✓
	FAU_STG.4									✓	✓					✓
	FIA_UAU.1							✓	✓							
	FIA_ATD.1								✓							
	FIA_UID.1							✓	✓							
	FMT_MOF.1	✓						✓	✓							
	FMT_MTD.1a	✓						✓	✓			✓				
	FMT_MTD.1b	✓						✓	✓			✓				
	FMT_SMR.1								✓							
	FMT_SMF.1							✓								
	FPT_ITT.1											✓	✓			
	FCS_COP.1	✓										✓	✓			
	IDS_SDC.1		✓	✓												
	IDS_ANL.1				✓											

Objectives	TOE														
IDS_RCT.1					✓										
IDS_RDR.1						✓	✓	✓							
IDS_STG.1	✓						✓	✓	✓		✓				✓
IDS_STG.2									✓						
FAV_ACT_(EXT).1													✓		
FAV_ALR_(EXT).1													✓		
FAV_SCN_(EXT).1													✓		

O.PROTCT The TOE must protect itself from unauthorized modifications and access to its functions and data.
The System is required to protect the System data from any modification and unauthorized deletion [FCS_COP.1], and 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 System is required to protect the System data 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 System may query and add System and audit data, and authorized administrators of the TOE may query and modify all other TOE data [FMT_MTD.1a and FMT_MTD.1b].

O.IDSCAN The Scanner must collect and store 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.
A System containing a Scanner is required to collect and store static configuration information of an IT System. The type of configuration information collected must be defined in the ST [IDS_SDC.1].

O.IDSENS 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.
A System containing a 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_SDC.1].

O.IDANLZ The Analyzer must accept data from IDS Sensors or IDS Scanners and then apply analytical processes and information to derive conclusions about intrusions (past, present, or future).
The Analyzer is required to perform intrusion analysis and generate conclusions [IDS_ANL.1].

O.RESPON The TOE must respond appropriately to analytical conclusions.
The TOE is required to respond accordingly in the event an intrusion is detected [IDS_RCT.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 the System [FAU_SAR.1, FAU_SAR.3, FAU_SEL.1]. The System must provide the ability for authorized administrators to view all System data collected and produced [IDS_RDR.1]. TOE must also provide management functions to administrative users [FMT_SMF.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 System is required to restrict the review of System data to those granted with explicit read-access [IDS_RDR.1]. The System 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, or failure [FAU_STG.2].
The System is required to protect the System data 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 behaviour of functions of the TOE to authorized users of the TOE [FMT_MOF.1]. Only authorized administrators of the System may query and add System 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 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 System is required to restrict the review of System data to those granted with explicit read-access [IDS_RDR.1]. The System 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, or failure [FAU_STG.2]. The System is required to protect the System data 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 behaviour of functions of the TOE to authorized users of the TOE [FMT_MOF.1]. Only authorized administrators of the System may query and add System 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].
O.OFLOWS	The TOE must appropriately handle potential audit and System 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, or failure [FAU_STG.2]. The TOE must prevent the loss of audit data in the event that its audit trail is full [FAU_STG.4]. The System is required to protect the System data 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 System must prevent the loss of System data in the event that its storage capacity has been reached [IDS_STG.2].
O.AUDITS	The TOE must record audit records for data accesses and use of the System 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 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_ARV.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 System data. The TOE together 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, or failure [FAU_STG.2]. The System is required to protect the System data from any modification and unauthorized deletion [IDS_STG.1]. Only authorized administrators of the System may query or change audit and System data [FMT_MTD.1]. The TOE must protect the system data's confidentiality and ensure its integrity when the data is transmitted to between different parts of the TOE [FPT_ITT.1, FCS_COP.1].
O.EXPORT	When any IDS component makes its data available to another IDS component, the TOE will ensure the confidentiality of the System data. The TOE must protect the system data's confidentiality and ensure its integrity when the data is transmitted to between different parts of the TOE [FPT_ITT.1, FCS_COP.1].
O.VIRUS	The TOE will detect and take action against known viruses introduced to the protected computer via network traffic or removable media. The anti-virus scanner collects and stores information and performs an analysis to identify possible viruses [FAV_SCN.1]. The System takes action to quarantine or remove viruses [FAV_ACT.1], and alert the authorised users [FAV_ALR.1].
O.AUDIT_SORT	The System will provide the capability to sort audit information. The System must provide the ability to review and manage the System audit trail to include sorting the audit data [FAU_SAR.3].
O.AUDIT_PROTECTION	The TOE uses the capabilities of the IT environment 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, or failure [FAU_STG.2, IDS_STG.1]. The TOE is informed of data storage exhaustion by the environment and takes appropriate action in protecting the audit data and System data [FAU_STG.2, FAU_STG.4, IDS_STG.2].

6.3.4 Explicitly Stated Requirements Rationale

The claimed extended Intrusion Defense System functionality creates a family of IDS requirements 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.

The explicitly stated Extended (FAV) SFRs in Section 5 are additional requirements created to specifically address Anti-Virus protection for viruses that do not enter via network traffic and therefore may not be detectable by the IDS system. However, this family of requirements uses the same IDS functionality to provide the requirements for collecting, reviewing and managing the data.

6.3.5 Security Functional Requirements Dependency Rationale

The SFRs in Section 6 do satisfy all the requirement dependencies of the Common Criteria. Table 6-10 Requirement Dependencies Rationale lists each requirement from the ST with a dependency and indicates whether the dependent requirement was included. As the table indicates, all dependencies have been met.

Table 6-10 Requirement Dependencies Rationale

SFR ID	Dependencies	Dependency Met
FAU_GEN.1	FPT_STM.1	Yes, satisfied by operational environment (OE.TIME)
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.1	Yes, met by FAU_STG.2 as FAU_STG.2 is hierarchical to FAU_STG.1
FIA_UAU.1	FIA_UID.1	Yes
FMT_MOF.1	FMT_SMR.1 and FMT_SMF.1	Yes
FMT_MTD.1	FMT_SMR.1 and FMT_SMF.1	Yes
FMT_SMR.1	FIA_UID.1	Yes
FCS_COP.1	FCS_CKM.1 and FCS_CKM.4	N/A, FCS_CKM functions are not included, following the guidance of CCS Instruction #4, version 1.10.

6.3.6 TOE IT Security Functions Rationale

This section demonstrates that the security functions selected for the ST provide complete coverage of the defined security functional requirements. The mapping of security functions to SFRs is depicted in the following table, rationales are provided to support the mapping.

Table 6-11 TOE Security Functions Rationale

IT Security Functions	SFRs	Rationale
SF.AUDIT	FAU_GEN.1	SF.AUDIT supports the generation of audit records in accordance with Table 6-2.
	FAU_SAR.1	SF.AUDIT allows only authorised administrators read access to audit information.
	FAU_SAR.2	
	FAU_SAR.3	SF.AUDIT supports the sorting of audit records using records attributes.
	FAU_SEL.1	SF.AUDIT provides the capability of selective auditing.
	FAU_STG.2	SF.AUDIT protects the audit data from deletion as well as guaranteeing the availability of the audit data in the event of storage exhaustion or failure.
	FAU_STG.4	SF.AUDIT prevents auditable events from occurring and records unpreventable events by overwriting the oldest stored audit records when audit trail becomes full.
SF.RBAC	FMT_MOF.1	SF.RBAC allows only administrators with appropriate roles to modify TOE security functions/data.
	FMT_MTD.1a	SF.RBAC assigns users with "Full Access" role with the right to perform all security functions.
	FMT_MTD.1b	SF.RBAC allows Auditor only read access to all information.
	FMT_SMR.1	Full Access and Auditor are the default roles supported by SF.RBAC.
	FMT_SMF.1	SF.RBAC provides management functions to administrators.
SF.I&A	FIA_ATD.1	SF.I&A maintains user security attributes.
	FIA_UAU.1	SF.I&A requires users to be positively authenticated, before granting access to the TOE.
	FIA_UID.1	SF.I&A requires users to be positively identified, before granting access to the TOE.
SF.SECCOM	FPT_ITT.1	SF.SECCOM secures the internal communication using symmetric encryption.
	FCS_COP.1	
SF.IDPS	IDS_SDC.1	SF.IDPS supports the generation of audit records in accordance with Table 6-5.
	IDS_ANL.1	SF.IDPS performs analysis of network traffic based on statistics, attack signatures or integrity of the network traffic.
	IDS_RCT.1	Upon discovery of attacks, SF.IDPS sends email alarms to the appropriate administrator and prevents the attack.
	IDS_RDR.1	SF.IDPS allows authorised administrators read access to audit information.
	IDS_STG.1	SF.IDPS protects the event logs and overwrites the oldest stored records with newest records upon storage exhaustion.
	IDS_STG.2	

IT Security Functions	SFRs	Rationale
SF.AV	FAV_ACT.1	SF.AV performs an analysis of virus data, and upon discovery of a virus, acts to eliminate the effect of the virus.
	FAV_ALR.1	SF.AV performs an analysis of virus data, and upon discovery of a virus, sends email alarms to the appropriate administrator
	FAV_SCN.1	SF.AV performs real time scans for viruses

7 TOE Summary Specification

7.1 Statement of TOE IT Security Functions

The TOE provides the following security functions in meeting the SFR's specified in section 6.1:

- SF.AUDIT (Audit)
- SF.RBAC (Role Based Access Control)
- SF.I&A (Identification and Authentication)
- SF.SECCOM (secure intra-TOE communication)
- SF.IDPS (Intrusion detection and prevention)
- SF.AV (Anti-Virus)

7.1.1 SF.AUDIT

Deep Security 9.5 maintains information regarding the administration and management of its security functions as part of the audit records. This security function addresses the generation, storage and reviewing of these audit records.
Authorised TOE administrators are only allowed to interact with the TOE through a browser based graphical user interface supported by the Deep Security Manager. All the security relevant actions as specified in Table 6-2 taken by the authorized administrators are recorded as a part of the audit log.
All audit records generated are stored within a database. All audit records include the date and time of the event, type of event, subject identity, the outcome (success or failure) of the event. No TOE administrator has direct access to the database. An authorised TOE administrator with the appropriate roles assigned has the capability of selecting the system events to be recorded based on Event Type.
When the capacity of the database has been reached, an emergency email is sent to a pre-selected administrator alerting them of the situation. The TOE will prevent TOE users from starting new user sessions with the TOE. For existing live user sessions, any attempts at modifying the TOE data will be prevented and reading of the TOE data remain granted. The TOE records new auditable events such as reading of TOE data, user requests failure by writing the audits to file on disk until the database capacity is increased, at which point any audits written to disk are written to the database.
Authorised TOE administrators can only read audit records through the TOE's administrative interface and their access rights to the audit records is restricted based on their role definition. No administrator is given write access to the audit records. The SF.AUDIT audit logs are all classified as "system events" at the administrative interface. The Authorised TOE administrators are given the capability of sorting the system events to be displayed based on Event Date and Time, Event Type, Event ID/Name, Target System, or User ID of who performed the Action.

7.1.2 SF.RBAC

Deep Security 9.5 restricts Authorised TOE administrators' access to the system using role based access control. All TOE administrators are assigned roles at creation. Authorised TOE administrators can only access the TOE through the administrative interface. They have full access to the functions permitted by their roles.
By default, two predefined roles are available upon successful installation of Deep Security Manager. And these are "Full Access" and "Auditor". Users assigned the "Full Access" role have access to all the system functions, including the capability of defining new roles and assigning users to these roles; Users of the "Auditor" role are only allowed read access to all data/configuration. Deep Security 9.5 provides management functions to administrative users.

7.1.3 SF.I&A

The identification and authentication mechanism used by Deep Security 9.5 is based on user ID and password. For each user being created, the creator is required to assign them with a user id, an initial password and a role. Before users are granted access through the administrative interface, they are required to provide their credentials at the browser based interface and these are verified by the TOE. Before users are allowed to access the REST API they are required to call a special authentication API providing username and password to be verified by the TOE. Identification is performed by finding the matching administrator based on a case-insensitive match to the username. Authentication takes place by matching one-way hashed passwords against values previously stored in the database.
Users are allowed to modify their own passwords; however, they must follow the password policy.

7.1.4 SF.SECCOM

All communications between the Deep Security Agents/Appliances and the Deep Security Manager are protected from disclosure or modification. This is achieved by deploying symmetric encryption algorithms for protection of the communication channel.

7.1.5 SF.IDPS

The TOE provides intrusion detection and prevention functions. Data is first collected, analyzed and stored by Deep Security Agents/Appliances and is then passed to the Deep Security Manager for consolidated review and storage. If Deep Security Manager reaches its storage capacity, event data will no longer be collected from Deep Security Agents/Appliances until space is made available at the Deep Security Manager. If Deep Security Agents/Appliances reach their log storage capacity they will overwrite the oldest log file (in the rotating set of log files) and immediately communicate with Deep Security Manager. Deep Security Manager will raise an Alert and send an Email notification regarding the Agent's lack of storage space to the administrators with a valid email address who have elected to receive notifications and have the view rights to the host.

Deep Security Agents sit directly on a host, and defend it by monitoring incoming and outgoing network traffic for protocol deviations or contents that might signal an attack. Deep Security Appliance intercepts traffic before it reaches the destination virtual machine. Authorized administrative Users of the TOE configure the Agents or Virtual Agents (protecting VMs inside the appliance) through functionalities offered by the Deep Security Manager. Rules are defined for each individual Agent/Virtual Agent or a group of Agents/Virtual Agents as a whole to manage their actions. The Deep Security Manager is populated with commonly used rules, targeted at known vulnerabilities for each type of hosts. These rule configurations can be categorized into Anti-Malware Configurations, Web Reputation Configurations, Firewall Rules, Stateful Configurations, Intrusion Prevention Rules, Integrity Monitoring Rules and Log Inspection Rules. Anti-malware rules define the policy for anti-malware real-time and scheduled scans. Web Reputation configurations determine if web reputation functionality is on or off and allow specification of additional URLs to allow or block. Firewall Rules examine the control information of network packets, and determine if a network connection should be allowed. Stateful Configuration filters analyze each network packet in the context of traffic history, correctness of TCP and IP header values, and TCP connection state transitions, and manages existing network sessions with great efficiency. IDS/IPS Rules examine the actual content of a network packet or a sequence of packets performing deep packet inspection. Based on predefined Intrusion Prevention Rules, various actions are carried out by the Agents/Appliances on these packets: from replacing specifically defined or suspicious byte sequences, to completely dropping packets and resetting the connection. Integrity Monitoring rules define the content to be hashed and compared with future scans. Log Inspection Rules define the logs, decoding and parsing techniques for analyzing logs.

Deep Security Agents/Virtual Agents/Appliances generate log records in accordance with details as specified in Table 6-5, regarding their own startup and shut down, the network traffic and malicious codes or vulnerabilities detected, and pass these records to the Deep Security Manager for review, storage and reports generation. Within each record, event time, event type, action taken, data source and destination are recorded. Authorized administrators can use functionalities provided by the Deep Security Manager to control the behaviour of the Deep Security Manager log collection process. This could be configured occur on demand or at regular intervals.
Deep Security Manager groups the information received from Deep Security Agents/Appliances into System, Anti-Malware, Web Reputation, Firewall, Intrusion Prevention, Integrity and Log Inspection events based on their Event ID (type). Generally speaking, the records of Agents/Appliances Start up and Shut downs are regarded as System Events; Information collected on network traffic and detected known vulnerabilities are grouped into Firewall or Intrusion Prevention events and log data collected regarding the detection of Malicious codes are placed into the Intrusion Prevention events. System integrity changes are collected as Integrity events, and events generated by

monitoring the Agent logs are collected as Log Inspection events. Anti-Malware detection, cleaning and quarantining events are collected as Anti-Malware events. Web Reputation URL blocking events are collected as Web Reputation Events.

Deep Security Manager offers only pre-authorized administrators of appropriate roles with read access to these events logs. When a predefined event has been detected, email alarms are sent to pre-selected administrators.

7.1.6 SF.AV

The TOE provides anti-virus functions. Data is first collected, analyzed and stored by Deep Security Agents/Virtual Appliances and is then passed to the Deep Security Manager for consolidated review and storage.
Protection and storage of event data, alerts and email notifications are handled as for SF.IDPS (above).
Deep Security Agents sit directly on a computer, and defend it by monitoring files for viruses based on known signatures. Authorized administrative Users of the TOE configure the Appliances through functionalities offered by the Deep Security Manager. Deep Security Virtual Appliances sit on an ESXi host and monitor one or more virtual machines for virus activity in the same way as an Agent, with the exception that files to monitor are passed to it by VMWare.
Deep Security Agents/Virtual Appliances generate Anti-Malware event records in accordance with details as specified in Table 6-6, regarding viruses detected, and pass these records to the Deep Security Manager for review, storage and reports generation. Within each record, event time, event type, action taken, and data source are recorded. Authorized administrators can use functionalities provided by the Deep Security Manager to control the behaviour of the Deep Security Manager log collection process. This could be configured occur on demand or at regular intervals.

Deep Security Manager groups the anti-virus information received from Deep Security Agents/Virtual Appliances into AV events based on their Event ID (type). Deep Security Manager offers only pre-authorized administrators of appropriate roles with read access to these events logs. When a predefined event has been detected, email alarms are sent to pre-selected administrator.