TREND MICRO

9.5 Deep Security

Installation Guide VWware vShield

Advanced Protection for Physical, Virtual, and Cloud Servers

Cloud & Data Center

Complete End User

Cyber Threats

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Table of Contents

Introduction

About Deep Security

Deep Security provides advanced server security for physical, virtual, and cloud servers. It protects enterprise applications and data from breaches and business disruptions without requiring emergency patching. This comprehensive, centrally managed platform helps you simplify security operations while enabling regulatory compliance and accelerating the ROI of virtualization and cloud projects. The following tightly integrated modules easily expand the platform to ensure server, application, and data security across physical, virtual, and cloud servers, as well as virtual desktops.

Protection Modules

Anti-Malware

Integrates with VMware environments for agentless protection, or provides an agent to defend physical servers and virtual desktops in local mode.

Integrates new VMware vShield Endpoint APIs to provide agentless anti-malware protection for VMware virtual machines with zero in-guest footprint. Helps avoid security brown-outs commonly seen in full system scans and pattern updates. Also provides agent-based anti-malware to protect physical servers, Hyper-V and Xen-based virtual servers, public cloud servers as well as virtual desktops in local mode. Coordinates protection with both agentless and agent-based form factors to provide adaptive security to defend virtual servers as they move between the data center and public cloud.

Web Reputation

Strengthens protection against web threats for servers and virtual desktops.

Integrates with the Trend Micro Smart Protection Network web reputation capabilities to safeguard users and applications by blocking access to malicious urls. Provides same capability in virtual environments in agentless mode through the same virtual appliance that also delivers agentless security technologies for greater security without added footprint.

Firewall

Decreases the attack surface of your physical and virtual servers.

Centralizes management of server firewall policy using a bi-directional stateful firewall. Supports virtual machine zoning and prevents Denial of Service attacks. Provides broad coverage for all IP-based protocols and frame types as well as fine-grained filtering for ports and IP and MAC addresses.

Intrusion Prevention

Shields known vulnerabilities from unlimited exploits until they can be patched.

Helps achieve timely protection against known and zero-day attacks. Uses vulnerability rules to shield a known vulnerability -- for example those disclosed monthly by Microsoft -- from an unlimited number of exploits. Offers out-of-the-box vulnerability protection for over 100 applications, including database, web, email and FTP servers. Automatically delivers rules that shield newly discovered vulnerabilities within hours, and can be pushed out to thousands of servers in minutes, without a system reboot.

Defends against web application vulnerabilities

Enables compliance with PCI Requirement 6.6 for the protection of web applications and the data that they process. Defends against SQL injections attacks, cross-site scripting attacks, and other web application vulnerabilities. Shields vulnerabilities until code fixes can be completed.

Identifies malicious software accessing the network

Increases visibility into, or control over, applications accessing the network. Identifies malicious software accessing the network and reduces the vulnerability exposure of your servers.

Integrity Monitoring

Detects and reports malicious and unexpected changes to files and systems registry in real time. Now available in agentless form factor.

Provides administrators with the ability to track both authorized and unauthorized changes made to the instance. The ability to detect unauthorized changes is a critical component in your cloud security strategy as it provides the visibility into changes that could indicate the compromise of an instance.

Log Inspection

Provides visibility into important security events buried in log files.

Optimizes the identification of important security events buried in multiple log entries across the data center. Forwards suspicious events to a SIEM system or centralized logging server for correlation, reporting and archiving. Leverages and enhances open-source software available at OSSEC.

Deep Security Components

Deep Security consists of the following set of components that work together to provide protection:

- **Deep Security Manager**, the centralized Web-based management console which administrators use to configure security policy and deploy protection to the enforcement components: the Deep Security Virtual Appliance and the Deep Security Agent.
- **Deep Security Virtual Appliance** is a security virtual machine built for VMware vSphere environments that Agentlessly provides Anti-Malware, Web Reputation Service, Firewall, Intrusion Prevention, and Integrity Monitoring protection to virtual machines.
- **Deep Security Agent** is a security agent deployed directly on a computer which provides Anti-Malware, Web Reputation Service, Firewall, Intrusion Prevention, Integrity Monitoring, and Log Inspection protection to computers on which it is installed.
    - The Deep Security Agent contains a **Relay Module.** A Relay-enabled Agent distributes Software and Security Updates throughout your network of Deep Security components.
- **Deep Security Notifier** is a Windows System Tray application that communicates information on the local computer about security status and events, and, in the case of Deep Security Relays, also provides information about the Security Updates being distributed from the local machine.

Deep Security Manager

Deep Security Manager ("the Manager") is a powerful, centralized web-based management system that allows security administrators to create and manage comprehensive security policies and track threats and preventive actions taken in response to them. Deep Security Manager integrates with different aspects of the datacenter including VMware vCenter and Microsoft Active Directory. To assist in deployment and integration into customer and partner environments, Deep Security has Web Service API that is exposed to allow for an easy, language-neutral method to externally access data and programming configurations.

Policies

Policies are templates that specify the settings and 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 Policies provide the necessary rules for a wide range of common computer configurations.

Dashboard

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

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

Built-in Security

Role-based access allows multiple administrators (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.

Deep Security Virtual Appliance

The Deep Security Virtual Appliance runs as a VMware virtual machine and protects the other virtual machines on the same ESXi Server, each with its own individual security policy.

Deep Security Agent

The Deep Security Agent ("the Agent") is a high performance, small footprint, software component installed on a computer to provide protection.

The Deep Security Agent contains a **Relay module** (off by default). At least one Relay-enabled Agent is required in any Deep Security installation to distribute Security and Software Updates throughout your Deep Security network. You can enable multiple Relays and organize them into hierarchical groups to more efficiently distribute Updates throughout your network.

Deep Security Notifier

The Deep Security Notifier is a Windows System Tray application that communicates the state of the Deep Security Agent and Deep Security Relay to client machines. The Notifier displays pop-up user notifications when the Deep Security Agent begins a scan, or blocks malware or access to malicious web pages. The Notifier also provides a console utility that allows the user to view events and configure whether pop-ups are displayed.

What's New in Deep Security 9.5

VMware vSphere 5.5 Support

- Security for network virtualization and Software-Defined Data Center with NSX
- Support for mixed-model deployments (NSX and vShield)

Smarter, Lightweight Agent

- Lightweight installer
- Selective deployment of Protection Modules to Agents based on Security Policy requirements results in smaller Agent footprint
- Automatic support for new Linux Kernels

Trend Micro Control Manager Enhancements

- More dashboard widgets with drill-down capability
- Full Events for Anti-Malware and Web Reputation Service

Linux Support

- New distributions: CloudLinux, Oracle Unbreakable
- On-demand Anti-Malware scanning for all distributions
- Real-Time Anti-Malware for Red Hat and SuSE

Note:	*For a list of supported Deep Security features by software platform, see the document titled **Deep Security 9.5 Supported Features and Platforms**. For a list of specific Linux kernels supported for each platform, see the document titled **Deep Security 9.5 Supported Linux Kernels**.*

Improvements to Security and Software Update Management

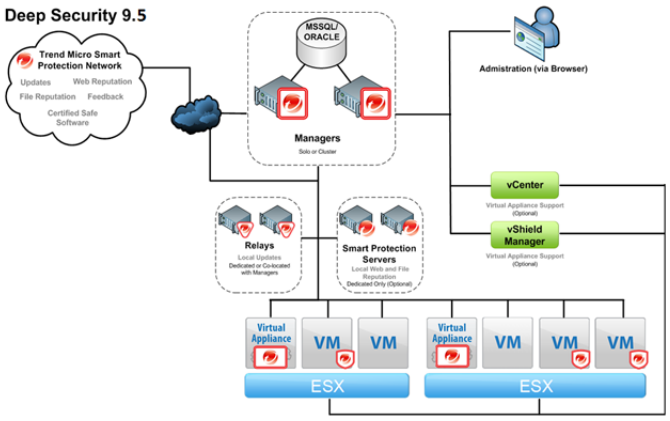
- Improved visibility into Security and Software Update status
- Improved accessibilty to Software Updates

Multi-Tenant Improvements

- Sign in as a Tenant
- Security Model Usage Report

About This Document

Deep Security 9.5 Installation Guide (VMware vShield)



This document describes the installation and configuration of the basic Deep Security 9.5 software components.

1. The Deep Security Manager
2. The Deep Security Virtual Appliance
3. The Deep Security Agent (with Relay functionality)
4. The Deep Security Notifier

This document covers:

1. System Requirements
2. Preparation
3. Database configuration guidelines
4. Installing the Deep Security Manager management console
5. Installing a Relay-enabled Deep Security Agent
6. Integrating Deep Security with a VMware vShield environment
7. Implementing Deep Security protection using Deep Security Protection Policies and Recommendation Scans
8. Guidelines for monitoring and maintaining your Deep Security installation

Intended Audience

This document is intended for anyone who wants to implement Agentless Deep Security 9.5 protection in a VMware vShield environment. The information is intended for experienced system administrators who are familiar with virtual machine technology and virtual datacenter operations. This document assumes familiarity with VMware Infrastructure 5.x, including VMware ESXi, vCenter Server, and the vSphere Web Client.

Other Deep Security 9.5 Documentation

- Deep Security 9.5 Installation Guide (Basic)
- Deep Security 9.5 Installation Guide (Cloud)
- Deep Security 9.5 Installation Guide (VMware vShield)
- Deep Security 9.5 User's Guide
- Deep Security 9.5 Supported Features and Platforms
- Deep Security 9.5 Supported Linux Kernels

Preparation

System Requirements

Deep Security Manager

- **Memory:** 8GB, which includes:
  - 4GB heap memory
  - 1.5GB JVM overhead
  - 2GB operating system overhead
- **Disk Space:** 1.5GB (5GB recommended)
- **Operating System:**
  - Windows Server 2012 (64-bit), Windows Server 2012 R2 (64-bit)
  - Windows Server 2008 (64-bit), Windows Server 2008 R2 (64-bit)
  - Windows 2003 Server SP2 (64-bit), Windows 2003 Server R2 (64-bit)
  - Red Hat Linux 5/6 (64-bit)
- **Database:**
  - Oracle 11g, Oracle 11g Express
  - Oracle 10g, Oracle 10g Express
  - Microsoft SQL Server 2014, Microsoft SQL Server 2014 Express
  - Microsoft SQL Server 2012, Microsoft SQL Server 2012 Express
  - Microsoft SQL Server 2008, Microsoft SQL Server 2008 Express
  - Microsoft SQL Server 2008 R2, Microsoft SQL Server 2008 R2 Express
- **Web Browser:** Firefox 24+, Internet Explorer 9.x, Internet Explorer 10.x, Internet Explorer 11.x, Chrome 33+, Safari 6+. (Cookies enabled.)
  - **Monitor:** 1024 x 768 resolution at 256 colors or higher

Deep Security Agent

- **Memory:**
  - **with Anti-Malware protection:** 512MB
  - **without Anti-Malware protection:** 128MB
- **Disk Space:**
  - **with Anti-Malware protection:** 1GB
  - **without Anti-Malware protection:** 500MB
  - **with Relay functionality enabled:** 8GB
- **Windows:**
  - Windows Server 2012 (64-bit), Windows Server 2012 R2 (64-bit)
  - Windows 8.1 (32-bit and 64-bit)
  - Windows 8 (32-bit and 64-bit)
  - Windows 7 (32-bit and 64-bit)
  - Windows Server 2008 (32-bit and 64-bit), Windows Server 2008 R2 (64-bit)

- Windows Vista (32-bit and 64-bit)
- Windows Server 2003 SP1 (32-bit and 64-bit) with patch "Windows Server 2003 Scalable Networking Pack"
- Windows Server 2003 SP2 (32-bit and 64-bit)
- Windows Server 2003 R2 SP2 (32-bit and 64-bit)
- Windows XP (32-bit and 64-bit)
- **With Relay functionality enabled:** All 64-bit Windows versions above

- **Linux:**
  - Red Hat 5 (32-bit and 64-bit)
  - Red Hat 6 (32-bit and 64-bit)
  - Oracle Linux 5 (32-bit and 64-bit)
  - Oracle Linux 6 (32-bit and 64-bit)
  - CentOS 5 (32-bit and 64-bit)
  - CentOS 6 (32-bit and 64-bit)
  - SuSE 10 SP3 and SP4 (32-bit and 64-bit)
  - SuSE 11 SP1, SP2, and SP3 (32-bit and 64-bit)
  - CloudLinux 5 (32-bit and 64-bit)
  - CloudLinux 6 (32-bit and 64-bit)
  - Amazon Red Hat Enterprise 6 EC2 (32-bit and 64-bit)
  - Amazon SuSE 11 EC2 (32-bit and 64-bit)
  - Amazon Ubuntu 12 EC2 (32-bit and 64-bit)
  - Amazon AMI Linux EC2 (32-bit and 64-bit)
  - Ubuntu 10.04 LTS (64-bit)
  - Ubuntu 12.04 LTS(64-bit)
  - Ubuntu 14.04 LTS (64-bit)
  - **With Relay functionality enabled:** All 64-bit Linux versions above

Note: *The CentOS Agent software is included in the Red Hat Agent software package. To install a Deep Security Agent on CentOS, use the Red Hat Agent installer.*

Note: *For a list of supported Deep Security features by software platform, see the document titled **Deep Security 9.5 Supported Features and Platforms**. For a list of specific Linux kernels supported for each platform, see the document titled **Deep Security 9.5 Supported Linux Kernels**.*

Deep Security Virtual Appliance

- **Memory:** 4GB (Memory requirements can vary depending on the number of VMs being protected).
- **Disk Space:** 20GB
- **VMware Environment:**
  - **NSX Environment:** VMware vCenter 5.5, with ESXi 5.5
  - **vShield Environment:** VMware vCenter 5.0, 5.1, or 5.5, with ESXi 5.0, 5.1, or 5.5
- **Additional VMware Utilities:**
  - **NSX Environment:** VMware Tools, VMware vCenter Server Appliance 5.5, VMware NSX Manager 6.1

    - **vShield Environment:** VMware Tools, VMware vShield Manager 5.0, 5.1, or 5.5, VMware vShield Endpoint Security 5.0, 5.1, or 5.5 (ESXi5 patch ESXi500-201109001 or later for vShield Endpoint Driver)

- **VMware Endpoint Protection supported guest platforms:**
    - **Windows:**
        - Windows Server 2012 (64-bit), Windows Server 2012 R2 (64-bit)
        - Windows 8.1 (32-bit and 64-bit)
        - Windows 8 (32-bit and 64-bit)
        - Windows 7 (32-bit and 64-bit)
        - Windows Vista (32-bit and 64-bit)
        - Windows Server 2003 SP2 (32-bit and 64-bit), Windows Server 2003 SP2 R2 (32-bit and 64-bit)
        - Windows XP SP2 (32-bit and 64-bit)
    - **Linux:**
        - Red Hat Enterprise 5 (32-bit and 64-bit)
        - Red Hat Enterprise 6 (32-bit and 64-bit)
        - CentOS 5 (32-bit and 64-bit)
        - CentOS 6 (32-bit and 64-bit)
        - Oracle Linux 5 (32-bit and 64-bit)
        - Oracle Linux 6 (32-bit and 64-bit)
        - SuSE 10 SP3, SP4 (32-bit and 64-bit)
        - SuSE 11 SP1, SP2, SP3 (32-bit and 64-bit)
        - Ubuntu 10.04 LTS (64-bit)
        - Ubuntu 12.04 LTS(64-bit)
        - Ubuntu 14.04 LTS (64-bit)
        - Cloud Linux 5 (32-bit and 64-bit)
        - Cloud Linux 6 (32-bit and 64-bit)

Note:	*Your VMware vCenter must be either an NSX Environment or a vShield Environment, not a mixture of the two. If you want to use both NSX and vShield, they must be in separate vCenters. You can add more than one vCenter to Deep Security Manager.*

Note:	*The Deep Security Virtual Appliance uses 64-bit CentOS/Red Hat (included in the Virtual Appliance software package). Because the Deep Security Virtual Appliance uses the same Protection Module plug-ins as Deep Security Agents, importing an update to the 64-bit Red Hat Agent software can lead to a notification that new software is available for the Virtual Appliance as for Red Hat Agents.*

Note:	*If using **MTU 9000** (jumbo frames), you must use ESXi build 5.5.0.1797756 or later.*

Note:	*For a list of supported Deep Security features by software platform, see the document titled **Deep Security 9.5 Supported Features and Platforms**.*

ESXi Requirements for the Deep Security Virtual Appliance

In addition to the ESXi standard system requirements, the following specifications must be met:

- **CPU:** 64-bit, Intel-VT or AMD-V present and enabled in BIOS
- **Supported vSwitches:**
    - **NSX:** vSphere Distributed Switch (vDS)

- **vShield:** vSphere Standard Switch (vSS) or third party vSwitch (Cisco Nexus 1000v)

Note: *VMware does not support running nested ESXi servers in production environments. For more information, see this VMware Knowledge Base article.*

Deep Security Notifier System Requirements

- **Windows:** Windows Server 2012 R2 (64-bit), Windows Server 2012 (64-bit), Windows 8.1 (32-bit and 64-bit), Windows 8 (32-bit and 64-bit), Windows 7 (32-bit and 64-bit), Windows Server 2008 R2 (64-bit), Windows Server 2008 (32-bit and 64-bit), Windows Vista (32-bit and 64-bit), Windows Server 2003 SP2 (32-bit and 64-bit), Windows Server 2003 R2 (32-bit and 64-bit), Windows XP (32-bit and 64-bit)

Note: *On VMs protected by a Virtual Appliance, the Anti-Malware module must be licensed and enabled on the VM for the Deep Security Notifier to display information.*

What You Will Need (VMware vShield)

Deep Security Software Packages

Download the following software install packages from the Trend Micro Download Center:

- **Deep Security Manager**
- **Deep Security Filter Driver**
- **Deep Security Virtual Appliance**
- **Deep Security Agent**

> *Note:* *Any Deep Security installation, regardless of whether it is providing Agentless or Agent-based protection, requires at least one Relay-enabled Agent to be installed to download and distribute Security and Software Updates. Any 64-bit Windows or Linux Agent can provide Relay functionality*

- **Deep Security Notifier**

The download center is located at:

http://downloadcenter.trendmicro.com/

> *Note:* *To manually confirm that you possess a legitimate version of each install package, use a hash calculator to calculate the hash value of the downloaded software and compare it to the value published on the Trend Micro Download Center Web site.*

Once the Deep Security Manager is installed, you will need to manually import the filter Driver and the Virtual Appliance from a local directory into the Manager. (To prepare the VMware vCenter by installing the Filter Driver, and then to deploy the Deep Security Appliance, the Filter Driver and the Appliance must be imported to Deep Security Manager.)

To import the Deep Security Virtual Appliance and Filter Driver software:

1. Download the software packages from the Trend Micro Download Center (http://downloadcenter.trendmicro.com) to the Deep Security Manager host machine.
2. In the Deep Security Manager, go to the **Administration > Updates > Software > Local** page and click **Import...** in the toolbar and import the software packages to Deep Security. (The Deep Security manager will then automatically download the latest 64-bit Red Hat agent software package which will later be used to upgrade the Virtual Appliance's Protection Modules.)

To import the Deep Security Agent software, see ***Installing the Deep Security Agent (page 34)*** and ***Installing and Configuring a Relay-enabled Agent (page 42)***.

The Deep Security Notifier is an optional component that you can install on your protected Windows VMs. It displays local notifications of system Events in the notification area.

License (Activation Codes)

You will require Deep Security Activation Codes for the protection modules and a separate Activation Code for Multi-Tenancy if you intend to implement it.

(VMware Licenses will also be required for VMware components.)

Administrator/Root Privileges

You need to have Administrator/Root privileges on the computers on which you will install Deep Security software components.

SMTP Server

You will need an SMTP server to send alert emails. The DSM uses Port 25 by default for connection to the SMTP Server.

Available Ports

On the Deep Security Manager Host

You must make sure the following ports on the machine hosting Deep Security Manager are open and not reserved for other purposes:

- **Port 4120:** The "heartbeat" port, used by Deep Security Agents and Appliances to communicate with Deep Security Manager (configurable).
- **Port 4119:** Used by your browser to connect to Deep Security Manager. Also used for communication from ESXi and requests for Security Updates by the DSVA (configurable).
- **Port 1521:** Bi-directional Oracle Database server port.
- **Ports 1433 and 1434:** Bi-directional Microsoft SQL Server Database ports.
- **Ports 389, 636, and 3268:** Connection to an LDAP Server for Active Directory integration (configurable).
- **Port 25:** Communication to a SMTP Server to send email alerts (configurable).
- **Port 53:** For DNS Lookup.
- **Port 514:** Bi-directional communication with a Syslog server (configurable).
- **Port 443:** Communication with VMware vCloud, vCenter,vShield/NSX Manager and Amazon AWS.

Note:	*For more details about how each of these ports are used by Deep Security, see **Ports Used by Deep Security** in the Reference section of the online help or the Administrator's Guide.*

On the Deep Security Relay, Agents, and Appliances

You must make sure the following ports on the machine hosting Deep Security Relay are open and not reserved for other purposes:

- **Port 4122:** Relay to Agent/Appliance communication.
- **Port 4118:** Manager-to-Agent communication.
- **Port 4123:** Used for internal communication. Should not be open to the outside.
- **Port 80, 443:** connection to Trend Micro Update Server and Smart Protection Server.
- **Port 514:** bi-directional communication with a Syslog server (configurable).

The Deep Security Manager automatically implements specific Firewall Rules to open the required communication ports on machines hosting Deep Security Relays, Agents and Appliances.

Network Communication

Communication between Deep Security Manager and Deep Security Relay-enabled Agents, Agents/Appliances and hypervisors uses DNS hostnames by default. In order for Deep Security Agent/Appliance deployments to be successful, you must ensure that each computer can resolve the hostname of the Deep Security Manager and a Relay-enabled Agent. This may require that the Deep Security Manager and Relay-enabled Agent computers have a DNS entry or an entry in the Agent/Appliance computer's hosts file.

Note:	*You will be asked for this hostname as part of the Deep Security Manager installation procedure. If you do not have DNS, enter an IP address during the installation.*

Reliable Time Stamps

All computers on which Deep Security Software is running should be synchronized with a reliable time source. For example, regularly communicating with a Network Time Protocol (NTP) server.

Performance Recommendations

See ***Deep Security Manager Performance Features (page 73)***.

Deep Security Manager and Database Hardware

Many Deep Security Manager operations (such as Updates and Recommendation Scans) require high CPU and Memory resources. Trend Micro recommends that each Manager node have four cores and sufficient RAM in high scale environments.

The Database should be installed on hardware that is equal to or better than the specifications of the best Deep Security Manager node. For the best performance the database should have 8-16GB of RAM and fast access to the local or network attached storage. Whenever possible a database administrator should be consulted on the best configuration of the database server and a maintenance plan should be put in effect.

For more information, see ***Database Deployment Considerations (page 20)***.

Dedicated Servers

The Deep Security Manager and the database can be installed on the same computer if your final deployment is not expected to exceed 1000 computers (real or virtual). If you think you may exceed 1000 computers, the Deep Security Manager and the database should be installed on dedicated servers. It is also important that the database and the Deep Security Manager be co-located on the same network with a 1GB LAN connection to ensure unhindered communication between the two. The same applies to additional Deep Security Manager Nodes. A two millisecond latency or better is recommended for the connection from the Manager to the Database.

High Availability Environments

If you use VMware's High Availability (HA) features, make sure that the HA environment is established before you begin installing Deep Security. Deep Security must be deployed on all ESXi hypervisors (including the ones used for recovery operations). Deploying Deep Security on all hypervisors will ensure that protection remains in effect after a HA recovery operation.

Note:	*When a Virtual Appliance is deployed in a VMware environment that makes use of the VMware Distributed Resource Scheduler (DRS), it is important that the Appliance does not get vMotioned along with the virtual machines as part of the DRS process. Virtual Appliances must be "pinned" to their particular ESXi server. You must actively change the DRS settings for all the Virtual Appliances to "Manual" or "Disabled" (recommended) so that they will not be vMotioned by the DRS. If a Virtual Appliance (or any virtual machines) is set to "Disabled", vCenter Server does not migrate that virtual machine or provide migration recommendations for it. This is known as "pinning" the virtual machine to its registered host. This is the recommended course of action for Virtual Appliances in a DRS environment. An alternative is to deploy the Virtual Appliance onto local storage as opposed to shared storage. When the Virtual Appliance is deployed onto local storage it cannot be vMotioned by DRS. For further information on DRS and pinning virtual machines to a specific ESXi server, please consult your VMware documentation.*

Note:	*If a virtual machine is vMotioned by DRS from an ESXi protected by a DSVA to an ESXi that is not protected by a DSVA, the virtual machine will become unprotected. If the virtual machine is subsequently vMotioned back to the original ESXi, it will not automatically be protected again unless you have created an Event-based Task to activate and protect computers that have been vMotioned to an ESXi with an available DSVA. For more information, see the* ***Event-Based Tasks*** *sections of the online help or the Administrator's Guide.*

Database Deployment Considerations

Refer to your database provider's documentation for instructions on database installation and deployment but keep the following considerations in mind for integration with Deep Security.

Version

Deep Security requires Microsoft SQL Server 2012 or 2008, or Oracle Database 11g or 10g for enterprise deployments. Deep Security Manager comes with an embedded Apache Derby database but this is only suitable for evaluation purposes. (You cannot upgrade from Apache Derby to SQL Server or Oracle Database.)

Install before Deep Security

You must install the database software, create a database instance for Deep Security (if your are not using the default instance), and create a user account for Deep Security *before* you install Deep Security Manager.

Location

The database must be located on the same network as the Deep Security Manager with a connection speed of 1Gb/s over LAN. (WAN connections are not recommended.)

Dedicated Server

The database should be installed on a separate dedicated machine.

Microsoft SQL Server

- Enable "Remote TCP Connections". (See http://msdn.microsoft.com/en-us/library/bb909712(v=vs.90).aspx)
- The database account used by the Deep Security Manager must have **db_owner** rights.
- If using Multi-Tenancy, the database account used by the Deep Security Manager must have **dbcreator** rights.
- Select the "simple" recovery model property for your database. (See http://technet.microsoft.com/en-us/library/ms189272.aspx)

Oracle Database

- Start the "Oracle Listener" service and make sure it accepts TCP connections.
- The database account used by the Deep Security Manager must be granted the **CONNECT** and **RESOURCE** roles and **CREATE SEQUENCE**, **CREATE TABLE** and **CREATE TRIGGER** system privileges.
- If using Multi-Tenancy, the database account used by the Deep Security Manager must be granted the **CREATE USER**, **DROP USER**, **ALTER USER**, **GRANT ANY PRIVILEGE** and **GRANT ANY ROLE** system privileges.

Transport Protocol

The recommended transport protocol is **TCP**.

If using **Named Pipes** to connect to a SQL Server, a properly authenticated Microsoft Windows communication channel must be available between Deep Security Manager host and the SQL Server host. This may already exist if:

- The SQL Server is on the same host as Deep Security Manager.
- Both hosts are members of the same domain.
- A trust relationship exists between the two hosts.

If no such communication channel is available, Deep Security Manager will not be able to communicate to the SQL Server over named pipes.

Connection Settings Used During Deep Security Manager Installation.

During the Deep Security Manager installation, you will be asked for Database connection details. Enter the Database hostname under "Hostname" and the pre-created database for Deep Security under "Database Name".

The installation supports both SQL and Windows Authentication. When using Windows Authentication, click on the "Advanced" button to display additional options. The screenshot above shows an example for connecting to a named SQL instance using Windows Authentication

Avoid special Characters for the database user name (Oracle)

Although Oracle allows special characters when configuring the database user object, if they are surrounded by quotes. Deep Security does not support special characters for the database user.

Keep the database Name Short (SQL Server)

If using Multi-Tenancy, keeping the main database name short will make it easier to read the database names of your Tenants. (ie. If the main database is "MAINDB", the first Tenant's database name will be "MAINDB_1", the second Tenant's database name will be "MAINDB_2", and so on.)

Oracle RAC Support

Deep Security supports:

- SUSE Linux Enterprise Server 11 SP1 with Oracle RAC 11g R2 (v11.2.0.1.0)
- Red Hat Linux Enterprise Server 5.8 with Oracle RAC 11g R2 (v11.2.0.1.0)

Note:	*Applying the default Linux Server Deep Security Policy to the Oracle RAC nodes should not cause any communication issues with Oracle Automated Storage Management (ASM) and cluster services. However if you experience issues, try customizing the Firewall settings according to the port requirements found in Oracle RAC documentation, or disabling the Firewall altogether.* *http://docs.oracle.com/cd/E11882_01/install.112/e41962/ports.htm#BABECFJF*

High Availability

The Deep Security database is compatible with database failover protection so long as no alterations are made to the database schema. For example, some database replication technologies add columns to the database tables during replication which can result in critical failures.

For this reason, database mirroring is recommended over database replication.

Minimum VMware Privileges for DSVA Deployment

The following tables list the VMware environment privileges required by the VMware role assigned to the account used by the Deep Security Manager to deploy the Deep Security Virtual Appliance. (The account used to connect to the vCenter when importing the vCenter into the Deep Security Manager.)

These privileges must be applied at the data center level in the Hosts and Clusters view.

Note: *During synchronization with a vCenter, if the Deep Security Manager receives information about a new folder that is not the child of an existing folder, it will need to trace its parent folders up to the datacenter to determine which datacenter the folder belongs to. Applying these privileges only at the cluster level could result in synchronization errors.*

The tables list the required privilege and the function for which the privilege is required. To set the privilege, use the vSphere Web Client to edit the properties of the role used by the Deep Security Manager to access the vCenter. The required privileges can be found in the Privileges tree of the vSphere Role editor.

The tables are organized as follows:

1. **Preparing the ESXi Server.** A kernel driver is loaded on the ESXi server, and a separate vSwitch is configured to facilitate internal connectivity for the DSVA.
2. **Deploying the Virtual Appliance.** The virtual appliance itself is deployed from an OVF file.
3. **Deploying into a DRS-enabled Cluster.**
4. **Activating the Virtual Machine (the protected computer).**
5. **Ongoing operations.** Day to day Deep Security operations.

Preparing the ESXi Server

Privilege	Function
Host > Configuration > Change Settings	Query Modules on ESXi
Host > Configuration > Maintenance	Enter and Exit Maintenance Mode
Host > Configuration > Network Configuration	Add new virtual switch, port group, virtual NIC etc.
Host > Configuration > Advanced Settings	Setup networking for dvfilter communication on ESXi
Host > Configuration > Query Patch	Install Filter Driver
Host > Configuration > Connection	Disconnect/reconnect a host
Host > Configuration > Security profile and firewall	Reconfiguration outgoing FW connections to allow retrieval of Filter Driver package from DSM
Global > Cancel Task	Required to cancel a task if required

Deploying the Virtual Appliance

Privilege	Function
vApp > Import	Deploy DSVA from OVF file
vApp > vApp application configuration	Upgrade the DSVA
Datastore > Allocate Space	Allocate space for DSVA on datastore.
Host > Configuration > Virtual machine autostart configuration	Set DSVA to autostart on ESXi
Network > Assign Network	Assign DSVA to networks
Virtual Machine > Configuration > Add new disk	Add disks to DSVA
Virtual Machine > Interaction > Power On	Power on DSVA
Virtual Machine > Interaction > Power Off	Power off DSVA

Deploying into a DRS-enabled Cluster

Privilege	Function
Host > Inventory > Modify Cluster	Deploy DSVA to DRS-enabled cluster.

Activating the Virtual Machine (the protected computer)

Privilege	Function
Virtual Machine > Configuration > Advanced	Reconfigure virtual machine for dvfilter

Ongoing Operations

Privilege	Function
Host > Configuration > Change Settings	Query Modules on ESXi
Virtual Machine > Configuration > Advanced	Reconfigure virtual machine for dvfilter

Preparing a vShield Environment for Agentless Protection

The following describes a Deep Security deployment in a typical VMware environment.

Two ESXi servers are required:

- **Host A:** is an ESXi hypervisor on which are running individual virtual machines (VMs) for Deep Security Manager 9.0, vShield Manager 5.0 or 5.1, and vCenter Server 5.0 or 5.1. Optionally, Trend Micro Smart Protection Server and Deep Security Relay can be installed on virtual machines on Host A. An additional virtual machine can also be provided for a second Deep Security Manager node. One VM should also be provided for installing the Deep Security Database.
- **Host B:** is an ESXi hypervisor on which are running Deep Security Virtual Appliance (DSVA) and the VMs requiring protection.

Note: *The vCenter Server, the vShield Manager and the Deep Security Manager are installed on a separate ESXi because the protected ESXi must be restarted during the course of Deep Security deployment. Also note that the Deep Security database is not shown in this diagram. It also can be installed on a physical machine or on a VM.*

Required Resources Checklist

Check	Software Requirements	Notes
	VMware vCenter 5.0, 5.1, or 5.5	Includes vCenter Server and vCenter Client GUI application. License is required during product installation.
	VMware vShield Manager 5.0, 5.1, or 5.5	License is required during product installation.
	Trend Micro Deep Security Manager 9.5 (DSM)	License is required during product installation.
	VMware vShield Endpoint 5.0, 5.1, or 5.5	Add the license to vCenter
	Trend Micro Deep Security Filter Driver 9.5 (FD)	
	Trend Micro Deep Security Virtual Appliance 9.5 (DSVA)	
	Supported Guest OS	vShield Endpoint drivers required on each guest VM. (Since ESXi 5 patch ESXi500-201109001, vShield Endpoint driver is included in VMware Tools).

Install vShield Endpoint on ESXi server B

This section lists additional tasks necessary to complete the Deep Security integration with the VMware environment for Agentless protection.

At this point...

- The VMware Environment is already setup as described in Preparing a VMware Environment for Agentless Protection
- Deep Security Manager (and database) is already installed
- A Deep Security Relay has been installed and configured.

VMware vShield Endpoint Deployment on ESXi server B

1. Login to vShield Manager by browsing to **https://<vSM-ip>**
2. On the **Settings and Reports > Configuration** tab, enter your vCenter Server Information
3. In the left navigation pane, select the ESXi hypervisor to be protected by Deep Security (Host B).
4. On the **Summary** tab, click the **Install** link for the **vShield Endpoint Service**
5. Select the services to install/upgrade, check **vShield Endpoint** and click the **Install** button at the top right of the screen. Click **OK**.

6. After installing, make sure the Service vShield Endpoint correctly displays the installed version (The **Install** link will have changed to **Uninstall**)

Install vShield Endpoint Drivers on the VMs to be protected on ESXi server B

On each VM to be protected agentlessly by a Deep Security Virtual Appliance

1. Install guest OS. (If using Windows 2003 Server, make sure you install Service Pack 2)
2. Install the VMware vShield Endpoint driver to this machine. The vShield Endpoint driver is contained within the vShield Drivers in VMware Tools. (Note that vShield Drivers are not installed by default during the installation of VMware Tools.)
    1. Launch the VMware Tools installer and select to perform an Interactive Install
    2. During VMware Tools installation, select **Custom Install**
    3. Expand VMware Device Drivers
    4. Expand VMCI Driver
    5. Select vShield Drivers and choose **This feature will be installed on local drive**.
    6. Click **Yes** to restart the machine.

Note:	*If you plan to use manual or scheduled scans be sure to turn off sleep and standby mode on the guest virtual machines. If a guest virtual machine goes into sleep or standby mode during a scan you will see an error indicating that the scan terminated abnormally. Virtual Machines must be in the running state for scans to complete successfully.*

Note:	*In a High Availability environment, you must install Deep Security Virtual Appliances on all the ESXi hypervisors in a cluster in order to provide Agentless protection for vMotioned guests.*

Installation

Installing the Deep Security Manager

Before You Begin

Database

Before you install Deep Security Manager, you must install database software, create a database and user account for Deep Security Manager to use. For information on installing a database, see ***Database Deployment Considerations (page 20)***.

Co-Located Relay-enabled Agent

A Deep Security deployment requires at least one Deep Security Relay (a Deep Security Agent with Relay functionality enabled). Relays distribute Software and Security Updates to Agents/Appliances which keep your protection up to date. Trend Micro recommends installing a Relay-enabled Agent on the same computer as the Deep Security Manager to protect the host computer and to function as a local Relay.

During the installation of the Deep Security Manager, the installer will look in its local directory for an Agent install package (the full zip package, not just the core Agent installer). If it doesn't find an install package locally, it will attempt to connect to the Trend Micro Download Center over the Internet and locate an Agent install package there. If it locates an install package in either of those locations, it will give you the option to install a co-located Relay-enabled Agent during the installation of the Deep Security Manager. (If Agent install packages are found in both locations, the latest of the two versions will be selected.) The Agent can be used to protect the Deep Security manager host machine, however it will initially be installed with only the Relay module enabled. To enable protection you will have to apply an appropriate Security Policy.

If no Agent install package is available, the installation of the Deep Security Manager will proceed without it (but you will have to install a Relay-enabled Agent at a later time).

Note: *Depending on your environment, additional Relay-enabled Agents can be installed at a later time. (For instructions on installing a Relay-enabled Agent, see* ***Installing the Deep Security Agent (page 34)*** *and* ***Configuring a Relay (page 42)****.)*

Proxy Server Information

If the Deep Security will need to use a proxy server to connect to Trend Micro Update Servers over the Internet, have your proxy server address, port, and log in credentials ready.

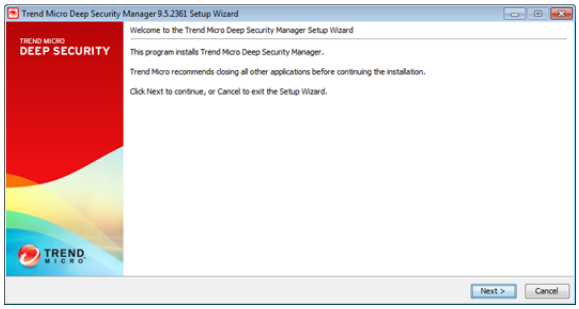
Download the the Installer Package

Download the latest version of the Deep Security Manager (and optionally the Deep Security Agent) software from the Trend Micro Download Center at:

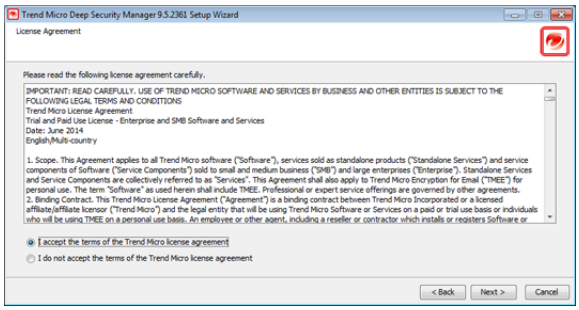
http://downloadcenter.trendmicro.com/

Install the Deep Security Manager for Windows

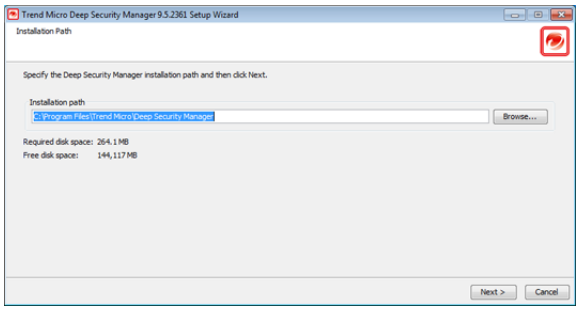
1. Copy the Deep Security Manager installer package to the target machine. Start the Deep Security Manager installer by double-clicking the install package.



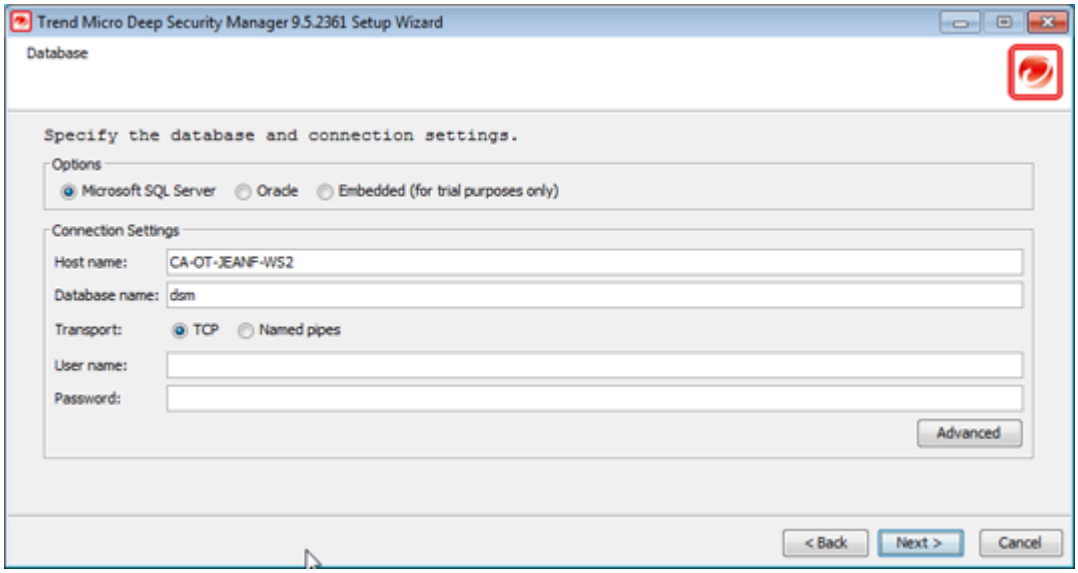
2. **License Agreement:** If you agree to the terms of the license agreement, select **I accept the terms of the Trend Micro license agreement**.



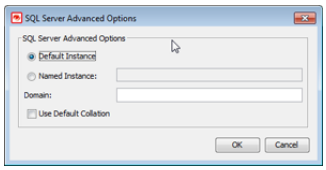
3. **Installation Path:** Select the folder where Deep Security Manager will be installed and click **Next**.



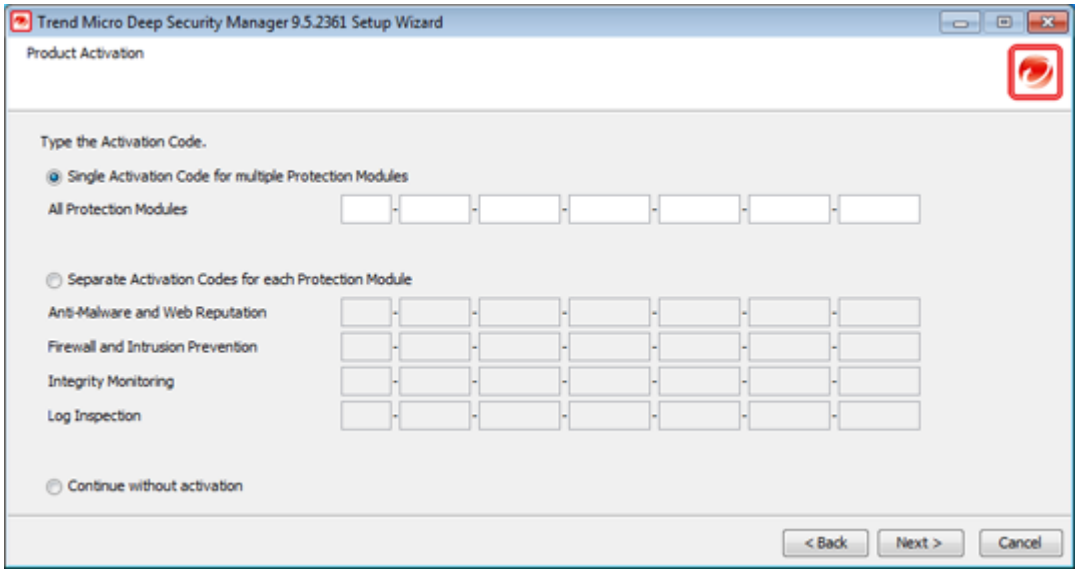
4. **Database:** Select the database you installed previously.



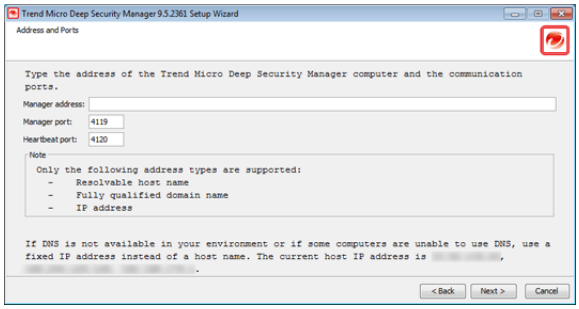
If your database is SQL Server and you are using a named instance, click **Advanced** to enter the specifics.



5. **Product Activation:** Enter your Activation Code(s). Enter the code for All Protection Modules or the codes for the individual modules for which you have purchased a license. You can proceed without entering any codes, but none of the Protection Modules will be available for use. (You can enter your first or additional codes after installation of the Deep Security Manager by going to **Administration > Licenses**.)

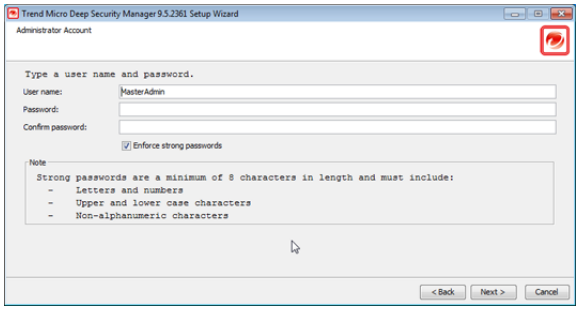


6. **Address and Ports:** Enter the hostname, URL, or IP address of this computer. The Manager Address must be either a resolvable hostname, a fully qualified domain name, or an IP address. If DNS is not available in your environment, or if some computers are unable to use DNS, a fixed IP address should be used instead of a hostname. Optionally, change the default communication ports: The "Manager Port" is the port on which the Manager's browser-based UI is accessible through HTTPS. The "Heartbeat Port" is the port on which the Manager listens for communication from the Agents/Appliances.

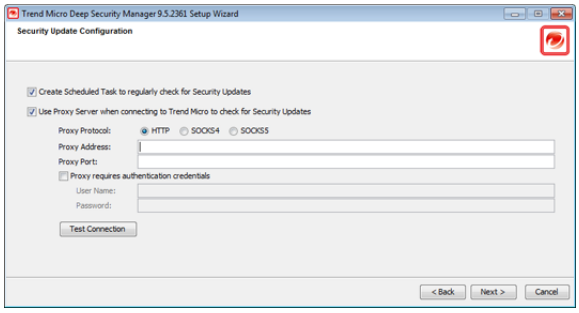


7. **Administrator Account:** Enter a username and password for the Master Administrator account. Selecting the Enforce strong passwords (recommended) requires this and future administrator passwords to include upper and lower-case letters, non-alphanumeric characters, and numbers, and to require a minimum number of characters.

> *Note:* *If you have admin rights on the Manager host machine, you can reset an account password using the `dsm_c -action unlockout -username USERNAME -newpassword NEWPASSWORD` command.*

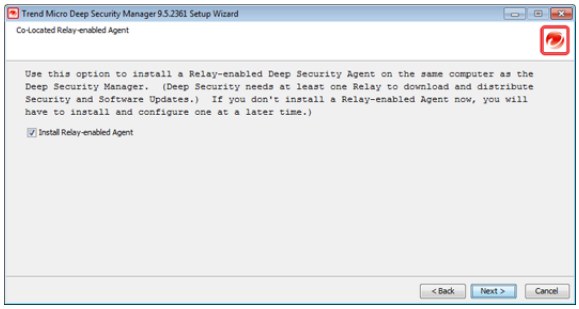


8. **Automatic Updates:** Selecting the **Create Scheduled Task** option will create a Scheduled Task to automatically retrieve the latest Security and Software Updates from Trend Micro and distribute them to your Agents and Appliances. (You can configure Updates later using the Deep Security Manager.) If the Deep Security Manager will need to to use a proxy to to connect to the Trend Micro Update servers over the Internet, select **Use Proxy Server when connecting to Trend Micro to check for Security Updates** and enter your proxy information.

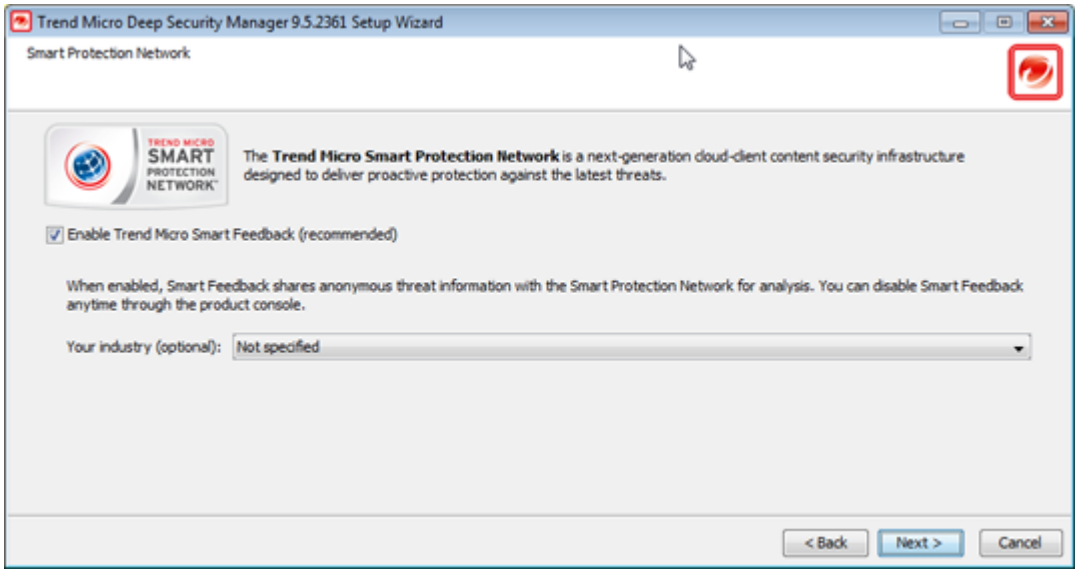


9. **Co-Located Relay-enabled Agent:** If an Agent install package is available either in the local folder or from the Trend Micro Download Center, you will be given the option to install a co-located Relay-enabled Agent. Any Deep Security installation requires at least one Relay to download and distribute Security and Software Updates. If you don't install a Relay-enabled Agent now, you will need to do so at a later time.

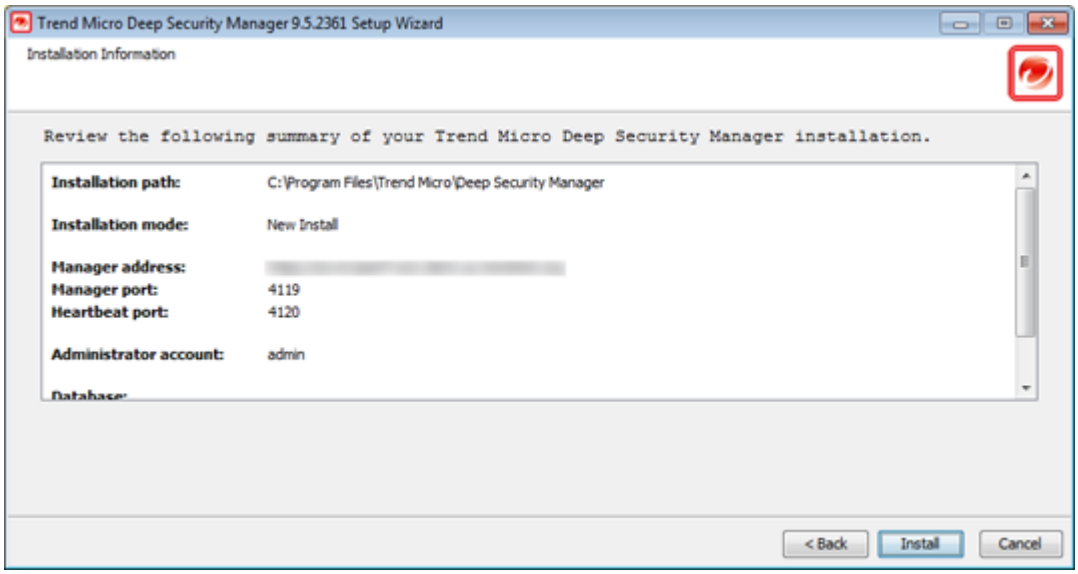
> *Note:* *Installing a co-located Relay-enabled Agent is strongly recommended.*



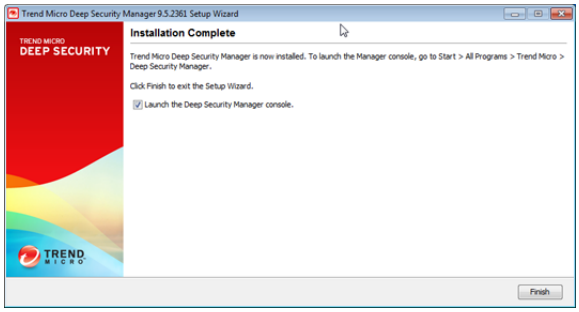
10. **Smart Protection Network:** Select whether you want to enable Trend Micro Smart Feedback (recommended). (You can enable or configure Smart Feedback later using the Deep Security Manager). Optionally enter your industry by selecting from the drop-down list.



11. **Installation Information:** Verify the information you entered and click **Install** to continue.



12. Select **Launch the Deep Security Manager console** to open web a browser to the Deep Security Manager URL when setup is complete. Click **Finish** to close the Setup wizard.



The Deep Security Manager service will start when setup is complete. The installer places a shortcut to Deep Security Manager in the program menu. You should take note of this URL if you want to access the Manager from a remote location.

Installing the Deep Security Manager for Linux

The sequence of steps for installing Deep Security Manager on a Linux OS with X Window System are the same as those described for Windows (above). For information on performing a silent Linux installation, see ***Silent Install of Deep Security Manager (page 77)***.

Note:	*If you are installing Deep Security Manager on Linux with iptables enabled, you will need to configure the iptables to allow traffic on TCP ports 4119 and 4120.*

Starting Deep Security Manager

The Deep Security Manager service starts automatically after installation. The service can be started, restarted and stopped from the Microsoft Services Management Console. The service name is "Trend Micro Deep Security Manager".

To run the Web-based management console, go to the **Trend Micro** program group in the Start menu (MS Windows) or K-Menu (X Windows) and click **Deep Security Manager**.

To run the Web-based management console from a remote computer you will have to make note of the URL:

https://[hostname]:[port]/

where **[hostname]** is the hostname of the server on which you have installed Deep Security Manager and **[port]** is the "Manager Port" you specified in step 8 of the installation (4119 by default).

Users accessing the Web-based management console will be required to sign in with their User Account credentials. (The credentials created during the installation can be used to log in and create other User accounts.)

Note:	*The Deep Security Manager creates a 10-year self-signed certificate for the connections with Agents/Appliances, Relays, and Users' web browsers. However, for added security, this certificate can be replaced with a certificate from a trusted certificate authority (CA). (Such certificates are maintained after a Deep Security Manager upgrade.) For information on using a certificate from a CA, see* ***Creating an SSL Authentication Certificate (page 75)****.*

Manually Importing Additional Deep Security Software

Deep Security Agents and their supporting software packages can be imported from within the Deep Security Manager on the **Administration > Updates > Software > Download Center** page. Other software packages must be imported manually from the Trend Micro Download Center web site (http://downloadcenter.trendmicro.com/).

To manually import additional Deep Security software to the Deep Security Manager:

1. Download the software from the Trend Micro Download Center web site to a local directory.
2. In the Deep Security Manager, go to **Administration > Updates > Software > Local** and click **Import...** in the toolbar to display the **Import Software** wizard.
3. Use the **Browse**... option to navigate to and select your downloaded software.
4. Click **Next** and then **Finish** to exit the wizard.

The software is now imported into the Deep Security Manager.

Installing the Deep Security Agent

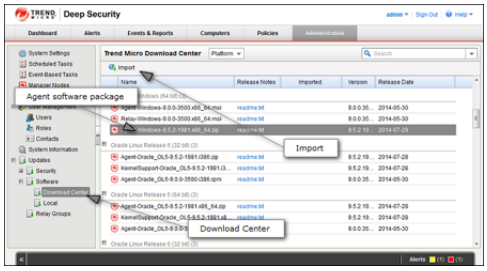
This section describes how to install and activate Deep Security Agents and how to enable Relay functionality (if required).

Importing Agent Software

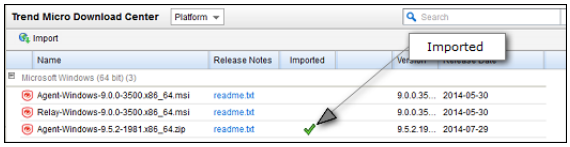
A Deep Security Agent is initially installed with core functionality only. It is only when a Protection Module is enabled on an Agent that the plug-ins required for that module are downloaded and installed. *For this reason, Agent software packages must be imported into Deep Security Manager before you install the Agent on a computer.* (A second reason for importing the Agent to Deep Security Manager is for the convenience of being able to easily extract the Agent installer from it using the Deep Security Manager's UI.)

To import Agent software packages to Deep Security:

1. In Deep Security Manager, go to **Administration > Updates > Software > Download Center**. The **Download Center** page displays the latest versions all Agent software available from Trend Micro.
2. Select your Agent software package from the list and click **Import** in the menu bar. Deep Security will begin to download the software from the Trend Micro Download Center to the Deep Security Manager.



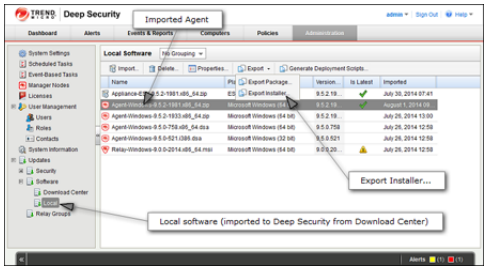
3. When the software has finished downloading, a green check mark mark will appear in the **Imported** column for that Agent.



To export the Agent installer:

1. In Deep Security Manager, go to **Administration > Updates > Software > Local**.
2. Select your Agent from the list and select **Export > Export Installer...** from the menu bar.

> *Note:* *If you have older versions of the Agent for the same platform, the latest version of the software will have a green check mark in the **Is Latest** column.*



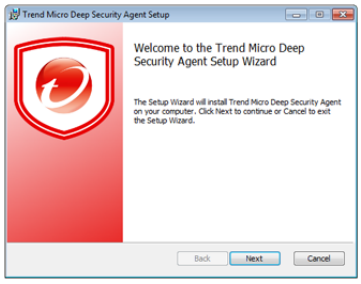
3. Save the Agent installer to a local folder.

Note: *Only use the exported Agent **installer** package (the .msi or the .rpm file) on its own to install the Deep Security Agent. If you extract the full Agent zip package and then run the Agent installer from the same folder that holds the other zipped Agent components, all the Security Modules will be installed (but not turned on). If you use the core Agent installer, individual Modules will be downloaded from Deep Security Manager and installed on an as-needed basis, minimizing the impact on the local computer.*

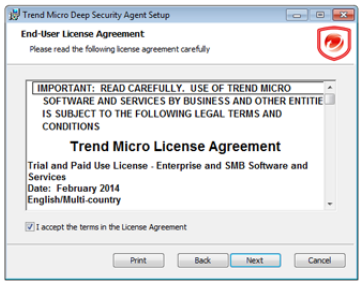
The Deep Security Agent "zip" files are made available on the Trend Micro Download Center for users who need to manually import the Agents into their Deep Security environment because their Deep Security Manager is air-gapped and cannot connect directly to the Download Center web site. Users whose Deep Security Manager is able to connect to the Download Center are strongly encouraged to import their Agent software packages using the Deep Security Manager interface. Attempting to install an Agent when the corresponding software package has not been imported to Deep Security Manager can lead to serious issues.

Installing the Windows Agent

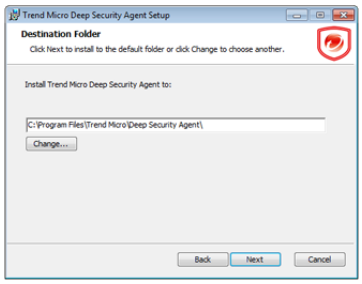
1. Copy the Agent installer file to the target machine and double-click the installation file to run the installer package. At the Welcome screen, click **Next** to begin the installation.



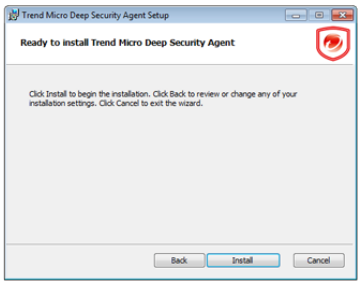
2. **End-User License Agreement:** If you agree to the terms of the license agreement, select **I accept the terms of the license agreement** and click **Next**.



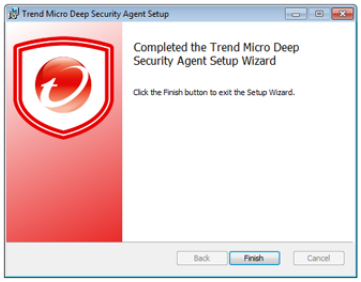
3. **Destination Folder:** Select the location where you would like Deep Security Agent to be installed and click **Next**.



4. **Ready to install Trend Micro Deep Security Agent:** Click **Install** to proceed with the installation.



5. **Completed:** when the installation has completed successfully, click **Finish**.



The Deep Security Agent is now installed and running on this computer, and will start every time the machine boots.

Note: *During an install, network interfaces will be suspended for a few seconds before being restored. If you are using DHCP, a new request will be generated, potentially resulting in a new IP address for the restored connection.*

Note: *Installing the Deep Security Agent over Windows Remote Desktop is NOT recommended because of the temporary loss of connectivity during the install process. However, using the following command line switch when starting Remote Desktop will allow the install program to continue on the server after the connection is lost. On Windows Server 2008 or Windows Vista SP1 and later or Windows XP SP3 and later, use:*

```
mstsc.exe /admin
```

On earlier versions of Windows, use:

```
mstsc.exe /console
```

Installing the Red Hat, SuSE, or Oracle Linux Agent

Note:	*The following instructions apply to Red Hat, SuSE, and Oracle Linux. To install on SuSE or Oracle Linux, substitute the SuSE or Oracle Linux RPM name in place of Red Hat.*

Note:	*You must be logged on as "root" to install the Agent. Alternatively, you can use "sudo".*

1. Copy the installation file to the target machine.
2. Use "rpm -i" to install the ds_agent package:

```
# rpm -i <package name>
Preparing... ########################################### [100%]
1:ds_agent ########################################### [100%]
Loading ds_filter_im module version ELx.x [ OK ]
Starting ds_agent: [ OK ]
```

   (Use "rpm -U" to upgrade from a previous install. This approach will preserve your profile settings)
3. The Deep Security Agent will start automatically upon installation.

Installing the Ubuntu Agent

To install on Ubuntu, copy the installation file to the target machine and use the following command:

```
sudo dpkg -i <driver_deb_pkg>
```

where `<driver_deb_pkg>` is the Debian package with the driver that was built and placed in the <DS>/src/dsa/agent/deb/ directory.

Starting, stopping and resetting the Agent on Linux:

Command-line options:

To start the Agent:

```
/etc/init.d/ds_agent start
```

To stop the Agent:

```
/etc/init.d/ds_agent stop
/etc/init.d/ds_filter stop
```

To reset the Agent:

```
/etc/init.d/ds_agent reset
```

To restart the Agent:

```
/etc/init.d/ds_agent restart
```

Using Deployment Scripts to Install Agents

Adding a computer to your list of protected resources in Deep Security and implementing protection is a multi-step process. Most of these steps can be performed locally from the command line on the computer and can therefore be scripted. The Deep Security Manager's Deployment Script generator can be accessed from the Manager's Help menu.

To generate a deployment script:

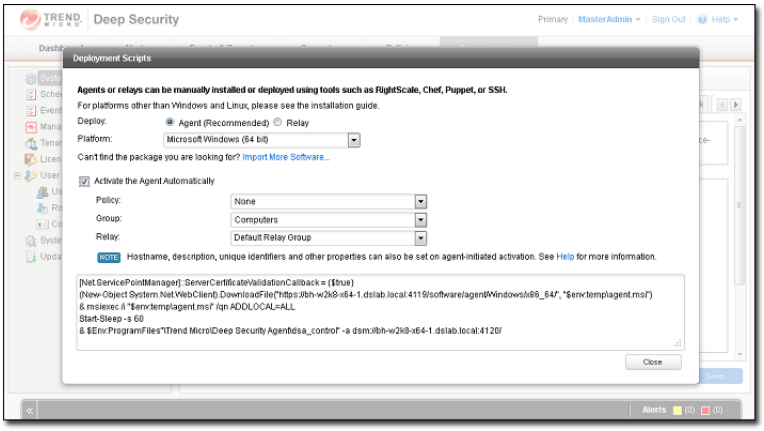
1. Start the Deployment Script generator by clicking **Deployment Scripts...** from the Deep Security Manager's Help menu (at the top right of the Deep Security Manager window).
2. Select the platform to which you are deploying the software.

   Note: *Platforms listed in the drop-down menu will correspond to the software that you have imported into the Deep Security Manager.*

3. Select **Activate the Agent Automatically**. (Optional, but Agents must be activated by the Deep Security Manager before a protection Policy can be implemented.)
4. Select the Policy you wish to implement on the computer (optional)
5. Select the computer Group (optional)
6. Select the Relay Group

As you make the above selections, the Deployment Script Generator will generate a script which you can import into your deployment tool of choice.

Note: *The Deployment Script Generator can also be started from the menu bar on the **Administration > Updates > Software > Local** page.*



Note: *The deployment scripts generated by Deep Security Manager for Windows Agents must be run in Windows Powershell version 2.0 or later. You must run Powershell as an Administrator and you may have to run the following command to be able to run scripts:*

```
Set-ExecutionPolicy RemoteSigned
```

Note: *On windows machines, the deployment script will use the same proxy settings as the local operating system. If the local operating system is configured to use a proxy and the Deep Security Manager is accessible only through a direct connection, the deployment script will fail.*

Iptables on Linux

Iptables on linux are supported and remains enabled with 9.5 only. If you have an older agent you must proceed as described below:

To run the Deep Security Agent without affecting iptables, create the following empty file:

```
/etc/use_dsa_with_iptables
```

If the Deep Security Agent detects the presence of the file, iptables will not be affected when the `ds_filter` service starts.

For **SuSE 11**, on the target machine before beginning the installation procedure:

in:

```
/etc/init.d/jexec
```

after

```
# Required-Start: $local_fs
```

add the line:

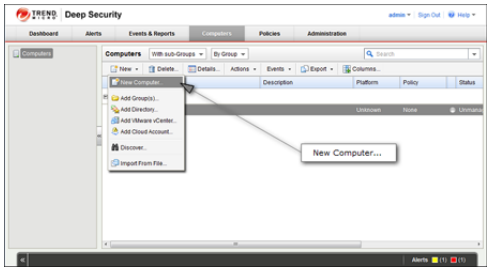
```
# Required-Stop:
```

Activating the Agent

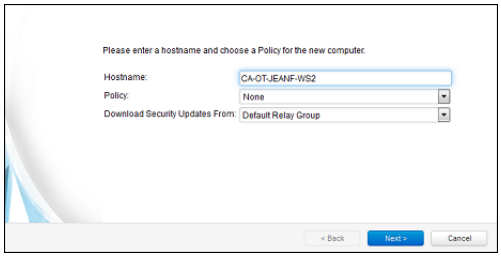
The Agent must be activated from the Deep Security Manager before it can be configured to act as a Relay or to protect the host computer.

To activate the newly installed Agent:

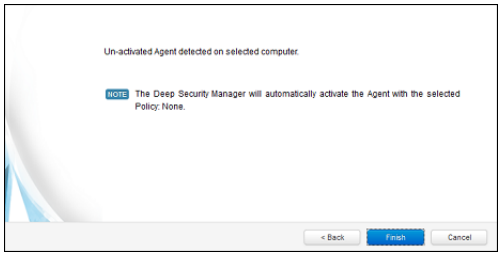
1. In the Deep Security Manager, go to the Computers page and click **New > New Computer...** to display the **New Computer Wizard**.



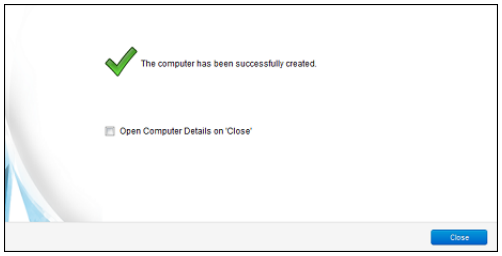
2. Enter the hostname or IP address of the computer. If you want to use the Agent to provide protection for the host computer as well as function as a Relay, select a Deep Security Policy from the **Policy** menu. Otherwise leave **Policy** set to "None".



3. The wizard will confirm that it will activate the Agent on the computer and apply a Security Policy (if one was selected).



4. On the final screen, de-select "Open Computer Details on 'Close'" and click **Close**.



5. The Agent is now activated. In the Deep Security Manager, go to the **Computers** screen and check the computer's status. It should display "Managed (Online)".

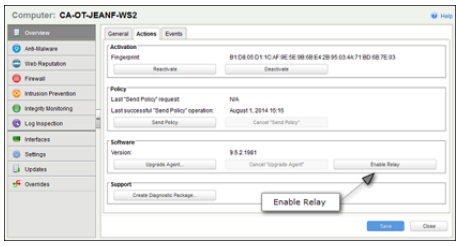
Enabling Relay Functionality

Any activated 64-bit Windows or Linux Agent can be configured to act as a Relay, downloading and distributing Security and Software Updates.

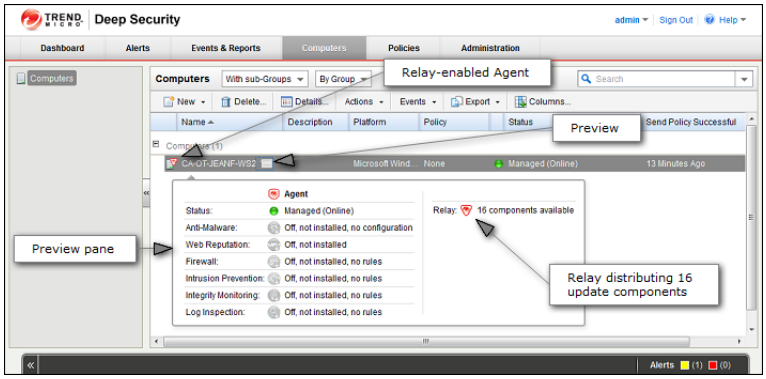
Note: *Once enabled on an Agent, Relay functionality cannot be disabled.*

To enable Relay functionality:

1. In the Deep Security Manager, go to the **Computers** page, double-click the computer with the newly-activated Agent to display its **Details** editor window.
2. In the computer editor, go to the **Overview > Actions > Software** area and click **Enable Relay**. Click **Close** close the editor window.



3. In the Deep Security Manager on the Computers page, the computer's icon will change from ordinary computer ( ) to computer with Relay-enabled Agent ( ). Click the **Preview** icon to display the Preview Pane where you can see the number of Update components the Relay Module is ready to distribute.


Deep Security
Relay-enabled Agent
Preview
Preview pane
Relay distributing 16 update components

Installing and Configuring a Relay-enabled Agent

The Deep Security Relay is a Deep Security Agent with Relay functionality enabled. Relays download and distribute Security and Software Updates to your Deep Security Agents and Appliances. You must have at least one Deep Security Relay to keep your protection up to date.

Install and Activate a Deep Security Agent

If you do not already have an agent installed on a computer, do so by following the instructions in ***Installing the Deep Security Agent (page 34)***. You skip ahead to the section on "Manual Installation".

Once the Agent is installed, you need to Activate it.

To Activate the Agent,

1. In the Deep Security Manager, go to the Computers page.
2. In the menu bar, click **New > New Computer...** to display the **New Computer** Wizard.
3. For **Hostname**, enter the hostname or IP address of the computer on which you just installed the Agent.
4. For **Policy**, select a Policy based on the operating system of your computer.
5. For **Download Security Updates From**, leave the default setting (Default Relay Group).
6. Click **Finish**. Deep Security Manager will import the computer to its Computers page and activate the Agent.

Enable Relay Functionality on a Deep Security Agent

To enable Relay functionality on an installed Deep Security Agent:

1. The Adding a new computer and activation process should have finished by opening the Computer's **Editor** window. If it hasn't, follow step two (below) to open the window.
2. In the Deep Security Manager, go to the **Computers** screen, find the Agent on which you want to enable Relay functionality and double-click it to open its **Computer Editor** window.
3. In the **Computer Editor** window, go to **Overview > Actions > Software** and click **Enable Relay**.

Note:	*If you do not see the **Enable Relay** button, go to **Administration > Updates > Software > Local** to check whether the corresponding package has been imported. Also ensure that the computer running a 64-bit version of the Agent.*

Deep Security Manager will install the plug-ins required by the Relay Module, and the Agent will begin to function as a Deep Security Relay.

Note:	*If you are running Windows Firewall or iptables, you also need to add a Firewall Rule that allows TCP/IP traffic on port 4122 on the Relay.*

Note:	*Relays are organized into **Relay Groups**. New Relays are automatically assigned to the **Default Relay Group**. The Default Relay Group is configured to retrieve Security and Software Updates from the Primary Security Update Source defined in the Deep Security Manager on the **Administration > System Settings > Updates** tab. (The Primary Update Source by default is Trend Micro's Update Servers, but this configurable.)*

Deploying Agentless Protection in a vShield Environment

Requirements

VMware Requirements

You must be running the following VMware software:

- **VMware vSphere 5.0, 5.1, or 5.5**
  - **VMware vCenter 5.0, 5.1, or 5.5**
  - **VMware ESXi 5.0, 5.1, or 5.5**
  - **VMware vSphere Web Client**

Your vShield datacenter must meet the following configuration requirements:

- **VMware Endpoint service must be installed on all ESXi servers.**
- **Virtual machines must have the latest VMware Tools installed, including the VMware Endpoint Driver.**

Consult your VMware documentation for more detailed information on configuring your vShield environment to meet the above requirements.

Deep Security Requirements

The following Trend Micro Deep Security software must be installed or imported:

- **The Deep Security Manager 9.5 must be installed, with a database**. (See ***Installing the Deep Security Manager (page 27)***.)

  Note: The Deep Security Manager should ideally be installed on a dedicated ESXi in the same datacenter.

- **A Deep Security Agent with Relay functionality enabled must be installed and activated, and all Updates must have completed downloading.** (For instructions on installing and configuring an Agent with a Relay, see ***Installing the Deep Security Agent (page 34)*** and ***Configuring a Relay (page 42)***.)
- **The Deep Security Virtual Appliance software package must be imported into Deep Security Manager.** Once the Virtual Appliance is running in the datacenter, it will need to connect to a Relay-enabled Agent to have access to the latest Security and Software Updates.

This section describes how to prepare the vShield environment for Agentless protection using the DSVA.

Add vCenter to the Deep Security Manager's list of Managed Computers.

Deep Security Manager configuration must be performed by using a Deep Security Manager user account with Full Access rights.

1. From the Deep Security Manager **Computers** screen, click **New > Add VMware vCenter...**
2. Enter the vCenter Server IP Address (or hostname if DNS is configured and able to resolve FQDN to IP addresses), and the Username and Password for the vCenter. Click **Next**.
3. Enter the vShield Manager Server Address, Username and Password. (You can also configure this information later from the Deep Security Manager). Click **Next**.
4. Accept the vShield Manager SSL certificate.
5. Accept the vCenter certificate.

6. Review the vCenter information. Click **Finish**.
7. The **VMware vCenter has been successfully added** message will be displayed. Click **Close**.

Note: *In a large environment with more than 3000 machines reporting to a vCenter Server, this process may take 20 to 30 minutes to complete. You can check the vCenter's **Recent Task** section to verify if there are activities running.*

Note: *Real-time synchronization will be maintained with this VMware vCenter to keep the information displayed in the Deep Security Manager up-to-date (number of VMs, their status, etc.).*

Prepare ESXi for Virtual Appliance deployment by Installing the Filter Driver

Note: *The ESXi will be placed in maintenance mode for this task. All virtual machines running on this ESXi must be stopped/paused or vMotioned to another ESXi server (make sure a cluster server with vMotion support is set up so that this can be done automatically).*

1. From the Deep Security Manager, Select **Computers > vCenter > Hosts and Clusters**
2. Find the ESXi server in the Computers list (its **status** column should read **Unprepared**), right-click and select **Actions > Prepare ESXi** to display the Prepare ESXi Server Wizard. Click **Next**.
3. Select **Yes** to allow the Deep Security Manager automatically bring the ESXi in and out of maintenance mode. Click **Finish**.
4. The ESXi preparation process will complete all activities with no further input necessary. (The ESXi will be placed in maintenance mode, the Deep Security Filter Driver will be installed, and the ESXi will be restarted).
5. Once the process is complete, you are given the option to continue with the next step, deploying the Deep Security Virtual Appliance. Select **No thanks, I will deploy later**. Click **Close**.

The ESXi is now prepared for Deep Security Virtual Appliance deployment.

Deploy Deep Security Virtual Appliance to the ESXi

To Deploy Deep Security Virtual Appliance (DSVA) to the ESXi:

1. From the Deep Security Manager, select **Computers > vCenter**.
2. Right-click on the ESXi server being protected and select **Actions > Deploy Appliance**. Click **Next**.
3. Enter an Appliance Name for the Appliance and select a **Datastore** for the Appliance.
4. Select the **Folder** for the Datacenter and select the **Management Network** for the Appliance. Click **Next**.
5. Define the Appliance Hostname. Enter the IPv4 Address and/or IPv6 Address for the Appliance. (DHCP is enabled by default). Click **Next**.
6. Select Thick Provisioned format.
7. Click **Finish** and wait for for the DSVA to be uploaded.
8. In the **Activate Deep Security Appliance** section, select **No thanks, I will activate it later**. (Activation is described later). Click **Close**.

The Virtual Appliance is now displayed along with the other computers in the **vCenter** Group in the Deep Security Manager **Computers > vCenter** list.

Note: *When a Virtual Appliance is deployed in a VMware environment that makes use of the **VMware Distributed Resource Scheduler (DRS)**, it is important that the Appliance does not get vMotioned along with the virtual machines as part of the DRS process. Virtual Appliances must be "pinned" to their particular ESXi server. You must proactively change the DRS settings for all the Virtual Appliances to "Manual" or "Disabled" (recommended) so that they will not be vMotioned by the DRS. If a Virtual Appliance (or any virtual machine) is set to "Disabled", vCenter Server will not migrate that virtual machine or provide migration recommendations for it. This is known as "pinning" the virtual machine to its registered host. This is the recommended course*

of action for Virtual Appliances in a DRS environment. (An alternative is to deploy the Virtual Appliance onto a local store as opposed to a shared store. When the Virtual Appliance is deployed onto a local store it cannot be vMotioned by DRS.) For further information on DRS and pinning virtual machines to a specific ESXi consult your VMware documentation.

Note: *The Deep Security Manager puts the ESXi into **maintenance mode** during an install or upgrade of the Deep Security Filter Driver. (This done during the "Prepare ESXi" phase of installation.) When an ESXi already hosting a Virtual Appliance is put into maintenance mode, the Deep Security Manager will automatically power the Virtual Appliance off and back on again when exiting maintenance mode. If the ESXi is put into maintenance mode by means other than through the Deep Security Manager, the Virtual Appliance is not powered off/on automatically.*

Activate the Deep Security Virtual Appliance

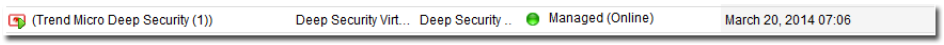
To activate the Virtual Appliance:

1. From the Deep Security Manager, select **Computers > vCenter**
2. Right Click on the DSVA machine and select **Actions > Activate Appliance**. Click **Next**.
3. For Policy, select **Deep Security Virtual Appliance**. Click **Next**. The activation process is started.
4. The DSVA will register itself with vShield Manager. You will see multiple tasks being executed in vCenter Console.

   Note: *The DSVA requires vShield Manager to configure the VMX file of each machine that is on the ESXi. Depending on the number of Virtual Machines, it could take several hours to complete the activation.*

   If vShield Manager is experiencing problems, the DSVA may fail to activate. Check if you can open the vShield Manager web console. If it is not responding, you can reboot the vShield Manager and wait for a few minutes after vShield is back on line to attempt DSVA activation again.
5. In **Activate Host Virtual Machines**, select **Yes**. Click **Close**.

The Virtual Appliance is now activated. You can confirm this by finding the Virtual Appliance on the Deep Security Manager's **Computers** page and seeing that it is in the "Managed (Online)" state:



Now that the Virtual Appliance is activated, all the VMs on the ESXi can be protected by assigning Deep Security Polcies to them through the Deep Security Manager interface.

To enable Virtual Appliance protection on guest virtual machines:

1. Right-click on a virtual machine in the computer list and select **Actions > Activate**.
2. The **Status** column for the virtual machine will change to "Managed (Online)".

The virtual machine is now protected by the Virtual Appliance even though no in-guest Agent is installed on the virtual machine. Policies can be assigned to this virtual machine like any other computer being managed by Deep Security Manager.

Once the Virtual Appliance is installed, any virtual machines that are added to the ESXi server afterwards can be automatically activated and a Policy can be automatically applied. New virtual machines can automatically be assigned Policies when detected.

Note: *The Virtual Appliance requires that all VMs that are to be protected have been assigned unique UUIDs by the vCenter. A situation with duplicate UUIDs can occur if you copy a VM. After copying a VM, you are asked by vCenter whether the new VM is a copy or whether it was moved. If you select the **I copied it** option, vCenter will assign it a new UUID. However, if you select the **I moved it** option (when in fact it was copied), vCenter will not assign it a new UUID. You will then have two VMs with the same UUID which will cause problems for the Virtual Appliance. If the Virtual Appliance is instructed to protect multiple VMs with the same UUID, an Alert will be raised and the operation will fail.*

To implement coordinated protection by installing an Agent on a virtual machine:

To install a Deep Security Agent on a virtual machine, follow the same procedures as for any physical computer. A virtual machine being protected by both a Virtual Appliance and an Agent is referred to as "coordinated protection". The Virtual Appliance and the Agent are in constant communication. As long as the Virtual Appliance detects the presence of an Agent on the virtual machine, it will pass all traffic to the Agent and let the Agent apply the security rules to the traffic. If the Agent fails or is stopped, the Virtual Appliance will take over the job of applying security rules to traffic.

Note:	*When a Policy is applied to an Agent on a VM that is also protected by a Virtual Appliance, then a copy of that Policy also goes to the Virtual Appliance. When the Agent is running on a VM, the Virtual Appliance is actually sitting idle. If the communication between the Virtual Appliance and the Agent is interrupted (by the Agent going offline for some reason), then the Appliance starts protecting the VM with the same Policy.*

Note:	*Both the ESXi and the Virtual Appliance may try to look up the hostname of the Manager and not find it if the Manager is in a different DNS domain. You can solve this by renaming the Manager to its fully qualified domain name (FQDN). To rename the Manager, go to* ***Administration > System Information > System Activity****. Make sure* ***Network Map with Activity Graph*** *is selected, then click on the Manager in the Network Map to display the Manager's* ***Properties*** *window and edit the* ***Hostname*** *field to the FQDN.*

Installing the Deep Security Notifier

The Deep Security Notifier is a utility for physical or virtual Windows machines which provides local notification when malware is detected or malicious URLs are blocked. The Deep Security Notifier is automatically installed as part of the Deep Security Agent on Windows machines. The stand-alone installation described here is intended for use on Agentless Windows VMs being protected by the Deep Security Virtual Appliance.

Copy the Installation Package

Copy the installation file to the target machine.

Installing the Deep Security Notifier for Windows

Note:	*Remember that you must have administrator privileges to install and run the Deep Security Notifier on Windows machines.*

1. Double-click the installation file to run the installer package. Click **Next** to begin the installation
2. Read the license agreement and click **Next**.
3. Click **Install** to proceed with the installation.
4. Click **Finish** to complete the installation.

The Deep Security Notifier is now installed and running on this computer, and the Notifier icon appears in the Windows System Tray. The Notifier will automatically provide pop-up notifications when malware is detected or a URL has been blocked. (You can manually disable notifications by double-clicking the tray icon to open the Notifier status and configuration window).

Note:	*On VMs protected by a Virtual Appliance, the Anti-Malware module must be licensed and enabled on the VM for the Deep Security Notifier to display information.*

Quick Start

Quick Start: System Configuration

This Quickstart Guide describes the initial basic Deep Security system configuration that is required before you can start protecting your computer resources.

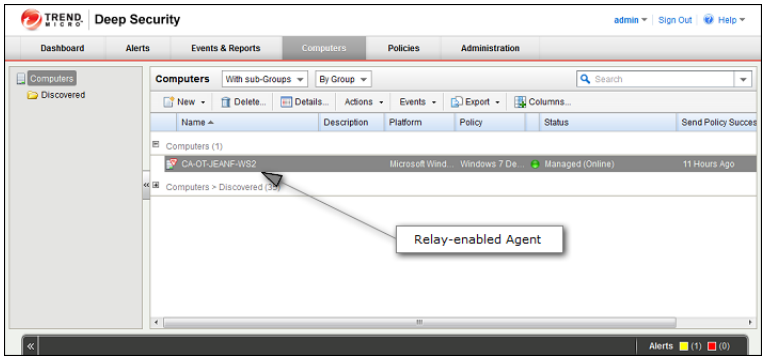
To complete basic Deep Security system configuration, you will need to:

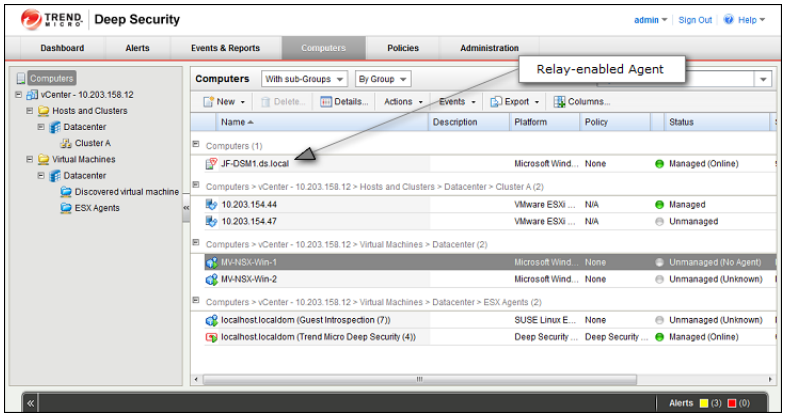
1. Make sure your Relay-enabled Agent is operational
2. Configure Deep Security's ability to retrieve Updates from Trend Micro
3. Check that you have a Scheduled Task to perform regular Updates
4. Set up email notification of important events

Make sure your Relay-enabled Agent is operational

Note: *The Relay is responsible for retrieving Security Updates from Trend Micro and distributing them to your protected computers. If you did not install a co-located Relay-enabled Agent during the installation of the Deep Security Manager, you need to install a Relay-enabled Agent before proceeding. (See* ***Installing and Configuring a Relay-enabled Agent (page 42)****.)*

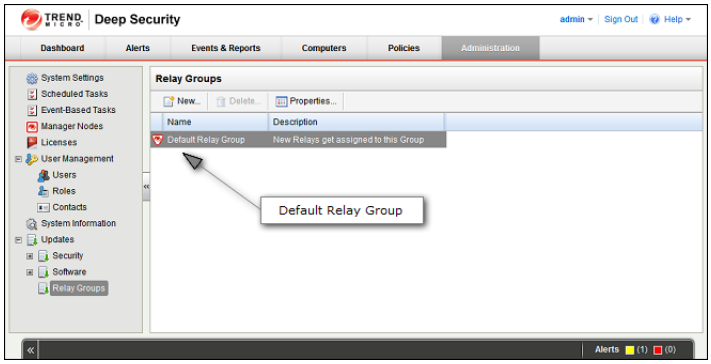
Start the Deep Security Manager management console and navigate to the **Computers** page. Your Relay-enabled Agent should appear on the **Computers** list identified by a "computer" icon with a Relay badge on it ( ). It's status column should display "Managed (Online)".





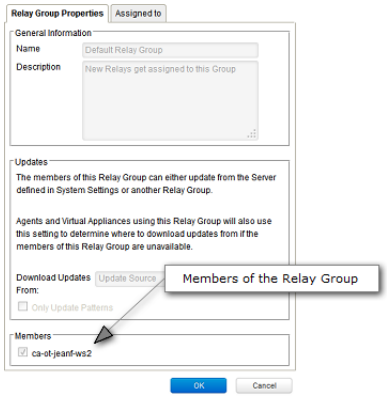
Relays are always organized into Relay Groups, even if it's only the one "Default Relay Group" to which all new Relays are assigned. You can create multiple Relay Groups if you have a large number of computers and want to create a hierarchical Relay structure or if your computers are spread out over large geographical areas. For more information on Relay Groups, see **Relay Groups** in the online help.

To view your Deep Security Relays, go to the **Administration > Updates > Relay Groups.**



This will display your current Relay Groups on the **Relay Groups** page. Usually you will only have the single **Default Relay Group**.

Double-click the Default Relay Group to display its **Relay Group Properties** window:



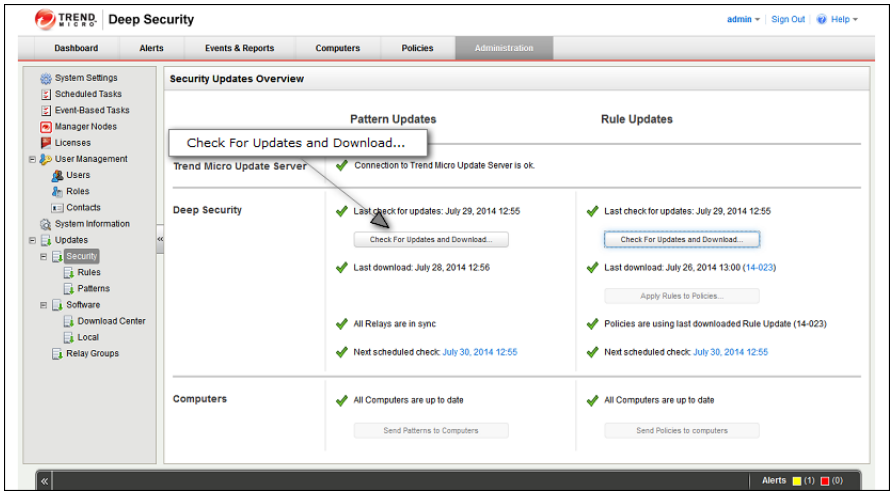
In the Members area of the **Relay Group Properties** window you'll see the Relays that are members of the group.

Note: *If there are no computers in the Members area see **Configuring the Deep Security Relay** in the Installation Guide.*

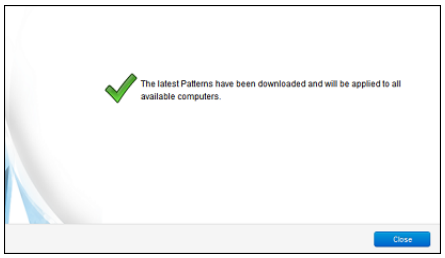
Configure Deep Security's ability to retrieve Updates from Trend Micro

Now that you've confirmed that you have a Relay, you can find the Relay in your Computers list and check that it can retrieve updates from Trend Micro.

Go to the **Administration > Updates > Security** page and click the **Check For Updates and Download...** button under **Pattern Updates**.



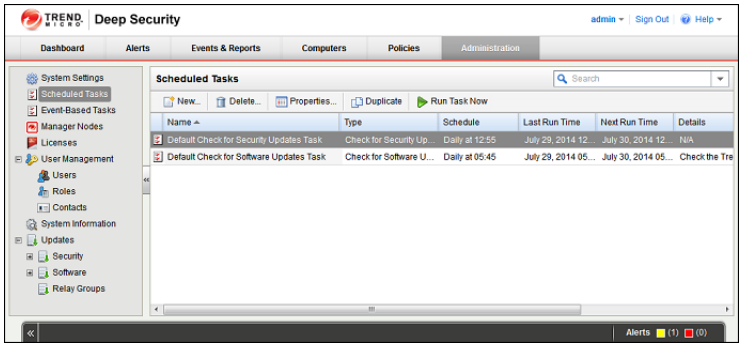
This will display the **Download Patterns** Wizard which contacts the Trend Micro Update Servers and downloads the latest Anti-Malware Pattern Updates and distributes them to your computers. (This is the default behavior. You can configure the automatic distribution of Security Updates on the **Administration > System Settings > Updates** tab.) If upon completion the wizard displays the success message it means your Relay-enabled Agent can communicate with the Update servers:



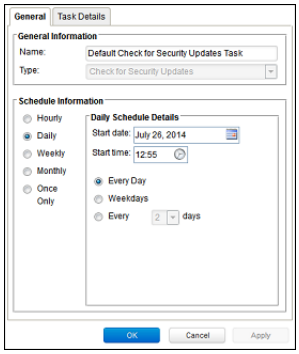
Check that you have a Scheduled Task to perform regular Updates

Now that you know your Relay can communicate with the Update servers, you should create a Scheduled Task which will regularly retrieve and distribute security Updates.

Go to **Administration > Scheduled Tasks**. There you should see at least one Scheduled Task called **Default Check for Security Updates Task**:



Double-click the Scheduled Task to view its **Properties** window:

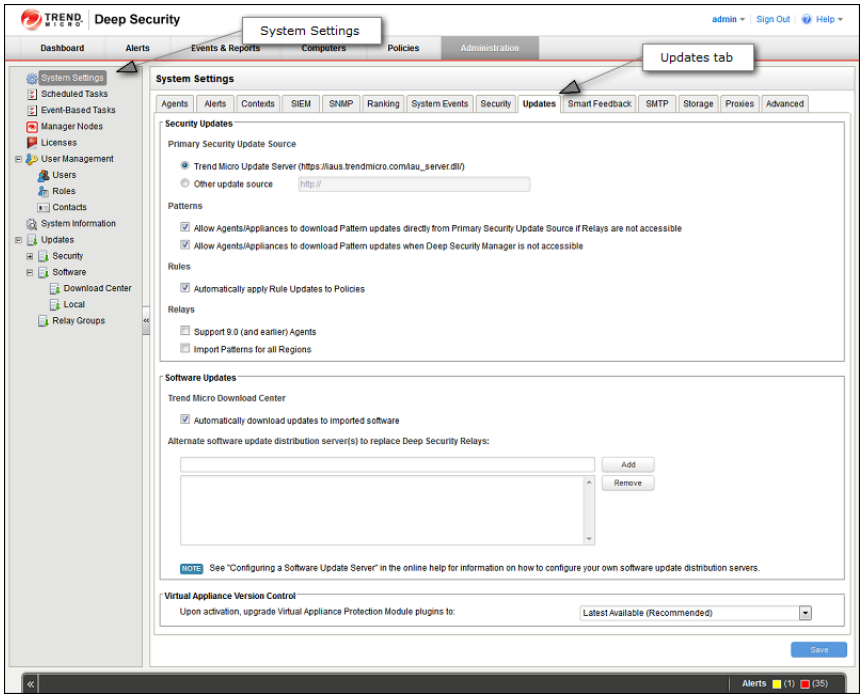


Notice that (in this case) the **Daily Check For Security Updates Task** is set to perform a Security Update every day at 12:55.

Note: *If you don't have a **Daily Check For Security Updates Task** in your list, you can create one by clicking on **New** on the Scheduled Task page toolbar and following the instructions in the **New Scheduled Task** wizard.*

Updates Configuration in the System Settings

To configure the finer details of Update behavior, in the Deep Security Manager, go to the **Updates** tab in **Administration > System Settings**.



In the **Security Updates** area you can configure the following options (although the default settings are recommended):

- **Primary Update Source:** this is the source that the Relays in all Relay Groups go to for Deep Security Rule and Pattern Updates which they can then distribute to Agents and Virtual Appliances. (Only change this if you have been instructed to do so by your support provider.)
- **Patterns:** Patterns are used by the Anti-malware Module. The default settings permits Agents and Virtual Appliances to download Pattern Updates directly from the Primary Security Update Source (above) if for some reason they cannot contact a Relay or the Deep Security Manager. (For example because of local connectivity issues, or if the computer is a roaming laptop.)

- **Rules:** Updates to the Deep Security Rules used by the Firewall, Intrusion Prevention, Log Inspection, and Integrity Monitoring Protection Modules must be integrated into Policies at the Deep Security Manager level before they can be sent out to Agents and Virtual Appliances. This setting (on by default) automatically integrates Rule Updates with the Policies in the Deep Security Manager.

  Note: *In each Security Policy, there is a further setting (also on by default) to automatically update computers when there has been a change to the Security Policy that is in use. This setting is found in the Policy/Computer Editor (the **Details** window) in **Settings > Computer > Send Policy Changes Immediately**.*

- **Relays:** The two settings under Relays determine if Deep Security will import updates for older 9.0 and earlier versions of the Agents and Appliances. Security Update architecture has changed substantially since 9.0 and the formats of the Updates for 9.0 and 9.5 are different. Do not download Updates for older Agents if you do not them as this would consume unnecessary bandwidth and storage space. Similarly, only download Patterns for all "Regions" (determined by language) if you have Agents or Appliances running in multiple Regions. Leaving this option unchecked will distribute only the package designed for the Region in which your Deep Security Manager is installed.

In the **Software Updates** area you can configure the following options (although the default settings are recommended):

- **Trend Micro Download Center:** By default, Deep Security will "Automatically download updates to imported software." Trend Micro will periodically issue updated builds of already released Agent and Appliance software. Setting this option will automatically download updates to any software that you have already imported to Deep Security (visible on the **Administration > Updates > Software > Local** page) from the Trend Micro Download Center (the software available from the Trend Micro Download Center can be see on the **Administration > Updates > Software > Download Center** page.)

  Note: *The installation of the software once it has been downloaded must be initiated manually. This last step cannot be automated.*

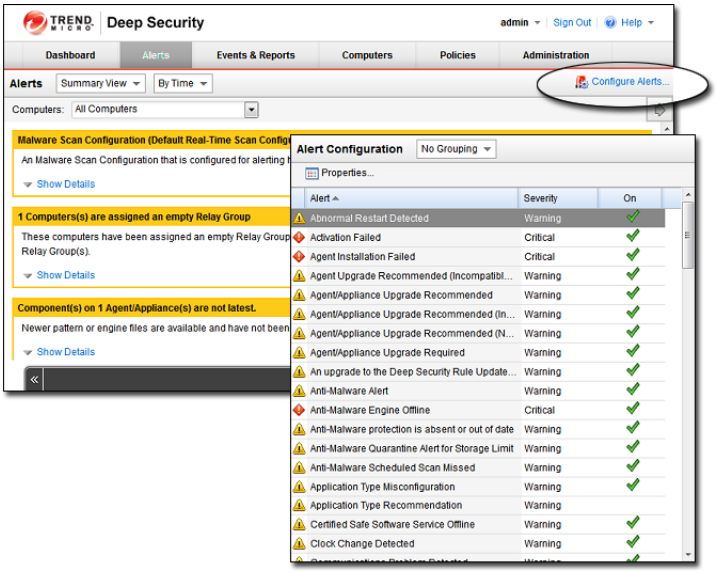
In the **Virtual Appliance Version Control** section, you can control the versions of the Protection Modules are installed on a newly activated Virtual Appliance. The Deep Security Virtual Appliance is shipped with basic versions of the Protection Module plug-ins. The Appliance relies on the plug-ins that are shipped with the 64-bit Red hat Agent software package for Updates. By default, the Appliance will use the latest version of the Red Hat package that has been imported to Deep Security (on the **Updates > Software > Local** page.) However you may wish to control over the version of the Protection Modules get installed and you can do using this setting.

Note: *For more information about the configuration options available on this page, see the associated online help for it in the Deep Security Manager.*

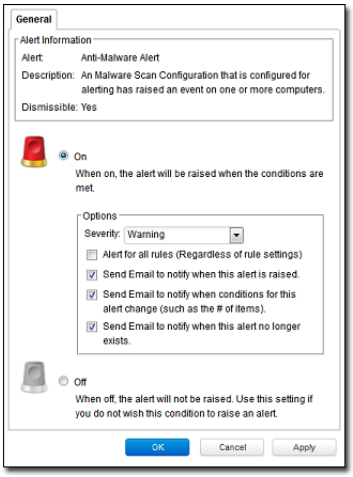
Set up email notification of important events

Deep Security Alerts are raised when situations occur that require special attention. Alerts can be raised due to security Events such as the detection of malware or an abnormal restart on a protected computer, or they can be system events like the Deep Security Manager running low on disk space. Deep Security can be configured to send email notifications when specific Alerts are raised.

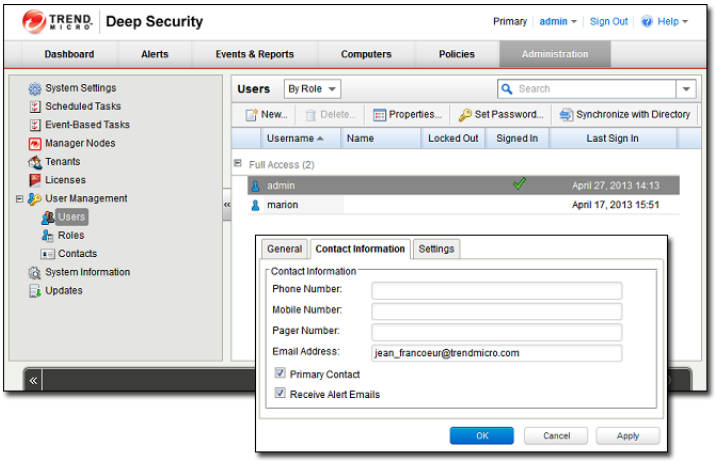
To configure which Alerts will generate an email notification, go to the **Alerts** page and click **Configure Alerts...** to display the list of Deep Security Alerts:



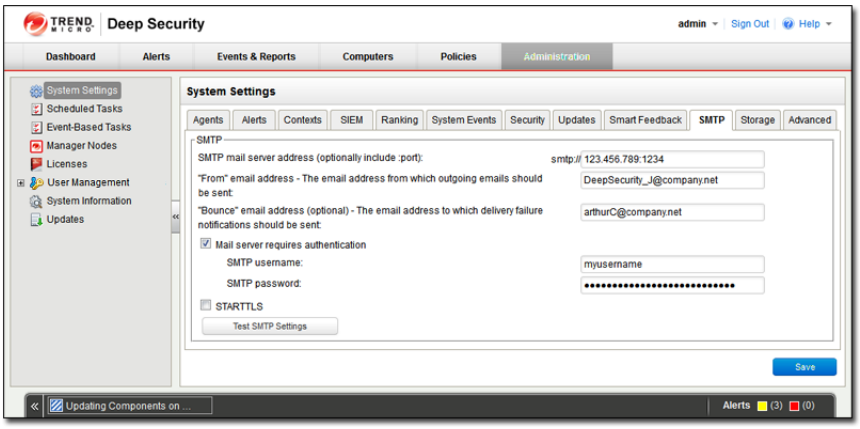
Double-click on an Alert see its **Properties** window where you can you can set the Alert options for email notification:



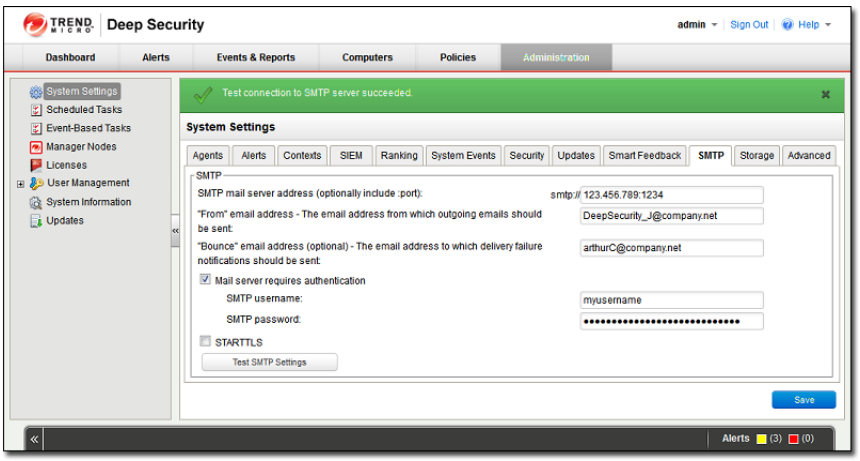
Now you need to configure your User account to receive the email notifications Deep Security will send out. Go to **Administration > User Management > Users** and double-click on your User account to display its **Properties** window. Go to the **Contact Information** tab and enter an email address and select the **Receive Alert Emails** option:



In order for Deep Security to send email notification it has to be able to communicate with an SMTP server (access to an SMTP server is a requirement for email notifications). To connect the Deep Security Manager to your SMTP server, go to the **Administration > System Settings > SMTP** tab:



Complete the required fields in the **SMTP** area press test SMTP Settings at the bottom of the page when you're done. you should see a **Test connection to SMTP server succeeded** message:



Note: *If you unable to connect with your SMTP server, make sure the Manager can connect with the SMTP server on port 25.*

Basic Configuration is complete

This completes the basic Deep Security system configuration. Deep Security is now configured to regularly contact Trend Micro for security Updates and distribute those Updates on regular basis, and it will send you email notifications when Alerts are raised. Now you need to apply Deep Security protection to your computers. For more information on protecting computer resources, see ***QuickStart: Protecting a Computer (page 57)***.

Quick Start: Protecting a Computer

The following describes how to use Deep Security to protect a Windows Server 2008 computer.

It will involve the following steps:

1. Adding the computer to the Deep Security Manager.
2. Configuring and running a Recommendation Scan
3. Automatically implementing scan recommendations
4. Create a Scheduled Task to perform regular Recommendation Scans
5. Monitoring Activity Using the Deep Security Manager

Note:	*We will assume that you have already installed the Deep Security Manager on the computer from which you intend to manage the Deep Security Agents throughout your network. We will also assume that* ***you have installed (but not activated) Deep Security Agent on the computer you wish to protect****. And finally, we will assume that you have a Deep Security Relay available from which Deep Security can download the latest Security Updates. If any of these requirements are not in place, consult the Installation Guide for instructions to get to this stage.*

Adding the computer to the Deep Security Manager

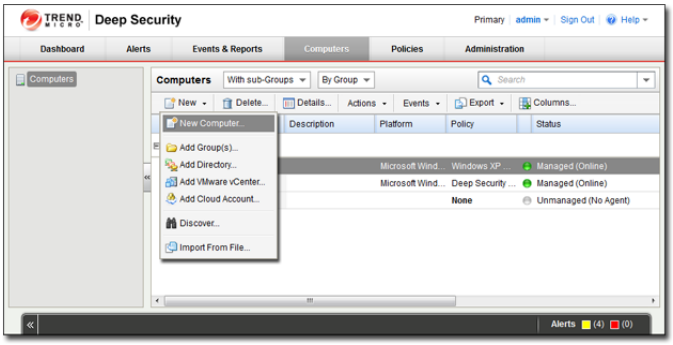
There are several ways of adding computers to the Deep Security Manager's **Computers** page. You can add computers by:

- Adding computers individually from a local network by specifying their IP addresses or hostnames
- Discovering computers on a local network by scanning the network
- Connecting to a Microsoft Active Directory and importing a list of computers
- Connecting to a VMware vCenter and importing a list of computers
- Connecting to computing resources from the following Cloud Provider services:
    - Amazon EC2
    - VMware vCloud

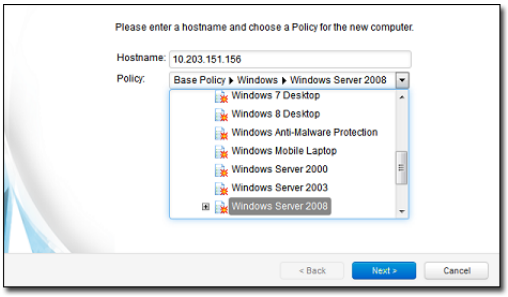
For the purposes of this exercise, we will add a computer from a local network but once a computer is added to the Manager, the protection procedures are the same regardless of where the computer is located.

To add a computer from a local network:

1. In the Deep Security Manager console, go to the **Computers** page and click **New** in the toolbar and select **New Computer...** from the drop-down menu.



2. In the **New Computer** wizard, enter the hostname or IP address of the computer and select an appropriate security Policy to apply from the Policy tree in the drop-down menu. (In this case we will select the **Windows Server 2008** Policy.) Click **Next**.



3. The wizard will contact the computer, add it to the Computers page, detect the unactivated Agent, activate it, and apply the selected Policy. Click **Finish**.

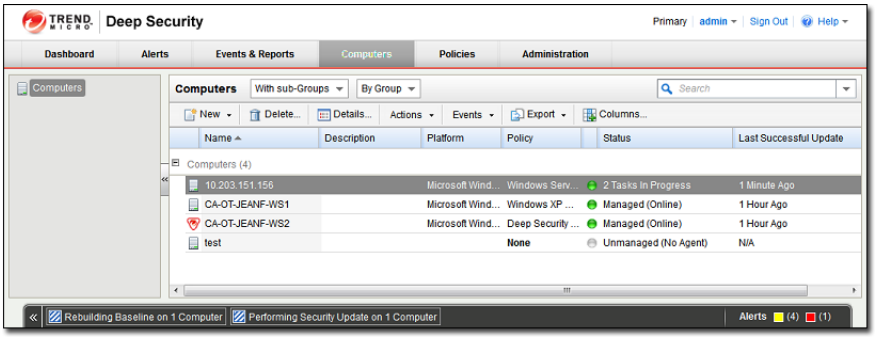
> *Note:* *An Agent can be configured to automatically initiate its own activation upon installation. For details, see **Command-Line Utilities** in the Reference section of the online help.*

4. When the computer has been added the wizard will display a confirmation message:

5. Deselect the **Open Computer Details on 'Close'** option and click **Close**.

The computer now appears in the Deep Security Manager's list of managed computers on the **Computers** page.

Deep Security will automatically download the latest Security Updates to the computer after activation. As well, the **Windows Server 2008** Policy that was assigned to the computer has Integrity Monitoring enabled and so it will start to Build an Integrity Monitoring baseline for the computer. You can see activities currently being carried out in the status bar of the Manager window:



Once Deep Security Manager has completed its initial post-activation tasks, the computer's **Status** should display as **Managed (Online)**.

Note: *More information is available for each page in the Deep Security Manager by clicking the **Help** button in the menu bar.*

Configuring and Running a Recommendation Scan

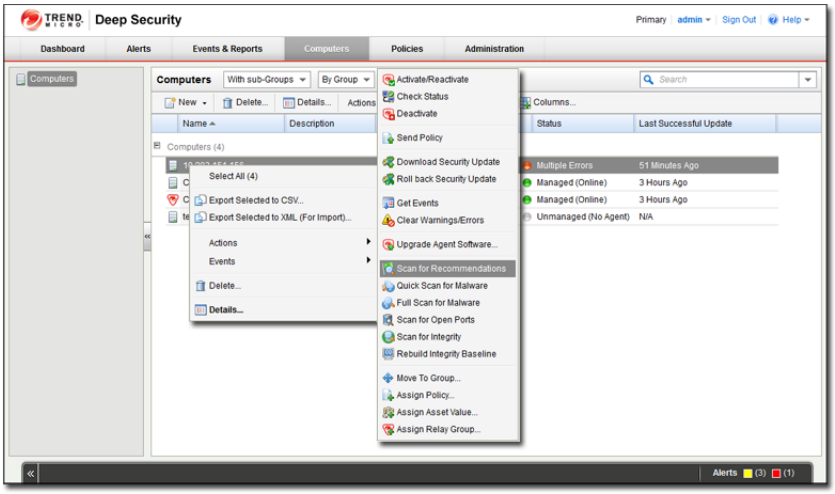
The security Policy that we assigned to the computer is made up of a collection of Rules and settings designed for a computer running the Windows Server 2008 operating system. However, a static Policy can soon fall out of date. This can be because of new software being installed on the computer, new operating system vulnerabilities being discovered for which Trend Micro has created new protection Rules, or even because a previous vulnerability was corrected by an operating system or software service pack. Because of the dynamic nature of the security requirements on a computer, you should regularly run Recommendation Scans which will assess the current state of the computer and compare it against the latest Deep Security protection module updates to see if the current security Policy needs to be updated.

Recommendation Scans make recommendations for the following protection modules:

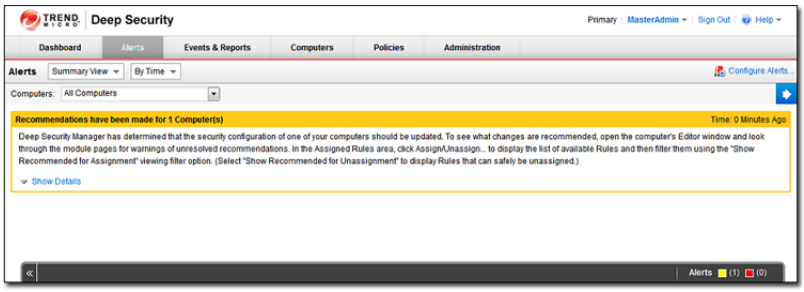
- **Intrusion Prevention**
- **Integrity Monitoring**
- **Log Inspection**

To run a Recommendation Scan on your computer:

1. Go to the Computers page in the main Deep Security Manager console window.
2. Right-click on your computer and select **Actions > Scan for Recommendations**:



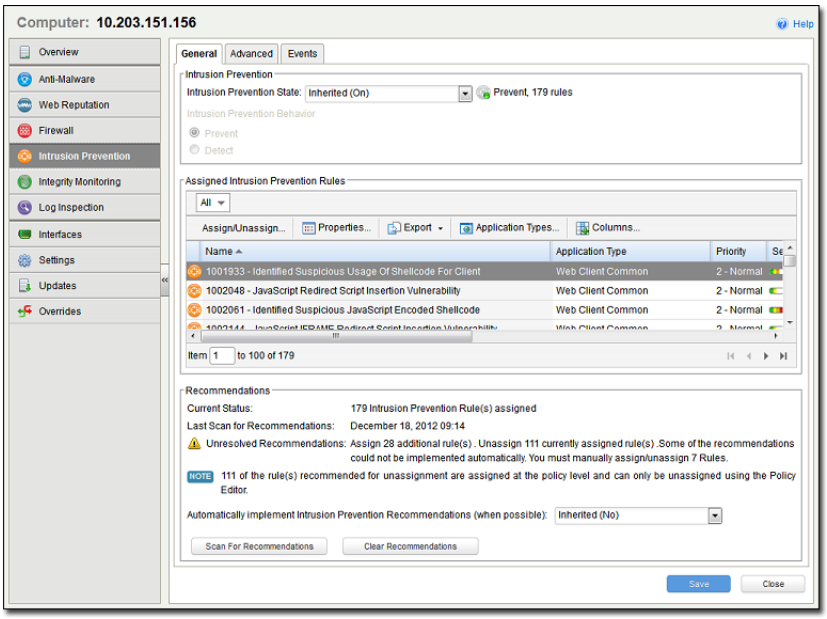
During the Recommendation Scan, your computer's Status will display **Scanning for Recommendations**. When the scan is finished, if Deep Security has any recommendations to make, you will see an Alert on the Alerts screen:



To see the results of the Recommendation Scan:

1. Open the computer editor for your computer (**Details...** in the **Computers** page menu bar or from the right-click menu.)
2. In the computer editor window, go to the **Intrusion Prevention** module page.

In the **Recommendations** area of the **General** tab, you'll see the results of the scan:



The **Current Status** tells us that there are currently 179 Intrusion Prevention Rules assigned to this computer.

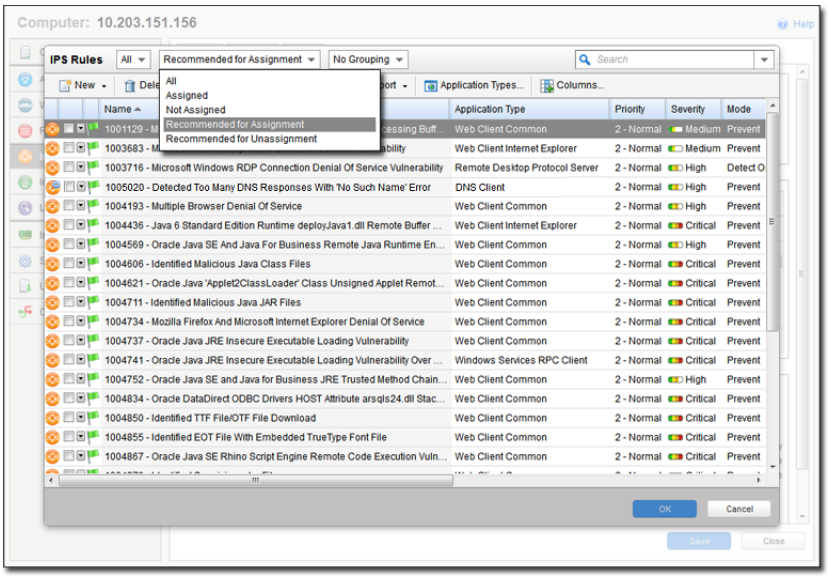
Last Scan for Recommendations tells us that the last scan took place on December 18th, 2012, at 09:14.

Unresolved Recommendations tells us that as a result of the scan, Deep Security recommends assigning an additional 28 Intrusion Prevention Rules and unassigning 111 currently assigned Rules.

The **Note** informs us that 111 of the Rules recommended for unassignment (all of them as it turn out) have been assigned at the Policy level (rather than directly here on the computer level). Rules that have been assigned at a level higher up the Policy tree can only be unassigned in the Policy where they were assigned -- in this case, the Windows Server 2008 Policy. (If we had opened the **Windows Server 2008** Policy editor, we would have seen the same recommendations and we could have unassigned them from there.)

We are also told that 7 of the Rules that are recommended for assignment can't be automatically assigned. Usually these are either Rules that require configuration or Rules that are prone to false positives and whose behavior should be observed in detect-only mode being being

enforced in prevent mode. To see which Rules have been recommended for assignment, click **Assign/Unassign...** to display the **IPS Rules** rule assignment modal window. Then select Recommended for Assignment from the second drop-down filter list:



Rules that require configuration are identified by an icon with a small configuration badge ( ). To see the configurable options for a Rule, double-click the Rule to open its **Properties** window (in local editing mode) and go to the **Configuration** tab. To Assign a Rule, select the checkbox next to its name.

To view Rules that are recommended for *unassignment*, filter the list of Rules by selecting **Recommended for Unassignment** from the same drop-down list. To unassign a Rule, deselect the checkbox next to its name.

Note: *Rules that are in effect on a computer because they have been assigned in a Policy higher up the policy tree can't be unassigned locally. The only way to unassign such Rules is to edit the Policy where they were originally assigned and unassign them from there. For more information on this kind of Rule inheritance, see* ***Policies, Inheritance and Overrides*** *in the Reference section of the online help.*

Automatically implement scan recommendations

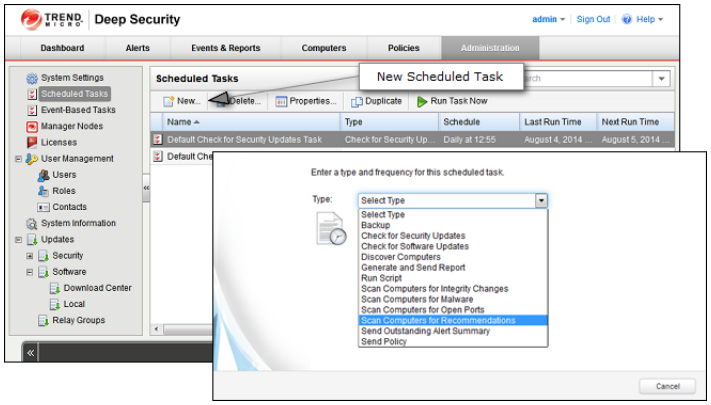
You can configure Deep Security to automatically assign and unassign Rules after a Recommendation Scan. To do so, open the computer or Policy editor and go to the individual protection module pages that support Recommendation Scans (Intrusion, Prevention, Integrity Monitoring, and Log Inspection). In the Recommendation area on the General tab, set **Automatically implement Intrusion Prevention Recommendations (when possible):** to Yes.

Create a Scheduled task to perform regular Recommendation Scans

Performing regular Recommendation Scans ensures that your computers are protected by the latest relevant Rule sets and that those that are no longer required are removed. You can create a Scheduled Task to carry out this task automatically.

To create a Scheduled Task:

1. In the main Deep Security Manager window, go to **Administration > Scheduled Tasks**
2. In the menu bar, click **New** to display the **New Scheduled Task** wizard.



3. Select **Scan Computers for Recommendations** as the scan type and select **Weekly** recurrence. Click **Next**.
4. Select a start time, select every 1 week, and select a day of the week. Click **Next**.
5. When specifying which computers to Scan, select the last option (**Computer**) and select the Windows Server 2008 computer we are protecting. Click **Next**.
6. Type a name for the new Scheduled Task. Leave the **Run task on 'Finish'** unchecked (because we just ran a Recommendation Scan). Click **Finish**.

The new Scheduled task now appears in the list of Scheduled Tasks. It will run once a week to scan your computer and make recommendations for you computer. If you have set **Automatically implement Recommendations** for each of the three protection modules that support it, Deep Security will assign and unassign Rules are required. If Rules are identified that require special attention, an Alert will be raised to notify you.

Schedule Regular Security Updates

If you follow the steps described in ***Quick Start: System Configuration (page 49)***, your computer will now be regularly updated with the latest protection from Trend Micro.

Monitor Activity Using the Deep Security Manager

The Dashboard

After the computer has been assigned a Policy and has been running for a while, you will want to review the activity on that computer. The first place to go to review activity is the Dashboard. The Dashboard has many information panels ("widgets") that display different types of information pertaining to the state of the Deep Security Manager and the computers that it is managing.

At the top right of the Dashboard page, click **Add/Remove Widgets** to view the list of widgets available for display.

For now, we will add the following widgets from the **Firewall** section:

- Firewall Activity (Prevented)
- Firewall IP Activity (Prevented)
- Firewall Event History [2x1]

Select the checkbox beside each of the three widgets, and click **OK**. The widgets will appear on the dashboard. (It may take a bit of time to generate the data.)

- The **Firewall Activity (Prevented)** widget displays a list of the most common reasons for packets to be denied (that is, blocked from reaching a computer by the Agent on that computer) along with the number of packets that were denied. Items in this list will be either types of Packet Rejections or Firewall Rules. Each "reason" is a link to the corresponding logs for that denied packet.

- The **Firewall IP Activity (Prevented)** widget displays a list of the most common source IPs of denied packets. Similar to the **Firewall Activity (Prevented)** widget, each source IP is a link to the corresponding logs.
- The **Firewall Event History [2x1]** widget displays a bar graph indicating how many packets were blocked in the last 24 hour period or seven day period (depending on the view selected). Clicking a bar will display the corresponding logs for the period represented by the bar.

Note: *Note the trend indicators next to the numeric values in the **Firewall Activity (Prevented)** and **Firewall IP Activity (Prevented)** widgets. An upward or downward pointing triangle indicates an overall increase or decrease over the specified time period, and a flat line indicates no significant change.*

Logs of Firewall and Intrusion Prevention Events

Now drill-down to the logs corresponding to the top reason for Denied Packets: in the **Firewall Activity (Prevented) widget**, click the first reason for denied packets. This will take you to the **Firewall Events** page.

The **Firewall Events** page will display all Firewall Events where the **Reason** column entry corresponds to the first reason from the **Firewall Activity (Prevented) widget** ("Out of Allowed Policy"). The logs are filtered to display only those events that occurred during the view period of the Dashboard (Last 24 hours or last seven days). Further information about the **Firewall Events** and **Intrusion Prevention Events** page can be found in the help pages for those pages.

Note: *For the meaning of the different packet rejection reasons, see **Firewall Events** and **Intrusion Prevention Events** in the Reference section of the online help.*

Reports

Often, a higher-level view of the log data is desired, where the information is summarized, and presented in a more easily understood format. The **Reports** fill this Role, allowing you to display detailed summaries on computers, Firewall and Intrusion Prevention Event Logs, Events, Alerts, etc. In the **Reports** page, you can select various options for the report to be generated.

We will generate a **Firewall Report**, which displays a record of Firewall Rule and Firewall Stateful Configuration activity over a configurable date range. Select **Firewall Report** from the Report drop-down. Click **Generate** to launch the report in a new window.

By reviewing scheduled reports that have been emailed by the Deep Security Manager to Users, by logging into the system and consulting the dashboard, by performing detailed investigations by drilling-down to specific logs, and by configuring Alerts to notify Users of critical events, you can remain apprised of the health and status of your network.

Upgrading

Upgrade Multi-Node Deep Security Manager

Upgrading a Multi-node Deep Security manager requires no special preparation.

To upgrade a Multi-node Manager:

1. Run the Deep Security Manager install package on any node.
   The installer will instruct the other nodes to shut down (there is no need to manually shut down the services).
   The installer will upgrade the local Deep Security Manager and update the database.
2. Run the Deep Security Manager installer on the remaining nodes.
   As each node is upgraded, the service will restart and the node will rejoin the network of Deep Security Managers.

Upgrade Deep Security Agents and Relays

Note:	*Deep Security Agents and Relays must be of the same version or less than the Deep Security Manager being used to manage it. The Deep Security Manager must always be upgraded before the Deep Security Agents and Relays.*

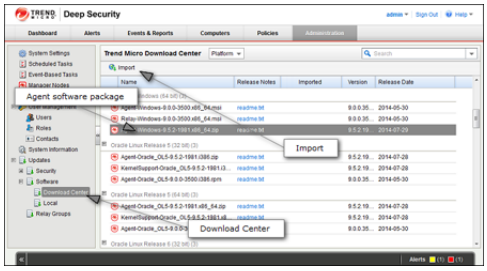
Note:	*When planning the upgrade of your Agents and Relays from 9.0 to 9.5, ensure that your 9.5 Agents are assigned to Relay Groups that contain only 9.5 Relays. You should upgrade all Relays in a Group to 9.5 (or create a new 9.5 Group) before configuring any 9.5 Agents to receive updates from the group.*

Deep Security 9.0 Agents can be upgraded using the Deep Security Manager interface (or by manual local upgrade), but the Agent software must first be imported into the Deep Security Manager.

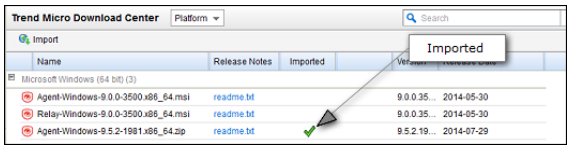
Deep Security 9.0 *Windows* Relays can be upgraded to 9.5 Relay-enabled Agents using the Deep Security Manager interface (or by manual local upgrade). Deep Security 9.0 *Linux* Relays cannot be upgraded. They must be uninstalled and replaced with a fresh install of a 9.5 Linux Agent. (See Upgrade a Relay on Linux, below, for instructions.)

To import Agent software packages to Deep Security:

1. In Deep Security Manager, go to **Administration > Updates > Software > Download Center**. The **Download Center** page displays the latest versions all Agent software available from Trend Micro.
2. Select your Agent software package from the list and click **Import** in the menu bar. Deep Security will begin to download the software from the Trend Micro Download Center to the Deep Security Manager.



3. When the software has finished downloading, a green check mark mark will appear in the **Imported** column for that Agent.



To Upgrade Deep Security Agents and Windows Deep Security Relays using the Deep Security Manager:

1. In the Deep Security Manager, go to the **Computers** screen.
2. find the computer on which you want to upgrade the Agent or Relay.
3. Right-click the computer and select **Actions > Upgrade Agent software**.
4. The new Agent software will be sent to the computer and the Agent or Relay will be upgraded.

Note:	*You can manually upgrade the any Agents or Relays locally on a computer. To do this, follow the instructions in* ***Installing the Deep Security Agent (page 34)****.*

Protection Module State after Upgrade

Changes to the 9.5 Deep Security Windows and Linux Agents since version 9.0 mean that, depending on the platform, not all Protection Modules that were enabled on a 9.0 Agent will remain enabled on a 9.5 Agent after upgrading. The following table shows which Modules are affected by an Upgrade:

Feature	Windows	Linux
AM	No change	Uninstalled
IM	Uninstalled	Uninstalled
WRS/FW/IPS	Uninstalled	Uninstalled
LI	Uninstalled	Uninstalled

Upgrade a Relay on Linux

You cannot use the command on the **Actions** menu to update a Relay from 9.0 SP1 to 9.5 on Linux.

To upgrade a 9.0 Relay to 9.5 on Linux:

1. Upgrade Deep Security Manager to version 9.5.
2. Import `Agent-`*`platform`*`-9.5.`*`build`*`.zip` into Deep Security Manager.
3. Deactivate the Relay that you want to upgrade and then uninstall it.
4. Install `Agent-Core-`***`platform`***`-9.5.`*`build`*`.rpm` on the Agent computer.
5. Enable the Relay.

To convert a 9.0 Relay to a 9.5 Agent on Linux:

1. Upgrade Deep Security Manager to version 9.5.
2. Import `Agent-`*`platform`*`-9.5.`*`build`*`.zip` into Deep Security Manager.
3. Deactivate the Relay that you want to upgrade.
4. Delete the Relay from Deep Security Manager.
5. Uninstall the Relay.
6. Install `Agent-Core-`*`platform`*`-9.5.`*`build`*`.rpm` on the Agent computer.
7. In Deep Security Manager, add the computer (**Computers** > **New** > **New Computer**).

Upgrade the Deep Security Notifier

Note: *Upgrading the Deep Security Notifier is only required on virtual machines being protected Agentlessly by a Deep Security Virtual Appliance. On machines with an in-guest Agent, the Notifier will be upgraded along with the Deep Security Agent.*

To upgrade the Deep Security Notifier:

1. Uninstall Deep Security Notifier 9.0
2. Install Deep Security Notifier 9.5 according to the procedures described in ***Installing the Deep Security Notifier (page 47)***.

Note: *The Deep Security Notifier must always be the same version as the Deep Security Manager.*

Uninstalling Deep Security from your vShield Environment

Note: *When you uninstall an activated Agent or a Relay from a managed computer, the Deep Security Manager does not know that the software has been uninstalled. The computer will remain listed in the Computers list and its status will be listed as "Managed (Offline)" or something equivalent depending on the context. To avoid this, either deactivate the Agent or Relay from the Manager before uninstallation, or simply delete the computer from the list.*

To remove the Deep Security Virtual Appliance

To remove the Virtual Appliance:

1. Use the Deep Security Manager to "deactivate" the Virtual Appliance.
2. Log in to vCenter.
3. Stop the Appliance.
4. Delete from disk.

To remove the Deep Security Filter Driver from a prepared ESXi

To restore the ESXi to its "un-prepared" state:

1. From the Deep Security Manager Computers list, select the Virtual Center. Choose the Prepared Computer for un-deployment, right-click the Computer and select Restore ESX.
2. Follow the wizard steps, accepting the defaults.
3. Choose "**Yes**" to have the DSM handle the ESXi driver un-installation automatically.

   Note: *The Deep Security Manager will attempt to bring the ESXi into and out of maintenance mode automatically. Any running virtual machines will need to be manually shutdown. At the end of the uninstallation process, the ESXi will be automatically rebooted and brought out of maintenance mode.*

   Or

4. Choose "**No**" to manually put the ESXi into /out of maintenance mode.

Note: *The Deep Security Manager wizard will start the uninstallation of the Filter Driver automatically once the ESXi has been put into maintenance mode. At the end of the uninstallation process, the ESXi will be automatically re-booted but remain in maintenance mode.*

Appendices

Deep Security Manager Memory Usage

Configuring the Installer's Maximum Memory Usage

The installer is configured to use 1GB of contiguous memory by default. If the installer fails to run you can try configuring the installer to use less memory.

To configure the amount of RAM available to the installer:

1. Go to the directory where the installer is located.
2. Create a new text file called "Manager-Windows-9.5.xxxx.x64.vmoptions" or "Manager-Linux-9.5.xxxx.x64.vmoptions", depending on your installation platform (where "xxxx" is the build number of the installer).
3. Edit the file by adding the line: "-Xmx800m" (in this example, 800MB of memory will be made available to the installer.)
4. Save the file and launch the installer.

Configuring the Deep Security Manager's Maximum Memory Usage

The Deep Security Manager default setting for heap memory usage is 4GB. It is possible to change this setting.

To configure the amount of RAM available to the Deep Security Manager:

1. Go to the Deep Security Manager install directory (the same directory as Deep Security Manager executable).
2. Create a new file. Depending on the platform, give it the following name:
    - **Windows:** "Deep Security Manager.vmoptions".
    - **Linux:** "dsm_s.vmoptions".
3. Edit the file by adding the line: " **`-Xmx10g`** " (in this example, "10g" will make 10GB memory available to the Deep Security Manager.)
4. Save the file and restart the Deep Security Manager.
5. You can verify the new setting by going to **Administration > System Information** and in the System Details area, expand **Manager Node > Memory**. The Maximum Memory value should now indicate the new configuration setting.

Deep Security Virtual Appliance Memory Usage

The following table lists minimum recommended Deep Security Virtual Appliance memory allocation based on the number of VMs being protected:

Number of virtual machines being protected by the Deep Security Virtual Appliance	Recommended memory allocation
1-32	4GB
33-64	6GB
65+	10GB

Configuring the Deep Security Virtual Appliance's Memory Allocation

Note: *Changing the Deep Security Virtual Appliance's memory allocation settings requires powering off the DSVA virtual machine. Virtual machines normally protected by the Virtual Appliance will be unprotected until it is powered back on.*

To configure the Deep Security Virtual Appliance's memory allocation:

1. In your VMware vSphere Web Client, right-click on the DSVA and select **Power > Shut Down Guest**.
2. Right-click on the DSVA again and select **Edit Settings...** The Virtual Machine **Properties** screen displays.
3. On the **Hardware** tab, select **Memory** and change the memory allocation to the desired value.
4. Click **OK**.
5. Right-click the DSVA again and select **Power > Power On**.

Deep Security Manager Performance Features

Performance Profiles

Deep Security Manager uses an optimized concurrent job scheduler that considers the impacts of each job on CPU, Database and Agent/Appliances. By default, new installations use the "Aggressive" performance profile which is optimized for a dedicated Manager. If the Deep Security Manager is installed on a system with other resource-intensive software it may be preferable to use the "Standard" performance profile. The performance profile can be changed by navigating to **Administration > Manager Nodes**. From this screen select a Manager node and open the **Properties** window. From here the Performance Profile can be changed via the drop-down menu.

The Performance Profile also controls the number of Agent/Appliance-initiated connections that the Manager will accept. The default of each of the performance profiles effectively balances the amount of accepted, delayed and rejected heartbeats.

Low Disk Space Alerts

Low Disk Space on the Database Host

If the Deep Security Manager receives a "disk full" error message from the database, it will start to write events to its own hard drive and will send an email message to all Users informing them of the situation. This behavior is not configurable.

If you are running multiple Manager nodes, the Events will be written to whichever node is handling the Event. (For more information on running multiple nodes, see Multi-Node Manager in the Reference section of the online help or the Administrator's Guide.)

Once the disk space issue on the database has been resolved, the Manager will write the locally stored data to the database.

Low Disk Space on the Manager Host

If the available disk space on the Manager falls below 10%, the Manager generates a Low Disk Space Alert. This Alert is part of the normal Alert system and is configurable like any other. (For more information on Alerts, see **Alert Configuration** in the **Configuration and Management** section of the online help or the Administrator's Guide.)

If you are running multiple Manager nodes, the node will be identified in the Alert.

When the Manager's available disk space falls below 5MB, the Manager will send an email message to all Users and the Manager will shut down. The Manager cannot be restarted until the available disk space is greater than 5MB.

You must restart the Manager manually.

If you are running multiple nodes, only the node that has run out of disk space will shut down. The other Manager nodes will continue operating.

Agentless Protection

Scan Caching

Scan Caching improves the efficiency of on-demand scans performed by the Virtual Appliance. It eliminates the unnecessary scanning of identical content across multiple VMs in large VMware deployments.

In addition,

- Integrity Monitoring scan caching speeds up Integrity Monitoring scans by sharing Integrity Monitoring scan results

- Anti-Malware on-demand caching speeds up scans on subsequent cloned/similar VMs
- Anti-Malware Real-time caching speeds up VM boot and application access time
- Concurrent Scan feature allows further overall scan time improvement by allowing multiple VMs to be scanned concurrently

High Availability Environments

If you intend to take advantage of VMware High Availability (HA) capabilities, make sure that the HA environment is established before you begin installing Deep Security. All ESXi hypervisors used for recovery operations must be imported into the Deep Security Manager with their vCenter, they must be "prepared", and a Deep Security Virtual Appliance must be installed on each one. Setting up the environment in this way will ensure that Deep Security protection will remain in effect after a HA recovery operation.

Note: *When a Virtual Appliance is deployed in a VMware environment that makes use of the VMware Distributed Resource Scheduler (DRS), it is important that the Appliance does not get vMotioned along with the virtual machines as part of the DRS process. Virtual Appliances must be "pinned" to their particular ESXi server. You must actively change the DRS settings for all the Virtual Appliances to "Manual" or "Disabled" (recommended) so that they will not be vMotioned by the DRS. If a Virtual Appliance (or any virtual machines) is set to "Disabled", vCenter Server does not migrate that virtual machine or provide migration recommendations for it. This is known as "pinning" the virtual machine to its registered host. This is the recommended course of action for Virtual Appliances in a DRS environment. (An alternative is to deploy the Virtual Appliance onto a local store as opposed to a shared store. When the Virtual Appliance is deployed onto a local store it cannot be vMotioned by DRS.) For further information on DRS and pinning virtual machines to a specific ESXi server consult your VMware documentation.*

Note: *If a virtual machine is vMotioned by HA from an ESXi protected by a DSVA to an ESXi that is not protected by a DSVA, the virtual machine will become unprotected. If the virtual machine is subsequently vMotioned back to the original ESXi, it will not automatically be protected again unless you have created an Event-based Task to activate and protect computers that have been vMotioned to an ESXi with an available DSVA. For more information, see "Event-Based Tasks" in the Deep Security Manager Help.*

Creating an SSL Authentication Certificate

The Deep Security Manager creates a 10-year self-signed certificate for the connections with Agents/Appliances, Relays, and Users' web browsers. However, for added security, this certificate can be replaced with a certificate from a trusted certificate authority (CA). (Such certificates are maintained after a Deep Security Manager upgrade.)

Once generated, the CA certificate must be imported into the .keystore in the root of the Deep Security Manager installation directory and have an alias of "tomcat". The Deep Security Manager will then use that certificate.

To create your SSL authentication certificate:

1. Go to the Deep Security Manager installation directory (for the purpose of these instructions, we will assume it's "**C:\Program Files\Trend Micro\Deep Security Manager**") and create a new folder called **Backupkeystore**
2. Copy **.keystore** and **configuration.properties** to the newly created folder **Backupkeystore**
3. From a command prompt, go to the following location: **C:\Program Files\Trend Micro\Deep Security Manager\jre\bin**
4. Run the following command which will create a self signed certificate:

   ```
   C:\Program Files\Trend Micro\Deep Security Manager\jre\bin>keytool -genkey -alias tomcat -keyalg RSA -dname cn=dsmserver
   ```

5. Choose password: **changeit**

Note:	*NOTE: **-dname** is the common name of the certificate your CA will sign. Some CAs require a specific name to sign the Certificate Signing Request (CSR). Please consult your CA Admin to see if you have that particular requirement.*

6. There is a new keystore file created under the user home directory. If you are logged in as "Administrator", You will see the **.keystore** file under **C:\Documents and Settings\Administrator**
7. View the newly generated certificate using the following command:

   ```
   C:\Program Files\Trend Micro\Deep Security Manager\jre\bin>keytool -list -v
   ```

8. Run the following command to create a CSR for your CA to sign:

   ```
   C:\Program Files\Trend Micro\Deep Security Manager\jre\bin>keytool -certreq -keyalg RSA -alias tomcat -file certrequest.csr
   ```

9. Send the **certrequest.csr** to your CA to sign. In return you will get two files. One is a "certificate reply" and the second is the CA certificate itself.
10. Run the following command to import the CA cert in JAVA trusted keystore:

    ```
    C:\Program Files\Trend Micro\Deep Security Manager\jre\bin>keytool -import -alias root -trustcacerts -file cacert.crt -keystore "C:\Program Files\Trend Micro\Deep Security Manager\jre\lib\security\cacerts"
    ```

11. Run the following command to import the CA certificate in your keystore:

    ```
    C:\Program Files\Trend Micro\Deep Security Manager\jre\bin>keytool -import -alias root -trustcacerts -file cacert.crt
    ```

    (say yes to warning message)

12. Run the following command to import the certificate reply to your keystore:

    ```
    C:\Program Files\Trend Micro\Deep Security Manager\jre\bin>keytool -import -alias tomcat -file certreply.txt
    ```

13. Run the following command to view the certificate chain in you keystore:

    ```
    C:\Program Files\Trend Micro\Deep Security Manager\jre\bin>keytool -list -v
    ```

14. Copy the .keystore file from your user home directory **C:\Documents and Settings\Administrator** to **C:\Program Files\ Trend Micro \Deep Security Manager**

15. Open the configuration.properties file in folder **C:\Program Files\Trend Micro\Deep Security Manager**. It will look something like:

    ```
    keystoreFile=C\:\\\\Program Files\\\\Trend Micro\\\\Deep Security Manager\\\\.keystore
    port=4119
    keystorePass=$1$85ef650a5c40bb0f914993ac1ad855f48216fd0664ed2544bbec6de80160b2f
    installed=true
    serviceName= Trend Micro Deep Security Manager
    ```

16. Replace the password in the following string:

    ```
    keystorePass=xxxx
    ```

    where "**xxxx**" is the password you supplied in step five

17. Save and close the file
18. Restart the Deep Security Manager service
19. Connect to the Deep Security Manager with your browser and you will notice that the new SSL certificate is signed by your CA.

Silent Install of Deep Security Manager

Windows

To initiate a silent install on Windows:

```
Manager-Windows-<Version>.x64.exe -q -console -Dinstall4j.language=<ISO code> -varfile <PropertiesFile>
```

Linux

To initiate a silent install on Linux:

```
Manager-Linux-<Version>.x64.sh -q -console -Dinstall4j.language=<ISO code> -varfile <PropertiesFile>
```

Parameters

The "**-q**" setting forces install4j to execute in unattended (silent) mode.

The "**-console**" setting forces messages to appear in the console (stdout).

The `-Dinstall4j.language=<ISO code>` options lets you override the default installation language (English) if other languages are available. Specify a language using standard ISO language identifiers:

- Japanese: **jp**
- Simplified Chinese: **zh_CN**

The **<PropertiesFile>** argument is the complete/absolute path to a standard Java properties file. Each property is identified by its equivalent GUI screen and setting in the Windows Deep Security Manager installation (described above). For example, the Deep Security Manager address on the "Address and Ports" screen is specified as:

```
AddressAndPortsScreen.ManagerAddress=
```

Most of the properties in this file have acceptable defaults and may be omitted. The only required values for a simple installation using an embedded database are:

```
LicenseScreen.License
CredentialsScreen.Administrator.Username
CredentialsScreen.Administrator.Password
```

For a complete description of available settings, see ***Deep Security Manager Settings Properties File (page 79)***.

Sample Properties File

The following is an example of the content of a typical properties file:

```
AddressAndPortsScreen.ManagerAddress=10.201.111.91
AddressAndPortsScreen.NewNode=True
UpgradeVerificationScreen.Overwrite=False
LicenseScreen.License.-1=XY-ABCD-ABCDE-ABCDE-ABCDE-ABCDE-ABCDE
DatabaseScreen.DatabaseType=Oracle
DatabaseScreen.Hostname=10.201.xxx.xxx
DatabaseScreen.Transport=TCP
```

```
DatabaseScreen.DatabaseName=XE
DatabaseScreen.Username=DSM
DatabaseScreen.Password=xxxxxxx
AddressAndPortsScreen.ManagerPort=4119
AddressAndPortsScreen.HeartbeatPort=4120
CredentialsScreen.Administrator.Username=masteradmin
CredentialsScreen.Administrator.Password=xxxxxxxx
CredentialsScreen.UseStrongPasswords=False
SecurityUpdateScreen.UpdateComponents=True
SecurityUpdateScreen.UpdateSoftware=True
RelayScreen.Install=True
SmartProtectionNetworkScreen.EnableFeedback=False
```

Deep Security Manager Settings Properties File

This section contains information about the contents of the Property file that can be used in a command-line installation (silent Install) of the Deep Security Manager. (See ***Silent Install of Deep Security Manager (page 77)***.)

Settings Properties File

The format of each entry in the settings property file is:

```
<Screen Name>.<Property Name>=<Property Value>
```

The settings properties file has required and optional values.

Note: *For optional entries, supplying an invalid value will result in the default value being used.*

Required Settings

LicenseScreen

Property	Possible Values	Default Value	Notes
LicenseScreen.License.-1=<value>	<AC for all modules>	blank	

OR

Property	Possible Values	Default Value	Notes
LicenseScreen.License.0=<value>	<AC for Anti-Malware>	blank	
LicenseScreen.License.1=<value>	<AC for Firewall/DPI>	blank	
LicenseScreen.License.2=<value>	<AC for Integrity Monitoring>	blank	
LicenseScreen.License.3=<value>	<AC for Log Inspection>	blank	

CredentialsScreen

Property	Possible Values	Default Value	Notes
CredentialsScreen.Administrator.Username=<value>	<username for master administrator>	blank	
CredentialsScreen.Administrator.Password=<value>	<password for the master administrator>	blank	

Optional Settings

LanguageScreen

Property	Possible Values	Default Value	Notes
Dinstall4j.language=<value>	<null> jp zh_CN	<null>	"" = English, "jp" = Japanese, "zh_CN" = Simplified Chinese

UpgradeVerificationScreen

Note: *This screen/setting is not referenced unless an existing installation is detected.*

Property	Possible Values	Default Value	Notes
UpgradeVerificationScreen.Overwrite=<value>	True False	False	

Note: *Setting this value to True will overwrite any existing data in the database. It will do this without any further prompts.*

DatabaseScreen

This screen defines the database type and optionally the parameters needed to access certain database types.

Note: *The interactive install provides an "Advanced" dialog to define the instance name and domain of a Microsoft SQL server, but because the unattended install does not support dialogs these arguments are included in the DatabaseScreen settings below.*

Property	Possible Values	Default Value	Notes
DatabaseScreen.DatabaseType=<value>	Embedded Microsoft SQL Server Oracle	Microsoft SQL Server	
DatabaseScreen.Hostname=<value>	The name or IP address of the database host Current host name	Current host name	
DatabaseScreen.DatabaseName=<value>	Any string	dsm	Not required for embedded
DatabaseScreen.Transport=<value>	Named Pipes TCP	Named Pipes	Required for SQL Server only
DatabaseScreen.Username=<value>			Not required for Embedded
DatabaseScreen.Password=<value>		blank	Not required for Embedded
DatabaseScreen.SQLServer.Instance=<value>			Blank implies default instance. Optional, required for SQL Server only
DatabaseScreen.SQLServer.Domain=<value>			Optional, required for SQL Server only
DatabaseScreen.SQLServer.UseDefaultCollation=<value>	True False	False	Optional, required for SQL Server only

AddressAndPortsScreen

This screen defines the hostname, URL, or IP address of this computer and defines ports for the Manager. In the interactive installer this screen also supports the addition of a new Manager to an existing database, but this option is not supported in the unattended install.

Property	Possible Values	Default Value	Notes
AddressAndPortsScreen.ManagerAddress=<value>	<hostname, URL or IP address of the Manager host>	<current host name>	
AddressAndPortsScreen.ManagerPort=<value>	<valid port number>	4119	
AddressAndPortsScreen.HeartbeatPort=<value>	<valid port number>	4120	
AddressAndPortsScreen.NewNode=<value>	True False	False	True indicates that the current install is a new node. If the installer finds existing data in the database, it will add this installation as a new node. (Multi-node setup is always a silent install). Note: The "New Node" installation information about the existing database to be provided via the DatabaseScreen properties.

CredentialsScreen

Property	Possible Values	Default Value	Notes
CredentialsScreen.UseStrongPasswords=<value>	true False	False	True indicates the DSM should be set up to enforce strong passwords

SecurityUpdateScreen

Property	Possible Values	Default Value	Notes
SecurityUpdateScreen.UpdateComponents=<value>	True False	True	True indicates that you want Deep Security Manager to automatically retrieve the latest Components
SecurityUpdateScreen.UpdateSoftware=<value>	True False	True	True indicates that you want to setup a task to automatically check for new software.

SmartProtectionNetworkScreen

This screen defines whether you want to enable Trend Micro Smart Feedback and optionally your industry.

Property	Possible Values	Default Value	Notes
SmartProtectionNetworkScreen.EnableFeedback=<value>	True False	False	True enables Trend Micro Smart Feedback.
SmartProtectionNetworkScreen.IndustryType=<value>	Not specified Banking Communications and media Education Energy Fast-moving consumer goods (FMCG) Financial Food and beverage Government Healthcare Insurance Manufacturing Materials Media Oil and gas Real estate Retail Technology Telecommunications Transportation Utilities Other	blank	blank corresponds to Not specified

Sample Properties Files

The following is an exampe of the content of a typical properties file:

```
AddressAndPortsScreen.ManagerAddress=10.201.111.91
AddressAndPortsScreen.NewNode=True
UpgradeVerificationScreen.Overwrite=False
LicenseScreen.License.-1=XY-ABCD-ABCDE-ABCDE-ABCDE-ABCDE-ABCDE
DatabaseScreen.DatabaseType=Oracle
DatabaseScreen.Hostname=10.201.xxx.xxx
```

```
DatabaseScreen.Transport=TCP
DatabaseScreen.DatabaseName=XE
DatabaseScreen.Username=DSM
DatabaseScreen.Password=xxxxxxx
AddressAndPortsScreen.ManagerPort=4119
AddressAndPortsScreen.HeartbeatPort=4120
CredentialsScreen.Administrator.Username=masteradmin
CredentialsScreen.Administrator.Password=xxxxxxxx
CredentialsScreen.UseStrongPasswords=False
SecurityUpdateScreen.UpdateComponents=True
SecurityUpdateScreen.UpdateSoftware=True
RelayScreen.Install=True
SmartProtectionNetworkScreen.EnableFeedback=False
```

Installation Output

The following is a sample output from a successful install, followed by an example output from a failed install (invalid license). The [Error] tag in the trace indicates a failure.

Successful Install

```
Stopping Trend Micro Deep Security Manager Service...
Detecting previous versions of Trend Micro Deep Security Manager...
Upgrade Verification Screen settings accepted...
Database Screen settings accepted...
License Screen settings accepted...
Address And Ports Screen settings accepted...
Credentials Screen settings accepted...
All settings accepted, ready to execute...
Uninstalling previous version
Stopping Services
Extracting files...
Setting Up...
Connecting to the Database...
Creating the Database Schema...
Updating the Database Data...
Creating MasterAdmin Account...
Recording Settings...
Creating Temporary Directory...
Installing Reports...
Creating Help System...
Setting Default Password Policy...
Importing Example Security Profiles...
Applying Security Update...
Assigning IPS Filters to Example Security Profiles...
Correcting the Port for the Manager Security Profile...
Correcting the Port List for the Manager...
Creating IP List to Ignore...
Creating Scheduled Tasks...
Creating Asset Importance Entries...
Creating Auditor Role...
Auditing...
Optimizing...
Recording Installation...
Creating Properties File...
Creating Shortcut...
Configuring SSL...
Configuring Service...
```

```
Configuring Java Security...
Configuring Java Logging...
Cleaning Up...
Starting Deep Security Manager...
Finishing installation...
```

Failed Install

This example shows the output generated when the properties file contained an invalid license string:

```
Stopping Trend Micro Deep Security Manager Service...
Detecting previous versions of Trend Micro Deep Security Manager...
Upgrade Verification Screen settings accepted...
Database Screen settings accepted...
Database Options Screen settings accepted...
[ERROR] The license code you have entered is invalid.
[ERROR] License Screen settings rejected...
Rolling back changes...
```

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