Symantec™ Data Loss Prevention Endpoint Server Scalability on VMware

Version 11.1

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Contents

Chapter 1

Overview of Endpoint Server Scalability on VMware

This chapter includes the following topics:

About Endpoint Server scalability on VMware

As of version 11.1 of Symantec Data Loss Prevention, Symantec supports the deployment of Endpoint Servers on the VMware ESX platform. This document describes scalability testing where the Endpoint Server is deployed on VMware ESX. The test results and recommendations that are presented in this document can help you understand and plan your Symantec Data Loss Prevention deployment.

The tests examined the following operations:

- The effect of adding Agents to an Endpoint Server
- The effect of restarting the Endpoint Server
- The effect of Agents connecting and disconnecting from the network
- Policy updates

Other Endpoint scalability documents

The following documents, available from the Symantec Data Loss Prevention Knowledge Base, also discuss Endpoint scalability:

- Symantec Data Loss Prevention Endpoint Server Scalability (https://kb-vontu.altiris.com/article.asp?article=54542&p=4)
- Symantec Data Loss Prevention Endpoint Scalability on Citrix XenApp (https://kb-vontu.altiris.com/article.asp?article=54540&p=4)

Chapter 2

Testing methodology

This chapter includes the following topics:

Product setup and configuration

The scalability tests used typical customer environments and configurations to measure the performance of a Symantec Data Loss Prevention deployment under load.

Table 2-1 describes the environments and configurations that were used for the tests.

Table 2-1 Test environment for Endpoint Server scalability on VMware

Setup or Configuration	Description
Enforce Server hardware and software configuration	Enforce Server and Oracle database: ■ 2 x 3.0 GHz dual-core CPU ■ 8 GB RAM ■ Microsoft Windows 2003 Enterprise SP2 (x86) ■ Oracle 10g, version 10.2.0.4 ■ Symantec Data Loss Prevention version 11.1 The Enforce Server and Oracle database were deployed on a hardware computer. Virtualization was not used.

Table 2-1 Test environment for Endpoint Server scalability on VMware *(continued)*

Setup or Configuration	Description
Endpoint Server hardware and software configuration	The Endpoint Server was deployed in a container that was hosted on a VMware ESX server, version 4.0.0. The ESX server was configured with the following hardware: ■ Intel x7460 Xeon 2.66 GHz CPU ■ Processor speed: 2.7 GHz ■ Processor sockets: 4 ■ Cores per socket: 6 ■ Logical processors: 24 ■ 128 GB RAM ■ 134.75 GB local storage ■ 1,400 GB external storage (NetApp) ■ Broadcom netXtreme II Network card, 100 Mbps The Endpoint Server was deployed in a virtual container on this ESX server in the following two configurations for the tests: Configuration 1: ■ 2 x Intel x7460 Xeon 2.66 GHz CPU ■ 8 GB RAM ■ Microsoft Windows 2008 Enterprise R2 (x64) ■ Symantec Data Loss Prevention version 11.1 Configuration 2: ■ 4x Intel x7460 Xeon 2.66 GHz CPU ■ 16 GB RAM ■ Microsoft Windows 2008 Enterprise R2 (x64) ■ Symantec Data Loss Prevention version 11.1

Table 2-1 Test environment for Endpoint Server scalability on VMware *(continued)*

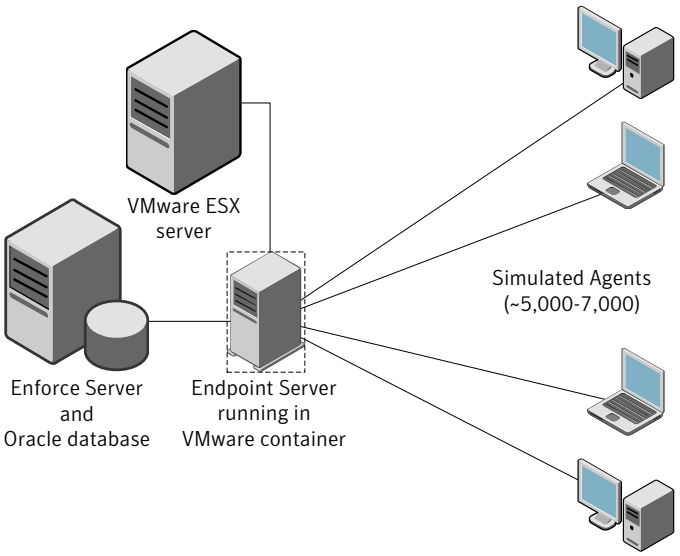
Setup or Configuration	Description

Policies	Polices were chosen that were of sufficient size and complexity. The policies were derived from actual production environments and represent the types of policies that most customers use.
	
	The polices used the following configurations:
	
	■ Types of Detection rules used:
	  ■ Described Content Matching for Keyword and Data Identifier
	  ■ File Properties for Message Attachment or File Size
	■ The policies used 14 detection rules
	■ The policies used 15 exceptions
	■ The size of the policy (as it was saved in the Agent database) was 2 MB

Network setup	The tests were carried out in a well-controlled laboratory environment where systems were connected on a local area network that had 100-Mbps Ethernet connectivity. Although the tests were performed in a controlled environment, the network was not isolated. Other systems that were not related to this test were connected and communicating but these systems were not performing any network-intensive activity. This design was intentional and the aim was to simulate real-time load on the network while the tests were in progress.
Incidents generated during testing	The simulated Agents sent one removable storage incident per hour per Agent.
Events sent during testing	The simulated Agents sent only connection and disconnection events as those activities occurred. No other types of events were sent.

Figure 2-1 shows the architecture that was used for testing.

Figure 2-1 Endpoint Server scalability test architecture



Test scenarios and execution

The tests were designed to simulate load on a newly installed Endpoint Server. The tests used simulated Agents that connect to the Endpoint Server. The number of simulated Agents was gradually increased until the system stopped performing at the expected level.

The tests begin with a newly installed Endpoint Server, and then the following steps were performed to increase the Agent load:

1. Add 1,000 Agents to the Endpoint Server.
2. Wait for all Agents connect.
3. Update and push a policy to all Agents.
4. Wait for the policy to deploy to all Agents.
5. The connected Agents continuously send incidents to the Endpoint Server.
6. Restart the Endpoint Server.
7. Repeat these steps and record the performance data.

These steps exercised the following functionality of the Endpoint Server:

- Policy management—receiving, storing, and pushing policies to connected Agents

- Incident management—receiving, processing, and sending incidents to the Enforce Server
- Agent connections—process incoming connections from new Agents
- Agent re-connections—process reconnections from all Agents when the Endpoint Server restarts

The following functions were not tested:

- Two-tier detection
- Sending events from the Agent to the Enforce Server
- Endpoint Discover scans

Note: The tests were performed a minimum of three times and performance measurements were averaged among the test results.

Performance measurements

The following aspects of Endpoint Server performance were measured:

- Overall CPU usage
- CPU usage of Endpoint Server processes
- Overall system memory usage
- Memory usage for all Endpoint Server processes
- Process crashes and restarts
- Disconnection of Agents (if any)
- Number of disconnected Agents
- Time that is required for all Agents to reconnect
- Time that is required for a new policy to reach all Agents

Break point conditions

The testing attempted to find the maximum load for an Endpoint Server. When the server reaches its maximum load, one of the following conditions occurs:

- The Endpoint Server does not respond to new connections.
- Connected Agents disconnect and are not able to reconnect within the expected amount of time.

- A new policy or updated policy that is sent to the Agents does not reach the Agents.
- A new policy or updated policy that is sent to the Agents takes longer than expected to reach the Agent.
- Endpoint Server or system CPU usage remains consistently high (greater than 80%).
- The Endpoint Server consumes all available memory, resulting in overall performance degradation.
- Incidents are lost, or it takes an abnormally long period of time for incidents to reach the Enforce Server.

Chapter 3

Test results and recommendations

This chapter includes the following topics:

About the test results

This chapter presents the observations, test results, and recommendations for scalability of Endpoint Servers running in a VMware ESX container. The performance of a Symantec Data Loss Prevention deployment varies depending on the infrastructure, Enforce Server configuration, and the overall workload of the deployment. The test results, observations, and recommendations provide a point of reference based on the configurations and the hardware that were specified for the testing. Limitations in scalability cannot be attributed to any one variable in these tests.

Test results

Table 3-1 displays the test results for the two tested configurations. (See "Product setup and configuration" on page 11.)

Table 3-1 Test results

Observation	Results: Configuration 1 (2 CPU / 8 GB RAM)	Results: Configuration 2 (4 CPU / 16GB RAM)
Number of Agents supported	5,000 With 5,000 Agents connected, a restart of the Endpoint Server did not have negative effect on the ability of the Agents to reconnect. All Agents reconnected successfully.	7,000 With 7,000 Agents connected, a restart of the Endpoint Server did not have negative effect on the ability of the Agents to reconnect. All Agents reconnected successfully.
Limitations on the number of Agents supported	When more than 5,000 Agents connected to an Endpoint Server: ■ CPU usage exceeded 80%. ■ Sending policies caused spikes of CPU usage up to 100%. ■ The time that is required to send a policy to the Agents increased. ■ No Agents disconnected. Agents started to disconnect during policy updates when the number of Agents increased to 6,000. ■ When the Endpoint Server was restarted, all Agents reconnected successfully.	When more than 7,000 Agents connected to an Endpoint Server: ■ CPU usage exceeded 80%. ■ Sending policies caused spikes of CPU usage up to 100%. ■ The time that is required to send a policy to the Agents increased. ■ No Agents disconnected. Agents started to disconnect during policy updates when the number of Agents increased to 9,000. ■ When the Endpoint Server was restarted, all Agents reconnected successfully.
Memory consumption	Memory consumption was not a limiting factor. Average memory consumption was around 300 MB.	Memory consumption was not a limiting factor. Average memory consumption was around 500 MB.

Deployment recommendations

Symantec recommends the following based on the test results:

- Configure the VMware container for the Endpoint Server to use static allocation of resources. Static resources are resources from the host operating system that are always available to the guest operating system that hosts the Endpoint Server. Using static resources prevents contention for resources and provides for consistent throughput.

- Configure your Endpoint Servers on multiple, smaller virtual machines, as tested in Configuration 1.

In addition to these scalability recommendations, the following general recommendations can also improve scalability and performance:

- Changes in policy size affect overall performance of the Endpoint Server. Policies that are larger or more complex require more processing power and memory usage by the Endpoint Server.
- Two-tier detection activities greatly increase the load on the Endpoint Server and are also network-intensive. Two-tier detection reduces the overall performance and scalability of the Endpoint Server. (Two-tier detection occurs when the Agent sends data to the Endpoint Server for analysis.)
- Networking speed, latency, and the use of load balancers in the network can affect the overall performance of the Endpoint Server.

Test limitations compared to actual deployments

The testing that is described in this document attempted to simulate actual Symantec Data Loss Prevention deployments. When using these results to plan your deployment, note the following regarding the tests:

- The tests used simulated DLP Agents to simulate connection and disconnection events .
- The simulated Agents only sent one incident per hour.
- The simulated Agents were deployed on a small number of endpoint computers where each computer hosted approximately 700 simulated endpoint Agents. This design caused contention for resources and contributed some additional performance delay to the test results.
- Due to the design of these tests, the following features were not exercised: Endpoint Server failover, Endpoint Discover scans, and two-tier detection using Exact Data Matching (EDM) or Indexed Document Matching (IDM).
- When disconnected Agents reconnect to their associated Endpoint Server they send any accumulated incidents that were stored in the Agent's incident database. Because the simulated Agents did not persist incidents in an incident database, the performance effect of Agents reconnecting was not measured.