

Citrix SCOM Management Pack for NetScaler Performance Overview



Software version: 1.16

Release date: September 2016

Document revision: 1st

This document is designed to help you understand scalability, performance, and resource consumption of Citrix SCOM Management Pack for NetScaler (**NetScaler Management Pack, the product**). It also lists resource consumption of the NetScaler Management Pack Agent (`MPNSMonitorSvc`), Microsoft System Center Operations Manager (**SCOM**) agent (`HealthService`), SCOM database (`OperationsManager`), and SCOM data warehouse (`OperationsManagerDW`), as measured in an environment with the specified NetScaler and SCOM configurations.

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Section 1: General and scalability aspects

Generally speaking, NetScaler Management Pack consists of two parts:

- A collection of SCOM management packs that are imported into SCOM (the server-side part)
- NetScaler Management Pack Agent

The server-side part

Management packs included in this part are collections of discoveries, monitors, rules, and tasks for Citrix NetScaler (**NetScaler**). From the compute and memory perspectives, this part does not add to the basic resource requirements of the SCOM management server where they are imported.

NetScaler Management Pack Agent

Performance and resource consumption of NetScaler Management Pack Agent both primarily depend on the size of your NetScaler environment, specifically on the number of discovered and monitored NetScaler objects.

Section 2: Configuration specifications

All figures in this document are valid for environments that:

- Are monitored with the specified product version of NetScaler Management Pack
- Match the documented configuration specifications for NetScaler and SCOM
- Use the default configuration of management packs in terms of which rules and monitors are enabled (this applies to management packs included in NetScaler Management Pack and management packs bundled with SCOM)
- Use the default configuration of SCOM management servers and SCOM agents, without fine-tuning or any special adjustments

Note Factors such as different hardware specifications and condition of your environment may cause divergence of your observed values from the documented values.

Validated NetScaler Management Pack version

Validation of NetScaler Management Pack was performed with the product version listed in the following table.

Product version
NetScaler Management Pack 1.15

Citrix NetScaler configuration specification

Specification item	Value
Software version	Citrix NetScaler 11.0 and 10.5
Virtualization platform	XenServer 6.5
Instantiated packet engines (NetScaler 11.0)	1
Instantiated packet engines (NetScaler 10.5)	1
Appliance type	NetScaler VPX
NetScaler devices in the monitored environment	2

Microsoft System Center Operations Manager configuration specification

With this configuration, the SCOM database and data warehouse server is deployed outside the SCOM management server computer.

Resource pool configuration	
Specification item	Value
SCOM resource pools	1
SCOM management servers in the resource pool	1

Computer: SCOM management server	
Specification item	Value
Compute	four virtual CPUs; CPU clock speed of 2.67 GHz
Memory	8 GB of RAM
Software version	Microsoft System Center Operations Manager 2012 R2

Computer: SCOM database and data warehouse server
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Specification item	Value
Compute	four virtual CPUs; CPU clock speed of 2.67 GHz
Memory	24 GB of RAM
Storage	100 GB of free storage space
Software version	Microsoft SQL Server 2014

Section 3: Monitoring ability

The following table lists the lab set-up in which NetScaler Management Pack was successfully validated with the specified NetScaler and SCOM configurations. NITRO API was used for monitoring during which data was gathered at the following intervals: 15 minutes for rules, 5 minutes for monitors, and 4 hours for object discovery.

Maximum number of monitored objects (for the specified configuration)

Item	Value
NetScaler objects discovered and monitored by NetScaler Management Pack ¹	app. 14,000

¹ Refers to the total number of objects of any type in either validated environment (with one or two appliances). For examples of object type distribution, see the following table.

Object type distribution examples (with load balancing)

Object type ²	Example A	Example B
	Value	Value
Appliances	1	2
Virtual servers	3,750	4,550
Services	1,500	1,000
Service groups	4,350	3,850
Other object types ³	app. 3,850	app. 4,600

² This table lists examples of object types that are monitored by NetScaler Management Pack. Object type distribution examples A and B explain how the maximum number of monitored objects is calculated.

³ Examples of other object types are Features, Global Settings, HTTP Settings, Interface, IPv4, Licenses, Memory Pool, Modes, Other Settings, SSL Certificate, TCP Settings, Timeout Settings, Virtual LAN, Other Settings, and so on.

Section 4: Resource consumption

Measuring of the product’s resource consumption was performed on different validation sets. Windows Performance Monitor was used as the measuring tool. During validation, NetScaler objects were gradually (on a daily basis) added to the monitored environment.

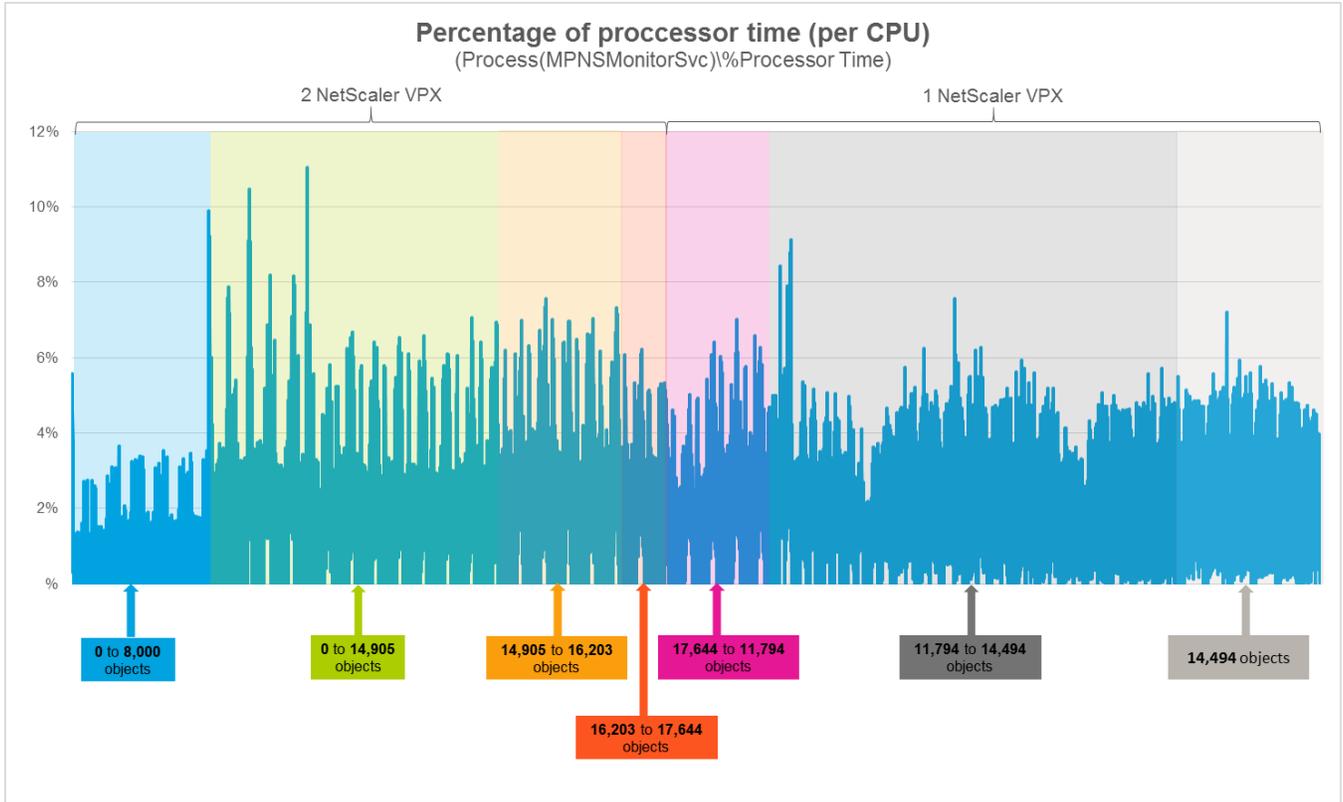
Average compute and memory consumption of the agents

The process of measuring average compute and memory consumption of the agents spanned a period of 26 days. Based on the measurement results, average percentage of processor time and average memory usage of both `MPNSMonitorSvc` and `HealthService` were determined.

Average consumption on a SCOM resource pool member (for app. 14,000 NetScaler objects)

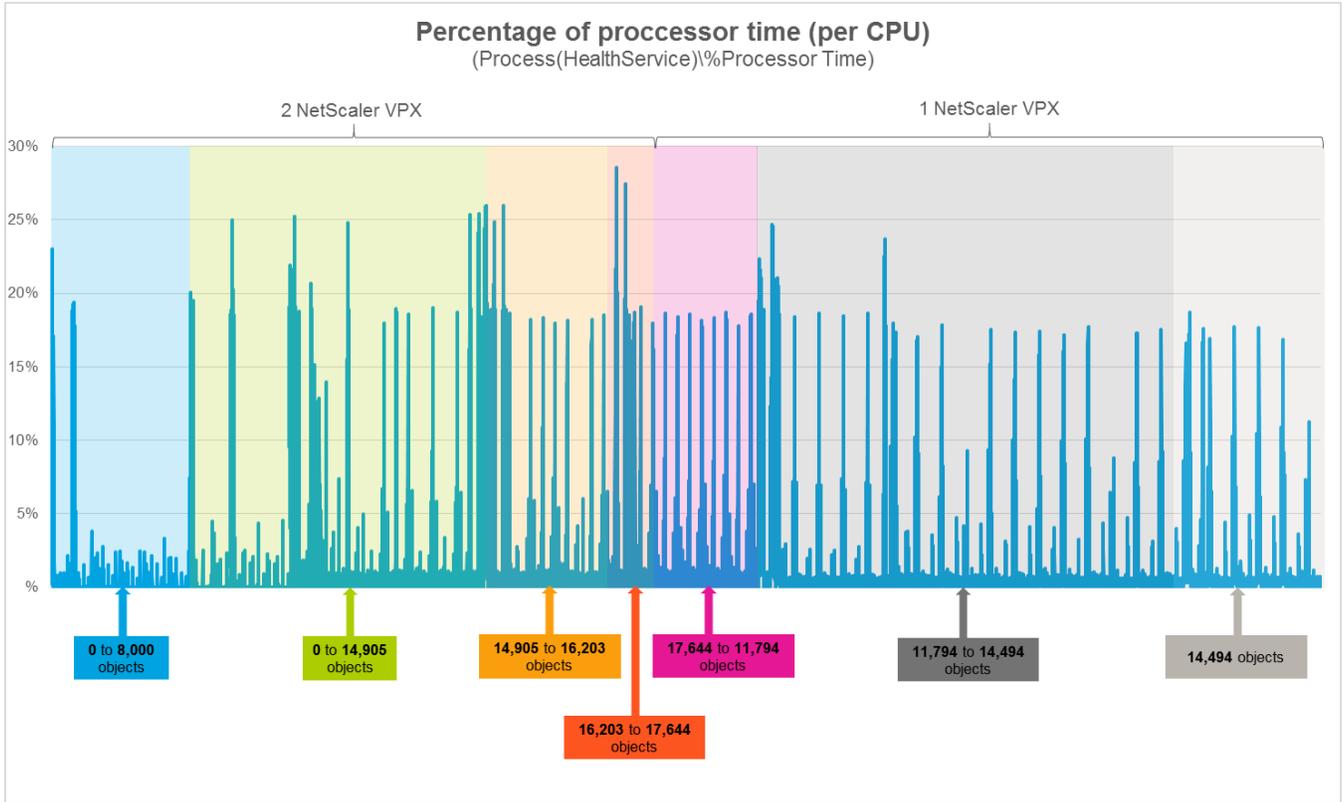
Item	Value
<code>MPNSMonitorSvc</code> percentage of processor time (per CPU)	1.19%
<code>HealthService</code> percentage of processor time (per CPU)	1.18%
<code>MPNSMonitorSvc</code> memory usage	331 MB
<code>HealthService</code> memory usage	659 MB

Figure 4.1 Percentage of processor time used by MPNSMonitorSvc through time, measured in seven different validation sets



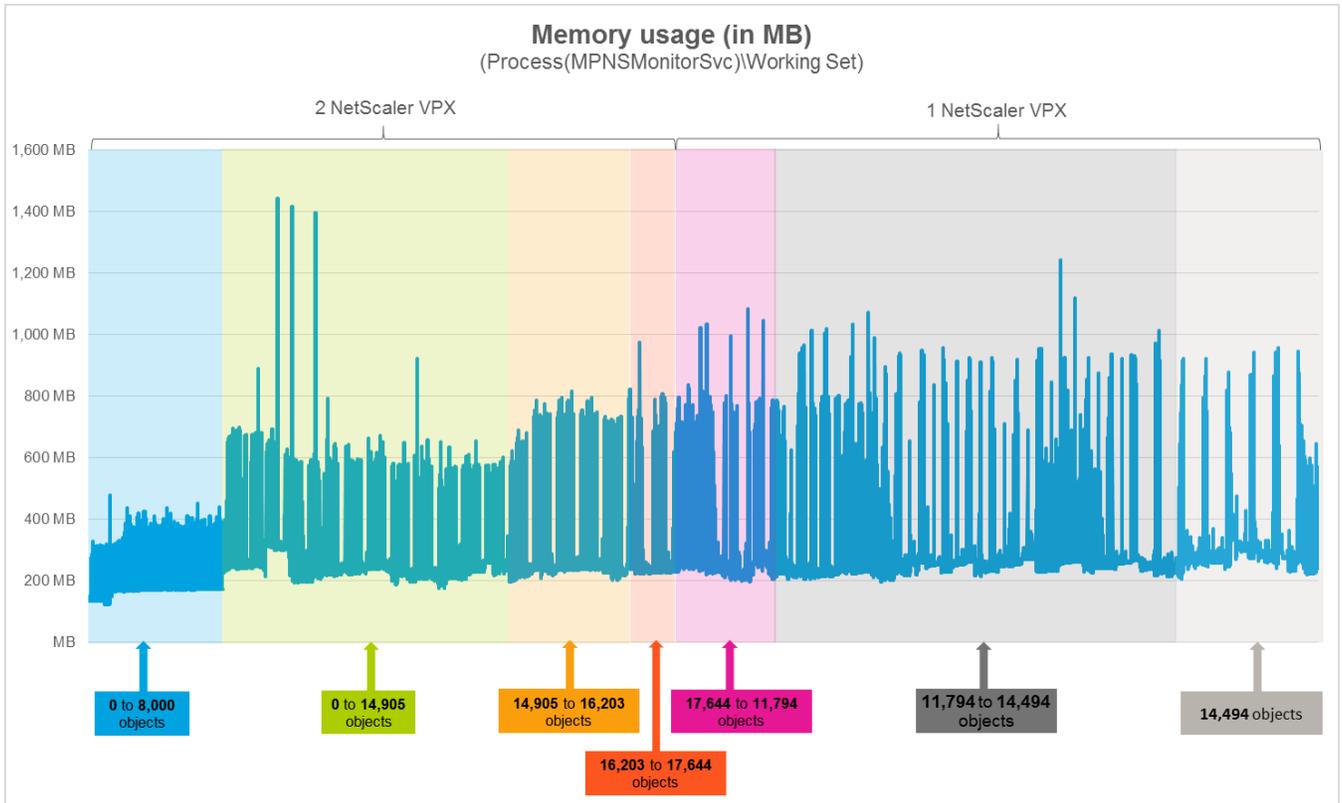
As figure 4.1 shows, adding NetScaler objects has no significant impact on the percentage of processor time used by NetScaler Management Pack Agent.

Figure 4.2 Percentage of processor time used by HealthService through time, measured in seven different validation sets



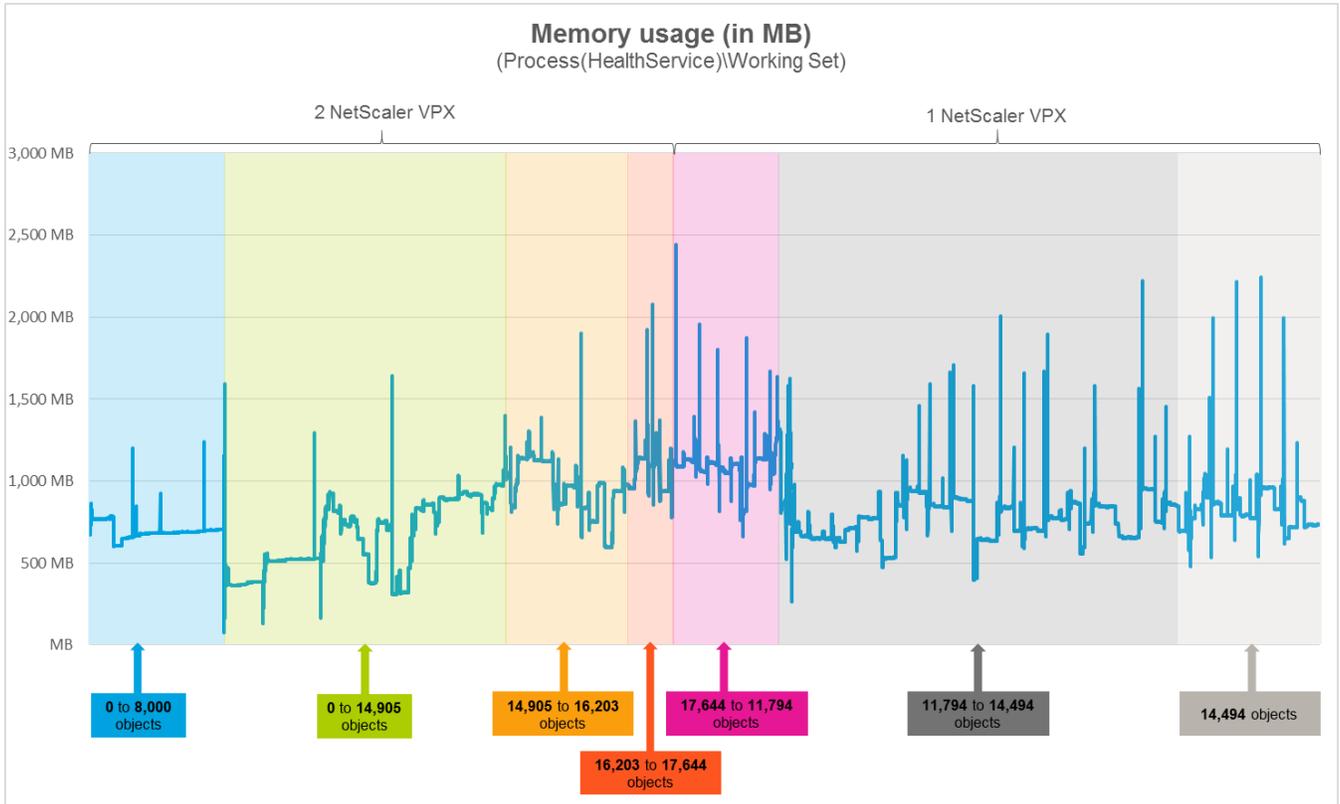
As figure 4.2 shows, addition of objects also does not influence the percentage of processor time used by the SCOM agent (Operations Manager Agent, Microsoft Monitoring Agent).

Figure 4.3 Memory usage of MPNSMonitorSvc through time, measured in seven different validation sets



As figure 4.3 shows, on the SCOM management server computer, there should be approximately 1.4 GB of physical memory available for the needs of the MPNSMonitorSvc service.

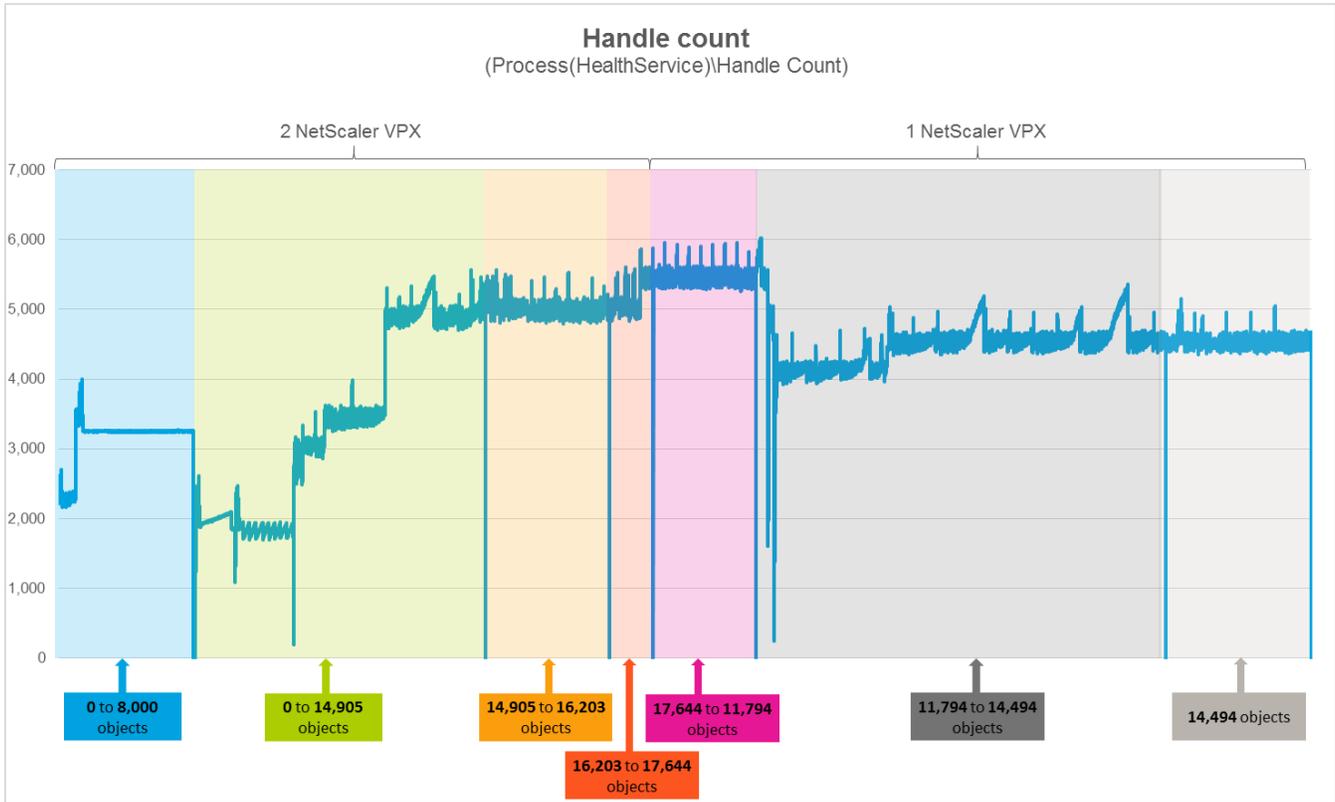
Figure 4.4 Memory usage of HealthService through time, measured in seven different validation sets



As figure 4.4 shows, on the SCOM management server computer, there should be approximately 1.6 GB of physical memory available for the needs of the HealthService service.

Detailed analysis of the sampled data reveals that NetScaler Management Pack has no significant impact on the compute and memory requirements for the SCOM resource pool members.

Figure 4.5 Handle count of HealthService through time, measured in seven different validation sets



The data analysis also helped estimate potential load on the HealthService service during workflow execution on individual validation sets. The following table lists handle count averages for different validation sets.

Number of objects	From	0	0	14,905	16,203	17,644	11,794	14,494
	To	8,000	14,905	16,203	17,644	11,794	14,494	
Average handle count		3,143	3,392	5,014	5,198	5,472	4,491	4,538

For validation sets that contained more than 14,000 NetScaler objects, the HealthService service started dropping data. This was caused by a very large amount of workflows on the SCOM management server computer that HealthService could not process. Tables 4.6 and 4.7 show the number of dropped data batches and data items for different validation sets.

Figure 4.6 Data batches dropped by `HealthService` through time, measured in seven different validation sets

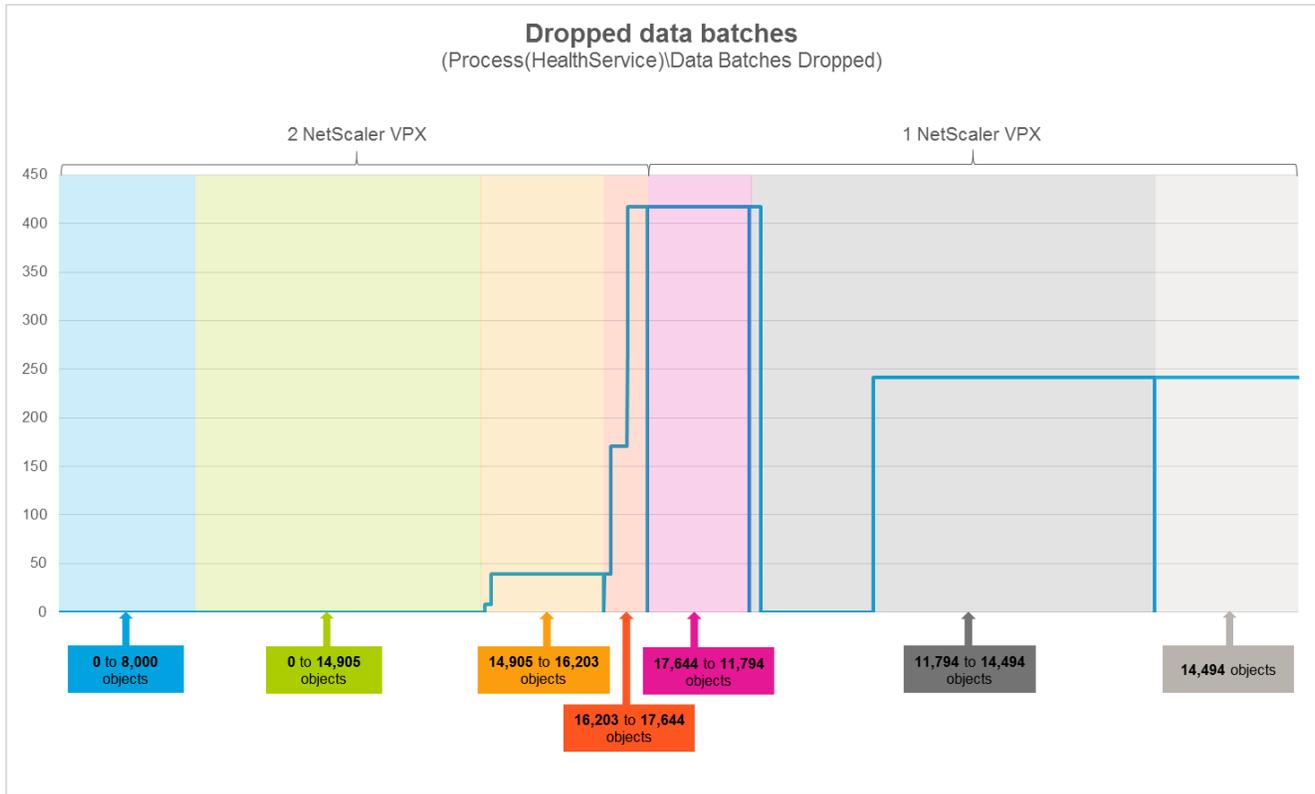
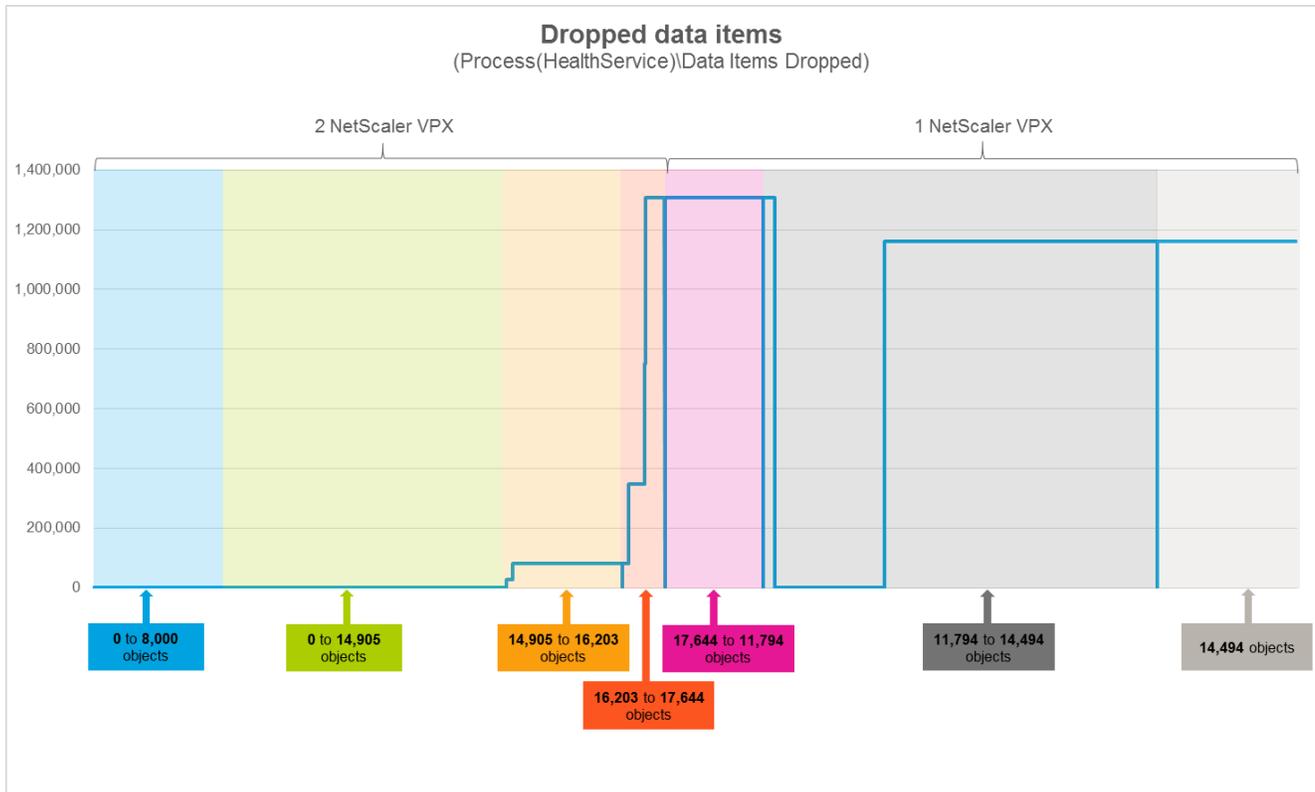


Figure 4.7 Data items dropped by HealthService through time, measured in seven different validation sets



Storage consumption of the SCOM database server

Storage consumption of the SCOM database server was measured in an environment with two NetScaler VPX appliances. The measurement process spanned a period of 30 days. During it, NetScaler objects were added to the monitored environment at different intervals of one or three days. Based on the results, maximum consumption of SCOM database (OperationsManager) and consumption growth of SCOM data warehouse (OperationsManagerDW) were determined.

Maximum consumption of the SCOM database

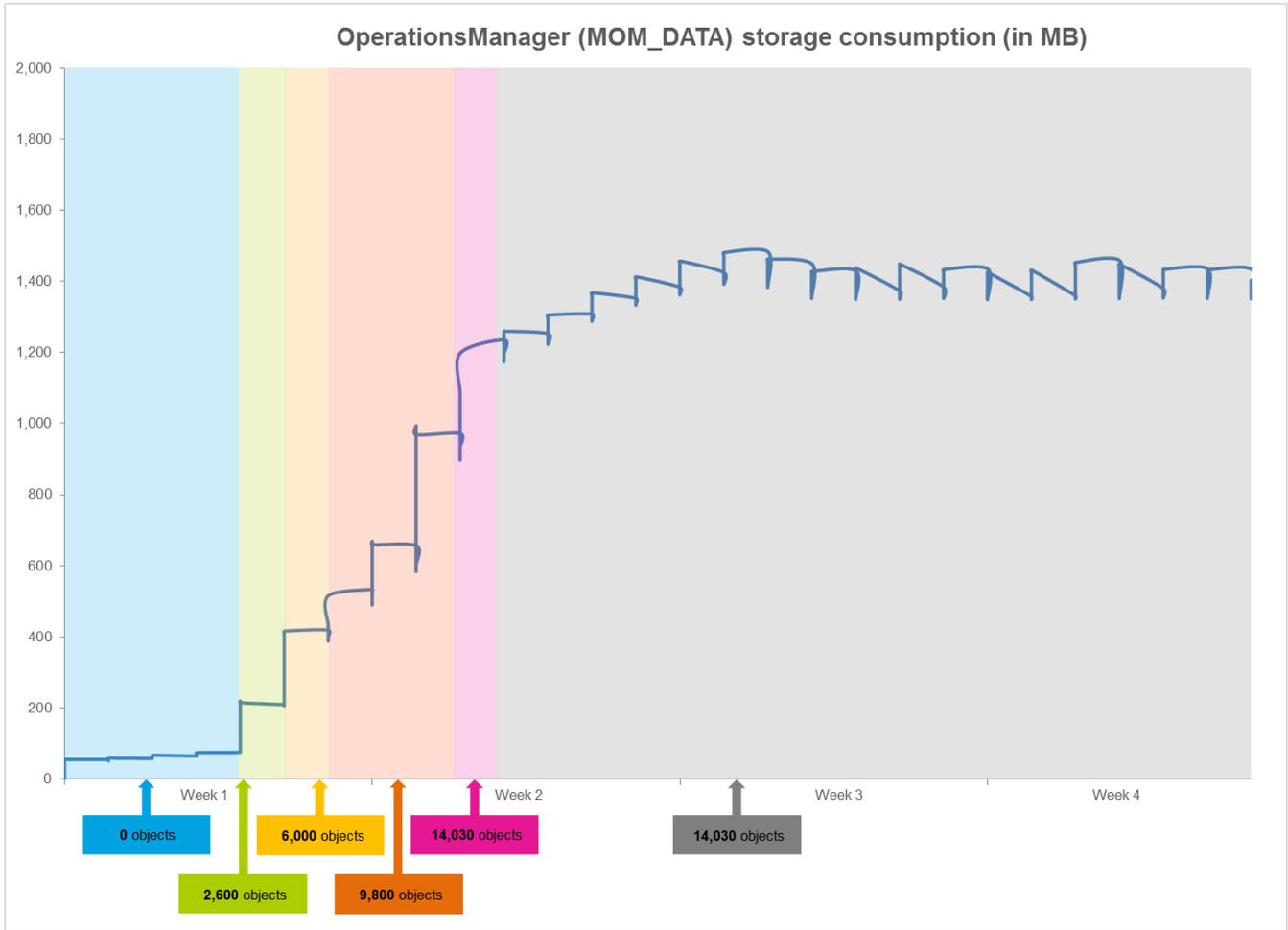
SQL Server database	Database filename	Monitored objects	Maximum storage consumption
OperationsManager	MOM_DATA	2,600	0.25 GB (237 MB)
		6,000	0.42 GB (433 MB)
		9,800	0.97 GB (994 MB)
		14,000	1.45 GB (1,483 MB)

Consumption growth of the SCOM data warehouse

SQL Server database	Database filename	Monitored objects	Consumption growth		
			Per day (in MB)	Per week ⁴ (in MB)	Per month ⁴ (in GB)
OperationsManagerDW	MOM_DATA	2,600	29	203	0.85
		6,000	49	344	1.44
		9,800	86	601	2.51
		14,000	197	1,377	5.76

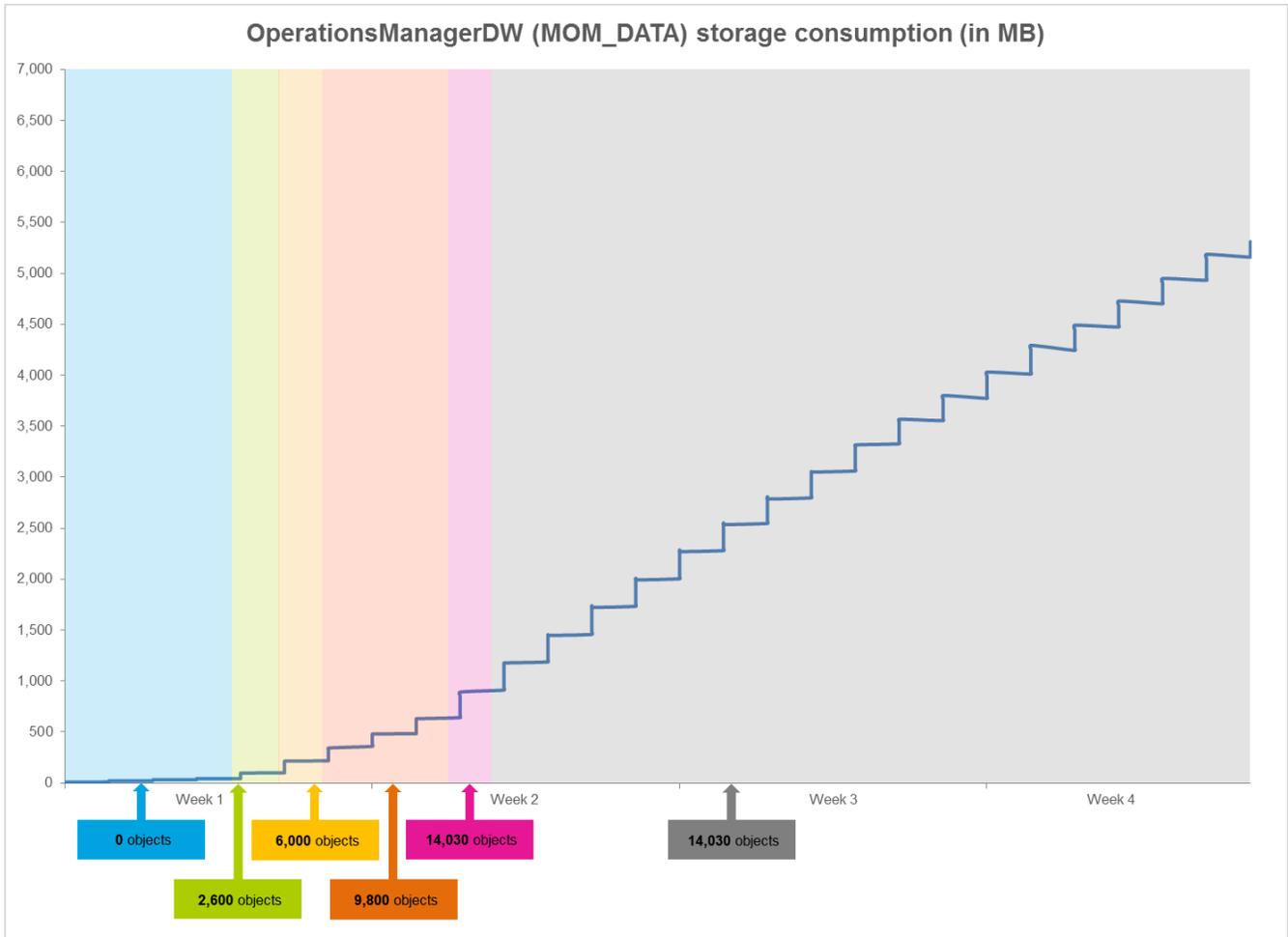
⁴ A projection.

Figure 4.8 Storage requirements of SCOM database (OperationsManager) through time, measured in six different validation sets



In figure 4.8 you can see a strong correlation between the number of monitored NetScaler objects and storage consumption of SCOM database. In stable circumstances, the SCOM database storage consumption (mean value) increases linearly with addition of new objects. The consumption then stabilizes when objects cease to be added.

Figure 4.9 Storage requirements of SCOM data warehouse (OperationsManagerDW) through time, measured in six different validation sets



In figure 4.9 you can see a linear growth of the SCOM data warehouse through the validation period. Increase in the storage consumption happens regardless of whether new objects are added to the monitored environment or not; it persists after the object count no longer changes. Depending on how many objects are added in each interval, the storage consumption growth may be either steeper or more gradual.