

HP Service Health Reporter

for the Windows® operating system

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Performance and Configuration Guide

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1 Introduction

HP Service Health Reporter (HP SH Reporter) is a cross-domain performance reporting solution. HP SH Reporter uses SAP BusinessObjects Enterprise for all its Business Intelligence and reporting needs. HP SH Reporter uses the Sybase IQ database for storing performance metrics for long periods. In addition to SAP BusinessObjects and Sybase IQ, it consists of several collectors that gather performance metrics from various data sources. This diversity of the product makes hardware sizing a challenging exercise.

One solution is to conduct performance tests on the product. The performance test results indicate HP SH Reporter's capability on the hardware on which the tests are run.

The key objective of this guide is to provide useful guidance for tuning various application, database, and operating system parameters and also to record the results of various performance tests carried out on the product.

[Chapter 2](#) of this guide provides general guidelines and best practices to obtain optimal performance from the HP SH Reporter application, the Sybase IQ database, and the operating system.

[Chapter 3](#) provides details of various performance benchmark tests conducted on HP SH Reporter. You can use the results of these tests to choose a system configuration for specific HP SH Reporter loads. These tests were conducted in a controlled environment and should only be used as an indication of the capacity of the system. It should not be directly replicated in the customer environment.

2 General Recommendations and Best Practices

This chapter provides the best practices and useful information for improving HP SH Reporter performance. It is divided into three sections—application, database, and operating system.

HP SH Reporter Application

HP SH Reporter implements an Extract, Transform, and Load (ETL) layer to collect, transform, and load data into its data warehouse. The data warehouse is implemented in a Sybase IQ column store database. Several parameters affect the performance of this ETL layer. You can apply the following tips and recommendations to tune this ETL layer for optimal performance on a given load:

- Sybase IQ is CPU-intensive. It is recommended to install HP SH Reporter with a remote Sybase IQ database for medium deployment configurations.
- Install only those Content Packs that have data sources configured. Content Packs installed in HP SH Reporter deploy data processing streams to audit and control the data flow. These streams consist of steps that implement various ETL tasks and also control the sequence of execution of these tasks.

Each Content Pack deploys one or more streams in HP SH Reporter. These streams are launched periodically and each step launches a process that runs the specified task. The HP SH Reporter 9.10 Content Packs deploy more than 140 steps. To keep the performance overhead of idle Content Packs low, it is recommended to install only those Content Packs that have data sources configured against them.

- The HP SH Reporter collectors provide the ability to collect historical data. The default settings for various data sources are:
 - HP Performance Agent: 15 days
 - Business Service Management (BSM) Profile database: 15 hours
 - BSM Service and Operations Bridge (OMi) database (Health Indicators (HIs) and Key Performance Indicators (KPIs)): 7 days
 - HP Operations Manager (HPOM) events: 30 days

These default settings may be changed to get additional historical data. However, performance can decline with increasing duration and number of agents. It primarily affects the RAM usage, and correspondingly increases the time taken for completing this operation.

If additional historical data is to be collected from the HP Performance Agents, increase the `<initHistory>` parameter in the `profiles.xml` file that is present in the `%PMDB_HOME%/config` folder. The number of HP Performance Agents polled for data concurrently is governed by the number of threads configured in the HP SH Reporter collection. The `org.quartz.threadPool.threadCount` parameter in the

`%PMDB_HOME%/config/jdbcscheduler.properties` file identifies the maximum number of threads that may be generated and therefore, the maximum number of HP Performance Agents that may be polled simultaneously. If the requested historical data is huge, decrease the number of threads. This ensures that the memory requirement of HP SH Reporter does not exceed and result in an `OutOfMemory` error. With 5000 hosts and 15 days of initial history collection, the recommended thread count is 50.

The Profile database is potentially another source for large volumes of data. The default value is 15 hours. If more than 15 hours of data is required, modify the `dbcollector.initHistory` parameter in the `%PMDB_HOME%/data/config.prp` file. If more historical data is required, set the thread count in the `%PMDB_HOME%/config/jdbcscheduler.properties` file to a very low value. This slows down the HP Performance Agent collection but allows the Profile database data to be collected, which can increase the heap memory consumption of HP SH Reporter. After the collection is complete, the thread count may be reset to the default value.

- A `MaxHistoryTime` parameter is defined in the `%PMDB_HOME%/config/profiles.xml` file for HP Performance Agent collection, in conjunction with `InitHistoryTime`. This parameter determines the maximum amount of historical data that may be collected by HP SH Reporter from the HP Performance Agents. `MaxHistoryTime` becomes important if the HP SH Reporter collection was down for several days and then is restarted.
- A `dbcollector.maxHistory` parameter is defined in the `%PMDB_HOME%/data/config.prp` file for Profile database data collection, in conjunction with `dbcollector.initHistory`. This parameter determines the maximum amount of historical data that may be collected by HP SH Reporter from the Profile database. `dbcollector.initHistory` becomes important if the HP SH Reporter collection was down for several days and then is restarted.
- After the data is loaded into the stage tables, the collected data is archived as CSV files in the `%PMDB_HOME%/stage/collection/archive` folder. These files are deleted periodically. If the number of files increases, it will adversely affect the disk I/O and the overall performance of the HP SH Reporter system.

Check for files in the `%PMDB_HOME%/collect/failed_to_transformed`, `%PMDB_HOME%/stage/collection/failed_to_stage`, and `%PMDB_HOME%/stage/collection/failed_to_load` folders regularly. Accumulation of files in these folders can adversely affect the disk I/O. These files contain data rejected by HP SH Reporter's ETL layer and may need manual processing before reprocessing is attempted. For information about the possible errors that might cause these files to accumulate and the resolution steps, see the *HP SH Reporter Troubleshooting Guide* section, "Report displays partial or no data."

- If there are too many files accumulated in the `%PMDB_HOME%/stage/` folder, decrease the thread count to reduce data inflow into HP SH Reporter till the backlog is cleared. This situation can occur if Sybase IQ was down for a period of time while data collection was running.
- HP SH Reporter uses either BSM Run-time Service Model (RTSM) or HPOM as its topology source. The default synchronization frequency for topology sources is set to 24 hours. This is the recommended minimum period. However, this value can be changed through the HP SH Reporter Administration Console. The ideal value for this frequency depends on the frequency with which the topology sources are updated. If RTSM or HPOM is updated at a much lower frequency, you should reduce the HP SH Reporter synchronization frequency accordingly. This helps avoid expensive dimension updates of all Content Packs. HP SH Reporter's performance decreases with increasing frequency of synchronization.

- The frequency of data collection from HP Performance Agent is set to one hour by default. You can change this parameter for each host in the Administration Console.
- All data movement within HP SH Reporter is controlled through a data processing framework. This framework allows the administrator to control the number of HP SH Reporter processes generated at any given time; there is no restriction on maximum processes generated by default. If the HP SH Reporter system has limited resources or is consuming very high CPU resources, providing a limit for the total number of HP SH Reporter data processes can help reduce resource utilization. This, however, can slow down the movement of data into HP SH Reporter. For more information about configuring the resource usage of the data processes, see the *Online Help for Administrators* section “Managing data processes.”
- Each data movement step that is processed in HP SH Reporter has a maximum time limit. This limit is set to 60 minutes by default. In certain cases where a large amount of data is being processed, steps like preaggregation and forecasting might exceed this limit. When this happens, the data processing stream displays an error state. In such cases, you must wait till the stream completes.

Sybase IQ Database

You can apply the following tips and recommendations to tune the Sybase IQ database for optimal performance:

- Retention period for HP SH Reporter are as follows:
 - Raw (as-collected) data – 30 days
 - Hourly aggregated data – 30 days
 - Daily aggregated data – 90 days

You can change the retention period. However, increasing the retention for raw data increases the size of the raw data table in Sybase IQ.

- The following Sybase IQ startup parameters, located in the `%SYBASE%\IQ-15_2\scripts\pmdbconfig.cfg` file, can be tuned for better HP SH Reporter performance. If you make any changes to the following parameters, you must restart the Sybase IQ database:

- **gm**

This parameter limits the total number of concurrent user connections to the Sybase IQ server; by default, HP SH Reporter sets this parameter to 150. If you have installed only one or two HP SH Reporter Content Packs, you can set this parameter to a lower value for better performance. Note that Sybase IQ allocates memory for both *active* and *idle* connections and a lower value of **gm** helps avoid overheads.

- **iqmc** and **iqtc**

Sybase IQ uses main and temporary buffer caches for database operations. The data is stored in one of the two caches whenever it is in memory. By default, HP SH Reporter sets **iqmc=920** and **iqtc=716** for small deployment and **iqmc=1845** and **iqtc=1430** for medium deployment. You can increase the value of the buffer cache for better database performance depending on the total amount of physical memory available on the system.

- HP SH Reporter creates database files and temporary dbspace files in the same directory (disk). The HP SH Reporter Internal Monitoring (IM) Service extends the **pmdb_user_main** database size automatically by adding new files when the database space usage crosses 85 percent. It is recommended that an initial file size of higher volume be set instead of allowing the HP SH Reporter IM Service to add the file.

▶ Note that the HP SH Reporter IM Service adds new files to the database in the same directory (same disk) as `pmdb.db` and will not extend the temporary dbspace.

For better Sybase IQ performance, consider adding more data files to the dbspace manually, preferably from a different disk, after the post-install configuration phase. This will increase the I/O rate and evenly distribute data in the database files, which will improve the overall database performance. You can add additional files to a dbspace either by using Sybase Central or from Interactive SQL Java (dbisql).

HP SH Reporter IM Service automatically adds the data file to the existing dbspace based on the deployment selection during the post-install configuration phase. Multiple smaller sets of data files will degrade the performance. Sybase IQ performs best if one big data file is added to the dbspace prior to the HP SH Reporter IM Service creation.

Add Database Files by using Sybase Central

To add database files by using Sybase Central, follow these steps:

- 1 Click **Start** → **Programs** → **Sybase** → **Sybase 15.2** → **Sybase Central Java Edition**. Sybase Central opens.
- 2 On the right pane, double-click **Sybase IQ 15**.
- 3 On the **Servers** tab, double-click **Servers**, and then double-click the server you want to connect to.
- 4 On the **Databases** tab, double-click the database you want to connect to.
- 5 In the **Connect** dialog box, on the **Identification** tab, type the user credentials.
- 6 On the **Database** tab, select the database you want to connect to and then click **OK**.
- 7 On the **Contents** tab, double-click **Dbspaces**. You can create a new dbspace file by clicking the **Create a dbspace** option on the left pane.

Add Database Files by using DBISQL

To add database files by using dbisql, follow these steps:

- 1 Click **Start** → **Programs** → **Sybase** → **Sybase 15.2** → **Interactive SQL Java**. Interactive SQL opens.
- 2 In the **Connect** dialog box, on the **Identification** tab, type the user credentials.
- 3 On the **Database** tab, select the database you want to connect to and then click **OK**.
- 4 Use the ALTER DBSPACE command to add a file:

```
ALTER DBSPACE <dbspace name> ADD FILE <logical name> '<complete file path>'
SIZE <size>
```

```
For example, ALTER DBSPACE pmdb_user_main ADD FILE pmdb_user_main02
'c:\dbfile\pmdb_user_main02.iq' SIZE 20GB
```

- If the following Sybase IQ database files are relocated to different drives prior to the start of data collection, it can enhance the performance:

- **Catalog Store** (for example, pmdb.db) - Once the database is created, this file cannot be moved.
- **IQ Store or IQ_SYSTEM_MAIN** (for example, pmdb.iq) - Once the database is created, this file cannot be moved.
- **IQ Temporary store or IQ_SYSTEM_TEMP** (for example, pmdb.iqtmp) - This file can be relocated post database creation.
- **IQ message log or IQ_SYSTEM_MSG** (for example, pmdb.iqmsg) - This file can be relocated post database creation.
- **Catalog Store transaction log** (for example, pmdb.log) - Once the database is created, this file cannot be moved.
- **User main or PMDB_USER_MAIN** (for example, pmdb_user_main(x).iq) - During the creation of the database, you can specify for different location.

Operating System Bottlenecks

To identify system-level resource bottlenecks, it is recommended that you monitor the performance of the operating system. Install HP Performance Agent or HP GlancePlus on the HP SH Reporter server for monitoring system performance. The following are a few rules to identify the operating system-level resource bottlenecks, using the metrics extracted from HP Performance Agent:

CPU bottleneck:

- Consistent high global CPU utilization ($GBL_CPU_TOTAL_UTIL > 90\%$), and significant Run Queue or Load Average (GBL_PRI_QUEUE or $GBL_RUN_QUEUE > 3$).
- Processes blocked on Priority ($PROC_STOP_REASON = PRI$).

Memory bottleneck:

- High physical memory utilization ($GBL_MEM_UTIL > 95\%$), and significant pageout rate ($GBL_MEM_PAGEOUT_RATE > 1$), or any deactivations ($GBL_MEM_SWAPOUT_RATE > 0$), or Vhand process consistently active (vhand's $ROC_CPU_TOTAL_UTIL > 5\%$).
- Processes or threads blocked on virtual memory ($GBL_MEM_QUEUE > 0$ or $PROC_STOP_REASON = VM$).

Disk bottleneck:

- Consistent high utilization on at least one disk device ($GBL_DISK_UTIL_PEAK$ or highest $BYDSK_UTIL > 50\%$).
- Significant queuing lengths ($GBL_DISK_SUBSYSTEM_QUEUE > 3$ or any $BYDSK_REQUEST_QUEUE > 1$).
- Processes or threads blocked on I/O wait reasons ($PROC_STOP_REASON = CACHE, DISK, IO$).

3 Performance Test Results

This chapter describes the performance test scenarios, the test methodology that is used, and the results of the performance tests.

Since it is difficult to perform performance tests on different platforms and HP SH Reporter configurations, a representative set of HP SH Reporter configurations were used to perform the performance tests.

The following table lists the performance test scenarios.

Test Scenario	HP SH Reporter and Sybase IQ System	Topology Source	Deployment Size	Content Packs
Performance Test Scenario 1	Single system	RTSM	Small	All
Performance Test Scenario 2	Single system	HPOM	Small	All
Performance Test Scenario 3	Single system	HPOM	Medium	All

Performance Test Scenario 1

HP SH Reporter and Sybase IQ are installed on the same system with all Content Packs installed. It is deployed in an RTSM environment. This performance testing is carried out on a small (supports 500 hosts) deployment.

The following table lists the test environment based on the Configuration Items (CIs) distribution where the performance tests were performed. For example, for a small deployment with 500 hosts, each host has three file systems. Therefore, the total number of file system CIs = $500 \times 3 = 1500$. Similarly, each host has two CPUs. Therefore, the total number of CPU CIs = $500 \times 2 = 1000$.

Table 1 CI Metrics Table for System Management

	Small Deployment Size
Total CIs per hour	144000
	CI Distribution
Host	500
File system	1500
Disk	1500
Network	1000
CPU	1000
Software	5000
Transaction	1500

Performance tests for HP SH Reporter are carried out for the BSM Service and Operations Bridge (SaOB) deployment scenario, with RTSM as the topology source. The test environment is based on the CI metrics for HP BSM, that is, BPM, SiteScope, and HPOM events. This information is listed in the following table.

Table 2 BSM SaOB Deployment Scenario

Metrics	Events per Second
Transactions (BPM)	4
Measurements (SiteScope)	40
Monitors (SiteScope)	10
HPOM events	35
Total	90

Test Methodology

The following test methodology was used to perform the performance tests:

- The test was carried out on a live environment with 500 live UNIX and Microsoft Windows hosts running HP Operations agent or HP Performance Agent.

- The average time taken to collect and transform data was measured.
- The average time taken by various steps of the data processes was measured.
- The CPU, memory, and disk I/O utilization of the HP SH Reporter system was collected at various periods during the test.

Hardware Configuration

Deployment Name	Recommended Hardware
HP SH Reporter (small deployment)	For HP SH Reporter and Sybase IQ on the same system
	CPU: 4
	RAM: 8 GB
	HDD size (preferably disk array with RAID5): 400 GB

Test Result Summary

The following table lists the test results for HP SH Reporter in the RTSM deployment scenario with all Content Packs installed.

Table 3 RTSM Small Deployment Scenario with All Content Packs (Live 500 HP Operations agent or HP Performance Agent Hosts)

Metric Name	Performance Metrics
RTSM topology collection	6 minutes 40 seconds
Data collection	8 minutes - Average 17 minutes - Maximum
Data load (raw data store)	1 minute 9 seconds - Average 20 minutes 35 seconds - Maximum
Data aggregation (aggregate data store)	3 minutes 43 seconds - Average 13 minutes 5 seconds - Maximum
Database maintenance	14 minutes 39 seconds - Average 16 minutes 29 seconds - Maximum

Performance Test Scenario 2

HP SH Reporter and Sybase IQ are installed on the same system with all Content Packs installed. It is then deployed in an HPOM environment. This performance testing was carried out on a small (supports 500 hosts) deployment.

The following table lists the test environment based on the Configuration Items (CIs) distribution where the performance tests were performed.

Table 4 CI Metrics Table for System Management

	Small Deployment Size
Total CIs per hour	144000
	CI Distribution
Host	500
File system	1500
Disk	1500
Network	1000
CPU	1000
Software	5000
Transaction	1500

Test Methodology

The following test methodology was used to perform the performance tests:

- The test was carried out on a live environment with 500 live UNIX and Microsoft Windows hosts running HP Operations agent or HP Performance Agent.
- The average time taken to collect and transform data was measured.
- The average time taken by various steps of the data processes was measured.
- The CPU, memory, and disk I/O utilization of the HP SH Reporter system was collected at various periods during the test.

Hardware Configuration

Deployment Name	Recommended Hardware
HP SH Reporter (small deployment)	For HP SH Reporter and Sybase IQ on the same system
	CPU: 4
	RAM: 8 GB
	HDD size (preferably disk array with RAID5): 400 GB

Test Result Summary

The following table lists the test results for HP SH Reporter in the HPOM deployment scenario with all Content Packs installed.

Table 5 HPOM Small Deployment Scenario with All Content Packs (Live 500 HP Operations agent or HP Performance Agent Hosts)

Metric Name	Performance Metrics
HPOM topology collection	28 minutes
Data collection	7 minutes – Average 15 minutes – Maximum
Data load (raw data store)	44 Seconds – Average 17 minutes 8 seconds – Maximum
Data aggregation (aggregate data store)	2 minutes 34 seconds – Average 11 minutes 23 seconds – Maximum
Database maintenance	15 minutes 25 seconds – Average 16 minutes 19 seconds – Maximum

Performance Test Scenario 3

HP SH Reporter and Sybase IQ are installed on the same system with all Content Packs installed. It is then deployed in an HPOM environment. This performance testing was carried out on a medium (supports 5000 hosts) deployment.

The following table lists the test environment based on the Configuration Items (CIs) distribution where the performance tests were performed.

Table 6 CI Metrics Table for System Management

	Medium Deployment Size
Total CIs per hour	1440000
CI Distribution	
Host	5000
File system	15000
Disk	15000
Network	10000
CPU	10000
Software	50000
Transaction	15000

Test Methodology

The following test methodology was used to perform the performance tests:

- The test was carried out on a live environment with 5000 live UNIX and Microsoft Windows hosts running HP Operations agent or HP Performance Agent.
- The average time taken to collect and transform data was measured.
- The average time taken by various steps of the data processes was measured.
- The CPU, memory, and disk I/O utilization of the HP SH Reporter system was collected at various periods during the test.

Hardware Configuration

Deployment Name	Recommended Hardware
HP SH Reporter (medium deployment)	For HP SH Reporter and Sybase IQ on the same system
	CPU: 8
	RAM: 16 GB
	HDD size (preferably disk array with RAID5): 800 GB

Test Result Summary

The following table lists the test results for HP SH Reporter in the HPOM deployment scenario with all Content Packs installed.

Table 7 HPOM Medium Deployment Scenario with All Content Packs (Live 5000 HP Operations agent or HP Performance Agent Hosts)

Metric Name	Performance Metrics
HPOM topology collection	5 hours 11 minutes – Average 7 hours 21 minutes – Maximum
Data collection	1 hour 51 minutes – Average 4 hours 4 minutes – Maximum
Data load (raw data store)	3 minutes – Average 48 minutes – Maximum
Data aggregation (aggregate data store)	4 minutes – Average 9 hours 4 minutes – Maximum
SQL Executor (custom procedures for data movement)	13 minutes – Average 15 hours 30 minutes – Maximum
Database maintenance (collection and database)	25 minutes – Average 3 hours 5 minutes – Maximum

