

**IBM Security Privileged Identity Manager
Performance Tuning Guide
Version 1 Update (PIM v1.0.0.2)**

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+---- Note -----+

Before using this information and the product it supports, read the information in 10.0, "Notices".

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This edition applies to version 1.0.0.2 of IBM Security Privileged Identity Manager Session Recorder and to all subsequent releases and modifications.

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Contents

1.0 Tables

2.0 About this information

2.1 Intended audience

2.2 Publications

2.2.1 IBM Privileged Identity Manager Session Recorder library

2.2.2 Related publications

2.3 Definitions for HOME and other directory variables

3.0 IBM Privileged Identity Manager Session Recorder performance tuning introduction

3.1 Environment

3.2 Focus areas

4.0 Prime the IBM Privileged Identity Manager Session Recorder database

5.0 Allocate resources

5.1 Memory

5.2 Processor

5.3 Disk space

6.0 Tune WebSphere Application Server

6.1 Adjust the Java virtual machine size

6.2 Modify the WebSphere Application Server log size

6.3 IBM Privileged Identity Manager Session Recorder work managers

6.3.1 Specify settings for subtask work manager

6.3.2 Change the application consumer threads for each Session Recorder application server

6.3.3 Change the application container threads for each Session Recorder application server in your environments

6.3.4 Alter the JDBC Data Source connection pool properties

7.0 Database servers used with IBM Privileged Identity Manager Session Recorder

7.1 Tune IBM DB2

7.1.1 Enable the self-tuning memory manager

7.1.2 Update IBM Privileged Identity Manager Session Recorder database

statistics for DB2 databases

7.1.3 Improve disk I/O performance

8.0 Tune IBM HTTP Server

8.1 Recommended IBM HTTP Server tunings for high-traffic environments

8.1.1 Maximum simultaneous connections

9.0 Best practices

9.1 IBM DB2

9.1.1 IBM DB2 Infocenter

9.1.2 IBM DB2 Performance Tuning

9.1.3 IBM DB2 developerWorks

9.1.4 DB2 maintenance

9.2 IBM WebSphere Application Server Performance

9.3 Operating Systems

9.4 Network

10.0 Notices

About this publication

This edition includes a troubleshooting, best practices, and regular maintenance sections as well. This publication is a working document and is updated as more information becomes available.

1.0 Tables

Table 1: Home Directory Variable Definitions

Table 2: Hardware Recommendations

Table 3: Work Manager Thread Pool Properties Example

Table 4: Server Thread Pool General Properties Example

Table 5: JDBC Connection Properties Configuration General Properties Example

Table 6: DB2 Registry Variables

2.0 About this information

This information describes how to tune the performance of the IBM® Privileged Identity Manager Session Recorder.

2.1 Intended audience

This information center is designed for the system and security administrators in an organization that uses IBM Privileged Identity Manager Session Recorder.

Readers are expected to understand system and security administration concepts. Additionally, the readers must understand administration concepts for the following types of products:

- * Database server
- * Application server
- * Web server

2.2 Publications

Read the descriptions of the product library and the related publications to determine which publications you might find helpful. After you determine the publications you need, refer to the instructions for accessing publications online.

2.2.1 IBM Privileged Identity Manager Session Recorder library

You can obtain the product documentation from the IBM Privileged Identity Manager Session Recorder information center. The information center is available at

http://publib.boulder.ibm.com/infocenter/tivihelp/v2r1/topic/com.ibm.ispim.doc_1.0.0.2/kc-homepage.html

2.2.2 Related publications

You can obtain related publications from these IBM websites.

- * IBM Software Support home page
[http://www.ibm.com/support/entry/portal/overview/software/software_support_\(general\)](http://www.ibm.com/support/entry/portal/overview/software/software_support_(general))
- * IBM Publications Center is available at
<http://www-05.ibm.com/e-business/linkweb/publications/servlet/pbi.wss>.
- * IBM Redbooks
<http://www.redbooks.ibm.com/>
- * IBM developerWorks
<http://www.ibm.com/developerworks/>
- * IBM Security Privileged Identity Manager version 1.0 Update Release Notes
http://publib.boulder.ibm.com/infocenter/tivihelp/v2r1/topic/com.ibm.ispim.doc_1.0.0.2/ReleaseNotes/reInotes101.html
- * Latest IBM Security Privileged Identity Manager version 1.0 Tuning Guide
<http://www.ibm.com/support/docview.wss?uid=swg27039803>

2.3 Definitions for HOME and other directory variables

The table contains default definitions that are used in IBM Privileged Identity Manager Session Recorder information center and guides. These definitions represent the HOME directory level for different product installation paths.

You can customize the HOME directory for your specific requirement. The default directory installation locations in the following table are provided for either administrator or root users.

Table 1: Home Directory Variable Definitions

Path variable	Default definitions	Description
SR_HOME	* Windows operating system: C:\Program Files (x86)\IBM\IBM Privileged Session Recorder Server	The base directory that contains IBM Security Privileged Identity Manager Session Recorder
DB_HOME	* Windows operating system: C:\Program Files\IBM\SQLLIB * Linux: /opt/ibm/db2/V9.7 * UNIX or AIX: /opt/IBM/db2/V9.7	The default DB2® home directory.
WAS_HOME	* Windows operating system: C:\Program Files\IBM\WebSphere\AppServer	The default WebSphere® Application Server home directory.

3.0 IBM Privileged Identity Manager Session Recorder performance tuning introduction

With IBM Privileged Session Recorder installed, licensed users can record privileged user endpoint activity in detail. Each user's session activity, including typed characters and mouse clicks, is recorded by Privileged Session Recorder and made available for forensics and compliance review. Auditors and managers can then subsequently search and replay these recordings for governance or troubleshooting purposes.

The IBM Privileged Identity Manager Session Recorder product can be divided into three major components:

- * WebSphere Application Server
- * IBM Privileged Identity Manager Session Recorder application
- * Database servers

The tuning for each of these components is described in this document.

3.1 Environment

Install the IBM Privileged Identity Manager Session Recorder server into a single server or into a clustered server environment. It is recommended that clustered environments are used as opposed to single server environments.

For performance tuning/troubleshooting purposes, it is recommended that the database server is located on a separate machine. It is further recommended that the database server is configured for optimal I/O performance with regards to the disk drives used by the database. For more information about best practices for tuning DB2, refer to the official DB2 documentation.

<http://pic.dhe.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.doc/welcome.html>

IBM Privileged Identity Manager configurations can vary significantly by platform, operating system, middleware applications, and hardware being used. You must tailor your configuration settings to your deployment. Configurations and settings used in this document include clustered application environments using stand-alone IBM DB2 database and IBM Http Server configurations.

3.2 Focus areas

To gain the most effective performance improvements, there are some important focus areas for better results.

There are several thousand different combinations of parameters that can be modified to tune WebSphere Application Server, IBM Privileged Identity Manager Session Recorder, and the database servers. This tuning guide discusses a small subset of these parameters that have proven effective during performance testing.

Perform the applicable tuning tasks for your systems. Key focus areas:

- * IBM WebSphere Application Server - JVM Tuning

- * IBM WebSphere Application Server- JMS Tuning
- * IBM DB2 - Bufferpools
- * IBM DB2 - Indexes
- * IBM DB2 - Optimizer statistics collection
- * IBM HTTP Sever maximum simultaneous connections

4.0 Prime the IBM Privileged Identity Manager database

When you tune a database in a newly deployed environment, it is important to prime your database statistics. Failing to prime the database can result in poor performance or transaction rollbacks.

About this task

Upload a small number of Session Recordings to prime the IBM Privileged Identity Manager Session Recorder database. Then update the database statistics.

These database statistics tuning tasks are a vital part of the IBM Privileged Identity Manager product performance.

Procedure

* For DB2, use the RUNSTATS command. For more information about this command, see the DB2 information center.

<http://pic.dhe.ibm.com/infocenter/db2luw/v9r7/index.jsp>

5.0 Allocate resources

You must properly allocate resources, such as memory, CPU, and disk space, to aid in the tuning process.

Establishing proper tuning values is a much more challenging concept when more than one middleware component is running on a given system. The tuning choices differ, depending on many different factors. It is recommended that the following items be calibrated and balanced so that they are not over-allocated:

- * 5.1, "Memory"
- * 5.2, "Processor"
- * 5.3, "Disk space"

5.1 Memory

System administrators and database administrators can adjust how much memory WebSphere Application Server and DB2 use.

Use these considerations when you allocate memory to middleware components:

- * Middleware memory settings that are too high can result in the operating system swapping memory out to disk if the physical memory is exceeded. Memory swapping results in poor performance. After setting up or changing values, monitor the memory and swap space to ensure that nothing is swapped out to disk. Adjust the settings to correct any issues.
- * Some middleware may pose limitations on configuring with 32bit environments. Performance recommends configuring with 64bit environments.
- * Although the buffer pools account for a large amount of the memory used by DB2, the application control heaps, sort heaps, and statement heaps also use memory. In addition to database-wide memory heaps, each database connection results in memory allocations.

Do not overlook these per-connection memory requirements when computing how much memory to allocate to DB2.

- * A large part of the memory usage for WebSphere Application Server is the JVM size. However, the size of the JVM does not set an upper bound on the amount of memory that the WebSphere Application Server uses.
- * Operating system limits can prevent processes from accessing all available memory. Confirm the appropriate limits to user resource values for your system, using the `ulimit -a` command. Ensure that the values do not artificially limit the amount of memory available.
- * At a bare minimum it is recommended to allocate 6-8 GB on the machine that houses WebSphere Application Server and at least 4-6 GB for the machine that houses

the Database server.

5.2 Processor

System administrators can adjust the processor usage for the IBM Privileged Identity Manager Session Recorder product and its components.

The following components are part of the IBM Privileged Identity Manager Session Recorder product:

- * IBM Privileged Identity Manager Session Recorder application
- * WebSphere Application Server
- * Database server

All of these components are processor-intensive. This performance tuning information groups WebSphere Application Server and the IBM Privileged Identity Manager Session Recorder application together because it is difficult to isolate their processor usage. Keep in mind the following considerations:

- * DB2 is multi-threaded and multi-processed. Applications perform best on a multi-processor server.
- * Even in a well-tuned environment, system bottlenecks might vary between the processor, memory, and disk on the IBM Privileged Identity Manager Session Recorder server, network throughput constraints, and the database server. You can expect better overall performance when the IBM Privileged Identity Manager Session Recorder server, and the database server are deployed on separate servers.

5.3 Disk space

System administrators and database administrators can adjust the amount of disk space available for IBM Security Privileged Identity Manager Session Recorder and DB2.

Each of the middleware components uses different amounts of disk space for various purposes:

- * WebSphere Application Server and the IBM Security Privileged Identity Manager Session Recorder application use disk space beyond their installation size because of log files and stored indices.

Use the WebSphere Application Server Administrative Console to configure the log file sizes for both System.out and System.err. To set these log file sizes, see 7.2, "Modify the WebSphere Application Server log size".

- * IBM Security Privileged Identity Manager Session Recorder uses local file indices on each application server where the product is installed. Ensure that the file systems for the application servers have adequate storage space to accommodate these indices.

- * IBM Security Privileged Identity Manager Session Recorder writes recordings to the configured database. Minimum recommended drive space are shown in the HW Recommendations table. The amount of disk space required may vary depending upon your session activity and usage requirements. This value is calculated based on example testing:

For example in a test environment where 150 simulated administrators were operating while their sessions were being recorded continually for an 8 hour workday, it was

seen that approximately 15-25GB of data was written to the database per hour. For a 40 hour period, this equates to approximately 1000GB of storage space.

Minimum hardware recommendations for IBM Security Privileged Identity Manager Session Recorder:

Table 2: Hardware Recommendations

HW Recommendations for PIM SR V1

PIM Session Recorder (WAS)

System Components	Minimum Values*	Recommended Values**
System Memory (RAM)	8 GB	16-24 GB
Processor Speed	Dual 2.0 GHz Intel Processors	4X3.34 GHz Intel Processors
Disk Space	500 GB	1 TB

PIM Session Recorder (DB)

System Components	Minimum Values*	Recommended Values**
System Memory (RAM)	8 GB	12-18 GB
Processor Speed	Dual 2.0 GHz Intel Processors	4X3.34 GHz Intel Processors
Disk Space	5 TB	10-12 TB

6.0 Tune WebSphere Application Server

WebSphere Application Server provides settings that enable you to tune the environment.

WebSphere Application Server v7.0 infocenter:

http://pic.dhe.ibm.com/infocenter/wasinfo/v7r0/topic/com.ibm.websphere.base.doc/info/aes/ae/welcome_base.html

WebSphere v7.0 Tuning performance infocenter:

<http://pic.dhe.ibm.com/infocenter/wasinfo/v7r0/topic/com.ibm.websphere.base.doc/info/aes/ae/welc6toptuning.html>

6.1 Adjust the Java virtual machine size

IBM Privileged Identity Manager Session Recorder runs on both 32-bit and 64-bit JVMs on supported platforms.

About this task

With a 64-bit JVM, you can allocate 2 GB or more of memory. You might need to allocate more memory for larger deployments depending on expected server load.

Important:

- * Do not set the JVM heap size larger than the physical RAM. Performance of WebSphere Application Server degrades significantly if the operating system swaps out the JVM to swap space. Setting the heap size larger than the physical RAM can cause slow user interface (UI) performance, transaction timeouts, and higher than normal disk utilization.
- * Before setting the JVM initial/max heap size on the WebSphere Application Server, ensure that you have enough available RAM. Close unnecessary, unrelated applications running on the IBM Privileged Manager server. Configure other applications to use less memory.

Use the following parameters to set the JVM heap size:

`initial_jvm_heap_size`

Specifies the initial size of the JVM heap in megabytes.

- * 32-bit JVM with 4 GB RAM available on the computer requires 1024 MB. (Recommended value 1280 MB)
- * 64-bit JVM with 8GB or more RAM available on the computer requires 1280 MB. (Recommended value 4096 MB)

`max_jvm_heap_size`

Specifies the maximum size of the JVM heap in megabytes.

- * 32-bit with 4 GB RAM available on the computer requires 1280 MB

Do not set JVM heap sizes on 32-bit Windows platforms higher

than 1280 MB even if the system has more available memory. Setting the maximum heap memory too high on 32-bit JVMs can cause memory allocation problems in Java. Problems occur when the memory limit is reached for 32-bit processes.

* In a 64-bit environment, it is recommended that the `max_jvm_heap_size` be set to at least 2048MB

Typically, 2048MB is an adequate maximum for the heap size on 64-bit JVMs. Although the maximum heap size can be more than 4 GB, do not set it higher than necessary. A larger value can result in long delays during a full garbage collection.

Procedure

1. Open the WebSphere Application Server Administrative Console.
2. Navigate to Servers > Server types > WebSphere application servers > Application Servers > <your application server name> > Java and Process Management > Process Definition.
3. Select Java Virtual Machine from the Additional Properties pane on the right.
4. Set Initial Heap Size with the appropriate value of `initial_jvm_heap_size`.
5. Set Maximum Heap Size with the appropriate value of `max_jvm_heap_size`.
6. Click OK.
7. Save the settings to the master configuration.
8. Restart the application server for the changes to take effect.

NOTE: In a clustered environment, repeat these steps for each application server in the cluster.

6.2 Modify the WebSphere Application Server log size

You might need to modify the WebSphere Application Server log size to better manage the amounts of disk space used during server runtime.

About this task

Use these log file sizes for both `SystemOut.log` and `SystemErr.log` files:

- * Maximum size = 10 MB
- * Maximum number of historical log files = 5

Take these steps to configure the log file sizes:

Alter WebSphere Application Server log file attributes:

Procedure

1. Open the WebSphere Application Server Administrative Console.
2. Navigate to Troubleshooting > Log and trace > <your server name> > JVM Logs.
3. Configure the log sizes.
4. Save the settings to the master configuration.
5. Restart the application server for the changes to take effect.

NOTE: Repeat the above steps for any additional resources in your environment.

6.3 IBM Privileged Identity Manager Session Recorder work managers

Work managers are thread pools that administrators create for J2EE applications to provide simultaneous multi-threading and increase workload throughput. The administrator specifies the properties of the thread pool and a policy that determines which J2EE contexts that the asynchronous bean inherits.

For IBM Privileged Identity Manager Session Recorder server the default work

manager consumer is called recorderWorkMgr. This work manager consumes the ISPIM Session Recording server queue messages.

6.3.1 Specify settings for subtask work manager

You might need to specify settings for the subtask work manager for your environment to meet timeout, queue size, and other runtime needs.

About this task

The subtask settings also include thread pool properties:

Table 3: Work Manager Thread Pool Properties Example

Thread pool property	Value
Number of Alarm Threads	2
Minimum Number of Threads	100
Maximum Number of Threads	200
Thread Priority	5
Growable	No/Unchecked

Take these steps:

Procedure

1. Open the WebSphere Application Server Administrative Console.
2. Navigate to Resources > Asynchronous beans > Work managers.
3. Select the recorderWorkMgr Work Manager.
4. Use the values in the tables to specify work manager settings that are appropriate for your environment. NOTE: The example tables above are only examples, and may not be appropriate values for your environment.
5. Save the settings to the master configuration.
6. Restart the application server for the changes to take effect.

6.3.2 Change the application consumer threads for each application server

Each Application server and/or Application cluster member contains a flat file that contains the Event system queue consumer daemon tasks. This flat file can be edited to alter the number of consumer threads running on the application server as appropriate for your environment to meet timeout, queue size, and other runtime needs.

Procedure

1. Edit the following file for each ISPIM Session Recording application server in your environment:

```
$WAS_HOME\profiles\<<profile name>\installedApps\<<cell name>\ISPIMRecorder.ear\com.ibm.security.recorder.service.rest.collector.war WEB-INF\classes\config\spring\collector>jms-cqc-daemon.xml
```

NOTE: This example file shows a total of 100 threads

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE beans PUBLIC
    "-//SPRING/DTD BEAN 2.0/EN"
```

```

"http://www.springframework.org/dtd/spring-beans-2.0.dtd">
<!-- Spring beans for recorder queue -->
<beans>

<bean abstract="true" id="RecorderQConsumerDaemonTask"
      class="com.ibm.security.recorder.jms.RecorderQueueConsumerDaemonTask">
  <property name="consumerChainExecutor" ref="consumerChainExecutor" />
</bean>

<!-- ===== -->
<!-- Event system queue consumer daemon tasks -->
<!-- ===== -->
<bean id="RecorderQueueManager" parent="RecorderQJWorkManagerDaemonTaskManager">
  <property name="tasks">
    <list>
      <!-- First 50 threads -->
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#1" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#2" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#3" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#4" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#5" /> </bean>

```

...NOTE: This example has been truncated for publications...

```

        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#46" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#47" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#48" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#49" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#50" /> </bean>

```

<!-- Second set of 50 threads -->

```

        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#set2-1" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#set2-2" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#set2-3" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#set2-4" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#set2-5" /> </bean>

```

...NOTE: This example has been truncated for publications...

```

        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#set2-46" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#set2-47" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#set2-48" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#set2-49" /> </bean>
        <bean parent="RecorderQConsumerDaemonTask"> <property name="id" value="RecorderQConsumer#set2-50" /> </bean>

```

```

    </list>
  </property>
</bean>

</beans>

```

2. Save the edited files.
3. Restart the application server for the changes to take effect.

NOTE: Repeat the above steps on each Session Recording application server in your environment.

6.3.3 Change the application server container threads for each Session Recording application server in your environment:

Procedure

Clustered WebSphere Application server environment:

1. Open the WebSphere Application Server Administrative Console.

2. Navigate to Servers > Clusters > WebSphere application server clusters
3. Click on IBM Security Recorder
4. Click on Cluster members
5. Click on the name of your cluster member
6. Under Additional Properties
7. Click on Thread pools
8. Click on WebContainer
9. Use the values in the table to specify work manager settings that are appropriate for your environment. NOTE: The example tables are only examples, and may not be appropriate values for your environment.

Table 4: Server Thread Pool General Properties Example

Name	Value
WebContainer	
Description	
Minimum Size	50 threads
Maximum Number of Threads	50 threads
Thread inactivity timeout	60000ms

10. Save the settings to the master configuration.
11. Restart the application server for the changes to take effect.

NOTE: Repeat this edit for each cluster member in the cluster.

6.3.4 Alter the JDBC Data source connection pool properties

Edit the settings of a datasource that is associated with your selected JDBC provider. The datasource object supplies your application with connections for accessing the database.

Procedure

1. Open the WebSphere Application Server Administrative Console.
 2. Navigate to Resources > JDBC > Data Sources
 3. Click on RecorderDB2DataSources
 4. Under Addition properties, click on Connection pool properties
 5. Use the values in the table to specify work manager settings that are appropriate for your environment.
- NOTE: The example tables are only examples, and may not be appropriate values for your environment.

Table 5: JDBC Connection Properties Configuration General Properties Example

Name	Value
Connection timeout	180 seconds
Maximum connections	800 seconds
Reap time	180 seconds
Unused timeout	180 seconds
Aged timeout	0 seconds

```

+-----+-----+
| Purge policy                | FailingConnection Only    |
+-----+-----+

```

6. Save the settings to the master configuration.
7. Restart the application server for the changes to take effect.

7.0 Database servers used with IBM Privileged Identity Manager Session Recorder

IBM DB2 Infocenter

<http://pic.dhe.ibm.com/infocenter/db2luw/v9r7/index.jsp>

IBM Privileged Identity Manager Session Recorder supports DB2 databases. Each database requires slightly different tuning. To improve performance, tuning the database is one of the most important tuning procedures for IBM Privileged Identity Manager Session Recorder.

7.1 Tune IBM DB2

IBM Privileged Identity Manager Session Recorder works with DB2 for Linux, AIX and Windows, including DB2 Version 9.7, which has auto-tuning mechanisms that can reduce administrative and maintenance tasks.

Tuning DB2 to run with IBM Privileged Identity Manager Session Recorder can include the following:

- * Enabling the DB2 self-tuning memory manager
- * Updating statistics.

7.1.1 Enable the self-tuning memory manager

The DB2 self-tuning memory manager handle tuning the memory values for areas such as buffer pools, the sort heap, and the package heap. With self-tuning memory enabled, DB2 can move memory between areas based on system need. DB2 version 9 databases have the self-tuning memory manager enabled by default.

Procedure

1. Update the database configuration to use the self-tuning memory manager:
`db2 update db cfg for isrm_database_name using SELF_TUNING_MEM ON`
2. Set the amount of memory available to the self-tuning memory manager:
`db2 update db cfg using DATABASE_MEMORY db_mem_size`
3. Restart IBM DB2 for this change to take effect.

7.1.2 Update IBM Privileged Identity Manager Session Recorder database statistics for DB2 databases

DB2 requires statistics on the number of rows in the tables and available indexes to efficiently execute queries. DB2 version 9 can update the statistics automatically, or you can manually update the statistics.

If RUNSTATS is not set to run automatically, you should manually execute RUNSTATS

as documented in the DB2 infocenter.

About this task
Use RUNSTATS

Ensure that RUNSTATS is automatically enabled on your databases (the default).

Perform RUNSTATS and the ReorgChk utilities after any large-scale changes to the database particularly if you experience high processor usage or poor DB2 database performance.

For example, changes include:

- * After multi-session recording captures
- * After large number captures
- * After an extended period of DB2 operations without using the automated utilities

It is recommended to use RUNSTATS on an idle or lightly used database because it requires update locking on the system statistics table to update the database statistics. The system acquires locks on the tables that are used by the database optimizer to fulfill queries. The locks might cause transaction rollbacks on a database with a heavy load.

7.1.3 Improve disk I/O performance

Disk I/O performance depends upon the drive types, layout, and configuration. You can change some registry variables to improve performance on some systems.

About this task

The following DB2 registry variables might improve performance.

Table 6: DB2 Registry Variables

Systems	Parameter	Value
All systems	DB2_USE_ALTERNATE_PAGE_CLEANING	ON
Systems with SAN, RAID, or other advanced disk subsystem	DB2_PARALLEL_IO	*

8.0 Tune IBM HTTP Server

IBM HTTP Server software library:

<http://www-01.ibm.com/software/webservers/httpservers/library/v70.html>

IBM HTTP Server, Version 7 infocenter:

http://pic.dhe.ibm.com/infocenter/wasinfo/v7r0/topic/com.ibm.websphere.ihs.doc/info/ihs/ihs/welcome_ihs.html

IBM HTTP Server Tuning document:

http://publib.boulder.ibm.com/httserv/ihsdiag/ihs_performance.html

The WebSphere Application Server uses the IBM HTTP Server (IHS) as a front-end server in a single-server installation. It uses the IBM HTTP Server as a load balancer between nodes in a cluster installation. Small and medium configurations can typically use default configuration parameters for the IBM HTTP Server. Larger or high-traffic ISPIIM Session Recording configurations will need to increase certain IHS parameters to enable proper tuning.

Tuning IBM HTTP Server is very specific to each particular operating environment. Many factors can impact the need to perform tunings, to include items such as the following: load, infrastructure, network speed, network traffic, peak and off hours, simultaneous number of connections, workload, caching, server I/O, etc. Please refer to the relevant IBM HTTP Server documentation for tuning recommendations and best practices.

8.1 Recommended IBM HTTP Server tunings for high-traffic environments

8.1.1 Maximum simultaneous connections

One of the main attributes to tune in an IHS environment is the value which controls the maximum number of simultaneous client connections allowed into the IBM HTTP server. This values should be set to a value which is approximately 25% above what the expected maximum number of connections will be. Windows based platforms and UNIX/Linux based platforms use different attributes to set this value.

http://publib.boulder.ibm.com/httserv/ihsdiag/ihs_performance.html#MaxClients

Procedure

Windows

Windows: Set the maximum number of simultaneous clients on a Windows based IBM HTTP Server

On Windows platforms, the default values to control the number of client connections is set with the following two parameters :

ThreadLimit

ThreadsPerChild

By default these values are set to 600. If you anticipate a greater number of clients connecting to the IHS in your environment, this number should be adjusted accordingly. Please refer to the IBM HTTP Server documentation for more tuning details. There are two methods of adjusting the value of the attribute:
Method one:

Manually edit the following attribute in the C:\Program Files\IBM\HTTPServer\conf\httpd.conf file on the IBM HTTP Server:

```
# ThreadLimit: maximum setting of ThreadsPerChild
# ThreadsPerChild: constant number of worker threads in each server process
# MaxRequestsPerChild: maximum number of requests a server process serves
ThreadLimit 600
ThreadsPerChild 600
```

Be sure to save your edits and restart the IBM HTTP Server to invoke the changes.

Method two:

The attribute can be altered via the IBM WebSphere Administrative console:

1. Open the WebSphere Application Server Administrative Console.
2. Navigate to Servers > Server Types > Web servers
3. Click on <you webserver name>
4. Under Addition properties, click on Configuration file
5. Make the appropriate edit to the file
6. Click Apply
7. Click OK
8. Restart the webserver to invoke the changes

Procedure

UNIX/Linux: Set the maximum number of simultaneous clients on a UNIX/Linux based IBM HTTP Server

On UNIX/Linux platforms, the default values to control the number of client connections is set with the following parameter:

MaxClients

By default this value is set to 600. If you anticipate a greater number of clients connecting to the IHS in your environment, this number should be adjusted accordingly. Please refer to the IBM HTTP Server documentation for more tuning details. There are two methods of adjusting the value of the attribute:
Method one:

Manually edit the following attribute in the /opt/IBM/HTTPServer/conf/httpd.conf file IBM HTTP Server :

```
# MaxClients: maximum number of simultaneous client connections
MaxClients 600
```

Be sure to save your edits and restart the IBM HTTP Server to invoke the changes.

Method two:

The attribute can be altered via the IBM WebSphere Administrative console:

1. Open the WebSphere Application Server Administrative Console.
2. Navigate to Servers > Server Types > Web servers
3. Click on <you webserver name>
4. Under Addition properties, click on Configuration file

5. Make the appropriate edit to the file
6. Click Apply
7. Click OK
8. Restart the webserver to invoke the changes

9.0 Best practices

You can set up and configure IBM Privileged Identity Manager Session Recorder in many ways. Use this information to determine the best configuration for your environment.

9.1 IBM DB2

9.1.1 IBM DB2 Infocenter

Please refer to IBM DB2 documentation for information with regards to setting up the IBM PIM SR database up for high traffic environments:

<http://pic.dhe.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.doc/welcome.html>

9.1.2 IBM DB2 Performance Tuning

<http://pic.dhe.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.admin.perf.doc/doc/c0005414.html>

9.1.3 IBM DB2 developerWorks

<https://www.ibm.com/developerworks/mydeveloperworks/groups/service/html/communityview?communityUuid=d4334e67-3b43-4d33-bf32-22a73685871c>

It is recommended that you follow the official guidelines provided by the IBM DB2 documentation with regards to setting up the database server so that the I/O is balanced and is not bound. There are various levels of RAID and other file system layout parameters that can increase the performance of the database server.

9.1.4 DB2 maintenance

As the IBM Privileged Identity Manager Session Recorder can be DB2 intensive, please follow all recommended IBM DB2 maintenance tasks.

9.2 IBM WebSphere Application Server Performance

<http://www-01.ibm.com/software/webservers/appserv/was/performance.html>

It is recommended that you follow the guidelines provided by the IBM WebSphere Application server documentation with regards to configuring the appropriate environment. Various levels of RAID and other file system layout parameters that can be used increase the performance of the IBM WebSphere Application server environment.

9.3 Operating Systems

For the IBM Privileged Identity Manager Session Recorder component servers, including IBM WebSphere Application servers, IBM HTTP Servers, and IBM DB2 servers, it is recommended that the operating systems be installed for optimum performance

as directed by the official IBM documentation for each component. This includes configuring the base operating systems up using appropriate RAID configurations and ensuring that optimal disk drive settings are used to maximize I/O.

9.4 Network

It is crucial to have the fastest possible network connectivity between the components of the IBM Privileged Identity Manager Session Recorder environment.

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