Adeptia Suite 6.2 SP1 Performance Tuning Guide

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PREFACE

The performance tuning guide is designed to help Adeptia users configure Adeptia Suite for maximum performance. It also describes different parameters that can be tweaked to improve the performance in different scenarios.

Target Audience

This document is intended for all the users who want to monitor and improve the performance of Adeptia Suite.

Applies To

This document applies to the following Adeptia Products:

- Adeptia EBIM Suite
- Adeptia BPM Suite
- Adeptia B2B Integration Suite
- Adeptia Integration Suite
- Adeptia ETL Suite

HOW IS THIS GUIDE ORGANIZED?

This guide is organized into the following sections:

Section	Description
Preface	Introduction to this document
Recommended System Configuration	To get the better performance
Java Heap Size	Recommended Java Heap Size Settings
DB Connection Pool	Log Database Connection Pool, Backend Database Connection Pool
Process Flow Settings	To reduce the log generated and to make sure that the disc space is not filled up
Process Flow Design	Determining the performance of a process flow

Section	Description
Additional Tuning Options For Large Volume Data	Configure larger Kernel Memory, Use High speed, multi core processors, Mapping - use splitting and Parallel processing in Mapping
Additional Tuning Options For Large Number Of Transactions	Faster Response Time
Best Practices	Best Practices

CONVENTIONS

The following tables list the various conventions used in Adeptia documentation. We follow these conventions to help you quickly and easily identify particular elements, processes, and names that occur frequently in documents.

Typographical conventions

This guide uses the following typographical conventions:

Convention	Description
Bold text	Indicates one of the following: ▪ Screen element ▪ New terminology ▪ A file or folder name ▪ A control in an application's user interface ▪ A registry key ▪ Important information
Italic text	Indicates a reference or the title of a publication.
`Monospaced text`	Indicates code examples or system messages.
`Monospaced bold text`	Indicates system commands that you enter.
Hyperlink	Indicates an Internet link to target material.

Graphical conventions

This guide uses the following graphical conventions:

Convention	Description
	Indicates additional information that may be of interest to the reader.
	Indicates cautions that, if ignored, can result in damage to software or hardware.

CONTACTS/REPORTING PROBLEMS

These sections present contact information for a variety of situations.

Sales

In case of any sales queries, please contact us at *sales@adeptia.com*.

Support

For support queries, please contact us at *support@adeptia.com*.

Latest updates and information

For the latest updates and information, please visit us at *www.adeptia.com*.

Adeptia Web site

Access the Adeptia Web site at the following URL:
www.adeptia.com

RECOMMENDED SETTINGS

To get the better performance, it is recommended to use servers with the configuration given below:

- 4 CPU cores minimum, 2 quad-core CPUs (8 cores) recommended
- Min 8GB, 16GB recommended
- OS: 64-bit
- Hard Drive: 200GB minimum, 500GB recommended
- Log Database: For higher performance Adeptia recommends a separate database for logs such as MS SQL Server, Oracle or MySQL. By default, an embedded database is used which limits the performance. For higher performance, the log DB can be installed on a separate server.

Depending on the size of the data and performance needed, servers with higher configuration can be used.

CONFIGURATION SETTINGS FOR PRODUCTION ENVIRONMENT

The default configuration settings of Adeptia Suite are not recommended for production environment. To use Adeptia Suite in Production Environment, configure the following properties according to your Adeptia Suite Edition:

Table 1: Configuration Settings for Production Environment

Property Name	Default Values	Express Edition	Professional Edition	Premier Edition	Enterprise Edition
Kernel: Xms	512M	512M	2048M	2048M	5120M
Kernel: Xmx	1024M	1024M	4096M	4096M	8192M
WebRunner: Xms	256M	256M	256M	256M	512M
WebRunner: Xmx	512M	512M	512M	512M	1024M
Backend DB: Xmx	1024M	750M	1024M	1024M	1024M
Log DB: Xms	512M	512M	512M	512M	1024M
Log DB: Xmx	1024M	750M	1024M	1024M	2048M
Queue Processor concurrent processes	5	5	10	10	20
Queue Processor reload factor	20	20	40	40	80
Backend DB Pool Size	50	50	50	50	100
Log DB Pool Size	100	100	100	100	200
Cluster DB Pool Size	25	25	25	25	50
Archive DB Pool Size	25	25	25	25	50
Max Idle	20	20	20	20	50
Min Idle	10	10	10	10	20
Max Wait	60000	600,000	600,000	600,000	600,000
Values for Log pools	30	30	30	30	30
Max Idle	50	50	50	50	100
Min Idle	20	20	20	20	40
Max Wait	60000	600,000	600,000	600,000	600,000
Archive cleanup cron	003**?	003**?	003**?	003**?	003**?
Data cleanup retain time	5	2	2	2	2

Log cleanup retain time	5	2	2	2	2
Archive cleanup retain time	15	10	10	10	10
Web Server HTTP Port	8080	80	80	80	80
log4j.rootLogger	INFO,console,jdbc	ERROR,console,jdbc			
log4j.logger.org.exolab.castor	INFO	ERROR	ERROR	ERROR	ERROR
log4j.logger.Event	INFO	ERROR	ERROR	ERROR	ERROR

JAVA HEAP SIZE

Adeptia Suite uses different JVM instances for Kernel and WebRunner. Following are the recommended Java heap size settings

Operating System and Java JRE	:	64 bit.
Java heap size for Kernel	:	60% of the total memory
Java heap size for WebRunner	:	20 % of the total memory

For Example:

For 8GB RAM - Kernel = 4.8GB; WebRunner = 1.6GB

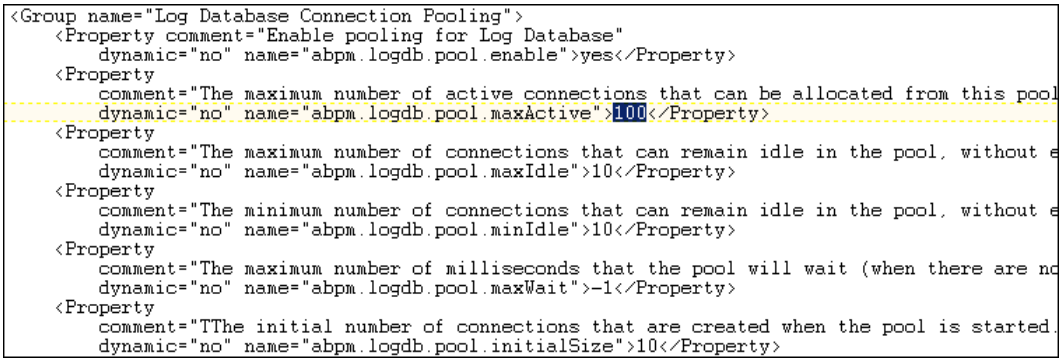
For 16GB RAM – Kernel = 10GB; WebRunner = 3.2GB

DB CONNECTION POOL

LOG DATABASE CONNECTION POOL

Following property can be configured to control the size of Log database connection pool. It is set to 100 but can be increased if Log connections are not available.

To change connection pool size of log database, open ***Server-Configure. properties*** file from ***<AdeptiaSuiteInstallFolder>/ServerKernel/*etc** folder and change the value highlighted in figure below:

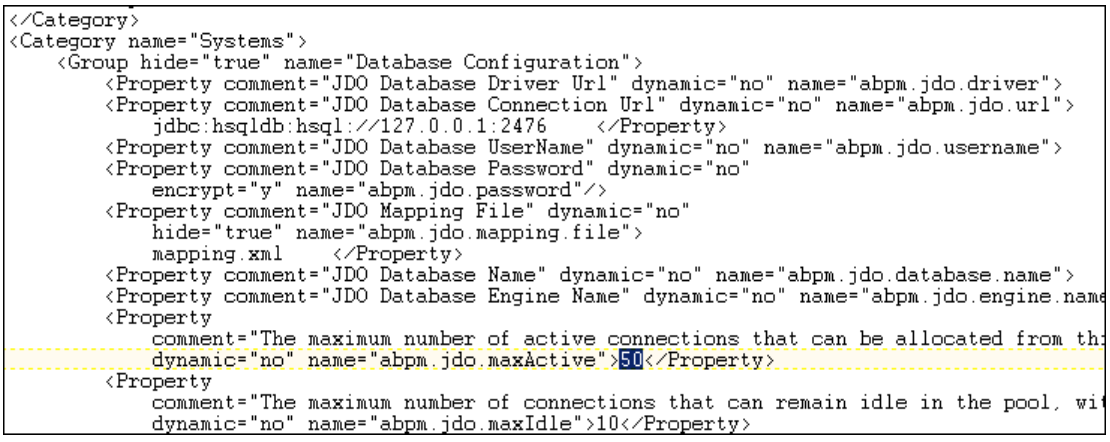


```
<Group name="Log Database Connection Pooling">
    <Property comment="Enable pooling for Log Database"
        dynamic="no" name="abpm.logdb.pool.enable">yes</Property>
    <Property
        comment="The maximum number of active connections that can be allocated from this pool
        dynamic="no" name="abpm.logdb.pool.maxActive">100</Property>
    <Property
        comment="The maximum number of connections that can remain idle in the pool, without e
        dynamic="no" name="abpm.logdb.pool.maxIdle">10</Property>
    <Property
        comment="The minimum number of connections that can remain idle in the pool, without e
        dynamic="no" name="abpm.logdb.pool.minIdle">10</Property>
    <Property
        comment="The maximum number of milliseconds that the pool will wait (when there are nc
        dynamic="no" name="abpm.logdb.pool.maxWait">-1</Property>
    <Property
        comment="TThe initial number of connections that are created when the pool is started.
        dynamic="no" name="abpm.logdb.pool.initialSize">10</Property>
```

BACKEND DATABASE CONNECTION POOL

Following property can be configured to control the size of backend database connection pool. It is set to 50 but can be increased if Log connections are not available.

To change connection pool size of backend, edit the ***Server-Configure-Properties*** file and change the value highlighted in figure below:



```
</Category>
<Category name="Systems">
    <Group hide="true" name="Database Configuration">
        <Property comment="JDO Database Driver Url" dynamic="no" name="abpm.jdo.driver">
        <Property comment="JDO Database Connection Url" dynamic="no" name="abpm.jdo.url">
            jdbc:hsqldb:hsql://127.0.0.1:2476    </Property>
        <Property comment="JDO Database UserName" dynamic="no" name="abpm.jdo.username">
        <Property comment="JDO Database Password" dynamic="no"
            encrypt="y" name="abpm.jdo.password"/>
        <Property comment="JDO Mapping File" dynamic="no"
            hide="true" name="abpm.jdo.mapping.file">
            mapping.xml    </Property>
        <Property comment="JDO Database Name" dynamic="no" name="abpm.jdo.database.name">
        <Property comment="JDO Database Engine Name" dynamic="no" name="abpm.jdo.engine.name
        <Property
            comment="The maximum number of active connections that can be allocated from thi
            dynamic="no" name="abpm.jdo.maxActive">50</Property>
        <Property
            comment="The maximum number of connections that can remain idle in the pool, wi
            dynamic="no" name="abpm.jdo.maxIdle">10</Property>
```

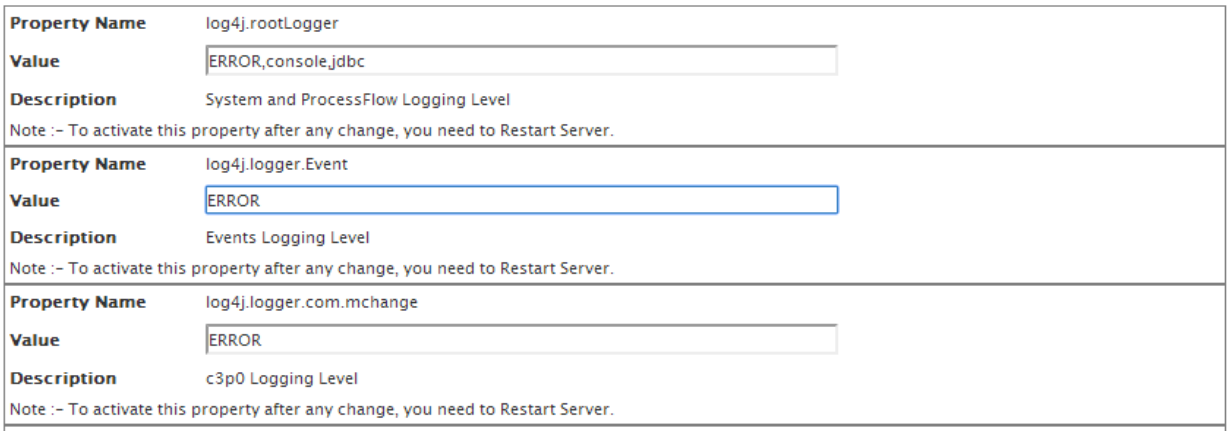
CONFIGURE LOGGING LEVEL

To achieve higher concurrency following logging levels should be set to ERROR.

- log4j.rootLogger
- log4j.logger.Event
- log4j.logger.com.mchange

To configure these properties:

1. Login as *admin* user, go to *Administer* tab.
2. Go to *Setup* and then click *Application Settings*
3. Expand *System* and then *Logging.*



4. Change the values of the properties as shown above.
5. Save the configuration and restart Kernel and WebRunner.

PROCESS FLOW SETTINGS

- To reduce the log generation Keep Log level for process flow as “Error”
- To make sure that the disc space is not filled up, use “Delete on success” option for repository cleanup.
- To delete the activities logs to keep Activities Logging Retention as “Delete on Success”. This will further reduce the amount of log generated.

You can configure this as follows:

1. On the *Process Flow Manage* page, select the radio button adjacent to process flow and click *Edit* link (see Figure 1).

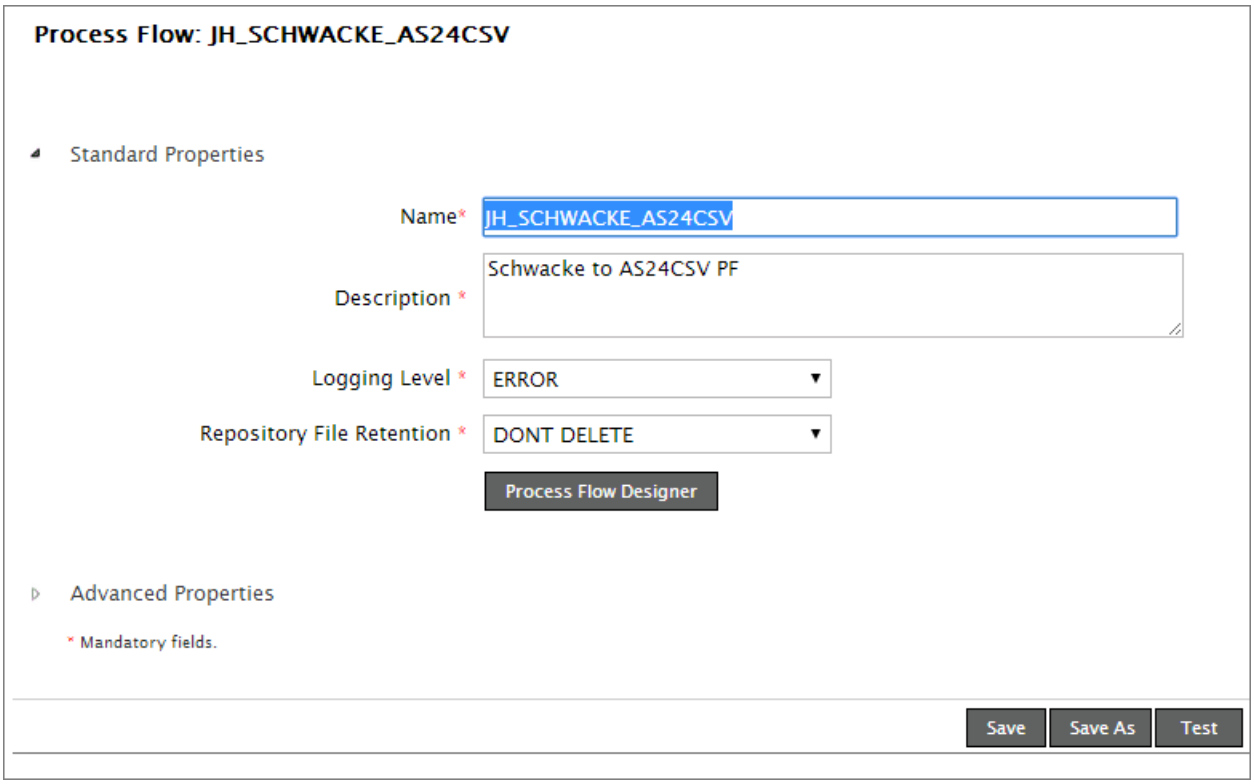


Figure 1: Process Flow Configuration Page

2. Select **Error** from the drop-down list Logging Level.
3. Select **Delete on Success** from the drop-down list **Repository File Retention**.

   Note: This feature is available from Adeptia Suite Version 6.2 onward.
4. Expand the Advanced Properties and select **Delete on Success** from the **Activities Logging Retention** drop-down list. (see Figure 2)

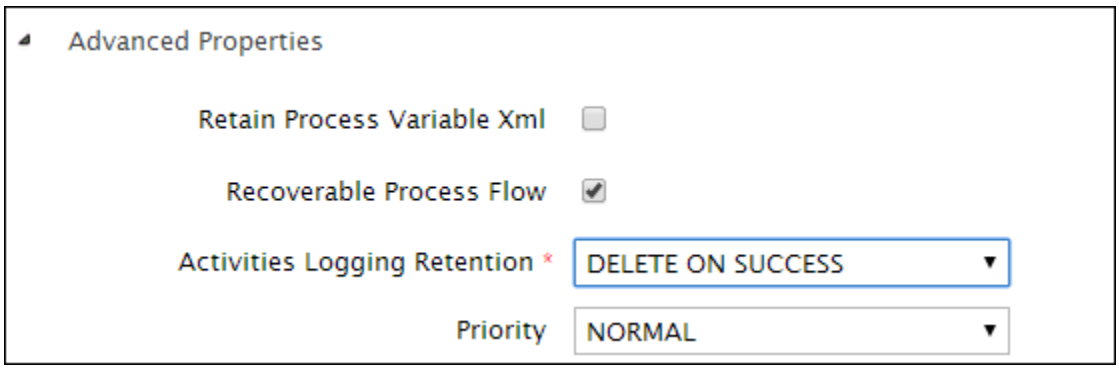


Figure 2: Process Flow Advanced Properties

PROCESS FLOW DESIGN

The biggest factor in determining the performance of a process flow in Adeptia is how the flow itself is designed.

- Fewer activities (steps) in the flow result in more in-memory processing which leads to faster performance
- A number of steps in the flow which use Adeptia activities could be combined in a custom plugin for faster response time
- Use database (stored procedures, queries, joins) for in-database processing whenever that option is available rather than extracting large amount of data from the database and processing in Adeptia
- Using Database loader programs for faster loading of bulk data into databases rather than using Adeptia JDBC connectors

ADDITIONAL TUNING OPTIONS FOR LARGE VOLUME DATA

- Configure larger Kernel Memory
- Use High speed, multi core processors
- Mapping - use splitting and Parallel processing in Mapping

To know how to apply splitting, refer to *Using Data Mapper > Splitting Source Data* Section of Adeptia Suite Developer Guide.

- DB lookups - use same connection rather than new connection per record
- DB lookups- implement database caching inside Data Mapper
- XML lookups - use for better performance compared to DB lookups by pre-fetching database records into XML and then doing XML lookups
- Schema - Skip non required field in source schema
- Solution design - Split the data and do parallel processing within process
- Maintenance - Enable Frequent cleanup of logs & repository

ADDITIONAL TUNING OPTIONS FOR LARGE NUMBER OF TRANSACTIONS – FASTER RESPONSE TIME

- Configure larger Kernel Memory
- Configure Database connection Pool
- Configure Queue Processor
- Configure Clustering
- Reduce number of discrete steps in flow by using custom plugins.
- Enable JDO Caching
- Set correct logging level
- Optimize TCP settings if you are using Windows OS.

To know how to deploy clustering, refer the *Deploying Clustering* section of Adeptia Suite Developer Guide.

To know how to enable JDO caching, refer the Enabling Caching section of Adeptia Suite Developer Guide.

To know how to set correct logging level, refer the section Configure Logging Level.

If Adeptia Suite is installed on Windows operating system, then you should also optimize TCP settings to avoid port exhaustion. For detailed steps, refer http://msdn.microsoft.com/en-us/library/aa560610(v=bts.20).aspx .

TO HANDLE HIGH NUMBER OF CONCURRENT USER AND HIGH VOLUME OF WEB SERVICE CALL

To handle high number of concurrent user and high volume of Web Service call, you need to increase jetty thread count.

Step to increase the jetty thread count:

1. Go to <Adeptia installation folder>/ServerKernel/etc/jetty
2. Open jetty.xml file. (See figure below)

```
<!-- =========================================================== -->
<!-- Server Thread Pool                                          -->
<!-- =========================================================== -->
<Set name="ThreadPool">
  <!-- Default queued blocking threadpool -->
  <New class="org.eclipse.jetty.util.thread.QueuedThreadPool">
    <Set name="minThreads">10</Set>
    <Set name="maxThreads">200</Set>
    <Set name="detailedDump">false</Set>
  </New>
</Set>
```

Figure 3: Edit jetty.xml

3. Increase the value of *maxThreads* as per your requirement.
4. Save this file.
5. Restart the Kernel and WebRunner.

BEST PRACTICES

- If Data Mapper needs to process large file (more than 50 MB), then always use splitting inside Data Mapper activity. You can enable splitting in Advanced Properties of Data Mapper activity and set Splitter/Merger x-path inside Data Mapper Applet. For more details on how to apply splitting in Data Mapper, please refer to Adeptia User manual.
- Always try to implement database caching inside Data Mapper. This can be achieved by making a DBQuery at Root node, storing the results in global variable and then for each record in input, using the global variable value to get the results from database. It would reduce the number of database interactions, probably one for whole Data Mapping and hence optimizing the performance of Data Mapper.
- There may be a need to increase the Operating System configuration for maximum allowed open file handles. Please check the help for your OS to see how to increase this parameter.
- If large number of concurrent process flows are executing in Adeptia Server, then make sure that number of concurrent connections to backend and log database are set to appropriate values. You can configure this in etc/server-configure.properties file.

Here are the properties that needs to be modified:

abpm.jdo.maxActive	(for backend database)
abpm.logdb.pool.maxActive	(for log database)

You need to re-start Adeptia Services after changing these properties

- Running large number of concurrent process flows require more memory to be assigned to Adeptia Kernel. You need to assign sufficient memory to Adeptia Kernel so that it can execute the process flows without any hassle. To configure memory assigned to Adeptia Kernel, you need to change following in etc/launcher.properties file:

```
#Kernel JVM parameters

KN:JVM: -Xms512M -Xmx1024M -Xrs -XX:PermSize=64M -XX:MaxPermSize=128M

-Xms represents initial memory assigned to Adeptia Kernel at start up

-Xmx represents the maximum memory that can be assigned to Adeptia Kernel
(if available)
```

You need to re-start Adeptia Services after making this change.

- To reduce logging on LIVE systems, all the process flows shall be deployed with “ERROR” logging level.

- The number of objects and processes within the backend database governs the performance of the user interface.

  Therefore, when the backend database becomes large, you may need to increase the memory setting to this database:

  1. Administer > Setup > Application Settings > Update System Properties> Embedded Database Settings.
  2. Increase the abpm.embedded.indigo.memory value.

  as well as the Adeptia WebRunner within etc/launcher.properties file:

```
#Webrunner JVM parameters

WB:JVM: -Xms128M -Xmx512M -Xrs -XX:PermSize=64M -
XX:MaxPermSize=128M
```

- To reduce the number of repositories inside Adeptia Server, all the process flows shall be deployed with Repository File Retention as “DELETE ON SUCCESS”.

- Inside Adeptia Server, data and log clean up should be enabled and properly configured. The retain time (number of days for which data and logs would be retained) shall be properly configured according to the requirement. Please note that data clean up means cleaning of repository files only.

- For data clean up, retain time (in days) can be configured through Adeptia GUI at Administer > Configure > Application Settings > Update System Properties. Path to the property is: Maintenance/ Data Cleanup Properties. The name of the property is “abpm.appmanagement.retainTime” .

- For log clean up, retain time (in days) for different tables can be configured through etc/ log-cleanup.properties file. Default value for retain time (in days) is 14.

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