



**[APPLICATIONS MANAGER
BEST PRACTICES]**

This document lists the best practices and tips that can be followed when working with ManageEngine™ Applications Manager.

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1. Hardware and Software Requirements

The performance of Applications Manager depends considerably on the CPU and memory of the system. The following table describes the system configuration required for various deployments. We strongly recommend having a dedicated server for Applications Manager when going into production. Each deployment of Applications Manager can have up to 250 monitors.

The hardware configuration for the standalone and Enterprise Edition setup is mentioned below.

Up to 50 monitors

<i>Operating Platform</i>	<i>Processor Speed</i>	<i>Memory*</i>	<i>Hard Disk Space Required</i>
Windows/Linux	1.4 GHz	1 GB RAM	20 GB

50 - 250 monitors

<i>Operating Platform</i>	<i>Processor Speed</i>	<i>Memory*</i>	<i>Hard Disk Space Required</i>
Windows/Linux	1.4 GHz	2 GB RAM	20 GB

Probe mode less than 20 monitors/Managed Server - Enterprise Edition Setup

<i>Operating Platform</i>	<i>Processor Speed</i>	<i>Memory*</i>	<i>Hard Disk Space Required</i>
Windows/Linux	Dual Processor 1.8 GHz	1 GB RAM – Managed Server	10 GB

The probe mode of Enterprise edition will be useful for a usage scenario of say 100 locations with 1 admin server.

250 -1000 monitors -Enterprise Edition Setup (250 monitors /Managed Server)

<i>Operating Platform</i>	<i>Processor Speed</i>	<i>Memory*</i>	<i>Hard Disk Space Required</i>
Windows/Linux	1.8 GHz	2 GB RAM – Managed Server	40 GB

1000 monitors and above Enterprise Edition Setup (250 monitors/Managed Server)

<i>Operating Platform</i>	<i>Processor Speed</i>	<i>Memory*</i>	<i>Hard Disk Space Required</i>
Windows/Linux	Dual Processor 1.8 *2 GHz	2 GB RAM – Managed Server	100 GB or higher based on monitors

** The above mentioned memory does not include memory used by OS which should account for another 2GB.*

** If the numbers of Managed Servers are high, 4GB for the Admin Server is recommended.*

** The above mentioned number also depends on the load of monitored server. When the load of monitored servers is high, then a higher configuration may be needed.*

The performance of Applications Manager is also influenced by other factors such as the type of monitors configured, the polling interval and network speed. When you are going for large deployments, we recommend adding the monitors in the range of 25 – 50 at a time and determine the performance before adding more monitors. When the threshold is reached and if you find Applications Manager system is slow to handle requests, then you may need to add the remaining monitors to another Managed Server.

Supported Operating Systems

Applications Manager has been tested on the following operating systems and versions:

- Windows 2000 Server / XP / 2003 / Vista / 2008
- Enterprise Linux 2.1 and above / Debian / SuSe / Ubuntu

Supported Browsers

- Internet Explorer 7.0 and above
- Firefox 3.0 and above

2. Configuring Applications Manager

The performance of Applications Manager can be improved by configuring the following attributes.

a) Enterprise Edition Setup

Each installation of Applications Manager can normally support 250 monitors (servers and applications on a 1 CPU, 1.8 GHz, 2 GB RAM, RH Linux). This number could go higher based on the hardware configuration of the server on which Applications Manager is deployed and based on the load of the monitored server.

When you need to monitor more than 250 monitors with the system configuration given

above, it is recommended to move to a distributed setup supported through Applications Manager Enterprise Edition setup. It works by supporting an Admin Server and Managed Server environment.

Refer the following links for more information on Enterprise Edition:

1. http://www.manageengine.com/applications_manager/enterprise-edition.html
2. http://www.manageengine.com/applications_manager/applications-management-productfaq.html#e1

This table gives the number of Managed Servers required based on the monitor count.

<i>Total No. of Monitors</i>	<i>Managed Servers</i>
500	2
750	3
1000	4
2000	8

**Better numbers are possible with better hardware supporting over 500 monitors per server.*

b) Increasing Data Collection Threads

Applications Manager uses a separate thread for every data collection of monitor. The default number of threads used is controlled by the respective schedulers specified in the file specified below.

<AppManager_Home>/working/conf/threads.conf

The default number of threads used for URL Sequence Monitoring is 5 and other monitors are 12.

When the number of monitors is greater than 100, you can increase the data collection threads (default is 10) by editing the '*Data Collection*' attribute in the file specified below.

<AppManager_Home>/working/conf/threads.conf

The '*Data Collection*' thread value can be increased to a value ranging between 20 and 25.

Similarly, when the number of URL Sequence monitors is high in the range of 100, you can increase the URL monitoring thread count by editing the '*URL Monitor*' attribute to 20 – 25. However, the total number of threads including both URL monitor and other data collection threads must not exceed 40.

Note: Increase in the '*Data Collection*' thread will lead to a slight increase in the CPU usage.

c) Increasing Number of Connections in Database Connection Pool

When the number of monitors is greater than 100, the connection pool can be increased by editing the **NON_TRANS_CONNECTIONS** field in the file specified below.

<AppManager_Home>/working/conf/database_params.conf

The default value of 6 can be set to 90 percent of the number of data collection threads.

Note: Increase in the '*Connection Pool*' will lead to a slight increase in the CPU usage.

d) Downtime Scheduler

If you do not need monitoring to happen during a specific time period for certain monitors, you can turn off monitoring using the '**Downtime Scheduler**' option available under the '**Admin**' tab.

The monitors configured for '**Downtime Scheduler**' does not use the data collection thread during the specified period. They allow the other monitors to utilize the data collection threads and hence improve the performance of Applications Manager.

e) Performance Polling

Data Collection

Use this option to control the Performance Data collection of the monitors for the given number of polls. Except for Availability check and health, other performance parameters like memory usage data, etc. will be collected at the scheduled number of polls. This would be helpful in decreasing the load on the system of the users who want to monitor availability and health alone.

Servers

Use this option to enable or disable Disk IO Stats data collection for the servers. This option is available for IBM AIX, Linux and Solaris servers.

Oracle

Use this option to enable or disable data collection for Disk Reads, Buffer Gets and Lock and Wait Statistics for Oracle servers.

WebLogic

Use this option to enable or disable data collection for Web Applications, EJBs and Servlet Statistics for Weblogic servers.

MS SQL

Use this option to enable or disable data collection for Scheduled jobs and Database backup of MsSQL servers

MySQL

Use this option to enable or disable data collection for metrics of Database Tables that takes place once in a day. This would be helpful in decreasing the load on the MySQL server.

f) MySQL Database Tuning

If Applications Manager is using MySQL database to store information, the performance of MySQL database server can be improved by editing the variables in MySQL configuration file '**my.ini**' located in the below folder.

<AppManager_Home>/working/mysql

You can set all of the memory, table, and connection limits to suit your needs. Some of the status variables to look at are:

1. Thread cache variables. (thread_cache_size)
2. Query cache variables. (query_cache_size, query_cache_limit)
3. Key buffer (key_buffer)
4. Connection values (max_connections)

For larger deployments in the range of 1000 monitors or more, we recommend a dedicated server for **MySQL database**.

g) Excluding antivirus check for temp folder and MySQL data directory

Using virus scanning software such as Norton/Symantec Anti-Virus on directories containing MySQL data and temporary tables can cause issues, both in terms of the performance of MySQL and the virus-scanning software misidentifying the contents of the files as containing spam.

This is because of the fingerprinting mechanism used by the virus scanning software, and the way in which MySQL rapidly updates different files, which may be identified as a potential security risk.

After installing MySQL Server, it is recommended that you disable virus scanning on the main directory (datadir of Applications Manager) being used to store your MySQL table data.

There is usually a system built into the virus scanning software to permit certain directories to be specifically ignored during virus scanning. In addition, MySQL creates temporary files in the standard Windows temporary directory by default.

To prevent the temporary files also being scanned, you should configure a separate temporary directory for MySQL temporary files and add this to the virus scanning exclusion list. To do this, add a configuration option for the tmpdir parameter in the **startMySQL.bat** file present in **<ApplicationsManager_Home>/working/bin/** folder.

The part to be changed is

```
mysqld-nt --defaults-file=..\my.ini -u root -b .. --tmpdir=..\temp --standalone --port=13327 --default-character-set=latin1
```

h) Increasing Applications Manager JVM heap size

Applications Manager JVM heap size can be increased according to your environment by editing the **-Xms** and **-Xmx** parameters in the file

<ApplicationManager_Home>/startApplicationsManager.sh for Linux

<ApplicationManager_Home>/startApplicationsManager.bat for Windows

Applications Manager installed as Windows Service

When Applications Manager is installed as a Windows service, memory tuning can be achieved by editing the following parameters in the **wrapper.conf** file available under the directory

<ApplicationManager_Home>/working/conf

wrapper.java.initmemory – Initial Java Heap Size

wrapper.java.maxmemory – Maximum Java Heap size

Here are the recommended settings for JVM Heap size and MySQL status values for various RAM sizes (assuming Applications Manager is running on a dedicated server).

<i>RAM size</i>	<i>JVM Heap Size</i>	<i>thread_cache_size</i>	<i>query_cache_size</i>	<i>query_cache_limit</i>	<i>key_buffer</i>	<i>table_cache</i>
1 GB	200M	32M	128M	2M	128M	64
2 GB	512M	32M	256M	2M	512M	128M
4 GB and above	1024M	32M	256M	2M	1024M	128M

i) Using Monitor Groups

Monitor Groups are a logical group of one or more monitors that provides a holistic view of your business environment. Monitor Groups can be used to group resources belonging to particular Business Application or to group resources by location-as-Services Group.

We recommend adding the components of a particular application infrastructure in the same managed server since it will be easier to track via groups.

Refer the following link for more information on Monitor Groups:

http://www.manageengine.com/applications_manager/help/managing-business-applications/working-business-applications.html

3. Securing Applications Manager

When moving Applications Manager to a production environment, certain configuration details have to be taken care of.

a) Installation Configuration

Have a dedicated OS User (System) account for installing Applications Manager. This OS user account needs full permissions on all folders and sub folders in the installation root

of Applications Manager only. Also make sure this OS User account is fully secure. It is NOT necessary to install Applications Manager in a root (in Linux) or administrator (windows) OS User account. However, make sure the entire installation is done using the same OS user account. Do not install using root and try to run using an OS user account. That will fail.

b) User Configuration

1. Make sure you change the password for the default **'admin'** Web Client user within Applications Manager.
2. If you want to give full **'Read-Only'** privileges to certain Web Client Users in your organization, and then make sure you create a client login with **'USER'** role.
3. If you want to give restricted **'Read-Only'** privileges to certain Web Client Users in your organization, and then make sure you create a client login with **'Operator'** role. **'Operator'** can view only servers that they own.

c) MySQL Database Configuration

It is recommended to change the default password.

Follow these steps to change the MySQL Database password:

1. Connect to the MySQL of Applications Manager. Go to **<AppManager_home/working/MySQL>** and execute the following command

```
./bin/mysql -u root -h localhost --port=13326 -D AMDB --pappmanager
```

2. Execute the following queries in the database

```
USE mysql;  
update user set password=password ('New Password') where user = 'root';  
FLUSH PRIVILEGES;
```

3. Stop Applications Manager.
4. Go to **<AppManager7/working/conf>** folder, edit **<databaseparams.conf>** and change the password to the 'New' password. Restart Applications Manager.

d) File Upload Configuration

By default, uploading binaries, MIBs and scripts are allowed in Applications Manager. This may be required in the initial stages while using Applications Manager for uploading MIBs, action scripts etc. However, while going into production, it is strongly

recommended to disable this.

This option can be disabled by setting ***am.upload.enabled=false*** in the ***<Appmanager_Home>/conf/AMServer.properties*** file.

4. Fault Management

This section lists the steps to prevent false alarms that may sometimes be generated in Applications Manager due to an overloaded network.

a) Socket Timeout

Increasing the socket timeout values ***<AppManager_Home>/conf/AMServer.properties*** by changing the ***'am.sockettest.timeout'*** value from 5 to 10 will help to eradicate false alerts generated. Here it represents the time in seconds for the timeout.

b) Network Availability Check

Assume a scenario where Applications Manager loses network connectivity. This could trigger a flood of alarms. The status of all the monitors could turn **'Down'**. You can avoid this situation by enabling the **'Check for Network Availability'** option.

When this option is enabled, Applications Manager will generate alerts for the unavailability of resources only if the specified host is reachable in the network. For example, let us assume that the system/host which runs Applications Manager has been isolated from the network. Enable this option and specify a hostname in the network (preferably not the hostname where Applications Manager runs). Now, Applications Manager will try to ping that machine for its availability in the network. If not available, alerts are not generated and resources are not shown as down.

You can also specify the IP of your routers, gateways, etc. to check if the system/host which runs the Applications Manager is present in the network.

c) URL Availability Check

When the Applications Manager is out of the network or if external proxy settings are not configured, the status of all the URLs that are monitored will be shown as **'Down'**. You can avoid this by enabling the **'Check URL Availability'** option.

When this option is enabled, Applications Manager will generate alerts for the unavailability of URL only if the other specified URL is down. For example, let us assume that the system/host which runs the Applications Manager has been isolated from the network. Enable this option and specify another URL which is expected to be up always. Now, Applications Manager will try to monitor the URL for its availability. If not

available, alerts are not generated and URL is not shown as down. Further a mail is sent to the configured mail address intimating the same.

d) Consecutive Polls Check

You can use this option to determine the number of consecutive polls for which the error exists before reporting the error to the system. The consecutive polls count in '**Admin**' -> **Action / Alert Settings** can be increased from the default value of 1 to 2, so that alerts will be generated after two consecutive polls which would eradicate false alarms.

5. Log File Management

Applications Manager logs the data collection details, error traces under the below folder:

<AppManager_Home>/logs

The default size and number for log file rotation can be changed in the file:

<AppManager_Home>/working/conf/logging_parameters.conf

The log folder available under **<AppManager_Home>** can be moved/deleted to a different location every fortnight.

6. Applications Manager Database Management

a) Data backup

It is very important to backup the Applications Manager data in the database every fortnight, so that data is not lost in case of any disaster. Refer the following link on how to backup the data:

http://www.manageengine.com/applications_manager/help/appendix/data-backup.html

7. Crash & Recovery

Under '**Admin**'->'**Global Settings**', '**Restart the product in case of serious server error**' checkbox is provided to automatically restart Applications Manager in case of any

serious errors. Make sure that the option is checked so that Applications Manager can recover automatically on error.

Other General Guidelines

- Refer the Security/Firewall Requirements documents given in the below link to understand what changes are required in the firewall.
http://www.manageengine.com/applications_manager/help/appendix/secure-configuration.html
- You can install Applications Manager as a Windows Service or configure a cron job on Linux to start on server start up. Refer the below link for more information:
http://www.manageengine.com/applications_manager/help/installation/startin-g-applications-manager.html#windows_service
- If you are planning to use the Enterprise Edition, fully understand the EE architecture
http://www.manageengine.com/applications_manager/help/enterprise-edition.html
- To change the default HTTP port used by Applications Manager, refer the Server Settings document given in the below link. You can refer to this document on other settings that you can modify. For e.g., whenever Applications Manager starts, if you do not want the browser to open automatically, you need to modify the below entry:

<am.browser.startup=false>

http://www.manageengine.com/applications_manager/help/administrative-operation/server-settings.html
- It is recommended to restart Applications Manager every *fortnight*.
- It is recommended to use **SNMP** or **WMI** mode for monitoring Windows machine and **SSH** or **Telnet** for monitoring **UNIX** based machines. **SSH** should be of more use as it provides much more security over **Telnet**
- When monitoring Windows Server 2003 using WMI mode, memory usage report may show incorrect values due to an issue in the Windows 2003 + Service pack1 version. Ensure that the latest service pack is applied to the Windows server. Please refer this link for more details - <http://support.microsoft.com/kb/906868/>

Addendum

<ApplicationManager_Home> refers to the directory in which you have installed the

Applications Manager product. This directory location is specified by you when you install the product.

For example, let us assume that you have installed Applications Manager under the default <Program Files> directory of C drive in your system. In this case,

<ApplicationManager_Home> denotes

C:\Program Files\Manageengine\AppManager9

In Linux, if Applications Manager is installed under home directory, then

<ApplicationManager_Home> denotes ~/Manageengine/AppManager9

Viewing Data Collection Errors in Applications Manager

To view the data collection errors thrown by various monitors, navigate to the 'Support' tab and click on the 'View Monitor Errors' link. This will open up a new window with a list of all the error messages thrown in Applications Manager. You can choose to view 'error only' messages or 'information only' messages or both.

If you want to receive these errors as notifications through email, select the 'Send errors that occurred during monitors polling to admin user email' option. The notifications will be sent to the email address specified for the admin user under **Admin->User Administration** section. You can also specify the number of polls that Applications Manager should wait before sending the notification.

What is the first thing to do when I get a doubt in Applications Manager?

Search for a solution in our troubleshooting wiki – <http://apm.manageengine.com>

If you don't get a solution from the wiki, report the issue to our technical support team along with the details specified in the below link:

<http://apm.manageengine.com/details-required-for-support-team.html>

For More Information

If you have any questions on the best practices described in this document, please contact our support team at appmanager-support@manageengine.com or call +1 925 924 9500 (Toll free).