



APPLICATIONS MANAGER
BEST PRACTICES

This document will list the best practices to be followed by the users of ManageEngine Applications Manager

1. Hardware and Software requirements
2. Configuring Applications Manager
3. Securing Applications Manager
4. Fault Management
5. Log file Management
6. Applications Manager Database Management
7. Crash & Recovery

1. Hardware and Software requirements

Performance of Applications Manager depends considerably on the CPU and memory of the system. The following table describes the configuration of the system 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 250 to 500 monitors.

The hardware configuration (dedicated resource) for Stand Alone and Enterprise Edition setup is mentioned below.

Up to 250 monitors - With medium load on the monitored servers

Operating Platform	Processor Speed	Memory*	Hard Disk Space Required
Windows/Linux	2.4 GHz and above	4 GB RAM	60 GB

250 - 1000 monitors - Enterprise Edition Setup (One Admin & 2-3 Managed Servers)

Per Managed Server/Admin Server

Operating Platform	Processor Speed	Memory*	Hard Disk Space Required
Windows/Linux	Dual Core, 2.4 GHz and above	8 GB RAM	80 GB

1000 monitors and above - Enterprise Edition Setup (One Admin & 4 Managed Servers and above)

Per Managed Server/Admin Server

Operating Platform	Processor Speed	Memory*	Hard Disk Space Required
Windows/Linux	Quad Core, 2.4 GHz and above	16 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 4 GB*

**If the number of Managed Servers is high, 16 GB RAM for the Admin Server is recommended.*

Performance of Applications Manager is also influenced by the other factors such as type of monitors configured, polling interval set 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 when you find that Applications Manager system is slow to handle requests, then you may need to add the remaining monitors to another Managed Server.

Supporting Operating System:

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

- Windows 7, Windows 8, Windows 10, Windows Server 2008, 2012, 2012 R2, 2016 both 32 and 64 bit.
- Enterprise Linux 2.1 and above, Debian, Suse, Ubuntu, Mandriva, CentOS, Oracle Enterprise Linux, RHEL 6 and above, Fedora Core both 32 and 64 bit.

Supported Monitor Resolution

- Applications Manager is optimized for 1024 x 768 resolutions and above.

Supported Database Backends

Applications Manager supports PostgreSQL and MS SQL database backends for storing all the configuration information and data collected. PostgreSQL comes bundled with your download of Applications Manager from Build 11000.

The supported MS SQL database versions that you may use are:

- MS SQL Servers 2005 / 2008 / 2012 / 2016 (SQL Standard / Enterprise Edition)

SQL Server Collation: Any case-insensitive collation. For Chinese Installation use Chinese_PRC_CI_AS

Supported Browsers:

- Internet Explorer 10, 11 and Edge
- Mozilla Firefox
- Google Chrome

2. Configuring Applications Manager

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

Enterprise Edition Setup:

Each installation of Applications Manager can normally support monitoring up to 500 monitors (servers and applications on a 1 CPU, 1.8 GHz, 2 GB RAM, RH Linux). This 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 number of monitors than 500, for the above given system configuration, then it is recommended to move to 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:

- https://www.manageengine.com/products/applications_manager/enterprise-edition.html
- <https://apm.manageengine.com/Enterprise-Edition-1.html>

Table gives the number of Managed Servers required for given number of monitors.

Total No. of Monitors	Managed Servers
500	1
750	2
1000	3
2000	4

**Better numbers are possible with better hardware supporting over 750 monitors per server.*

Increase 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 under

Applications Manager -> Admin Tab -> Server Settings (Under Product Settings column) ->Threads Configuration Tab

Note : Setting the schedulers from the web-client in the Admin Server will affect all its respective Managed Servers. Increase in the 'Data Collection' thread will lead to slight increase in CPU usage.

Alternate Method

You can also configure the default number of threads used by configuring the respective schedulers specified in the following file:

AppManager_Home/working/conf/threads.conf

When the number of monitors is greater than 100, you can increase the data collection threads (default is 10) by editing the **DataCollection Thread** attribute. The 'Data Collection' thread value can be increased to a value ranging between 20 and 25.

Similarly, when the number of **URLMonitor Thread** is large in the range of 100, you can increase the URL monitoring thread count by editing the 'URLMonitor' attribute to 20–25.

The threads and the respective module they affect:

Main Thread- The default value is 4 and used by JMX/SNMP Dashboard, JMX Applications, Anomaly, Alert Summary mailer etc...

URLMonitor Thread – The default value is 5. Monitors like HTTP(s) URLs,HTTP(s)-URL Sequence,SAP-CCMS uses this thread for data collection.

KeyValueMonitor Thread – The Default value is 10 and used by Active Directory, Amazon, Azure Role Instance, Cassandra, DNS Monitor, EC2 Instance, File & Directory, FTP/SFTP Monitor, GlassFish, Hyper-V Virtual Machine, Hyper-V-Server, JBoss Server, LDAP Server, Mail Server, Memcached, Microsoft MQ (MSMQ), MongoDB, MS Office SharePoint, Nginx, Oracle, Oracle EBS, Ping Monitor, PostgreSQL, RabbitMQ, Redis, Script monitor, Service Monitoring, Siebel Server, Silver Stream, SSL Certificate Monitor, Telnet, Tomcat Server, VMWare ESX/ESXi, WebSphere Server, Windows Azure, WMI, XenServer

RBMMonitor Thread- The default value is 1 and Real Browser Monitoring uses this thread for data collection.

MQSeriesMonitor Thread – The default value is 2 and used by Websphere MQ.

DataCollection Thread – The default value is 12 and used by Apache, DB2, Exchange, IIS Server, Java Runtime, Microsoft .NET, MS SQL, MySQL, Oracle Application Server, PHP, SAP Server, Servers, WebLogic.

CustomMonitor Thread – **The default value is 4.** This thread used for dataCollection of Custom Attributes for monitors like RMI,WEBLOGIC-server,JBOSS-server,WebSphere-server,JMX1.2-MX4J-RMI.

Increase number of connections in database connection pool:

You can configure the no.of non-transaction connections to be established with the database under **Applications Manager -> Admin Tab -> Server Settings (Under Product Settings column) ->Database Params Configurations**

When the number of monitors is **greater** than 100, connection pool can be increased by editing the **No.of Database Connections**. The default value of 6 can be set to 90 percent of the number of data collection threads.

Alternative Method

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

AppManager_Home/working/conf/database_params.conf

Note :

- *Increase in the 'Data Collection' thread will lead to slight increase in CPU usage.*
- *Setting the Number of Database Connections in the Admin Server will affect all its respective Managed Servers.*

Poll Intervals:

When performance polling is set only the availability and health check will happen at every polling event while other performance data will be collected only at the end of scheduled number of polls. This will reduce the load on the system when you want to monitor only health and availability.

This option is available under 'Admin' - 'Performance Polling' where you can set the number of polls before collecting performance data for server monitors. We recommend having a Poll Interval of 10 minutes for every monitor and a performance poll value of 3.

PostgreSQL database configuration:

To reduce disk space, to repair/reindex the database:

VACUUM FULL ANALYZE VERBOSE;

Note:

- *This script should to be executed in Applications Manager's database (AMDB).*

Fine Tuning in Postgres_ext.conf

effective_cache_size - This can be set of 1/2 of total memory upto 3/4 of memory. We have kept this as 512MB.

work_mem = 12MB

maintenance_work_mem = 100MB

checkpoint_segments = 15

checkpoint_timeout = 11min

checkpoint_completion_target = 0.9

seq_page_cost = 1.0

random_page_cost = 2.0

synchronous_commit=off

temp_buffers = 8MB

Fine Tuning in Postgresql.conf

checkpoint_segments = 15

checkpoint_timeout = 11min

checkpoint_completion_target = 0.9

shared_buffers = 512MB - A reasonable starting value for shared_buffers is 1/4 of the memory in your system.

Note:

The Postgresql.conf and Postgres_ext.conf files can be found under the APM_HOME/working/pgsql/data/amdb folder.

MSSQL database configuration:

To repair the database:

```
DBCC CHECKDB WITH ALL_ERRORMSG, NO_INFOMSGS;
```

To reindex/reduce size:

```
EXEC sp_MSforeachtable @command1="print '?' DBCC DBREINDEX ('?', '', 80)";
```

```
EXEC sp_updatestats;
```

Note:

This script should to be executed in Applications Manager's database (AMDB), preferably through SQL Server Management Studio (SSMS)

Set the Space Allocated size for both the log and the data file to be much larger than the initial database. Consider how much the database can grow over of a year. Ideally, the log and data files are allocated in a contiguous extent so that data does not end up fragmented all over the disk.

Memory settings

Change the minimum memory allocation to as large a number as possible. If the database is running on a separate computer, use all the memory. The default settings do not aggressively allocate memory, which hinders performance on almost any database. You should be most aggressive in allocating memory on production machines.

Processor settings

Modify the processor settings and, most importantly, select the Boost SQL Server Priority On Windows check box so that the server uses as many cycles as possible. The Use NT Fibers setting is less important, but you may want to select it too.

Database settings

The most important setting is Recovery Interval, which specifies the maximum amount of time to wait for recovery after a crash. The default setting is one minute. Using a larger value, from 5 to 15 minutes, improves performance because it gives the server more time to write changes from the database log back into the database files.

Note: This setting does not compromise the transactional behavior because it changes only the length of the log file replay that must be done on startup.

Increase AM JVM heap size

You can configure the JVM Heap Size by going to:

Applications Manager -> Admin Tab -> Server Settings (Under Product Settings column) -> JVM Params Configurations

Alternative Method

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

ApplicationsManager_Home/startApplicationsManager.sh for Linux

ApplicationsManager_Home/startApplicationsManager.bat for Windows

Applications Manager installed as Windows service

On such cases memory tuning can be achieved by editing the following parameters in wrapper.conf file available under the directory

ApplicationsManager_Home/working/conf

wrapper.java.initmemory – Initial Java Heap Size

wrapper.java.maxmemory – Maximum Java Heap size

3. Securing Applications Manager

When moving Applications Manager to Production environment, some of the configuration details have to be taken care

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. But make sure the whole 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.

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.

File upload configuration

By default, uploading binaries, MIBs, scripts are allowed in Applications Manager. This may be required in the initial stages while using Applications Manager for uploading MIBs, action scripts etc.

4. Fault Management

These sections list the steps to prevent false alarms that are generated in Applications Manager due to overloaded network.

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.

Network Availability check

When the Applications Manager is out of the network or is not connected to the network, the status of all the Monitors that are currently been monitored will be shown as 'Down'. You can avoid this 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 the 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 tries 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 the system/host which runs the Applications Manager is present in the network.

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 currently been 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 tries to monitor 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.

Consecutive polls check

You can use this option to determine the number of consecutive polls the error exists before reporting the error to system. Consecutive polls count in 'Admin' - Action / Alert Settings can be increased from 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

AppManager_Home/logs

You can also access the logs from the following location: http://APM_Host:port/viewLogs.do

Default size and number for log file rotation can be changed in the file

AppManager_Home/working/conf/logging_parameters.conf

Log folder available under AppManager_Home can be moved/deleted to different location every fortnight.

6. Applications Manager Database Management

Data backup

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

<http://help.appmanager.com/data-backup>

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 below link to understand what changes are required in the firewall.

<http://help.appmanager.com/secure-configuration>

- 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://help.appmanager.com/starting-applications-manager>

- If you are planning to use the Enterprise Edition, fully understand the EE architecture

<http://help.appmanager.com/enterprise-edition>

- To change the default HTTP port used by Applications Manager, refer the Server Settings document given in the following link:

<http://help.appmanager.com/server-settings>

- 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 machines.

Addendum

ApplicationsManager_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,

ApplicationsManager_Home denotes

C:\Program Files\ManageEngine\AppManager13

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

ApplicationsManager_Home denotes ~/opt/ME/AppManager13