Sun OpenSSO Enterprise 8.0 Performance Tuning Guide

Beta

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Contents

1

Tuning Components in the OpenSSO Enterpise Deployment

This chapter provides instructions for installing and using the amtune script to tune OpenSSO Enterprise and related components.

About the OpenSSO Enterprise Tuning Scripts

The OpenSSO Enterprise tuning scripts enable you to tune the following the major components of your deployment.

On the OpenSSO Enterprise server
  If the following conditions are met:

- OpenSSO Enterprise is deployed on supported web containers.

  Geronimo 2.x, JBoss 4.2.x, Oracle Application Server 10g, Tomcat 5.5.x or 6.x, WebLogic 9.2 MP2/10, WebSphere 6.1, or Sun web containers

- The host computer is running a supported operating system.

  Solaris or 10, Red Hat Enterprise 4 or 5, Windows 2003/Vista, Ubuntu 8.04 for some containers, or AIX 5.3 for only WebSphere 6.1

then OpenSSO Enterprise tunes the following:

- session/SDK cache entries, session cache, and LDAP entries
- logging buffer, notification thread pool/queue and LDAP connection
- pool sizes for service management, global authentication service and user data store

Sun Web Server 7 and Sun Application Server 9.1/Glassfish v2

- JVM heap and JVM per-thread stack sizes
- JVM garbage collection algorithms

- Container worker and acceptor threads and queue sizes

Sun Java System Directory Server 5.2 and 6.3

- Worker threads,
- Database cache and entry cache sizes

The amtune script changes the database home directory to RAM disk. Example: `-/tmp`

Please note that Sun Directory Server 6.2 is not supported for tuning due to its data corruption issues.

Other Tunings

- The operating system (OS) kernel
- TCP/IP parameters

The source locations of tuning scripts are:

Solaris and Linux   `opensso/products/amserver/scripts/tune/amtune`

Windows   `opensso/products/amserver/scripts/tune/amtune.bat`

The `amtune` script currently is not interactive. It does not prompt for more user input after the script is run for the first time.

The amtune script relies on a list of DO NOT MODIFY parameters in the last section of the `amtune-env.properties` file. The parameters in that section are mainly for internal use by `amtune`. Do not modify the parameters unless in the DO NOT MODIFY list unless user tests show significant improvement in performance.

Using a Password File

Execute amtune or amtune.bat with a file that contains passwords for the servers in your deployment. Use the following strings:

Server	String
Sun OpenSSO Enterprise 8.0	SSOADM_PASSWORD=
Sun Web Server 7.0	WADM_PASSWORD=
Sun Application Server 9.1	ASADMINPASSWORD=
Sun Directory Server	DIRMGR_PASSWORD=_

For sample entries, see the `amtune` sample password files.

On Solaris, Linux, and AIX, the password file must be inaccessible to non-owners and only readable by its owner . For example, you can run change the permissions mode of the password file by running the following command:

```
chmod 400
```

On Windows, `amtune.bat` does not check the permission on the password file.

Tuning operating system parameters does not require a password file.

Using amtune Modes

You can run the OpenSSO Enterprise tuning scripts in REVIEW mode (the default) or in CHANGE mode, as determined by the `AMTUNE_MODE` parameter in the `amtune-env.properties` file.

REVIEW   This is the default value. Returns tuning recommendations for an OpenSSO Enterprise deployment, but does not make any actual changes to the environment.

CHANGE   Makes all tuning modifications defined in the `amtune-env.properties` file. Use CHANGE mode only after you have reviewed and understand the tuning changes that will be applied to your deployment.

In either mode, the scripts return a list of tuning recommendations to the following log file:
`<TOOLS_DIR>\<FAM_INSTANCE_NAME>\logs\amtune-config.<randomstring>`

In the terminal window, debug logs will be present in the following file:
`<TOOLS_DIR>\<FAM_INSTANCE_NAME>\logs\amtune-debug-logs`

Tuning the Operating System

Solaris OS

Sun Fire T1000 and T2000 Servers

If Access Manager is installed on a Sun Fire T1000 or T2000 server, the tuning scripts for Web Server 7.0 and Application Server 8.2 set the `JVM GC ParallelGCThreads` parameter to 8:

```
-XX:ParallelGCThreads=8
```

This parameter reduces the number of garbage collection threads, which could be unnecessarily high on a 32-thread capable system. However, you can increase the value to 16 or even 20 for a 32 virtual CPU machine such as a Sun Fire T1000 server, if it minimizes full garbage collection activities.

Solaris SPARC Systems with CMT Processor with CoolThreads Technology

For Solaris SPARC systems with CMT processor with CoolThreads technology, in the `/etc/opt/SUNWam/config/AMConfig.properties` file, add the following properties at the end of the file:

```
com.sun.identity.log.resolveHostName=false
```

```
com.sun.am.concurrencyRate=value
```

where value depends on the number of cores in a Sun Fire T1000 or T2000 server. For example, for 8 cores, set value to 8, or for 6 cores, set value to 6.

Linux OS

To tune for maximum performance on Linux systems, you need to make tuning adjustments to the following items:

If you are running Application Server 8.1 on Red Hat Linux, the stack size of the threads created by the Red Hat OS for Application Server is 10 Mbytes, which can cause JVM resource problems (CR 6223676). To prevent these problems, set the Red Hat OS operating stack size to a lesser value such as 2048 or even 256 Kbytes, by executing the ulimit command before you start Application Server. Execute the ulimit command on the same console that you will use to start Application Server. For example: ulimit -s 256

File Descriptors

You might need to increase the number of file descriptors from the default. Having a higher number of file descriptors ensures that the server can open sockets under high load and not abort requests coming in from clients. Start by checking system limits for file descriptors with this command:

```
cat /proc/sys/fs/file-max
8192
```

The current limit shown is 8192. To increase it to 65535, use the following command (as root):

```
echo "65535" > /proc/sys/fs/file-max
```

To make this value to survive a system reboot, add it to /etc/sysctl.conf and specify the maximum number of open files permitted: fs.file-max = 65535 Note: The parameter is not proc.sys.fs.file-max, as you might expect.

To list the available parameters that can be modified using sysctl: sysctl -a To load new values from the sysctl.conf file: sysctl -p /etc/sysctl.conf

To check and modify limits per shell, use the following command: limit The output will look something like this:

```
cputime        unlimited
filesize       unlimit
datasize       unlimited
stacksize      8192 kbytes
coredumpsize   0 kbytes
memoryuse      unlimited
descriptors    1024
memorylocked   unlimited
maxproc        8146
openfiles      1024
```

The openfiles and descriptors show a limit of 1024. To increase the limit to 65535 for all users, edit /etc/security/limits.conf as root, and modify or add the nofile setting (number of file) entries:

```
*       soft    nofile                  65535
*       hard    nofile                  65535
```

The asterisk (*) is a wildcard that identifies all users. You could also specify a user ID instead.

Then edit /etc/pam.d/login and add the line:

session required /lib/security/pam_limits.so

On Red Hat Linux , you also need to edit /etc/pam.d/sshd and add the following line: session required /lib/security/pam_limits.so

On many systems, this procedure will be sufficient. Log in as a regular user and try it before doing the remaining steps. The remaining steps might not be required, depending on how pluggable authentication modules (PAM) and secure shell (SSH) are configured.

Virtual Memory

OpenSSO 8 supports only Linux kernel 2. 6 systems such as Red Hat Enterprise Linux 4 and 5, and Ubuntu 8.0.4. For more information, see "Chapter 4: Tuning the VM" in the documenthttp://people.redhat.com/nhorman/papers/rhel4_vm.pdf.

Understanding Virtual Memory in Red Hat Enterprise Linux 4

To ensure that the network interface is operating in full duplex mode, add the following entry into /etc/rc.local:

```
mii-tool -F 100baseTx-FD eth0
```

where eth0 is the name of the network interface card (NIC).

Disk I/O Settings

To tune disk I/O performance for a non-SCSI disk, follow these steps:

1. Test the disk speed with this command:

   /sbin/hdparm -t /dev/hdX

2. Enable direct memory access (DMA) with this command:

   /sbin/hdparm -d1 /dev/hdX

3. Check the speed again using the hdparm command. Given that DMA is not enabled by default, the transfer rate might have improved considerably. In order to do this at every reboot, add the /sbin/hdparm -d1 /dev/hdX line to /etc/conf.d/local.start, /etc/init.d/rc.local, or whatever the startup script is called.

TCP/IP Settings

To tune the TCP/IP settings, follow these steps:

1. Add the following entry to /etc/rc.local:

   ```
   echo 30 > /proc/sys/net/ipv4/tcp_fin_timeout
        echo 60000 > /proc/sys/net/ipv4/tcp_keepalive_time
        echo 15000 > /proc/sys/net/ipv4/tcp_keepalive_intvl
        echo 0 > /proc/sys/net/ipv4/tcp_window_scaling
   ```

2. Add the following to /etc/sysctl.conf:

   ```
   # Disables packet forwarding
        net.ipv4.ip_forward = 0
        # Enables source route verification
        net.ipv4.conf.default.rp_filter = 1
   ```

```
# Disables the magic-sysrq key
kernel.sysrq = 0
net.ipv4.ip_local_port_range = 1204 65000
net.core.rmem_max = 262140
net.core.rmem_default = 262140
net.ipv4.tcp_rmem = 4096 131072 262140
net.ipv4.tcp_wmem = 4096 131072 262140
net.ipv4.tcp_sack = 0
net.ipv4.tcp_timestamps = 0
net.ipv4.tcp_window_scaling = 0
net.ipv4.tcp_keepalive_time = 60000
net.ipv4.tcp_keepalive_intvl = 15000
net.ipv4.tcp_fin_timeout = 30
```

3. Add the following as the last entry in /etc/rc.local:

   ```
   sysctl -p /etc/sysctl.conf
   ```

4. Reboot the system.

5. Use this command to increase the size of the transmit buffer:

   ```
   tcp_recv_hiwat ndd /dev/tcp 8129 32768
   ```

Tuning Third-Party Containers

In case of 32-bit Sun JVM on Solaris 10 (both Sparc and x86), the following JVM options can be used as an example: the actual heap sizes should be adjusted based on the available physical memory, other processes running and the presence of any other active web applications running in the same JVM as OpenSSO.

```
"-server
-XX:+UseParNewGC
-XX:+UseConcMarkSweepGC
-Xms3136M Max Heap: -
-Xmx3136M
-XX:NewSize=392M
-XX:MaxNewSize=392M
-Xss128k
```

For more information on JVM tuning and use of 64-bit JVM, please go to Java Performance Portal:

http://java.sun.com/javase/technologies/performance.jsp."

Also in cases of WebLogic Application Servers, one needs to increase the MaxPermSize from the default value of 128m to 256m in setDomainEnv.sh as shown below: otherwise WebLogic Server may not start up with OpenSSO 8 deployed. "

```
"if [ "${JAVA_VENDOR}" = "Sun" ] ; then
        MEM_ARGS="${MEM_ARGS} ${MEM_DEV_ARGS} -XX:MaxPermSize=256m"
        export MEM_ARGS
fi"
```

Using the Tuning Scripts

- "To Install the Tuning Scripts" on page 12
- "To Tune the Operating System, Web Container, and OpenSSO Enterprise" on page 12
- "To Tune a Remote Sun Directory Server" on page 13

▼ To Install the Tuning Scripts

1   In the directory where you want to install the tuning scripts, unzip the ssoAdminTools.zip **file.**

2   In the directory which has the unzipped ssoAdminTools **file, run the following command:**

UNIX   **./setup**

Windows   **setup**

3   When prompted, enter the configuration directory.

Example: /fam_config/opensso

Once installation is complete, you can run use the command-line interface under the following directory:

<TOOLS_DIR>/<FAM_INSTANCE_NAME>/bin

where <TOOLS_DIR> is the directory which has the unzippedssoAdminTools.zip file, and <FAM_INSTANCE_NAME> is the OpenSSO Enterprise deployment URI.

▼ To Tune the Operating System, Web Container, and OpenSSO Enterprise

1   Log in as or change to superuser.

2   If you have not run the scripts in REVIEW mode, ensure that AMTUNE_MODE is set to REVIEW (Default Value:) in the following file:

<TOOLS_DIR>\<FAM_INSTANCE_NAME>\bin\amtune\amtune-env.properties file

3   **Edit other parameters in the** `amtune-env.properties` **file, depending upon the components you want to tune.**

See the Appendix for detailed information about the properties.

4   **Execute the following command:**

UNIX or Linux   **<TOOLS_DIR>\<FAM_INSTANCE_NAME>\bin\amtune\amtune**

Windows   **<TOOLS_DIR>\<FAM_INSTANCE_NAME>\bin\amtune\amtune.bat**

5   **In REVIEW mode, run either the** `amtune` **script or one of the component scripts.**

Review the tuning recommendations in the debug log file. If needed, make changes to the `amtune-env.properties` file based on the tuning recommendations.

6   **When you are satisfied with the tuning recommendations from the running** `amtune` **in REVIEW mode run, set** `AMTUNE_MODE` **to** `CHANGE` **in the** `amtune-env.properties` **file.**

7   **Check the debug log file for the results.**

In CHANGE mode, the amtune script might need to restart the web container and OpenSSO Enterprise. In some instances, amtune might also recommend a system restart.

▼ To Tune a Remote Sun Directory Server

1   **FTP or copy** `ssoAdminTools.zip` **to the remote Sun Directory Server host.**

2   **Unzip** `ssoAdminTools.zip`**.**

3   **Create a new directory:**

UNIX or Linux   <TOOLS_DIR>/<FAM_URI_DIR>/unix/bin/amtune

Windows   TOOLS_DIR>\<FAM_URI_DIR>\windows\bin\amtune

4   **Copy the amtune template file as follows:**

UNIX or Linux   Copy <TOOLS_DIR>/template/unix/bin/amtune/amtune.template

                     to

                     <TOOLS_DIR>/<FAM_URI_DIR>/unix/bin/amtune/amtune

Windows   Copy
                     <TOOLS_DIR>\template\windows\bin\amtune\amtune.bat.template

                     to

                     `<TOOLS_DIR>\<FAM_URI_DIR>\windows\bin\amtune\amtune.bat`

5 Set values for `TOOLS_HOME` **and** `JAVA_HOME`**.**

UNIX or Linux	`<TOOLS_DIR>/<FAM_URI_DIR>/unix/bin/amtune/amtune`
Windows	`<TOOLS_DIR>\<FAM_URI_DIR>\windows\bin\amtune\amtune.bat`

6 Copy the amtune-env.properties template as follows:

UNIX or Linux	Copy
	`<TOOLS_DIR>/template/unix/bin/amtune/amtune-env.properties.template`
	
	to
	
	`<TOOLS_DIR>/template/unix/bin/amtune/amtune-env.properties`

Windows	Copy `<TOOLS_DIR>\template\windows\bin\`
	`amtune\amtune-env.properties.template`
	
	to
	
	`<TOOLS_DIR>\template\windows\bin\`
	`amtune\amtune-env.properties`

7 Edit `amtune-env.properties` **file with Directory Server information.**

8 Run the `amtune` **script with a password file for the Sun Directory Server Directory Manager.**

The Directory Server Directory Manager password must be inaccessible to non-owners and only readable by its owner . For example, you can run change the permissions mode of the password file by running the following command:

`chmod 400`

UNIX or Linux	**amtune**
Windows	**amtune.bat**
	On Windows, you must also execute amtune.bat with a password file. But amtune.bat does not check its file permission on Windows.

A

amtune Properties

This appendix lists properties in the amtune-env.properties you must modify and verify before running the amtune script. After you have modified the file to suit your deployment, you can run the amtune script.

- "Tuning Modes" on page 15
- "Log Level Options" on page 17
- "Components to be Tuned" on page 17
- "Sun Web Server Settings" on page 20
- "Sun Application Server 9.1 Settings" on page 22
- "OpenSSO Enterprise Settings" on page 24
- "Sun Directory Server Settings" on page 26
- "Special Performance Settings" on page 28

Tuning Modes

AMTUNE_MODE

Description:	Based on this setting, the amtune script will behave differently.
Required:	Yes
Sample Values:	

	REVIEW	Suggest tuning recommendations only. In this mode, amtune will suggest tuning recommendations, but will not make any changes to thedeployment environment.
	CHANGE	Implements tuning recommendations. In this mode, amtune will implement all of the tuning recommendations that you have defined in here,

except for Sun Directory Server. See the note below for Sun Directory Server tuning.

Default Value:	None
Additional Information:	Use extreme caution while using CHANGE mode. In CHANGE mode, the amtune script may restart the web container on which OpenSSO is deployed. The amtune script may also recommend a system restart when the operating systems kernel parameters are changed.

On Operating System kernel and TCP parameter tuning, the amtune script tunes the operating system parameters only on Solaris and Linux. The amtune script does not tune the operating system parameters on AIX, Windows, MacOS or BSD variants.

Sun Directory Server tuning requires extra levels of confirmation. The amtune script assumes that OpenSSO Enterprise will use an existing Sun Directory Server in non-exclusive mode, although other applications may use Directory Server. If the Directory Server is installed on a remote machine, it will not be tuned automatically. If the amtune script detects that detects that the Directory server is installed on a remote machine, it creates and amtune.zip file for tuning the remote Directory Server. Follow the steps listed in README in the current directory for moving amtune.zip to a remote Sun Directory machine. See the README section, "Executing amtune on a remote Sun Directory Server machine"). modifying amtune/amtune.bat and amtune-env.properties with the Directory Server information and creating a password file, as well as setting its permission.

To selectively tune various components, see the section "AMTUNE_TUNE_*" on page 17 section of this document.

On Windows, use a backslash (/) for file separators. Example: `c:/sun/webserver7`

For tuning multiple data stores, execute amtune multiple times using different values for DS_* parameters and DIRMGR_PASSWORD.

Log Level Options

AMTUNE_LOG_LEVEL

Description:	Controls the logging of configuration data (calculated tuning values).
Required:	Yes
Sample Values:	

	TERM	The output is only displayed on the terminal.
	FILE	The output is displayed on both terminal and in amtune-config.<time stamp>.log file.

Default Value:	None
Additional Information:	Check the `<TOOLS_DIR>/<OPENSSO_URI>/logs/amtune-config.<time stamp>.log` file for the tuning parameters and their recommended values from each run.

Components to be Tuned

AMTUNE_TUNE_*

Description:	Specifies components to be tuned by amtune.
	These settings work in conjunction with the AMTUNE_MODE parameter setting. You can review or change recommended tunings of any set of these components.
Required:	Yes/No
Properties Details	

AMTUNE_TUNE_OS=
   Only Solaris and Linux kernel and TCP parameters are
   supported for tuning.

AMTUNE_TUNE_DS=
   Only Sun Directory Server is supported for tuning.

AMTUNE_TUNE_WEB_CONTAINER=
  Only Sun Application Server 9.1, Glassfish v2, or Sun Web Server
  7 are supported for tuning.

AMTUNE_TUNE_OPENSSO=
  OpenSSO tuning.

Sample Values:	True or False
Default Value:	None
Addtional Information	Even if only AMTUNE_TUNE_OPENSSO is set to `true`, if Web Server 7.0 or Application Server 9.1 is the web container for OpenSSO, you must specify values for the following:

- $WEB_CONTAINER
- $CONTAINER_ INSTANCE_DIR
- $WSADMIN_* or $ASADMIN_*

You must indicate whether these containers are running in 32- or
64-bit JVM mode. The amtune script restarts the server to check its
JVM mode and to determine how much heap size is available for
setting OpenSSO cache and session entries. For other web
containers, the amtune script supports only 32-bit JVM. For other
web containers, $WEB_CONTAINER and
$CONTAINER_INSTANCE_DIR values are not required.

Although the amtune script does not tune non-Sun web containers,
it will tune OpenSSO parameters if $AMTUNE _TUNE_OPENSSO
is set to `true`.

By default, the amtune script runs based on the assumption that the
following amount of memory is available for tuning OpenSSO
when the web container (both Sun and non-Sun) is running with
32-bit JVM: #

- AMTUNE_MAX_MEMORY_TO_USE_IN_MB_SOLARIS=3584 (Sparc/x86/AIX)
- AMTUNE_MAX_MEMORY_TO_USE_IN_MB_X86=2341 (Linux)
- AMTUNE_MAX_MEMORY_TO_USE_IN_MB_DEFAULT=1536 (Windows)

The amtune script also tunes OpenSSO Enterprise when it is
deployed on WebSphere 6.1 and AIX, though it does not tune AIX
system parameters or WebSphere container parameters.

Web Container Options

WEB_CONTAINER

Description:	Specifies OpenSSO web container name and version.
Required:	Yes
Sample Values:	

Sun Web Server 7	`WS7`
Sun Application Server 9.1 or Glassfish v2	`AS91`
BEA WebLogic 9.2	`weblogic92`
BEA WebLogic 10	`weblogic10`
IBM WebSphere 6.1	`websphere61`
JBOSS 4.1	`jboss42`
Tomcat 5.5	`tomcat55`
Tomcat 6	`tomcat6`
Geronimo 2	`geronimo2`
Oracle Application Server 10	`oas10`

Default Value:	None
Additional Information:	All web containers supported by OpenSSO can be specified here. However, for only Web Server 7 and Application Server 9.1, `amtune` tunes JVM heap and JVM per-thread stack sizes, JVM garbage collection algorithms, container worker/acceptor threads and queue sizes.
	For the other web containers, $AMTUNE_TUNE_WEB_CONTAINER should be set to `false`. OpenSSO tuning parameters will still be modified if $AMTUNE_TUNE_IDENTITY is set to `true`.

CONTAINER_INSTANCE_DIR

Description:	Specifies the OpenSSO web container instance directory.

Required:	If the you are using Sun Web Server 7 or Sun application Server 9.1, then this parameter is Required:.
Sample Values:	

Sun Web Server 7	`/sun/webserver7/https-localhost`
Sun Application Server 9.1	`/sun/appserver/domains/domain1`

Default Value:	None
Additional Information:	If you have installed Sun Web Server or Sun Application Server in a non-default location, then change this value before running amtune.
	On Windows, if a directory name has spaces, then use a short form such as `E:/PROGRA~1/GLASSF~1`.

Sun Web Server Settings

The following parameters are required for tuning JVM options and container parameters of Sun Web Server 7.0.

WSADMIN_*

Set the following parameters when $WEB_CONTAINER= WS7.

WSADMIN_DIR

Description:	Specifies Sun Web Server 7 installation location.
Required:	Yes, when `$WEB_CONTAINER=WS7`
Sample Values:	

Solaris	`/opt/sun/webserver7/bin`
Linux	`/opt/SUNWwbsvr7/bin`

Windows `E:/Progra~1/glassfish-v2/bin`

Default Value: None

WSADMIN_USER

Description: Specifies Sun Web Server administrator.

Required: Yes

Sample Values: `admin` (Sun Web Server default)

Default Value: None

WSADMIN_HOST

Description: Specifies Sun Web Server administrative host name.

Required: Yes

Sample Values: `localhost`

Default Value: None

WSADMIN_PORT

Description: Specifies Sun Web Server 7 administration port.

Required: Yes

Sample Values: `8888`

                             8989 (Sun Web Server default)

Default Value: None

Additional Information:

                             If this port is a secure port, set the $WSADMIN_SECURE value to
                             `--ssl=true`.

                             If this port is not a secure port, set the $WSADMIN_SECURE value to
                             `--ssl=false`.

WSADMIN_SECURE

Description: Flag to indicate whether or not $WSADMIN_PORT is in SSL mode.

Required: Yes

Sample Values:

                  If the port is a secure port   `--ssl=true`

| | If the port is not a secure port | `--ssl=false` |

Default Value: None

WSADMIN_CONFIG

Description: Specifies Sun Web Server instance name.

Required: Yes

Sample Values: `server1.domain.com` (Sun Web Server default.)

Default Value: None

WSADMIN_HTTPLISTENER

Description: Specifies HTTP listener name.

Required: Yes

Sample Values: `http-listener-1` (Sun Web Server default)

Default Value: None

Sun Application Server 9.1 Settings

These following parameters are required for tuning JVM options and container parameters of Sun Application Server 9.1.

ASADMIN_*

Set these parameters when `$WEB_CONTAINER= AS91`.

ASADMIN_DIR

Description: Specifies Sun Application Server 9.1 installation location.

Required: Yes

Sample Values:

Solaris	`/opt/SUNWappserver/bin`
Linux	`/opt/sun/appserver/bin`
Windows	`E:/Progra~1/glassfish-v2/bin`

Default Value: None

ASADMIN_USER

Description:	Specifies Sun Application Server 9.1 administrator.
Required:	Yes
Sample Values:	admin (Sun Application Server default)
Default Value:	None

ASADMIN_HOST

Description:	Specifies Sun Application Server administrative host name.
Required:	Yes
Sample Values:	`localhost`
Default Value:	None

ASADMIN_PORT

Description:	Specifies Sun Application Server administrative port.
Required:	Yes
Sample Values:	4848
	4849 (Sun Application Server default)
Default Value:	None
Additional Information:	If this port is a secure port, set $ASADMIN_SECURE value to `--secure`.
	If this port is not a secure port, leave the $ASADMIN_SECURE value blank.

ASADMIN_SECURE

Description:	Flag that indicates whether or not Sun Application Server is in SSL mode.

Required:	Yes
Sample Values:	

If the port is a secure port	`--secure` (Application Server 9.1 default)
If the port is not a secure port	Leave this value blank.

Default Value:	None

ASADMIN_HTTPLISTENER

Description:	Specifies Sun Application Server HTTP listener name.
Required:	Yes
Sample Values:	`http-listener-1` (Sun Application Server default)
Default Value:	None

AMTUNE_WEB_CONTAINER_JAVA_POLICY

Description:	Specifies whether Sun Application Server evaluates java security policies listed in the Application Server `server.policy` file.
Required:	Yes
Sample Values:	false (Application Server default)
Default Value:	`false`
Additional Information:	Do not modify this parameter setting unless it is a unique deployment requirement. Evaluating java security policies can add a significant performance overhead.

OpenSSO Enterprise Settings

SSOADM_LOCATION

Description:	Specifies the directory where the `ssoadm` command-line interface is located.
Required:	Ye

Sample Values: `<TOOLS_DIR>/<OPENSSO_URI>/bin`

where `<TOOLS_DIR>` is the directory in which `ssoAdminTools.zip` is unzipped, and `<OPENSSO_URI>` is the deployment URI of OpenSSO.

Default Value: `<TOOLS_DIR>/<OPENSSO_URI>/bin`

OPENSSOADMIN_USER

Description: Specifies administrator of OpenSSO 8.x.

Required: Yes,

Sample Values: `amadmin` (Default in OpenSSO)

Default Value: None

OPENSSOSERVER_URL

Description: Specifies OpenSSO URL.

Required: Yes

Sample Values: http://<HOST_NAME>:<PORT>/<OPENSSO_URI> (OpenSSO Enterprise default)

Default Value: None

REALM_NAME

Description: Realm names for which user data store LDAP connection pool and maximum session cache sizes need to be modified.

Required: Yes,

Sample Values:

Top_Level_Realm
 `/`

Top_Level_Realm and its sub-realm, subrealm1
 `/|subrealm1`

Top_Level_Realm and two sub-realms
 `/|subrealm1|subrealm2`

Default Value: None

Additional Information: Use "|" character as delimiter for multiple realm names.

For all the data stores under each realm, minimum and maximum LDAP connection pool sizes and maximum size of the cache will be tuned.

Sun Directory Server Settings

The parameters in this section are for tuning a Sun Directory Server instance where a user management or service management and configuration data store is installed. When the Directory Server instance is on a remote computer system, after amtune.zip is copied over and unzipped, amtune validates parameter values only on that remote computer system.

DS_HOST

Description: Specifies Sun Directory Server fully qualified domain name (FQDN).

Required: Yes

Sample Values: `ldap://hostname.domain.com`

Default Value: None

DS_PORT

Description: Specifies Sun Directory Server port.

Required: Yes

Sample Values: 386 (Sun Directory default)

Default Value: None

ROOT_SUFFIX

Description:	Specifies the root suffix of the organization.
Required:	Yes
Sample Values:	sample value
Default Value:	None

DS_INSTANCE_DIR

Description:	Specifies Sun Directory Server instance location
Required:	Yes
Sample Values:	sample value
Default Value:	None
Additional Information:	Use a backslach (/) for file separators on Windows Systems.

DS_TOOLS_DIR

Description:	Sun Directory Server dsadm/dsconf tools bin directory.
Required:	Yes
Sample Values:	sample value
Default Value:	None
Additional Information:	Use a backslach (/) for file separators on Windows Systems.

DS_VERSION

Description:	Sun Directory Server version.
Required:	Yes
Sample Values:	5.2 or 6.3
Default Value:	None
Additional Information:	Sun Directory Server 6.2 is not supported for tuning due to its data corruption issues.

DIRMGR_BIND_DN

Description: Directory Manager BIND DN for $DS_INSTANCE_DIR.

Required: Yes

Sample Values: `cn=Directory Manager` (Directory Server default)

Default Value: None

Special Performance Settings

The following parameters mainly are used internally by amtune.

⚠️ **Caution** – Do not modify these parameters unless tests show significant improvement in performance.

- "WEB_CONTAINER " on page 19
- "AMTUNE_MEM_MAX_HEAP_SIZE_RATIO" on page 29
- "AMTUNE_PER_THREAD_STACK_SIZE" on page 30
- "AMTUNE_*_MEMORY_TO_USE_*_MB" on page 30

AMTUNE_PCT_MEMORY_TO_USE

Description: Specifies a percentage value how much of the machine's available memory will be used by OpenSSO Enterprise.

Required: Yes/No

Sample Values: 0 to 100

Default Value: 75

Additional Information: Do not modify this percentage unless tests show significant improvement in performance.

                         OpenSSO Enterprise currently recommends at least 1 GB of RAM in deployment. OpenSSO can use a maximum of 4GB for 32-bit JVM. This is the per-process address space limit for 32-bit applications.

                         When you set AMTUNE_PCT_MEMORY_TO_USE to 100, the maximum space allocated for OpenSSO is the lesser of 4GB and 100% of available RAM for 32-bit JVM.

When you set AMTUNE_PCT_MEMORY_TO_USE to 0, OpenSSO is configured to use 256MB RAM. This value is the driving force in tuning OpenSSO. The following values are derived from this setting:

JVM memory use	Heap and new generation sizes.
Thread pool sizes	Web Server thread pool and OpenSSO Enterprise authentication, user and service/configuration data store LDAP connection pools and session notification thread pool.
OpenSSO cache	Maximum size of user session cache.
SDK cache/session entries	Maximum number of SDK cache and session entries.

For 64-bit JVM, the initial heap size (-Xms) cannot be more than 12GB due to Web Server 7 and Application Server 9.1 limitations. There is no such limit for the maximum heap size (-Xmx).

Using 64-bit JVM, the user session cache size, and number of sessions, and number of SDK cache entries are calculated by amtune and can be many times of those calculated in case for 32-bit JVM, depending on the available memory. Be sure to review these numbers and determine whether or not they are appropriate .

AMTUNE_MEM_MAX_HEAP_SIZE_RATIO

Description:	These parameters are used to calculate the maximum and minimum heap sizes. Options include:
	▪ AMTUNE_MEM_MAX_HEAP_SIZE_RATIO
	▪ AMTUNE_MEM_MIN_HEAP_SIZE_RATIO
Required:	Yes
Sample Values:	
	Maximum heap size ratio 7/8
	Minimum heap size ratio 1/2

Additional Information: Do not modify these ratios unless tests show significant improvement in performance.

Web Server 7 and Application Server 1.9 use about 1/8 of the OpenSSO Enterprise JVM process heap size, leaving about 7/8 for OpenSSO Enterprise. You should change these ratios only for 64-bit JVM. For 32-bit JVM, keep the default values.

AMTUNE_PER_THREAD_STACK_SIZE

Description: Specifies available stack space per thread in JVM. Per-thread stack size is used to tune various thread-related parameters in OpenSSO Enterprise and its web container. Options include:

- AMTUNE_PER_THREAD_STACK_SIZE_IN_KB
- AMTUNE_PER_THREAD_STACK_SIZE_IN_KB_64_BIT

Required: Yes

Sample Values:

32–bit JVM	128KB
64–bit JVM	512KB

Default Value: None

Additional Information: Do not modify these values.

AMTUNE_*_MEMORY_TO_USE_*_MB

Description: Maximum amount of memory that should not be exceeded for 32-bit JVM on different platforms. Options include:

- AMTUNE_MIN_MEMORY_TO_USE_IN_MB
- AMTUNE_MAX_MEMORY_TO_USE_IN_MB_SOLARIS
- AMTUNE_MAX_MEMORY_TO_USE_IN_MB_X86
- AMTUNE_MAX_MEMORY_TO_USE_IN_MB_DEFAULT (for Windows)

Required: Yes

Default Values   AMTUNE_MIN_MEMORY_TO_USE_IN_MB=512

AMTUNE_MAX_MEMORY_TO_USE_IN_MB_SOLARIS=3584

AMTUNE_MAX_MEMORY_TO_USE_IN_MB_X86=2341

AMTUNE_MAX_MEMORY_TO_USE_IN_MB_DEFAULT=1755

Additional Information: Do not modify these values. If the maximum values are changed to higher numbers, the web container will not start on these platforms due to a JVM crash.

AMTUNE_MAX_MEMORY_TO_USE_IN_MB_X86 is used to limit the maximum JVM heap size on non-Solaris operating systems (Linux) and on x86 hardware. These operating systems have limitations on how much JVM heap size can be allowed even with 32-bit JVM.