Moab HPC Suite – Enterprise Edition

Manual Version Installation Guide 7.2.7

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Contents

Welcome

Welcome to the *Moab HPC Suite – Enterprise Edition 7.2.7* Manual Version Installation Guide, which will help you install your Moab HPC Suite. This guide includes detailed instructions for installing each component of the suite so that you can quickly get up and running.

This guide is intended for system administrators who are responsible for installing the Moab HPC Suite – Enterprise Edition.

The Moab HPC Suite – Enterprise Edition version 7.2.7 contains the following components:

- Moab Workload Manager 7.2.7
- TORQUE 4.2.7
- Moab Accounting Manager 7.2.3
- Moab Web Services 7.2.7
- Moab Viewpoint 7.2.7

To get started with installing your Moab HPC Suite, please see **Installation overview** on page 1.

Installation overview

The installation process of the Moab HPC Suite includes installing the separate components in the suite. This guide contains detailed instructions for installing each component.

> Many individual components have dependencies on other components. (These dependencies are listed in the "Requirements" section of each component's installation instructions.) However, if you do not require a certain component (Moab Viewpoint, for example), you do not have to install it.

The install instructions for each component include information about system requirements and dependencies. Some include prerequisite instructions that you will need to complete before you begin the install. Please read this information carefully, and make sure you have installed all the dependencies and packages that are necessary in order to avoid errors during the Moab HPC Suite install process.

To install the Moab HPC Suite, install the packages in the following order:

1. Install TORQUE (see **Installing TORQUE** on page 5).
2. Install Moab Workload Manager (see **Installing Moab Workload Manager** on page 9).
3. Install Moab Accounting Manager (see **Installing Moab Accounting Manager** on page 15).
4. Install Moab Web Services (see **Installing Moab Web Services** on page 23).
5. Install Moab Viewpoint (see **Installing Moab Viewpoint** on page 29).

Enable the EPEL repository

You must enable the Extra Packages for Enterprise Linux (EPEL) repository if you use a RHEL or CentOS, or Scientific Linux system.

For RHEL 5 and CentOS 5:

```
[root]# rpm -Uvh http://dl.fedoraproject.org/pub/epel/5/x86_64/epel-release-5-4.noarch
.rpm
```

For RHEL 6, CentOS 6, and Scientific Linux 6:

```
[root]# rpm -Uvh http://dl.fedoraproject.org/pub/epel/6/x86_64/epel-release-6-
8.noarch.rpm
```

Install TORQUE and Moab Workload Manager dependencies.

You must install the following dependencies in order to use TORQUE and Moab Workload Manager:

- libxml2-devel package (package name may vary)
- openssl-devel package (package name may vary)

- ANSI C compiler. The native C compiler is recommended if it is ANSI; otherwise use gcc.

Use the following commands to install the required dependencies and packages.

RHEL and CentOS, and Scientific Linux:

```
[root]# yum update
[root]# yum install make perl-CPAN libxml2-devel openssl-devel gcc gcc-c++
```

SLES:

Before installing the dependencies, do the following:

1. Verify that you have a licensed installation of SLES 11 SP2.
2. Download the SuSE Linux Enterprise 11 Software Development Kit e-Media Kit and add the ISO to the repository.

```
[root]# zypper update
[root]# zypper install make libxml2-devel libopenssl-devel gcc gcc-c++
```

Install MongoDB

You must install MongoDB if you are installing Moab Web Services or Moab Viewpoint.

To install and enable MongoDB

1. Install MongoDB.

   RHEL and CentOS, and Scientific Linux:

   Create a file called `/etc/yum.repos.d/10gen.repo` and add the following lines.

   ```
   [10gen]
   name=10gen Repository
   baseurl=http://downloads-distro.mongodb.org/repo/redhat/os/x86_64
   gpgcheck=0
   enabled=1
   ```

   Install `mongo20-10gen` and `mongo20-10gen-server`.

   ```
   [root]# yum install mongo20-10gen mongo20-10gen-server
   ```

   SLES:

   ```
   [root]# zypper ar http://download.opensuse.org/repositories/server:/database/SLE_1
   1_SP2 OpenSuseDatabase
   [root]# zypper install mongodb
   ```

2. Start MongoDB.

   RHEL and CentOS, and Scientific Linux:

   ```
   [root]# chkconfig mongod on
   [root]# service mongod start
   ```

   SLES:

```
[root]# chkconfig mongodb on
[root]# service mongodb start
```

You may need to wait a minute or two for Mongo to initialize.

3. Prepare the MongoDB database by doing the following:

   a. Add the required MongoDB users.

```
[root]# mongo
> use admin;
> db.addUser("admin_user", "secret1");
> db.auth("admin_user", "secret1");

> use moab;
> db.addUser("moab_user", "secret2");
> db.addUser("mws_user", "secret3", true);

> use mws;
> db.addUser("mws_user", "secret3");
```

> Because the `admin_user` has read and write rights to the `admin` database, it also has read and write rights to all other databases. See Control Access to MongoDB Instances with Authentication for more information.

> The passwords used above (`secret1`, `secret2`, and `secret3`) are examples. Choose your own passwords for these users.

   b. Enable authentication in MongoDB.

RHEL and CentOS, and Scientific Linux:

```
[root]# nano /etc/mongod.conf

auth = true

[root]# service mongod restart
```

SLES:

MongoDB authentication is enabled by default in SLES. To verify, check the value of `auth` as shown below.

```
[root]# nano /etc/mongodb.conf
...
auth = true
...
[root]# service mongodb restart
```

Related topics

- **Welcome** on page v

Installing TORQUE

These instructions describe how to install and start TORQUE.

Requirements

The following software is required to run TORQUE4.2.7:

- A fully POSIX make. If you are unable to "make" PBS with your make, we suggest using `gmake` from GNU.
- Tcl/Tk version 8 or higher if you plan to build the GUI portion of TORQUE or use a Tcl based scheduler.
- If you use cpusets, `libhwloc` 1.1 or later is required (for TORQUE 4.0.0 and later)

Prerequisites

TORQUE requires certain ports to be open for essential communication:

- For client communication to `pbs_server`, all privileged ports must be open (ports under 1024).
- For `pbs_server` communication to `pbs_mom`, the default port is 15003.
- For `pbs_mom` to `pbs_server`, the default port is 15001.

For more information on how to configure the ports that TORQUE uses for communication, see Configuring Ports.

Important: If you intend to use TORQUE 4.2.7 with Moab, you must run Moab version 7.1 or later. TORQUE 4.2.7 will not work with versions earlier than Moab 7.1.

To install TORQUE

1. Download the latest 4.2.7 build (`torque-4.2.3.1.tar.gz`, for example) from the Adaptive Computing website.
2. Switch the user to root.

```
[user]$ su -
```

3. Run each of the following commands in order.

```
[root]# tar xzvf torque-4.2.7.tar.gz
[root]# cd torque-4.2.7
[root]# ./configure
[root]# make
[root]# make install
```

For information on what options are available to customize the ./configure command, see Customizing the install.

4. Configure the `trqauthd` daemon to start automatically at system boot.

```
* If Debian distribution, do the following *
[root]# cp contrib/init.d/debian.trqauthd /etc/init.d/trqauthd
[root]# chkconfig --add trqauthd
[root]# echo /usr/local/lib > /etc/ld.so.conf.d/torque.conf
[root]# ldconfig
[root]# service trqauthd start

* If SLES distribution, do the following *
[root]# cp contrib/init.d/suse.trqauthd /etc/init.d/trqauthd
[root]# chkconfig --add trqauthd
[root]# echo /usr/local/lib > /etc/ld.so.conf.d/torque.conf
[root]# ldconfig
[root]# service trqauthd start

* If RHEL distribution, do the following *
[root]# cp contrib/init.d/trqauthd /etc/init.d/
[root]# chkconfig --add trqauthd
[root]# echo /usr/local/lib > /etc/ld.so.conf.d/torque.conf
[root]# ldconfig
[root]# service trqauthd start
```

5. The make packages command can be used to create self-extracting packages that can be copied and executed on your nodes. For information on creating packages and deploying them, see Compute nodes.

   You will also want to scp the `init.d` scripts to the compute nodes and install them there.

6. Verify that the `/var/spool/torque/server_name` file exists and contains the correct name of the server.

```
[root]# echo <pbs_server's_hostname> > /var/spool/torque/server_name
```

7. By default, TORQUE installs all binary files to `/usr/local/bin` and `/usr/local/sbin`. Make sure the path environment variable includes these directories for both the installation user and the root user.

```
[root]# export PATH=/usr/local/bin/:/usr/local/sbin/:$PATH
```

8. Initialize `serverdb` by executing the `torque.setup` script.

```
[root]# ./torque.setup root
```

9. Add nodes to the `/var/spool/torque/server_priv/nodes` file. For information on syntax and options for specifying compute nodes, see Managing Nodes.

10. Configure the MOMs if necessary (See Configuring TORQUE on compute nodes in the TORQUE Administrator Guide.).

11. **ONLY** if you are doing a *clean* install, run the following commands to create the pbs server and do some basic setup:

```
[root]# /usr/share/doc/moab-torque-server-4.2.7/torque.setup
[root]# service pbs_server restart
```

12. Configure pbs_server and pbs_mom to start automatically at system boot, and then start their daemons.

```
*If Debian distribution, do the following *
[root]# cp contrib/init.d/debian.pbs_server /etc/init.d/pbs_server
[root]# cp contrib/init.d/debian.pbs_mom /etc/init.d/pbs_mom
[root]# chkconfig --add pbs_server
[root]# chkconfig --add pbs_mom
[root]# service pbs_server restart
[root]# service pbs_mom start

*If SLES distribution, do the following *
[root]# cp contrib/init.d/suse.pbs_server /etc/init.d/pbs_server
[root]# cp contrib/init.d/suse.pbs_mom /etc/init.d/pbs_mom
[root]# chkconfig --add pbs_server
[root]# chkconfig --add pbs_mom
[root]# service pbs_server restart
[root]# service pbs_mom start

* If RHEL distribution, do the following *
[root]# cp contrib/init.d/pbs_server contrib/init.d/pbs_mom /etc/init.d
[root]# chkconfig --add pbs_server
[root]# chkconfig --add pbs_mom
[root]# service pbs_server restart
[root]# service pbs_mom start
```

Related topics

- **Installation overview** on page 1
- **Installing Moab Workload Manager** on page 9
- **Component documentation** on page 33

Installing Moab Workload Manager

These instructions describe how to install and start Moab Workload Manager (MWM).

Requirements

Hardware requirements:

- Quad-core Intel/AMD x86-64 processor
- At least 12 GB of RAM
- 100 GB disk space

Supported operating systems:

MWM has been tested on the following variants of Linux:

- CentOS (5.7 and 6.3)
- Red Hat (5.7 and 6.3)
- Scientific Linux (6.3)
- SUSE Linux Enterprise Server 11 SP2

MWM has historically worked, but has not been tested, on the following operating systems:

- Debian
- AIX

Host operating system software dependencies:

- libcurl
- unixODBC and unixODBC-devel (if you are using an ODBC database)
- perl-CPAN (This package may be named differently on non-RHEL systems.)
- Perl version 5.8.8 +
- libxml2-devel (This package may be named differently on non-RHEL systems.)

Supported resource managers:

- TORQUE
- SLURM

Dependencies and packages installation

Use the following commands to install the required Moab Workload Manager dependencies and packages (listed in the **Requirements** section above).

RHEL 5 and CentOS 5:

```
[root]# yum update
[root]# yum install make curl unixODBC unixODBC-devel perl-CPAN libxml2-devel
```

RHEL 6 and CentOS 6, and Scientific Linux 6:

```
[root]# yum update
[root]# yum install make libcurl unixODBC unixODBC-devel perl-CPAN libxml2-devel
```

SLES:

```
[root]# zypper update
[root]# zypper install make curl unixODBC unixODBC-devel libxml2-devel
```

To install Moab Workload Manager

If you have not met the hardware and host operating system software requirements listed above, you will likely encounter errors when trying to install Moab Workload Manager.

1. Download the latest MWM build (`moab-<version>-<OS>-linux-x86_64-<type>.tar.gz`) from the Adaptive Computing website.

   The variable marked *<version>* is the desired version of the suite; for example, 7.2.7. The variable marked *<OS>* indicates whether you are using a RHEL/CentOS 5 operating system (`EL5`), a RHEL/CentOS 6 operating system (`EL6`), or a SUSE 11 operating system (`SUSE11`). The variable marked *<type>* is one of `libtorque` (TORQUE), `generic` (generic), `libtorque-libodbc` (TORQUE ODBC), or `generic-libodbc` (generic ODBC).

2. As the root user, run each of the following commands in order.

   ```
   [root]# tar xzvf moab-7.2.0-xxxx.tar.gz (where xxxx can be one of: generic, generi
   c-odbc, torque, torque-odbc)
   [root]# cd moab-7.2.0
   ```

3. Configure Moab. The `./configure` command allows you to specify some options. In some cases, you might want to customize the location of the MWM home directory, the server daemon, and the client commands. You can make these configurations by using the `./configure` options (For a complete list of `./configure` options, use `./configure --help` or refer to the table of commonly used `./configure` options in the Installing Moab section of the Moab Workload Manager Administrator Guide.).

   It is strongly recommended that you configure Moab with the `--with-init`, `--with-profile`, and `--with-flexlm` options. If you are using TORQUE as your resource manager, use the `--with-torque` option. If you are installing Moab Accounting Manager, configure Moab with the `--with-am` option.

```
[root]# ./configure <options>
```

4. (Only if you are using green computing, or if you are using a resource manager other than TORQUE) Run the make perldeps command to install the necessary perl modules using CPAN. When first running CPAN, you will be asked for configuration information. It is recommended that you choose an automatic configuration. You will be prompted to provide input during module installation; running the make perldeps command with a script is not recommended.

```
[root]# make perldeps
```

5. Install Moab.

```
[root]# make install
```

6. (ONLY if installing on non-RHEL distributions)

   Copy the appropriate `init.d` file, set the permissions on it, and configure MWM to start automatically at system boot.

```
* If SLES distribution, do the following *
[root]# cp OS/SUSE/etc/init.d/moab /etc/init.d/moab

[root]# chmod 755 /etc/init.d/moab
[root]# chkconfig --add moab

* If chkconfig doesn't work, try the following *
[root]# update-rc.d moab defaults
```

7. Modify the MWM configuration file.

```
[root]# nano /opt/moab/etc/moab.cfg
```

   Do the following:

   a. Verify that **SUBMITCMD** is set up for your TORQUE resource manager (Change `RMCFG [hostname]` to `RMCFG[torque]`) and that it points to a valid `qsub` executable. For example:

```
RMCFG[torque] SUBMITCMD=/usr/local/bin/qsub
```

      If you use a SLURM resource manager, see Moab-SLURM Integration Guide for configuration information. If you use a NATIVE resource manager, see Managing Resources Directly with the Native Interface for configuration information.

   b. *ONLY* if you are using Moab Web Services or Moab Viewpoint, add *tomcat* to the list of administrator **USERS**. For example:

```
ADMINCFG[1] USERS=root,tomcat
```

      Also, make sure that you set **ENABLEPROXY** to *TRUE*:

```
ADMINCFG[1] ENABLEPROXY=TRUE
```

      Without this configuration, all jobs submitted in Viewpoint will be submitted as "root," regardless of the user who actually submitted the job.

8. If you ran the ./configure –with-profile option, source the following file to add the MWM home directory to your current shell *$PATH* environment.

```
[root]# . /etc/profile.d/moab.sh
```

9. Copy your license file into the same directory as `moab-server.cfg` (`/opt/moab/etc/` by default). For example:

```
[root]# cp moab.lic $MOABHOMEDIR/etc/moab.lic
```

   To verify the current status of your license, use `moab --about`.

   MWM checks the status of the license every day just after midnight. At 60 and 45 days before, and daily from 30 days before license expiration to and including the license expiration date, MWM sends an e-mail to all level 1 administrators informing them of the pending MWM license expiration. A log record is also made of the upcoming expiration event. For the notifications to occur correctly, you must enable administrator email notification (see "Notifying Administrators of Failures" in the Moab Workload Manager Administrator Guide) and `moab.cfg` must contain email addresses for level 1 administrators. For example:

```
ADMINCFG[1] USERS=u1,u2,u3[,...]

USERCFG[u1] EMAILADDRESS=u1@company.com
USERCFG[u2] EMAILADDRESS=u2@company.com
USERCFG[u3] EMAILADDRESS=u3@company.com

MAILPROGRAM DEFAULT
```

   MWM has an internal license that enables some functionality for a limited time for evaluation purposes. If you want to enable adaptive energy management, dynamic multi-OS provisioning, grid management, and other features, or if you want to evaluate MWM for a longer period, contact evaluation support. Use mdiag -S -v to see which features your license supports.

10. Start MWM.

```
[root]# service moab start
```

   If Moab fails to start because `libodbc.so.1` cannot be found, you must create a symbolic link from `libodbc.so.1` to `libodbc.2`.

```
[root]# ln -s /usr/lib64/libodbc.so.2 /usr/lib64/libodbc.so.1
```

   For more information, see the Unix ODBC documentation.

11. Submit a sleep job as a non-root user and verify the job is running.

```
[root]# su - user
[user]$ echo sleep 150 | msub
[user]$ showq
```

12. Connecting Moab to MongoDB

If you will be installing Moab Web Services or Moab Viewpoint, connect MWM to MongoDB using the following instructions:

a. In `/opt/moab/etc/moab.cfg`, set the **MONGOSERVER** parameter to the correct location of the MongoDB server. This may be set to `localhost`. By default, Moab assumes it is on the same server.

```
MONGOSERVER <host>[:<port>]
```

b. In the `/opt/moab/etc/moab-private.cfg` file, set the **MONGOUSER** and **MONGOPASSWORD** parameters to the MongoDB `moab_user` credentials you set (for details, see **Install MongoDB** on page 2).

```
MONGOUSER     moab_user
MONGOPASSWORD secret2
```

c. Verify that Moab is able to connect to MongoDB.

```
[root]# service moab restart
[root]# mdiag -S
...
Mongo connection (localhost) is up (credentials are set)
...
```

Related topics

- **Installation overview** on page 1
- **Installing TORQUE** on page 5
- **Component documentation** on page 33

Installing Moab Accounting Manager

These instructions describe how to install and start Moab Accounting Manager (MAM).

Requirements

Supported databases:

- PostgreSQL
- MySQL
- SQLite (embedded database bundled with the Moab Accounting Manager source code)

Software requirements:

- GCC or ANSI C-Compiler
- Selected database server, client, libraries, and development package
- libxml2

Optional software:

- Suidperl
- GNU readline
- Apache Httpd Server with mod_ssl

Dependencies and packages installation

Use the following commands to install the required Moab Accounting Manager dependencies and packages (listed in the **Requirements** section above).

RedHat 5 based system:

```
[root]# yum install gcc mysql mysql-server mysql-devel perl-DBD-MySQL libxml2-devel
openssl-devel perl-suidperl readline-devel ncurses-devel httpd mod_ssl perl-
TermReadKey perl-CGI-Session perl-Config-Tiny perl-Crypt-CBC perl-Crypt-DES perl-
Crypt-DES_EDE3 perl-DateManip perl-DBI perl-Digest-HMAC perl-Digest-SHA1 perl-Error
perl-Log-Dispatch-FileRotate perl-Log-Log4perl perl-Term-ReadLine-Gnu perl-XML-
LibXML perl-Time-HiRes perl-CGI
```

RedHat 6 based system:

```
[root]# yum install gcc mysql mysql-server mysql-devel perl-DBD-MySQL libxml2-devel
openssl-devel perl-suidperl readline-devel ncurses-devel httpd mod_ssl perl-CGI
perl-CGI perl-CGI-Session perl-Config-Tiny perl-Crypt-CBC perl-Crypt-DES perl-
Crypt-DES_EDE3 perl-Date-Manip perl-Time-HiRes perl-DBI perl-Digest-HMAC perl-
Digest-SHA1 perl-Error perl-Log-Dispatch-FileRotate perl-Log-Log4perl perl-Term-
ReadLine-Gnu perl-TermReadKey perl-XML-LibXML
```

On a RHEL 6 system, you may experience failed dependencies on perl(Config::Tiny) and perl(RRDs). You can install these by running the following:

```
[root]# rpm -Uvh ftp://ftp.pbone.net/mirror/ftp.centos.org/6/os/x86_
64/Packages/rrdtool-perl-1.3.8-6.el6.x86_64.rpm --nodeps
```

Once those packages finish installing, rerun the `yum install` command.

SuSE-based system:

```
[root]# zypper install gcc mysql libmysqlclient-dev mysql-devel perl-DBD-MySQL
libxml2-devel openssl-devel readline-devel ncurses-devel apache2 perl-CGI-Session
perl-Crypt-CBC perl-Crypt-DES perl-Date-Manip perl-DBI perl-Digest-HMAC perl-
Digest-SHA1 perl-Error perl-Log-Log4perl perl-Term-ReadLine-Gnu perl-XML-LibXML
lsb-release perl-Params-Validate perl-TermReadKey perl-DBD-mysql perl-Log-Dispatch
[root]# cpan -i Config::Tiny Crypt::DES_EDE3 Log::Dispatch::FileRotate

[root]# chmod 4755 /usr/bin/sperl*
```

If any of the Perl module packages fail to install or are unavailable for your system, you can install it from CPAN by running `cpan MODULENAME` where *MODULENAME* is the respective perl module name.

Prerequisites

RedHat-based system:

In RedHat-based systems, Security-Enhanced Linux (SELinux) blocks the use of Setuid Perl (used in client authentication). If you are using Setuid Perl as the security promotion method (this is the default if available), you will need to disable SELinux before you can install Moab Accounting Manager. Do the following:

```
[root]# nano /etc/sysconfig/selinux

SELINUX=disabled

[root]# setenforce 0
```

Moab Accounting Manager uses a configurable server port (default 7112) for client-server communication. If you have a firewall enabled, you must either disable the firewall (`iptables`, `ip6tables`) or configure the firewall to allow the server port. Do the following:

```
[root]# service iptables stop
[root]# chkconfig iptables off
```

If you are using the IPv6 firewall, replace each `iptables` with `ip6tables` in the example above.

To install Moab Accounting Manager

1. Download the latest MAM build (`mam-<version>.tar.gz`) from the Adaptive Computing website.
2. Create a user called `moab`, and switch to that user.

```
[root]# useradd -m moab
[root]# su - moab
```

3. Untar the MAM tarball as the user `moab` in a directory with write permissions for the user.

```
[moab]$ tar -zxvf mam-7.2.3.tar.gz
```

4. Navigate to `mam-7.2.3`.

```
[moab]$ cd mam-7.2.3
```

5. Configure, compile, and install the software.

```
[moab]$ ./configure --with-db-type=mysql
[moab]$ make
[moab]$ exit
[root]# cd /home/moab/mam-7.2.3
[root]# make install
```

6. Enable support for transactions.

```
[root]# nano /etc/my.cnf

## Place this in the [mysqld] section:
default-storage-engine = INNODB
```

7. Start the `mysql` daemon and configure it to start automatically on boot up.

   RedHat-based system:

   ```
   [root]# chkconfig mysqld on
   [root]# service mysqld restart
   ```

   SuSE-based system:

   ```
   [root]# chkconfig mysql on
   [root]# service mysql restart
   ```

8. Create a database called `mam` and grant database privileges to the `moab` user.

   ```
   [root]# mysql

   mysql> create database mam;
   mysql> grant all on *.* to 'moab'@'localhost' identified by 'changeme';
   mysql> exit
   ```

   The *password* you define must be synchronized with the `database.password` value in `/opt/mam/etc/goldd.conf`.

   ```
   [moab]$ nano /opt/mam/etc/goldd.conf

   database.password = changeme
   ```

9. As the `mysql` user `moab`, import the `hpc.sql` file into the `mam` database.

   ```
   [root]# mysql mam -u moab -p < hpc.sql
   ```

10. Source the appropriate environment file to add the MAM commands to your current PATH.

    ```
    [root]# cp etc/profile.d/*.sh /etc/profile.d
    [root]# . /etc/profile.d/mam.sh
    ```

11. Copy the appropriate system startup script to `/etc/init.d` and start the Moab Accounting Manager service. You may also want to configure MAM to start up automatically at system boot as appropriate for your distribution.

    RedHat-based system:

    ```
    [root]# cp etc/init.d/mam.redhat /etc/init.d/mam
    [root]# chkconfig --add mam
    [root]# service mam start
    ```

    SuSE-based system:

    ```
    [root]# cp etc/init.d/mam.suse /etc/init.d/mam
    [root]# chkconfig --add mam
    [root]# service mam start
    ```

12. Copy the auto-generated secret key from the **token.value** parameter in the `/opt/mam/etc/site.conf` file. Add it to the `moab-private.cfg` file as the value of the CLIENTCFG **KEY** attribute so that Moab Workload Manager can communicate with Moab Accounting Manager. Restart Moab Workload Manager.

```
[root]# nano /opt/moab/etc/moab-private.cfg

CLIENTCFG[AM:mam] KEY=<MAMSecretKey> AUTHTYPE=HMAC64

[root]# service moab restart
```

13. If you use a SuSE-based system, edit the Apache configure files to use SSL and CGI and to define aliases.

    SuSE-based system:

```
[root]# nano /etc/sysconfig/apache2

APACHE_SERVER_FLAGS="-DSSL"
### Reword per the per-OS variances below
```

14. As `root`, add or edit the SSL virtual host definition as appropriate for your environment. To do so, configure the `cgi-bin` directory in `ssl.conf`. Below the `cgi-bin` directory element, create an alias for `/cgi-bin` pointing to your `cgi-bin` directory. If you chose to install to a cgi-bin sub-directory, you might want to create an alias for that as well. Also, add `index.cgi` to the `DirectoryIndex` so you can use the shorter sub-directory name.

    RedHat-based system:

```
[root]# nano /etc/httpd/conf.d/ssl.conf

<Directory "/var/www/cgi-bin">
## Add these lines
  Options ExecCGI
  AddHandler cgi-script .cgi
  AllowOverride All
  Order allow,deny
  Allow from all
</Directory>

# Aliases for /cgi-bin
Alias /cgi-bin/ /var/www/cgi-bin/
Alias /mam/ /var/www/cgi-bin/mam/

# Make shorter sub-dir name available
DirectoryIndex index.cgi
```

    SuSE-based system:

```
[root]# cp /etc/apache2/vhosts.d/vhost-ssl.template
/etc/apache2/vhosts.d/mam-ssl.conf
[root]# nano /etc/apache2/vhosts.d/mam-ssl.conf

<Directory "/srv/www/cgi-bin">
## Add these lines
  Options ExecCGI
  AddHandler cgi-script .cgi
  AllowOverride All
  Order allow,deny
  Allow from all
</Directory>

# Aliases for /cgi-bin
Alias /cgi-bin/ /srv/www/cgi-bin/
Alias /mam/ /srv/www/cgi-bin/mam/

# Make shorter sub-dir name available
DirectoryIndex index.cgi
```

15. For the highest security, it is recommended that you install a public key certificate that has been signed by a certificate authority. The exact steps to do this are specific to your distribution and the chosen certificate authority. An overview of this process for CentOS 5 is documented here. If you are using self-signed certificates, some Mozilla Firefox users might experience certificate-related difficulties accessing MAM within Moab Viewpoint for the first time.

    Alternatively, if your network domain can be secured from man-in-the-middle attacks, you culd use a self-signed certificate. Often this does not require any additional steps since in many distributions, such as RedHat, the Appache SSL configuration provides self-signed certificates by default.

    The following steps assume you are using self-signed certificates:

    Create self-signed SSL certificate and key files. Some distributions such as RedHat ship with ready-made certificates.

    For SuSE-based systems:

    ```
    [root]# cd /etc/apache2
    [root]# openssl genrsa -out ssl.key/server.key 1024
    [root]# openssl req -new -key ssl.key/server.key -x509 -out ssl.crt/server.crt
    ```

16. Start or restart the HTTP server daemon.

    RedHat-based system:

    ```
    [root]# service httpd restart
    ```

    SuSE-based system:

    ```
    [root]# service apache2 restart
    ```

17. Create a password for the user `moab` to be used with the MAM Web GUI.

    ```
    [root]# su - moab
    [moab]$ gchpasswd
    ```

You can now access the GUI at `https://<hostname>/cgi-bin/mam` by logging in as `moab` and using the password you set.

You can define users, accounts, charge rates, etc., as needed for your site (for more information, see the "Getting Started" section of the Moab Accounting Manager Administrator Guide). An initialization script has been provided that can set up a sample initial environment (with some dummy users, accounts, charge rates, etc.) To initialize your database with this sample data, execute the script as the `moab` user:

```
[moab]$ mam-7.2.3/test/hpc-allocation-enforcement.sh
```

Related topics

- **Installation overview** on page 1
- **Component documentation** on page 33

Installing Moab Web Services

These instructions describe how to install Moab Web Services (MWS).

Requirements

Hardware requirements:

- Dual-core Intel/AMD x86-64 processor
- At least 4 GB of RAM

Software requirements:

- Moab® Workload Manager 7.2.7
- Apache Tomcat™ 6.0.24 or greater
- Oracle® Java® 6 Runtime Environment
- MongoDB®
  - 2.0.8 (RHEL, CentOS, and Scientific Linux)
  - 2.4.3 (SLES 11)

To install Moab Web Services


You must deploy Moab Web Services on the same server as Moab Workload Manager.

1. You must install the dependencies listed in the **Requirements** on page 23 section above before you begin to install Moab Web Services.

   a. Set up Tomcat.

   RHEL 5 and CentOS 5:

```
[root]# rpm -Uvh 'http://plone.lucidsolutions.co.nz/linux/centos/images/jpackag
e-utils-compat-el5-0.0.1-1.noarch.rpm'
[root]# cd /etc/yum.repos.d
[root]# wget 'http://www.jpackage.org/jpackage50.repo'
[root]# yum update
[root]# yum install tomcat6
```

   RHEL 6 and CentOS 6:

```
[root]# yum update
[root]# yum install tomcat6
```

   SLES:

```
[root]# zypper ar --refresh -r http://download.opensuse.org/evergreen/11.4/openS
USE:Evergreen:11.4.repo
[root]# zypper in tomcat6
[root]# zypper mr -d openSUSE_Evergreen_11.4
```

b. Install the 64-bit RPM version of Oracle® Java® 6 Runtime Environment.

> Oracle Java 6 Runtime Environment is the *only* supported Java environment. All other versions of Java, including Oracle Java 7, OpenJDK/IcedTea, GNU Compiler for Java, and so on cannot run Moab Web Services.

Follow this link to download Java 6. You must download the Linux 64-bit RPM package (`jre-6u45-linux-x64-rpm.bin`). Run the following:

```
[root]# sh jre-6u45-linux-x64-rpm.bin
```

2. Make sure that you have first installed and configured MWM as desired (for details, see **Installing Moab Workload Manager** on page 9).

3. Generate a secret key to be used for communication between MWM and MWS.

```
[root]# service moab stop
[root]# dd if=/dev/urandom count=18 bs=1 2>/dev/null | base64 > /opt/moab/etc/.moab
.key
[root]# chown root:root /opt/moab/etc/.moab.key
[root]# chmod 400 /opt/moab/etc/.moab.key
```

4. Make sure you have started MWM.

```
service moab start
```

5. Create the MWS home directory (for more information, see the "Configuration" section of the Moab Web Services Reference Guide), and the `etc`, `hooks`, `plugins`, and `log` subdirectories. You will need to give the Tomcat user "read" access to *all* directories and "write" access to the `plugins` and `log` directories.

> The default location for the MWS home directory is `/opt/mws`. These instructions assume the default location.

Here is an sample script for this setup:

```
[root]# mkdir -p /opt/mws/etc /opt/mws/hooks /opt/mws/plugins /opt/mws/log
[root]# chown -R tomcat:tomcat /opt/mws # Depending on your OS, the Tomcat username
might be tomcat6.
[root]# chmod -R 555 /opt/mws
[root]# chmod u+w /opt/mws/plugins /opt/mws/log
```

6. Download the latest MWS build (`mws-<version>.tar.gz`) from the Adaptive Computing website.

7. Extract the contents of the MWS download tarball into a temporary directory. For example:

```
[root]# mkdir /tmp/mws-install
[root]# cd /tmp/mws-install
[root]# tar xvzf $HOME/Downloads/mws-7.2.7.tar.gz
[root]# cd /tmp/mws-install/mws-7.2.7
```

8. Set up the MWS configuration file by doing the following:

   a. Copy `mws-config-hpc.groovy` to the MWS home `etc/` sub-directory, and rename it to `mws-config.groovy`.

   ```
   [root]# cp mws-config-hpc.groovy /opt/mws/etc/mws-config.groovy
   ```

   b. In the `/opt/mws/etc/mws-config.groovy` file, make the following changes:

   - Modify the **moab.secretKey** setting to match the MWM secure key you generated earlier (contained in `/opt/moab/etc/.moab.key`).
   - Change the default MWS password (**auth.defaultUser.password**) to a password of your choosing.
   - (Optional) Change the default MWS username (**auth.defaultUser.username**) to any value you like.

   ```
   [root]# nano /opt/mws/etc/mws-config.groovy

   // Change these to be whatever you like.
   auth.defaultUser.username = "admin"
   auth.defaultUser.password = "adminpw"
   ```

   > If you do not change `auth.defaultUser.password`, your MWS will not be secure (because anyone reading these instructions would be able to log into your MWS). Here are some tips for choosing a good password.

   - If you are using Moab Accounting Manager, you must set the **mam.server**, **mam.port**, and **mam.secretKey** parameters to your MAM host name, port number, and the secret key (obtained from the **token.value** parameter in the `/opt/mam/etc/site.conf` file), respectively.

   ```
   ...
   mam.server = "hostname"
   mam.port = 7112
   mam.secretKey = "a1B2c3D4e5F6g7H8i9"
   ```

   - Add the following parameters to configure an MWS connection to your LDAP server:

   ```
   ldap.server  = "192.168.0.5"
   ldap.port = 389
   ldap.baseDNs = ["dc=acme,dc=com"]
   ldap.bindUser = "cn=Manager,dc=acme,dc=com"
   ldap.password = "*****"
   ldap.directory.type = "OpenLDAP Using InetOrgPerson Schema"
   ```

> In this example, you see **dc=acme,dc=com**. "acme" is only used as an example to illustrate what you would use as your own domain controller if your domain name was "acme.com." You should replace any references to "acme" with your own organization's domain name.
>
> If you followed the Adaptive Computing tutorial, "Setting up OpenLDAP on CentOS 6," your **ldap.directory.type** should be set to "OpenLDAP Using InetOrgPerson Schema." However, the use of other schemas is supported. For more information see "LDAP Configuration Using mws-config.groovy" in the *Moab Web Services Reference Guide*.

> To see how to configure a secure connection to the LDAP server, see "Connection to LDAP" in the *Moab Web Services Reference Guide*.

- In `/opt/mws/etc/mws-config.groovy`, add the **grails.mongo.username** and **grails.mongo.password** parameters to the MongoDB `mws_user` credentials you set in **Installation overview** on page 1.

```
...
grails.mongo.username = "mws_user"
grails.mongo.password = "secret3"
```

c. Give the Tomcat user "read" access to the `/opt/mws/etc/mws-config.groovy` file.

```
chown tomcat:tomcat /opt/mws/etc/mws-config.groovy
chmod 400 /opt/mws/etc/mws-config.groovy
```

9. Add the following line to the end of `/etc/tomcat6/tomcat6.conf`:

```
CATALINA_OPTS="-DMWS_HOME=/opt/mws -Xms256m -Xmx3g -XX:MaxPermSize=384m -Dfile.enco
ding=UTF8"
JAVA_HOME="/usr/java/latest"
```

> Some Linux distributions use `/etc/default/tomcat6` or `/etc/sysconfig/tomcat6` instead of `/etc/tomcat6/tomcat6.conf`.

10. Start Tomcat and deploy `mws.war`.

```
[root]# chkconfig tomcat6 on
[root]# service tomcat6 stop
[root]# cp /tmp/mws-install/mws-7.2.7/mws.war /var/lib/tomcat6/webapps
[root]# service tomcat6 start
```

11. Navigate to `http://localhost:8080/mws/` in a web browser to verify that MWS is running (you will see some sample queries and a few other actions).

12. Log in to MWS to verify that your credentials are working. (Your login credentials are the `auth.defaultUser.username` and `auth.defaultUser.password` values you set in the `/opt/mws/etc/mws-config.groovy` file.)

If you encounter problems, or if the application does not seem to be running, see the steps in the "Troubleshooting Installation" section of the Moab Web Services Reference Guide.

Related topics

- **Installation overview** on page 1
- **Installing Moab Workload Manager** on page 9
- **Component documentation** on page 33

Installing Moab Viewpoint

These instructions describe how to install and start Moab Viewpoint.

System requirements

Hardware requirements:

- 16 GB disk space

Software requirements:

- Moab Workload Manager version 7.2.7
- Moab Web Services version 7.2.7
- Oracle® Java® 6 Runtime Environment
- Apache Tomcat™ 6.0.24 or greater
- Open LDAP™ or Microsoft Active Directory®

Supported web browsers:

- Mozilla Firefox 3.5 or later
- Internet Explorer 7.0 or later

In order for Viewpoint to run correctly in Internet Explorer, you must navigate to **Tools > Compatibility View Settings** and deselect the **Display intranet sites in Compatibility View** option.

Prerequisites to installation

- Make sure that you have installed Apache Tomcat™ 6. You should have already done this while installing Moab Web Services (see **Installing Moab Web Services** on page 23).
- Make sure that you have installed Oracle® Java® 6 Runtime Environment. You should have already done this while installing Moab Web Services (see **Installing Moab Web Services** on page 23).
- If you do not already have an instance of OpenLDAP or Active Directory, install OpenLDAP and set it up with users. For more information, see "Setting up OpenLDAP on CentOS 6" in the *Viewpoint Management and User Guide*.
- (Optional, but highly recommended) Configure Viewpoint to trust the LDAP/Active Directory server certificate for a secure LDAP SSL connection. For more information, see "Securing a Viewpoint-LDAP/Active Directory connection" in the *Viewpoint Management and User Guide*.
- If you want to enable users to submit jobs through the Viewpoint portal, make sure that the following configuration is set in the `/opt/moab/etc/moab.cfg` file:

```
ADMINCFG[1] ENABLEPROXY=TRUE
ALLOWROOTJOBS TRUE
```

To install Moab Viewpoint

1. Download the latest Viewpoint build (`viewpoint-<version>.tar.gz`) from the Adaptive Computing website.
2. Stop Tomcat.

```
[root]# service tomcat6 stop
```

3. Edit the Tomcat configuration file.

Depending on your operating system and sysadmin preferences, you may find the Tomcat configuration file in different places. For example:

CentOS™ 5 and 6: `/etc/sysconfig/tomcat6`

Red Hat® Enterprise Linux 5 and 6: `/etc/sysconfig/tomcat6`

SUSE® Linux Enterprise Server 11: `/etc/tomcat6/tomcat6.conf`

Ubuntu® 10.04: `/etc/default/tomcat6`

Using the example, `/etc/tomcat6/tomcat6.conf`:

```
[root]# nano /etc/tomcat6/tomcat6.conf
```

a. Update the **JAVA_HOME** line to point to the Java Runtime Environment you just installed. For example:

```
JAVA_HOME=/usr/java/latest
```

b. If your Moab Web Services and Viewpoint exist in the same Tomcat, you will want to set the MaxPermSize to allow more memory. Add (if it does not already exist) a line that sets **JAVA_OPTS** to the following:

```
JAVA_OPTS="$JAVA_OPTS -Xms4096m -Xmx4096m -XX:MaxPermSize=512m"
```

4. Create the Viewpoint home directory.

```
[root]# mkdir /opt/viewpoint
[root]# chown -R tomcat:tomcat /opt/viewpoint
```

5. Unpack the Viewpoint tarball and copy the `moab.war` file into the Tomcat `webapps` folder.

```
[root]# tar -xzvf viewpoint-gatling-snapshot.tar.gz
[root]# cp viewpoint-7.2.7/moab.war /var/lib/tomcat6/webapps
[root]# chown -R tomcat:tomcat /var/lib/tomcat6
```

It is recommended that you do not run more than one instance of Viewpoint within Tomcat.

6. Start Tomcat.

```
[root]# service tomcat6 start
```

The default firewall settings on your system prevent other machines from accessing Viewpoint. You will need to configure your firewall to allow external connections. However, if you want to temporarily turn off your firewall to test that Viewpoint is running you can run:

```
[root]# service iptables stop
```

Make sure you turn your firewall back on again once it is configured to allow Viewpoint to be accessed externally.

7. Verify that Viewpoint was correctly installed by directing your browser to the Viewpoint URL (for example: `http://[hostname or ip address]:8080/moab`), and logging in with the default super user username and password (**moab-admin/changeme!**).

   The super user has all Viewpoint permissions. This means that the super user has rights to access every page and perform every function within Viewpoint.

8. Navigate to the Configuration page (**Administration > Configuration**), and do the following:

   a. Set the Moab Web Services connection. (For more information, see "Setting the MWS configuration" in the *Viewpoint Management and User Guide*.)

   b. Authenticate the LDAP connection by specifying the bind user password. (For more information, see "Setting the LDAP configuration" in the *Viewpoint Management and User Guide*.)

   c. Change the super user password. (For more information, see "Changing the super user password" in the *Viewpoint Management and User Guide*.)

d. Edit the customer configuration. (For more information, see "Setting customer configuration" in the *Viewpoint Management and User Guide*.)

9. Navigate to the Principal Management page (**Administration > Principal Management**), and create principals for LDAP users and user groups. Assign a role to the principals to enforce user permissions for the users contained in the principal. (For more information, see "About principal management" in the *Viewpoint Management and User Guide*.)

If you would like to enable reporting in Viewpoint, please contact Adaptive Computing Professional Services.

Related topics

- **Installation overview** on page 1
- **Installing Moab Workload Manager** on page 9
- **Installing Moab Web Services** on page 23
- **Installing Moab Accounting Manager** on page 15
- **Component documentation** on page 33

Component documentation

The individual components of the suite have more options and allow for more configuration than can be contained in this guide. Refer to the individual component guides for more information.

TORQUE

- TORQUE 4.2.7 Administrator Guide: HTML – PDF

Moab Workload Manager

- Moab Workload Manager 7.2.7 Administrator Guide: HTML – PDF

Moab Accounting Manager

- Moab Accounting Manager 7.2.3 Administrator Guide: HTML – PDF

Moab Web Services

- Moab Web Services 7.2.7 Reference Guide: HTML – PDF

Moab Viewpoint

- Moab Viewpoint for Moab Cloud Suite 7.2.7 Management and User Guide: HTML – PDF

Related topics

- **Installation overview** on page 1
- **Welcome** on page v