

# Moab HPC Suite – Basic Edition

RPM Installation Guide 7.2.10

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# Welcome

Welcome to the *Moab HPC Suite – Basic Edition 7.2.10* RPM 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 – Basic Edition.

The Moab HPC Suite – Basic Edition version 7.2.10 contains the following components:

- Moab Workload Manager 7.2.10
- TORQUE 4.2.10
- Moab Web Services 7.2.10
- Moab Viewpoint 7.2.10

Before commencing the installation, please see [Requirements on page vii](#) to verify your system conforms to minimum prerequisites.



# Requirements



It is highly recommended that you *first* perform installations and upgrades in a *test environment*. Standard installation and upgrade procedures and use cases are tested prior to release. However, due to the wide range of possible configurations and customizations, it is important to exercise caution when deploying new versions of software into your production environments. This is especially true when the workload has vital bearing on your organization's day-to-day operations. We recommend that you test in an environment that mirrors your production environment's configuration, workflow and load as closely as possible. Please contact your Adaptive Computing account manager for suggestions and options for installing / upgrading to newer versions.

## HPC Suite requirements

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

## TORQUE requirements

- 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.
- 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 your configuration uses cpusets, you must install libhwloc 1.1; the corresponding hwloc-devel package is also required.

## Moab Workload Manager requirements

- One of the following supported variants of Linux:
  - CentOS (5.7 and 6.3)
  - Red Hat (5.7 and 6.3)
  - Scientific Linux (6.3)

## Requirements

- One of the following supported resource managers:
  - TORQUE
  - SLURM

### Moab Accounting Manager requirements

- MySQL version 3.2.8 or higher
- Suidperl 5.8 or higher
- The following optional software as necessary:
  - gnu readline version 2.0 or higher (needs [ncurses](#))
  - Term::ReadKey Perl module

### Moab Web Services requirements

- Oracle® Java® 6 Runtime Environment
- Apache Tomcat™ 6.0.24 or greater
- MongoDB® 2.0.8



# Upgrading Moab HPC Suite – Basic Edition from an earlier 7.2.x version



It is highly recommended that you perform a full database backup before updating your database. This can be done using the `mongodump` utility documented in the [MongoDB documentation](#).

## To upgrade the RPM suite

1. Shut down all Adaptive applications.

```
[root]# service moab stop           # you can also run mschedctl -k
[root]# service tomcat6 stop
[root]# service pbs_server stop
[root]# service trqauthd stop
[root]# service pbs_mom stop
[root]# service mam stop
```

2. Back up your `/opt/moab/tools` directory to prevent losing modifications made to the perl scripts.

```
[root]# tar czf backup-tools.tar.gz /opt/moab/tools
```

3. Download the latest 7.2 build executable (`moab-hpc-basic-suite-<type>-<version>-el-6.tar.gz`, for example) from the [Adaptive Computing](#) website.



The variable marked `<type>` is one of `libtorque` (TORQUE), `generic` (generic), `libtorque-libodbc` (TORQUE ODBC), or `generic-libodbc` (generic ODBC). The variable marked `<version>` is the desired version of the suite; for example, 7.2.

4. Untar the package.

```
[root]# tar xzf moab-hpc-basic-suite-<type>-<version>.tgz
```

5. Change directories into the root directory of the untarred directory.

```
[root]# cd moab-hpc-basic-suite-<type>-<version>
```



Consider reviewing the README file for additional details on using the RPM distribution tarball.

6. Install the suite repositories.

```
[root]# ./install-yum-repos.sh [repository-directory] -y
```



The `-y` option will install with the default settings for the RPM suite.

**i** The installation returns the following warning line:  
Warning: RPMDB altered outside of yum.  
This is normal and can safely be ignored.

7. Execute the upgrade suite package.

```
[root]# yum update 'moab*' -y
```

8. Restart all the services you stopped.

```
[root]# service moab start  
[root]# service tomcat6 start  
[root]# service trqauthd start  
[root]# service pbs_server start  
[root]# service pbs_mom start  
[root]# service mam start
```

**i** The MWM and MWS RPMs automatically create a backup of all relevant files. These backups are stored in `/var/tmp/backup-<rpmName>-<timestamp>.tar.gz`.

**i** If changes are detected between any existing configuration files and new configuration files, a version of the new configuration file will be saved under `<configurationFileLocation>/<fileName>.rpmnew`.

## Related topics

- [Welcome on page v](#)

# Installing Moab HPC Suite – Basic Edition

## Dependencies and packages installation

### Install Java

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

**i** 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.

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

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

## Installing the RPM suite

### To install the RPM suite

1. If you are upgrading from a previous installation of Moab, back up your /opt/moab/tools directory to prevent losing modifications made to the perl scripts. If you are performing a clean installation of Moab HPC Suite, skip this step.

```
[root]# tar czf backup-tools.tar.gz /opt/moab/tools
```

2. Download the latest 7.2.10 build tarball (moab-hpc-basic-suite-<type>-<version>-el-6.tgz, for example) from the [Adaptive Computing](#) website.

**i** The variable marked <type> is one of libtorque (TORQUE), generic (generic), libtorque-libodbc (TORQUE ODBC), or generic-libodbc (generic ODBC). The variable marked <version> is the desired version of the suite; for example, 7.2.10.

3. Untar the downloaded package.

**i** Consider reviewing the README file for additional details on using the RPM distribution tarball.

4. Change directories into the untarred directory.
5. Install the suite repositories.

```
[root]# ./install-yum-repos.sh [<repository-directory>] -y
```

**i** The `-y` option will install with the default settings for the RPM suite.

**i** The installation returns the following warning line:  
Warning: RPMDB altered outside of yum.  
This is normal and can safely be ignored.

**i** For a description of the options of the repository installer script, run:  

```
[root]# ./install-yum-repos.sh -h
```

The `<repository-directory>` option is the directory where you want to copy the RPMs. If no argument is given, `<repository-directory>` defaults to `/opt/adaptive/yum`. If the `<repository-directory>` already exists, RPMs will be added to the existing directory. No files are overwritten in `<repository-directory>`. A repository file is also created in `/etc/yum.repos.d/` and points to the `<repository-directory>` location.

For ease in repository maintenance, the install script fails if Adaptive Computing RPMs are copied to different directories. If a non-default `<repository-directory>` is specified, please use the same directory for future updates.

The script installs the `createrepo` package and its dependencies. You must answer "y" to all the questions in order for the RPM install of the cloud suite to work. Additionally, the script installs the EPEL, xCAT, and 10gen repositories.

- 6. Execute the install suite package.

```
[root]# yum install moab-hpc-basic-suite-<type>-<version>.x86_64 -y
```

To find the exact name of the package including its type and version, run the following command:

```
[root]# yum search moab-hpc-basic-suite
```

- 7. Prepare the MongoDB database by doing the following:

- a. Start MongoDB.

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

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

- b. 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");

> exit
```

**i** 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.

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

- c. Enable authentication in MongoDB.

**RHEL and CentOS, and Scientific Linux:**

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

auth = true

[root]# service mongod restart
```

**Related topics**

- [Welcome on page v](#)



# Configuring TORQUE

These instructions describe how to configure and start TORQUE.

## 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](#).

**i Important:** If you intend to use TORQUE 4.2.10 with Moab, you must run Moab version 7.1 or later. TORQUE 4.2.10 will not work with versions earlier than Moab 7.1.

## To configure TORQUE

1. Add nodes to the `/var/spool/torque/server_priv/nodes` file. For information on syntax and options for specifying compute nodes, see [Managing Nodes](#).
2. **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-4.2.10/torque.setup
[root]# service pbs_server restart
```

3. Start the servers.

```
[root]# service trqauthd start
[root]# service pbs_server start
[root]# service pbs_mom start
```

## To configure MOMs

1. To set up the MOMs, in the directory of the unpackaged tarball, copy the `torque-common` and `torque-mom` RPM files to each MOM node.

```
[root]# scp RPMs/moab-torque-common-*.rpm <mom-node>
[root]# scp RPMs/moab-torque-mom-*.rpm <mom-node>
```

2. On each MOM node, install the `moab-torque` RPM.

```
[root]# ssh root@<mom-node>
[root]# yum install moab-torque-*.rpm
```

3. By default, on each MOM node, the `/var/spool/torque/server_name` file contains the hostname of the current host. If `pbs_server` is running on another host, change the name.

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

4. Edit the `TORQUE_HOME/mom_priv/config` file on each node. This file is identical for all compute nodes and can be created on the head node and distributed in parallel to all systems.

```
[root]# nano TORQUE_HOME/mom_priv/config

$pbsserver    headnode    # hostname running pbs server
$logevent     225                # bitmap of which events to log
```

## Related topics

- [Installing Moab HPC Suite - Basic Edition on page 1](#)
- [Configuring Moab Workload Manager on page 7](#)
- [Component documentation on page 19](#)



# Configuring Moab Workload Manager

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

## To configure Moab Workload Manager

1. Source the following file to add the MWM home directory to your current shell *\$PATH* environment.

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


2. 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.

3. If you intend to install Moab Viewpoint as part of the suite, make the following configuration setting in the `/opt/moab/etc/moab.d/moab-server.cfg` file:

```
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.

4. Start MWM.

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

**i** 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](#).

5. If you have a resource manager configured, submit a sleep job as a non-root user and verify the job is running.

**i** If you do not have a resource manager configured, skip this step. For TORQUE, you can configure a basic queue.

```
qmgr -c "set server scheduling=true"
qmgr -c "create queue batch queue_type=execution"
qmgr -c "set queue batch started=true"
qmgr -c "set queue batch enabled=true"
qmgr -c "set queue batch resources_default.nodes=1"
qmgr -c "set queue batch resources_default.walltime=3600"
qmgr -c "set server default_queue=batch"
```

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

## 6. 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.d/moab-server.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.

```
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

- [Installing Moab HPC Suite - Basic Edition on page 1](#)
- [Configuring TORQUE on page 5](#)
- [Component documentation on page 19](#)




# Configuring Moab Web Services

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

## Requirements

- Moab® Workload Manager 7.2.10
- Apache Tomcat™ 6.0.24 or greater
- Oracle® Java® 6 Runtime Environment
- MongoDB®
  - 2.0.8 (RHEL, CentOS, and Scientific Linux)

## To configure Moab Web Services

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

1. Make sure you have started MWM.

```
service moab start
```


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

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

- 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.

- 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"
```

**i** 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*.

**i** 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 [Installing Moab HPC Suite – Basic Edition](#) on page 1.

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

3. Start or restart Tomcat.

```
[root]# chkconfig tomcat6 on
[root]# service tomcat6 restart
```

4. 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).
5. 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.)



**i** 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

- [Installing Moab HPC Suite - Basic Edition on page 1](#)
- [Configuring Moab Workload Manager on page 7](#)
- [Component documentation on page 19](#)





# Configuring Moab Viewpoint

These instructions describe how to configure and start Moab Viewpoint.

## System requirements

### Hardware requirements:


- 16 GB disk space

### Software requirements:

- Moab Workload Manager version 7.2.10
- Moab Web Services version 7.2.10
- 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 [Configuring Moab Web Services on page 11](#)).
- Make sure that you have installed Oracle® Java® 6 Runtime Environment. You should have already done this while installing Moab Web Services (see [Configuring Moab Web Services on page 11](#)).
- 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.d/moab-server.cfg` file:

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

### To configure Moab Viewpoint

1. Install the Moab HPC Suite – Basic Edition RPM package, as described in [Installing Moab HPC Suite – Basic Edition on page 1](#).
2. 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.

3. 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*.)
4. 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*.)

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

### Related topics


- [Installing Moab HPC Suite - Basic Edition on page 1](#)
- [Configuring Moab Workload Manager on page 7](#)
- [Configuring Moab Web Services on page 11](#)
- [Component documentation on page 19](#)



# 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 4.2.10 Administrator Guide: [HTML](#)  - [PDF](#) 


## Moab Workload Manager

- Moab Workload Manager 7.2.10 Administrator Guide: [HTML](#)  - [PDF](#) 

## Moab Web Services

- Moab Web Services 7.2.10 Reference Guide: [HTML](#)  - [PDF](#) 

## Moab Viewpoint

- Moab Viewpoint for Moab Cloud Suite 7.2.10 Management and User Guide: [HTML](#)  - [PDF](#) 

## Related topics

- [Installing Moab HPC Suite – Basic Edition on page 1](#)
- [Welcome on page v](#)

