Moab HPC Suite 7.5.0 – Enterprise Edition Release Notes

The release notes file contains the following sections:

New features

The following is a summary of key new features in Moab HPC Suite 7.5.0 – Enterprise Edition.

Moab Workload Manager

ZeroMQ™

Three new parameters, **MESSAGEQUEUEADDRESS**, **MESSAGEQUEUEPORT**, and **MESSAGEQUEUESECRETKEY**, track and secure the message queue (ZeroMQ™) events that occur in Moab. **MESSAGEQUEUEADDRESS** specifies the IP address a user must give to follow ZeroMQ™ events. **MESSAGEQUEUEPORT** specifies the port. **MESSAGEQUEUESECRETKEY** enables security in the message queue with AES. For more information about these parameters, see "Appendix A: Moab Parameters" in the *Moab Workload Manager Administrator Guide*.

Moab logs have a standard format

Moab logging now follows a standard log format. The order of logging output has changed. Timestamps are written in local time in ISO 8601 format with a 4-digit time zone offset suffix and millisecond precision. Log messages are now tab-delimited instead of space-delimited to support useful log scanning by a variety of tools including splunk, text editors, grep, sed/awk/cut, and database/spreadsheet importers.

Node sets created dynamically

The **VARATTR** attribute of the **NODESETATTRIBUTE** parameter allows you to construct node sets with job **VARATTR** values that you specify dynamically with the msub command. For more information, see "Node Set Overview" in the *Moab Workload Manager Administrator Guide*.

Custom display names for objects in MongoDB

The Moab resource manager language attribute **VARATTR** allows you to supply a custom display name for an object to the Mongo database rather than relying solely on the object's unique ID. A valid value for **VARATTR** has the following format: `<attribute>=<value>[=<displayName>]`. See "Moab Resource Manager Language Data Format" in the *Moab Workload Manager Administrator Guide* for more information.

Reference IPMI scripts for green computing

New Python-based IPMI reference scripts have been created for green computing. You can modify and use these scripts to enable green computing in your environment, or you can use the scripts as a reference for creating your own.

Failed jobs can remain in the completed job queue

When set, the new *PURGEONSUCCESSONLY* job flag indicates that Moab should not purge its job from the completed queue if it does not complete successfully. This allows you to restart jobs at any time and is particularly useful for setup and destroy jobs in a workflow. For more information, see "Job Attributes/Flags Overview" in the *Moab Workload Manager Administrator Guide*.

PriorityPolicyBlocking scheduler flag

A new scheduler flag called *PRIORITYPOLICYBLOCKING* prevents small, low priority jobs from starting before larger jobs with higher priority that wait in the blocked queue for resources. For more information, see "SCHEDCFG flags" in the *Moab Workload Manager Administrator Guide*.

Moab can stop evaluating job templates after the first match

The **JOBMATCHCFG** parameter supports a new *BREAK* flag. When Moab searches for a match, it processes the job templates in the order they are configured in `moab.cfg`. Setting **FLAGS**=*BREAK* causes Moab to accept the first match and stop evaluating all other **JOBCFG** entries. For more information, see "Applying templates based on job attributes" in the *Moab Workload Manager Administrator Guide*.

FreeCompletedJobSubmitString scheduler flag

A new scheduler flag called *FREECOMPLETEDJOBSUBMITSTRING* (`SCHEDCFG[] FLAGS=FREECOMPLETEDJOBSUBMITSTRING`) frees up the submit string for completed jobs to decrease the memory needed for operation. For more information, see "SCHEDCFG flags" in the *Moab Workload Manager Administrator Guide*.

Account thread pool enables Moab non-blocking accounting calls for charges

A new accounting thread pool allows Moab to make non-blocking calls to Moab Accounting Manager for charges instead of blocking the scheduling thread. This is now the default behavior. It can result in faster aggregate scheduling and better client response times; however, individual actions might be shortly

delayed in some cases. New **AMCFG** attributes support cases in which the old blocking behavior is necessary. These attributes are:

- **THREADPOOLSIZE** – lets you specify the number of threads that can concurrently communicate with the accounting manager thread when you use non-blocking accounting actions.

- **BLOCKINGACTIONS** – lets you specify which accounting actions to perform when a blocking call is made.

- **DISABLEDACTIONS** – lets you specify which accounting actions are disabled.

For more information, see "Charging and Allocation Management" in the *Moab Workload Manager Administrator Guide*.

Specifiable accounting resume failure action and resume URL

A new **AMCFG** **RESUMEFAILUREACTION** attribute lets you specify the action Moab will take when, during an attempt to resume a suspended job, its call to the accounting manager to verify valid funds fails. If you use the Native Accounting Manager Interface (NAMI script interface), you can also use the new **AMCFG** **RESUMEURL** attribute to specify a script for Moab to run before a suspended job fails to resume. For more information, see "Charging and Allocation Management" in the *Moab Workload Manager Administrator Guide*.

MAM credentials importable to Moab

The new **AMCFG** **CREATECRED** attribute prompts a query to Moab Accounting Manager for accounting credentials (accounts, users, account-user members, user default accounts) to define them in Moab. The new **AMCFG** **REFRESHPERIOD** attribute, when used with **CREATECRED**, specifies how often Moab should refresh the accounting parameters from Moab Accounting Manager. For more information, see "Charging and Allocation Management" in the *Moab Workload Manager Administrator Guide*.

High availability between Moab and MAM

A new **AMCFG** attribute called **BACKUPHOST** lets you specify a backup server host to use if Moab cannot contact the primary accounting manager server.

CPUTime and job partition routes from MWM to MAM

Moab Workload Manager now routes CPUTime to Moab Accounting Manager as a standard job attribute for tracking and charging. Moab can also route the job's partition when you add Partition as a UsageRecord attribute in MAM.

Moab Web Services

Multi-tenant access control

Moab Web Services now supports a role-based access control (RBAC) model that allows you to assign a single tenant, comprised of an LDAP entity and one or more roles, as the owner of a valid object. Valid objects currently include nodes, jobs, services, service templates, reservations, and events. See "Multi-tenant role-based access control overview" in the *Moab Web Services Reference Guide* for more information.

An object can belong to just one tenant; however, you can reassign objects to different tenants.

The nodes, VMs, and jobs resources now show tenant name and ID fields. For POST and PUT actions, the tenant name or ID, or both the name and ID must be specified; if both the name and ID are specified, they must both refer to the same tenant or MWS returns an error.

You can query MWS for a list of tenants that a user, or a current user, is associated with. See "Get a user's tenants" in the *Moab Web Services Reference Guide* for more information.

For information about creating, editing, and deleting tenants, see "About tenant management" in the *Moab Viewpoint Management and User Guide*.

Audit logging tracks changes to permissions, roles, principals, and tenants

A new audit trail log is available, and it is written to `/opt/mws/log/audit.log` by default. The log format is `yyyy-mm-dd HH:MM:ss <resource><username><action><data>`. The following events are recorded: tenant ownership changes for services and nodes; permissions, roles, principals, or tenants change; a principal's or tenant's access to an object changes; and when a service or service template is created.

Getting current user's permissions

Users can now view which permissions they have been granted by accessing `/mws/rest/permissions/users/<username>`.

ZeroMQ™

Event information is passed between MWS and Moab via ZeroMQ™. The **moab.messageQueue.port**, **moab.messageQueue.secretKey**, **mws.messageQueue.address**, and **mws.messageQueue.port** parameters configure the ZeroMQ™ connection. For more information, see "System events" in the *Moab Web Services Reference Guide*.

Message queue security with AES

MWS supports message queue security with AES. If the **moab.messageQueue.secretKey** property is set, then all messages MWS publishes on the message queue will be encrypted. Additionally, MWS will be able to read messages from Moab Workload Manager that are encrypted with the same key using the **MESSAGEQUEUESECRETKEY** parameter. For more information, see "Configuration reference" and "Securing the connection with the message queue" in the *Moab Web Services Reference Guide*.

Encryption is done with AES in CBC mode where inputs are padded with PKCS5 padding. Only 128-bit (16-byte) keys are supported. Keys should be encoded in Base64.

Event dictionary framework

MWS now supports the event dictionary framework — a collection of information that describes all errors, warnings, and notable events emitted by Adaptive Computing products. Please note that this addition includes many changes to the events API that are not compatible with events in API Version 2. For more information, see "Events" in the *Moab Web Services Reference Guide*.

Notifications and Notification Conditions resources

Moab Web Services now includes Notifications and Notification Conditions resources with API version 3. Notifications are a per-user representation of all notification conditions present in the system at any one time. When an administrator or user requests this resource, notifications are automatically created from

the notification conditions that they can access. Notifications are expected to contain messages and details that may be understood by a user or administrator – depending on the escalation level – and contain fields that control whether the user or administrator will be notified of future updates to their corresponding condition. For more information, see "Notifications" and "Notification Conditions" in the *Moab Web Services Reference Guide*.

MWS resource manager

The MWS resource manager is a native integration between Moab and MWS. Resource manager data is passed directly between Moab and MWS using JSON (rather than Moab's native WIKI syntax). This simplifies RM configuration for systems where one or more MWS plugins are acting as resource managers. For more information, see "Moab Workload Manager resource manager integration" in the *Moab Web Services Reference Guide*.

Standard log format

The `mws.log` file now follows the Moab standard log format. Timestamps are written in local time in ISO 8601 format with a 4-digit time zone offset suffix and millisecond precision. Log messages are now tab-delimited instead of space-delimited to support useful log scanning by a variety of tools including splunk, text editors, grep, sed/awk/cut, and database/spreadsheet importers.

Accounting queries supported for several resources

Moab Web Services supports accounting queries for the following resources: Allocations, Charge Rates, Liens, Organizations, Quotes, Transactions, and Users. The URLs for these resource queries require an `/accounting` subdirectory (for example, `/rest/accounting/allocations`). A new `show-all` parameter queries for all attributes, including metadata and hidden attributes. For more information about the web service accounting queries, see the Accounting links in "Resources introduction" in the *Moab Web Services Reference Guide*.

Health information includes ZeroMQ™ status

The `/rest/diag/health/summary` and `/rest/diag/health/detail` resources now provide information about the status of ZeroMQ™. For more information, see "Diagnostics" in the *Moab Web Services Reference Guide*.

Configurable event lifetime

A new **mws.events.expireAfterSeconds** property in `mws-config.groovy` allows you to configure MongoDB to drop events after a certain amount of time, preventing particularly verbose systems from using up too much disk space. The default is 30 days. The feature depends on Mongo 2.4 or greater. For more information, see "Configuring MWS" in the *Moab Web Services Reference Guide*.

Expanded options for FEATURE names

The `FEATURE` field of the Native plugin now allows you to specify a feature name that includes spaces.

Date strings convertible to Java Date objects

A new method called `convertDateString` was added to `moabRestService`. It converts date strings into actual Java Date objects.

Configurable plugin-commons compatibility

You can use the plugin project file to specify the version of `plugin-commons` with which the plugin project is compatible.

Credentials resource

A new Credentials resource was added. It lists the credentials configured in Moab.

Plugin docs packaged inside plugin

With this release, MWS plugin docs are now packaged inside the actual plugin (for example, the vCenter plugin documentation can be found here: `http://localhost:8080/mws/admin/plugin-types/docs/VCenter`).

Querying for a unique value from an MWS resource

The new Distinct resource lets you to retrieve distinct (unique) values from another MWS resource. For example, a client can request the list of all node features across all nodes like this:

`GET http://localhost/mws/rest/distinct/nodes/featuresReported/?api-version=2`

For more information, see "Distinct" in the *Moab Web Services Reference Guide*.

Severity field in Events resource

A new field in the MWS Events resource reports the severity of the event that occurred. For more information, see "Events" in the *Moab Web Services Reference Guide*.

mws.d directory for configuration files

MWS now supports an `mws.d` directory for configuration files (`/opt/mws/etc/mws.d/`). See "Configuring MWS" in the *Moab Web Services Reference Guide* for more information.

Call determines API version support

A new call is available for plugin developers that determines whether a specific API version is supported. See "moabRestService.isAPIVersionSupported()" in the *Moab Web Services Reference Guide* for more information.

joda DateTime class support

The plugin framework's `moabRestService` now supports joda `DateTime` class.

Moab Viewpoint

Role-based role access control

Tenants have been added to Viewpoint to control access to its objects (services, nodes, and the like) for users and groups. A tenant is a set of LDAP entities and roles that own certain Viewpoint objects. Each Viewpoint object can belong to a single tenant, and only users associated with that tenant can access the object.

A Tenant Management page and Tenant page have been added to allow you to create new tenants and to modify or delete existing ones. For more information, see "Fields: Tenant management" and "Fields: New tenant" in the *Moab Viewpoint Management and User Guide*.

Notifications in Viewpoint

The Viewpoint navigation bar now includes a Notifications center. Notifications appear on a per-user basis, allowing users and administrators a quick glance into what is happening in their own systems. They are similar to events; however, notifications only appear when there is a persistent condition of the system or component rather than when a single instance occurs. Users can dismiss or ignore notifications they are not interested in seeing. For more information, see "About notification management" in the *Moab Viewpoint Management and User Guide*.

Node feature management

The Node Management and Node Details pages display information about reported features (a node's features that are reported by the resource manager) and configured features, which are applied using feature tags. You can add or remove configured feature tags to or from a node from the Node Details page. For more information, see "Setting node feature tags" in the *Moab Viewpoint Management and User Guide*.

Standard log format

The `viewpoint.log` file now follows the Moab standard log format. Timestamps are written in local time in ISO 8601 format with a 4-digit time zone offset suffix and millisecond precision. Log messages are now tab-delimited instead of space-delimited to support useful log scanning by a variety of tools including splunk, text editors, grep, sed/awk/cut, and database/spreadsheet importers.

StartTLS support

Previously, only MWS connections to LDAP could be secured using StartTLS. That secure LDAP connection is now supported in Viewpoint. For more information, see "Securing the LDAP connection" in the *Moab Web Services Reference Guide* and "Securing LDAP/Active Directory connection" in the *Moab HPC Suite 7.5.0 – Enterprise Edition Installation Guide*.

HTTPS connection to MWS

You can now configure a connection from Viewpoint to MWS via HTTPS so that your system is secure even when Viewpoint and MWS reside on different servers.

Configurable Details pages

Configuration options for the Details pages (such as Node Details and Reservation Details) have been externalized in the `$VIEWPOINT_HOME/hpc/DataviewConfig.groovy` file.

Urgent Events Log gadget

The Viewpoint homepage contains a new gadget called Urgent Events Log that displays a list of all urgent events (events with a severity of WARNING, ERROR, or FATAL) from the last 7 days and allows you to navigate quickly to all events. See "Homepage gadgets" in the *Moab Viewpoint Management and User Guide* for more information.

Default permissions restorable

Three new buttons in Viewpoint Configuration allow you to restore default MWS roles and permissions, restore default Viewpoint page and gadget permissions, and purge all deprecated Viewpoint permissions from previous versions. For more information, see "Setting default permissions" in the *Moab Viewpoint Management and User Guide*.

Gadget permissions

The default Viewpoint Homepage gadgets are permission-specific. This means that you can determine which gadgets appear depending on the role of the user logged in to Viewpoint. For more information, see "Permissions" in the *Viewpoint Management and User Guide*.

Gadget customization

You can change the size and order of gadgets in the `gadgets.xml` file. For more information, see "Configuring Homepage gadgets" in the *Moab Viewpoint Management and User Guide*.

Externalized permissions

Because default roles and permissions differ between suite types, a new external `security.xml` file has been added to Viewpoint. This file contains all the default roles and permissions specific to the suite type. When you install and set up Viewpoint for the first time, these permissions and roles will be pushed to Moab Web Services and will appear on the New/Edit Role page in Viewpoint. For more information, see "Permissions" in the *Moab Viewpoint Management and User Guide*.

XML validation for configuration files

Viewpoint validates the XML in the gadgets.xml, info.xml, navigation.xml, reporting.xml, and security.xml pages. The XML file validation page, accessed through Configuration > Warning - Multiple files exist, displays the status of the delivered Viewpoint XML files and which are broken due to invalid XML. For more information, see "Fields: XML file validation" in the *Moab Viewpoint Management and User Guide*.

Localization support

Viewpoint does not currently ship in any other language than U.S. English. However, you can translate the user interface strings and place them in a file that will be used by the Internet browser, depending on its language locale. For more information, see "Localizing the user interface" in the *Moab Viewpoint Management and User Guide*.

Resizable data view columns

You can now resize and reorder all columns on data view pages in Viewpoint.

Moab Accounting Manager

Self-tracking allocations

Allocations have a new initial deposit attribute that stores the amount deposited in an allocation when it is created. This allows the allocation to track the initial deposit within the object itself and to manage the allocation adjustments and amount used for faster reports without having to refer to the allocation journal or transaction table for this information.

glsalloc now includes start time and end time options for displaying allocation usage during a particular time frame and displaying a number of new intrinsic and derived fields. For more information, see "Querying allocations" in the *Moab Accounting Manager Administrator Guide.*

Default deposit amount

You can now choose a default deposit amount that MAM will use when a user does not specify an amount in a deposit. The new field allows you to designate a regular allocation amount (whether resetting or incrementing) for each fund that can be deposited on an automated basis via events or cron scripts. You can use the Fund Reset action in an event to periodically reset funds to predesignated values. glsfund now shows **DefaultDeposit** by default. For more information, see "Querying funds" in the *Moab Accounting Manager Administrator Guide.*

Discrete allocations

By default, Moab Accounting Manager now attempts to enforce Discrete Allocations, or to ensure that allocations within a fund are non-overlapping (in time) and non-reusable (each allocation period should use a distinct allocation). This behavior is designated by the **allocation.enforcediscrete** server configuration parameter. If set to true, this policy prevents new allocations within a fund from overlapping existing ones. Enabling this policy helps improve clarity when reporting on allocation usage during a particular period. If set to false, the policy allows overlapping allocations within a fund. This might be useful if you want to allow the remaining balance from a prior allocation period to carry over into the new allocation period. With overlapping allocations, it is harder to describe what percentage of a group's allocation has been used. Enforcing discrete allocations helps pave the way to improved reports, eliminating confusion due to carry-over balances and overlapping allocations. For more information, see "Managing allocations" in the *Moab Accounting Manager Administrator Guide.*

CPU time tracking and charging

The standard HPC usage record now includes a CPUTime field for tracking per-job CPU time used. Usage tracking clients – gmkusage, gchusage, gcharge, greserve, and gquote – have been augmented with a -C option for specifying a CPU time argument.

Command line clients create and modify events

Two new command line clients, gmkevent and gchevent, create new events and modify them, respectively. See "Creating events" and "Modifying events" in the *Moab Accounting Manager Administrator Guide* for more information.

init.d and profile.d scripts automatically installed

make install now automatically installs the init.d script and the profile.d scripts unless you disable this via the configure --without-init or --without-profile options.

goldd status option

A new goldd option (-l, --status) has been added to display the status of the goldd daemon, indicating whether the server is running or stopped.

Specifying destination allocation in a transfer

It is now possible to specify the destination allocation to be credited to in a transfer. This complements the existing ability to specify the source allocation in a transfer.

Charging to a specified fund

The ability to charge to a specified fund supports the controlled distribution of charges, such as with balanced or proportional charging. A new `gcharge -f` option supports this feature. For more information, see "Charging for usage" in the *Moab Accounting Manager Administrator Guide*.

CSV output option

A new `--format` option allows you to display the output of query commands in CSV (Comma-Separated-Values) format. The former `--raw` option has been deprecated.

Time-based charge rate modifiers

Time-based modifiers let you specify that Moab Accounting Manager should multiply the charge for a resource by the amount of time it was used. The following time periods are valid for time-based charges:

- /s (per-second)
- /m (per-minute)
- /h (per-hour)
- /d (per-day)
- /W (per-week)
- /M (per-month)
- /Y (per-year)

This feature replaces the `resource` charge rate type. See "Managing Charge Rates" in the *Moab Accounting Manager Administrator Guide* for more information.

Divisor charge rate modifiers

A divisor modifier indicates that the pre-additive charge rate should be divided by the specified integer. It can be used in situations where you might otherwise set a small decimal charge rate, such as converting a value from megabytes to gigabytes. See "Managing Charge Rates" in the *Moab Accounting Manager Administrator Guide* for more information.

Charging for complex usage property values

Moab Accounting Manager now supports usage property values with both a name and a numeric value that indicates how many instances of the property were used (for example, `License=Matlab*4`). The numeric part of this usage property value is multiplied by the name-valued charge rate. See "Managing Charge Rates" in the *Moab Accounting Manager Administrator Guide* for more information.

TORQUE Resource Manager

Cray ALPS Basil 1.3 protocol support

Support for Cray ALPS Basil protocol has been added to TORQUE.

Adding features for Cray compute nodes

The ability to add features for Cray compute nodes has been implemented into TORQUE. This feature reduces the typical Moab startup time from 30-40 minutes to less than two minutes.

trqauthd terminate option

You can now terminate trqauthd by running trqauthd -d. For more information, see "trqauthd" in the *TORQUE Resource Manager Administrator Guide*.

Differences

This section contains differences in previously existing features that require a change in configuration or routine.

Moab Workload Manager

Moab Trial license no longer included

Moab is no longer shipped with a trial moab.lic file, and it will not run without a license file in place. To obtain a trial license, you must contact the Adaptive Computing Sales team. For more information, see "Configuring Moab Workload Manager" in the Moab HPC Suite Installation Guide.

unixODBC no longer an installation dependency

Now that ODBC is statically compiled into the Moab binary, there is no need for Moab installers or administrators to install unixODBC and unixODBC-devel packages prior to starting Moab.

The RMPOLLINTERVAL is 0,30 by default

The default installed moab.cfg includes RMPOLLINTERVAL 0,30 for best responsiveness on standard clusters. For more information about customizing the parameter for systems with large jobs or nodes, see "Considerations for Large Clusters" in the *Moab Workload Manager Administrator Guide*.

ACLOVERLAP enabled by default

The behavior of the *ACLOVERLAP* reservation flag, which is to cause reservations to reserve resources that match their ACL credential, is now the default behavior of reservations. The *ACLOVERLAP* flag has been deprecated and a new *NOACLOVERLAP* flag added to allow you to turn the feature off as needed. For more information, see "Configuring and Managing Reservations" in the *Moab Workload Manager Administrator Guide*.

mdiag -R -v, mdiag -r --xml, and showconfig -v commands enhanced

mdiag -R -v, mdiag -R –xml and showconfig -v provide more accounting manager attribute information. There is a greater difference between the outputs of mdiag -R and mdiag –R -v.

Special characters supported in VARATTR

Node sets, configured with the **VARATTR** attribute, may now contain hyphens, underscores, and spaces to increase naming possibilities. See "Resource Manager Extensions" in the *Moab Workload Manager Administrator Guide* for more information.

NoCharge reservation flag removed

The reservation flag *NoCharge* has been removed. By default, reservations are not charged unless the chargeaccount and chargeuser are specified, making the flag redundant. To prevent a reservation from charging, simply do not specify a chargeaccount or chargeuser. If you want reservations to charge their idle cycles as their default behavior, use the **AMCFG ALWAYSCHARGERESERVATIONS**=*TRUE* parameter. This setting causes charging to be overridden on a per-reservation basis. To override charging on a reservation, specify the reservation **CHARGE** attribute with a value of *FALSE*. A new reservation *Charge* flag was created for internal use, but it is not recommended for customers to specify or manipulate it.

AMCFG attributes removed

The **WIREPROTOCOL** and **SOCKETPROTOCOL** attributes of **AMCFG** have been removed.

CLIENTCFG[AM] AUTHTYPE no longer required

It is no longer necessary to specify **AUTHTYPE** in the **CLIENTCFG**[AM] line in moab-private.cfg for the MAM Accounting manager type.

QUEUENAMIACTIONS parameter removed

The **QUEUENAMIACTIONS** moab.cfg parameter has been removed. Its functionality has been replaced with the new accounting thread pool and non-blocking account calls.

Moab Web Services

LDAP server's public certificate required in JRE trusted keystore

When you configure a secure LDAP connection (SSL or StartTLS), you must give MWS the LDAP server's public certificate. In previous releases, you had to copy the certificate file to the MWS server and set a property in /opt/mws/etc/mws-config.groovy. Now you must add the certificate to the JRE trusted keystore. Setting the property in mws-config.groovy is no longer necessary.

Mongo health information moved

The structure of the mwm field in the /rest/diag/health/detail resource changed: the mongo information is now contained in a sub-object.

Accounting URLs for Accounts, Funds, and Usage Records moved

The accounting URLs for Accounts, Funds, and Usage Records moved into an `/accounting` subdirectory; for example, the funds URL changed from `/rest/funds` to `/rest/accounting/funds`. The previous URLs were deprecated and could be removed in a future release.

Accounting queries return only non-hidden attributes by default. To specify that the query should return all attributes, including metadata and hidden attributes, use the new `show-all` parameter.

Quote service URL changed

The quote service URL changed from `/rest/quotes/standard/quote` to `/rest/accounting/usage-records/quote`.

custom-fields is now fields

The `fields` parameter replaced the `custom-fields` parameter in the accounting-related resources.

API version 1 deprecated

API version 1 has been deprecated and will be removed from Moab Web Services in the next major release. It is highly recommended that you use the most recent API version (version 3). For more information, see "Requesting specific API versions" in the *Moab Web Services Reference Guide*.

MongoDB 2.4 support

Moab HPC Suite 7.5.0 – Enterprise Edition supports MongoDB 2.4.3 for SLES and 2.4.8 for CentOS and RedHat. 2.0.8 is still supported, but an upgrade is recommended. For more information, see "Upgrading Moab HPC Suite – Enterprise Edition from 7.2" in the *Moab HPC Suite – Enterprise Edition 7.5.0 RPM Installation Guide*.

Oracle Java Runtime Environment 7 support

Moab HPC Suite 7.5.0 – Enterprise Edition now supports Oracle Java 7 Runtime Environment. While Java 6 is still supported, an upgrade is recommended. For more information, see "Upgrading Moab HPC Suite – Enterprise Edition from 7.2" in the *Moab HPC Suite – Enterprise Edition 7.5.0 RPM Installation Guide*.

MWS automatically assigns object owners and users

Because of the new tenancy feature, Nodes must each have an owner (or user) assigned to it. If you are logged in as an administrator or application account, you can specify any user. If you do not specify a user, however, MWS automatically assigns the object to the user you are logged in as.

Job array names no longer required

Job arrays no longer require a name during submission. Moab automatically sets the name if one is not specified.

Plugin framework support for some RM Methods removed

The plugin framework has been simplified to support fewer RM Methods. The following URLs are no longer supported:

- `/rest/plugins/all/rm/virtual-machine-migrate`
- `/rest/plugins/all/rm/resource-create`
- `/rest/plugins/all/rm/system-modify`
- `/rest/plugins/all/rm/system-query`

Default username and password changed

The default username and password for MWS changed to match the defaults in Moab Viewpoint. The new default username is "moab-admin" and the new password is "changeme!".

Moab Viewpoint

Faster loading

All data pages in Viewpoint, including the dashboard, load five times faster than in any previous release.

Moab Accounting Manager

MySQL Transaction Isolation level must be READ COMMITTED

Because Moab Workload Manager now uses multi-threading to communicate with MAM, if you are using the MySQL database, you will need to configure MySQL transactions to use the READ COMMITTED Transaction Isolation level. For more information, see "Configuring Moab Accounting Manager" in the *Moab HPC Suite – Enterprise Edition Installation Guide*.

user.firstaccountdefault now defaults to true

Beginning in 7.5.0, when a user is added to his first account, MAM will automatically make this account his default account. This behavior can be adjusted via the **user.firstaccountdefault** parameter in `goldd.conf`.

Transfer allocation option split into from-allocation and to-allocation options

The Allocation option for the Fund Transfer action has been replaced with separate FromAllocation and ToAllocation options. The gtransfer client has similarly replaced the `-i` option with separate `--from-allocation` and `--to-allocation` options. Similar enhancements were made to the GUI Fund Transfer page.

--raw option is deprecated

The `--raw` option is deprecated. It is no longer documented but can currently still be used by invoking the `--raw` option directly or by using `--format=raw`.

Allocation Deposited property renamed Allocated

The Allocation Deposited attribute has been renamedAllocated in order to more properly reflect its purpose to store the adjusted allocation amount. The former Allocation Allocated derived field in gbalance and glsfund has been renamed to Capacity. gchalloc no longer allows you to adjust the Allocated (formerly Deposited) amount since this is strictly a calculated value. glsfund now shows the Allocated field by default.

Non-reusable allocations

The behavior of Fund Reset has changed to enforce the use of separate allocations for separate allocation periods. When you reset a fund, instead of zeroing out the allocated and current amounts and reusing the allocation, the currently active allocation ends and a new allocation is created. This is done to support self-tracking allocations and to facilitate better reporting. The Allocation Reset action has been removed and a Fund Stop action has been added.

Non-overlapping allocations

By default, a new allocation may not overlap with an existing allocation in the same fund. Similarly, by default, allocations can only be modified if the resulting allocation does not overlap with an existing allocation and if the modified allocation does not move away from time bounds that might have included charges to the allocation. This behavior is designated by the new **allocation.enforcediscrete** server configuration parameter.

glsalloc enhanced as an allocation reporting tool

glsalloc has been enhanced to include start time and end time options for displaying allocations that were active during a particular time frame in the past and to display a number of new intrinsic and derived fields including FundName, InitialDeposit, Adjustments, Allocated, Capacity, Used, PercentUsed, Remaining, PercentRemaining, Reserved, Balance, and Available. These enhancements provide better intrinsic reporting for current and past allocation usage. The default displayed options have changed to Id, Fund, StartTime, EndTime, InitialDeposit, Allocated, CreditLimit, Remaining, and PercentUsed. The long and wide options have been removed.

make deps is deprecated

The use of `make deps` has been deprecated and references to it have been removed from the documentation. The principle method for installing Perl module dependencies is through the package manager for your operating system.

gmkfund -C is deprecated

Use of the `-C` option with gmkfund as a shortcut for `--constraint` has been deprecated. The `-C` option will now generally be reserved to specify the new CPU time argument.

configure --without-readline removed

The configure `--without-readline` option has been removed since perl module dependencies are now installed via the package manager.

Charge rate Rate replaced with charge rate Amount

The ChargeRate `Rate` attribute, which required a float value, has been replaced with the ChargeRate `Amount` attribute, which requires a string value. Charge rate amounts now support operation modifiers, time-based modifiers, or divisor modifiers. See "Managing Charge Rates" in the *Moab Accounting Manager Administrator Guide* for more information.

Charge rate Type replaced with operation modifiers

The ChargeRate `Type` attribute has been replaced with operation modifiers on the ChargeRate `Amount`. The former VBU, NBU, VBR and NBR charge rate types have been replaced with pre-additive operation

modifiers on the charge rate amount (see time-based modifiers for VBR and NBR in the next item). The former VBM and NBM charge rate types have been replaced with multiplicative operation modifiers on the charge rate amount. The former VBF and NBF charge rate types have been replaced with post-additive operation modifiers on the charge rate amount. See "Managing Charge Rates" in the *Moab Accounting Manager Administrator Guide* for more information.

Resource charge rate types replaced with time-based modifiers

The VBR and NBR charge rate types, which charged for the time the resource was used, have been replaced by the specification of time-based modifiers on the ChargeRate Rate (in conjunction with the pre-additive operation modifier described in the previous item). See "Managing Charge Rates" in the *Moab Accounting Manager Administrator Guide* for more information.

TORQUE Resource Manager

Custom functions replaced by STD and BOOST C++ classes

TORQUE 4.5.0 eliminates the need for custom functions in favor of STD and BOOST C++ classes. This change introduces a dependency on the boost libraries, and TORQUE now requires that install the gcc, gcc-c++, and boost-devel packages. For more information, see "Installing TORQUE" in the *TORQUE Resource Manager Administrator Guide*.

trqauthd retry logic improved

The tqauthd retry action has been improved, decreasing failures.

qstat improvements

The qstat command has been significantly refactored. Many error codes are different from what they were in the past. You can check the new error codes against pbs_error.db.h for descriptions of their meanings. The retry logic included in the command reduces failures.

Unit test coverage of TORQUE increased in 4.5.0.

The percent of the TORQUE code covered by unit tests has increased from less than 4% to 18.4%, increasing the quality of the software.

Request failures significantly decreased

Failures generated during stress tests of TORQUE decreased from 40 failures per million requests to fewer than two failures per million requests.

.JB files converted from binary to XML

The .JB files, formerly in binary, were converted to XML. This conversion introduces the ability to repair corrupt files. The XML version provides the means to better diagnose problems. TORQUE 4.5.0 is backwards-compatible with binary-based jobs. For more information, see "Job files" in the *TORQUE Resource Manager Administrator Guide*.

exec_host list processing improvement

Changes to the way TORQUE processes the exec_host list reduced the startup time of large jobs by 20 times.

Installation and upgrade information

Installing Moab HPC Suite 7.5.0 – Enterprise Edition

Installation instructions for Moab HPC Suite 7.5.0 – Enterprise Edition can be found in the Moab HPC Suite – Enterprise Edition Installation Guide.

> ℹ️ All installation documentation was removed from the individual component guides and added to the installation guide.

Upgrading to Moab HPC Suite 7.5.0 – Enterprise Edition

Upgrade instructions for Moab HPC Suite 7.5.0 – Enterprise Edition can be found in the Moab HPC Suite – Enterprise Edition Installation Guide.

Moab Workload Manager

If you are upgrading to Moab HPC Suite 7.5.0 – Enterprise Edition from a previous version and have an external database besides MongoDB (for example, MySQL), then you must upgrade your database to the new schema. For instructions, see "Migrating Your Database to Newer Versions of Moab" in the *Moab Workload Manager Administrator Guide*.

Moab Web Services

When Moab Web Services upgrades to 7.5.0, it adds the tenancy feature. MWS preserves principals and roles by splitting principals with more than one LDAP entity into multiple principals, appending the name with a counter as needed. As a part of the upgrade, a default tenant will be created and any 7.2 or 7.3 principals will be mapped to it. Additionally, all services, nodes, and service templates are assigned to that tenant. Finally, MWS creates all the default roles and permissions for the current suite.

Moab HPC Suite 7.5.0 – Enterprise Edition now supports MongoDB 2.4.3 for SLES and 2.4.8 for CentOS and RedHat. While 2.0.8 is still supported, an upgrade is recommended. For more information, see "Upgrading Moab HPC Suite – Enterprise Edition from 7.2" in the *Moab HPC Suite – Enterprise Edition 7.5.0 RPM Installation Guide*.

Moab HPC Suite 7.5.0 – Enterprise Edition now supports Oracle Java 7 Runtime Environment. While Java 6 is still supported, an upgrade is recommended. For more information, see "Upgrading Moab HPC Suite – Enterprise Edition from 7.2" in the *Moab HPC Suite – Enterprise Edition 7.5.0 RPM Installation Guide*.

Moab Accounting Manager

Moab Accounting Manager 7.5.0 is compatible with Moab Workload Manager versions 7.2.x, 7.3.x, and 7.5.x. It is only compatible with a Moab Accounting Manager database schema version of 7.5. To determine your current database schema version, run `goldsh System Query`. If your current database schema version is less than 7.5, you need to migrate your database to 7.5. For more information, see "Upgrading Moab Accounting Manager" in the *Moab HPC Suite – Enterprise Edition Installation Guide*.

Known issues

The following are known issues in the Moab HPC Suite 7.5.0 – Enterprise Edition. Following each issue description is an associated issue number in parentheses.

- Connecting Moab to an ODBC database causes Moab to slow down. You can work around this issue by creating the tables with the old storage engine (`ENGINE = MyISAM`) (MOAB-6316).

- Any reservation created in Viewpoint that has a duration longer than six years will appear on the Reservation management page as having an "infinite" end date, even though they will actually end after approximately six years. This issue should rarely, if ever, present itself, because hardware generally does not last for six years. Additionally, reservations on any orphaned VMs detected by Moab will also show an "infinite" end date (MOAB-5737, VEW-5145).

- Jobs submitted with a specific host list may not always conform to the details of the submission. Nodes may not be allocated exactly as requested with respect to total node count and task distribution (MOAB-6475).

- When you submit jobs with MWS, you must set the commandFile field to the absolute path of the job script on the MWS server. MWS must have read access to the file given in commandFile. Submitting remote job scripts (that is, including the script as part of the JSON payload) is not currently supported (WS-2112).

- When you submit jobs to Moab with a proxy user but no group specified via MWS, Moab uses the root group rather than the group of the proxy user (WS-2111, MOAB-6487).

- Although guaranteed start time and flex up/down work independently, a flex up has been known to compromise a guaranteed start time in a tightly-packed workload, depending on workload targeting and node load. If a flex up has left too few resources for a guaranteed start time job, the job will fail (AC-4046).

- When the resource manager reports a wiki attribute that Moab does not recognize and it contains "OS", Moab considers it the OS (MOAB-5120).

- Opening and closing parentheses ("(" and ")") are not supported characters in common name ("CN") LDAP entries. Other special characters, such as backslashes and commas, must be escaped properly. This includes a second back slash ("\\,") when specifying the OU or Group name in the **Roles** field of the **Principals** tab of the "Edit Tenant" and "Create Tenant" pages in Viewpoint (The JVM interpolates one of the back slashes before passing the information to MWS) (WS-2214).

- Error messages are inconsistent between different resources when POST-ing without a JSON body (WS-897).

- Under heavy stress conditions, pbsdsh hangs (TRQ-2188).

- Canceled heterogeneous Cray jobs are purged from TORQUE's memory (TRQ-2396).

Resolved issues

The following is a list of some key bugs fixed in Moab HPC Suite 7.5.0 – Enterprise Edition. Following each issue description is an associated issue number in parentheses.

- **Requesting to use a specified node list with mppnodes did not work properly.** mppnodes now works as documented (MOAB-6458).

- **Modifying a reservation would name under certain conditions caused Moab to crash.** This crash no longer occurs (MOAB-6352).

- **NODECFG attributes NODETYPE and CHARGERATE were not implemented for the MAM or native interface. NODETYPE and CHARGERATE** now correctly route charges to Moab Accounting Manager via the MAM and Native AM interfaces (MOAB-6237).

- **Moab commands would sometimes return a "could not authenticate client using .moab.key" error.** The key authentication procedure causing the errors has been fixed (MOAB-6152).

- **Running mdiag -j –xml returned a `ReqProcs` field in the output, but running mdiag -j –xml – blocking did not.** The `ReqProcs` field was previously deprecated and has been removed from the non-blocking mdiag -j output (MOAB-6029).

- **Modifying the ACL of a reservation did not cause Moab to reconsider jobs that were already blocked due to ACL conflicts.** Modifying the ACL now causes Moab to reevaluate these blocked jobs against the new ACL (MOAB-5293).

- **In some cases, jobs were running on the wrong partition.** Moab will only run jobs on the assigned partition (MOAB-6428).

- **When jobs with triggers completed, the trigger was never unarmed and continued to fire.** Triggers do not fire after a job has completed (MOAB-5959).

- **The IPMI scripts would generate an error if a non-IPMI node was in a node list.** The scripts no longer generate this error (MOAB-6377).

- **Reservations with a description spanning multiple lines would disappear from the system after a Moab restart.** Moab preserves these reservations when it restarts (MOAB-6231).

- **URLs in `moab.cfg` referred to the old documentation website.** The URLs now direct you to the new website (MOAB-3923).

- **When a job was submitted in MWS by root with a proxy user specified, the job was assigned to root instead of the user's primary group.** MWS now looks up the group if it is not specified at job submission (MOAB-6487).

- **Moab allowed VMs to migrate to hypervisors where the resources were already consumed by jobs or reservations with a guaranteed start time.** Moab no longer allows VMs to migrate to hypervisors with consumed resources (MOAB-6531).

- **Moab would continuously add triggers to jobs, overwhelming the checkpoint files.** Triggers are no longer added to a job again each iteration (MOAB-6583).

- **When an RM timeout was set too high, Moab interpreted it as 1.2 microseconds.** High timeouts are now correctly set (MOAB-5091).

- **If you attempted to delete all reservations when none existed, Moab would return mdiag -r output.** Moab now returns "No reservations on the system" when you delete all reservations and none exist (MOAB-5297).

- **A race condition occurred when parsing or formatting dates.** This condition has been fixed. As part of the change, some time zone names can no longer be used when sending dates to MWS (for example, EDT, MDT). For a full list of allowable time zone IDs, see http://joda-time.sourceforge.net/timezones.html (WS-1863).

- **MWS produced confusing error messages when MongoDB was down and MWS authentication failed.** These error messages have been improved (WS-1481).

- **Native plugin did not handle possible cases in which polls overlapped.** The Native plugin has been improved to enforce only 1 poll at a time per plugin instance to prevent potential issues from occurring during overlapping polls. In the event of an overlap, consecutive polls are queued and executed one at a time (WS-1942).

- **Reloading a plugin type did not reload its messages.properties file(s).** The **messages.properties** file(s) reload when you refresh a plugin type (WS-1683).

- **A plugin instance's datastore was not deleted with the plugin instance.** When you delete a plugin instance, its datastore is also deleted (WS-1900).

- **Moab would quote environment variables incorrectly when passing them to TORQUE.** Environment variables are now passed correctly from Moab to TORQUE (WS-1897).

- **The Native plugin did not correctly handle floating point values for the UPDATETIME wiki attribute.** Native now supports floating values for UPDATETIME (WS-1916).

- **Only the MWS admin user was able to GET various resources under /rest/diag.** A new Diagnostics role was added to the list of available resource access controls to resolve the issue (WS-1941).

- **The Accounting or Quotes resource did not support API version 2.** The resource now supports API version 2 (WS-1712).

- **Errors would occur when the value of the `fields` URL parameter starts or ends with a period.** Periods are now supported at the beginning and end of the `fields` URL Parameter (WS-1791).

- **Buttons in the dataview were not configurable.** You can now turn off certain buttons in the `DataviewConfig.groovy` file (VEW-5492).

- **When you saved configuration files that failed validation, no time stamp was preserved.** A time stamp is now saved in this scenario to provide a better idea of what may have happened (VEW-5296).

- **When LDAP configuration parameters were transferred from MWS to Viewpoint, the password field displayed a series of asterisks, making it appear as if the password were copied over when it wasn't.** The Viewpoint LDAP configuration password field now appears blank to indicate that you must fill in the field (VEW-5275).

- **Double-clicking on any event while using Internet Explorer 9 produced an error.** Selecting an event now opens the details page in I.E. 9 as expected (VEW-5227).

- **Viewpoint generated an event that said a policy was turned on after the policy was updated, even it was already turned on.** Updating a policy no longer generates an event for the policy's being turned on (VEW-4900).

- **Viewpoint generated unhelpful errors and messages.** The error messages have been improved (VEW-4153, VEW-3662, VEW-3528).

- **The MWS configuration pages did not display error messages when an incorrect path was given.** Viewpoint now handles invalid web services and a web service that returns an invalid suite (VEW-2797).

- **The LDAP configuration page accepted bad passwords without warning or error.** The LDAP configuration page now verifies the LDAP connection and displays an error if the connection fails (VEW-4997).

- **The Viewpoint data pages did not support multi-select using the keyboard Shift and Ctrl keys.** You can now select multiple items in the Viewpoint data pages using Shift and Ctrl (VEW-4219).

- **When creating a new principal, you could save a principal with no users or groups.** Attempting to save a principal without users or groups now produces a warning dialog that allows you to consciously save without users or to return to editing the principal (VEW-5011).

- **MAM did not provide confirmation when an account was created.** The issue was resolved and MAM now returns confirmation when an account is created (GOLD-222).

- **Jobs were sometimes charged for more time than they actually took to run.** The NAMI scripts now charge based on time passed between start and end times rather than on the current timestamp (MOAB-6470).

- **Moab was slow and unresponsive when charging with Moab Accounting Manager .** Moab charges with MAM much more quickly (MOAB-4646).

- **gchfund would reset more than one fund.** gchfund will not reset more than one fund unless you specify --all (GOLD-185).

- **The `init.d` scripts would incorrectly report status or become asynchronous with direct goldd starts and stops.** The scripts correctly report the status and are synchronized with direct goldd starts and stops.

- **The client commands that accept an integer non-option did not verify that the argument was in integer format.** These commands now verify integer arguments.

- **Charges did not show ItemizedCharges if the charge was 0.** Charges now show ItemizedCharges even when the charge is zero.

- **Queries did not always return aggregation information.** Queries now return aggregation information even when you specify options (GOLD-213).

- **The status bar that confirmed an account creation did not return any feedback in newer browsers.** It now provides feedback when actions are taken in all supported browsers (GOLD-222).

- **Newly-created transfer allocations had their Active field set to NULL.** Newly-created allocations from transfers now have an Active field value of True or False. Additionally, Allocation Refresh now repairs allocations with Active=NULL (GOLD-231).

- **You had to install the `perl-CGI-Session` RPM needed for the Moab Accounting Manager GUI manually.** The RPM now installs it for you. (GOLD-151).

- **The `--enable-cpuset` compile option did not work in a CentOS 5 environment.** `--enable-cpuset` is now supported in on CentOS 5 systems (TRQ-2352).

- **TORQUE failed to run `make` on a SuSE Linux 11 system.** The `make` command completes successfully in SuSE 11 (TRQ-2172).

- send_job_work was refactored (TRQ-2046).

- **`pbs_user` used popen to send mail using the email addresses specified on the command line, which posed a security risk.** TORQUE no longer allows you to run root commands in the email portion of qsub (TRQ-2310). CVE 2013-4495

- **`pbs_sched` did not return the correct syntax for the RM protocol.** pbs_sched now works as expected (TRQ-2318).

- **Client command failure handling frequently produced errors.** Client commands have been made more robust and the failure rate reduced (TRQ-2268).

- **MOMs leaked large amounts of memory.** These large memory leaks no longer occur (TRQ-2253).

- **`trqauthd` did not perceive which was the active server in a high availability environment and did not switch to the inactive server as needed.** trqauthd now switches to the inactive server when the active one fails (TRQ-2265).

- **TORQUE did not kill prologue scripts after the hard-coded 5-minute timeout.** Prologue scripts will now timeout to less than 5 minutes (TRQ-2273).

- **In rare cases, TORQUE would delete jobs without freeing their resources.** TORQUE frees jobs' resources when the jobs are deleted (TRQ-2111).

- **Running `qhold` on a BLCR job completed the job rather than holding it.** pbs_mom no longer uses trqauthd when it checkpoints a job, resolving the qhold problem (TRQ-2208).

- **For multi-node jobs TORQUE gave inflated memory stats to Moab.** vmem is no longer being stored with mem (and vice versa) to correct the problem (TRQ-2259).

- **Cray features were not written with the nodes file.** Save properties are added to Cray compute nodes in the nodes file if it is overwritten by pbs_server (TRQ-2280).

- **Some jobs did not progress from the OBIT state, becoming stuck in the MOM login.** Jobs now complete when expected (TRQ-2333).

- **TORQUE did not follow child processes that had changed their session IDs or record the resource usage, resulting in TORQUE's reporting the incorrect memory usage for jobs.** TORQUE now reports the correct memory usage of its jobs (TRQ-2321).

- **The stdout and stderr files were not deleted from `$TORQUE_HOME/spool` after being copied to the directory from which the job was submitted.** The stderr and stdout files are automatically removed from the /spool directory unless the job is purged manually (TRQ-2317).

- **Job queues disappeared after TORQUE restart.** Queues no longer disappear after restarting TORQUE (TRQ-2289).

- **A client could close a connection early and cause `trqauthd` to terminate.** When a client closes a connection early, trqauthd continues to run (TRQ-2252).

- **The TORQUE server would crash on an invalid string.** TORQUE validates strings to prevent the crashes from occurring (TRQ-2244).

- **Client commands would sometimes cause a deadlock.** These crashes no longer occur (TRQ-2337).

- **TORQUE would not honor jobs with -j -o -e in the job script when FSISREMOTE was enabled in Moab.** These jobs are now processed correctly, the -j taking precedence over oe and eo (TRQ-2234).

- **When pbs_server could not find the connection from the client in the connection table before trqauthd sent the credentials, TORQUE returned an "invalid credentials" error message.** TORQUE now returns a more accurate error message that says "Client connection not found. Please retry the command." in this scenario (TRQ-2198).

- **When several qdel all commands were run consecutively, the qstat -Q output returned a negative job number.** qstat -Q now returns the correct number of jobs (TRQ-2187, TRQ-2007).

- **pbs_server crashed when a job in a long dependency chain was deleted.** Deleting a job in a long dependency chain now causes TORQUE to delete all consecutive jobs and qstat to return the deleted job, and any jobs before it, as completed (TRQ-2169).

- **Deleting jobs from a node that was down caused the server to hang.** The server no longer hangs when jobs are deleted from a node that is down (TRQ-2138).

- **TORQUE did not track how much memory was committed to other jobs.** TORQUE now keeps track of how much memory is already allocated (TRQ-2124).

- **trqauthd could not authenticate users due to intermittent LDAP failures.** trqauthd now retries to retrieve user credentials from the system (TRQ-2070).

- **The cpuset reading on MOMs would fail due to incompatibility with the newer Linux kernels' file structure.** TORQUE has been updated to work well with the new Linux kernels (TRQ-2022).

- **Completed jobs would lose the total_runtime value when pbs_server restarted.** TORQUE retains the total_runtime of completed jobs on pbs_server restart (TRQ-2381).

- **After an upgrade from pbs_server 4.2.5 to 4.2.6, jobs would not run if MOMs were left at 4.2.5.** Jobs now run in this scenario (TRQ-2351).

- **pbs_mom would hang when contents in the cpulist were either a single number of the contents ended with a ",<number>".** This hang no longer occurs (TRQ-2350).

- **hwloc_bitmap_displaylist had a potential for buffer overrun.** cpuset code was refactored to resolve the potential vulnerability (TRQ-2319).

Product documentation

Technical Documentation

The online help for Moab HPC Suite 7.5.0 – Enterprise Edition is available in HTML and PDF format on the Adaptive Computing Documentation page.

Key documentation changes

This section lists some key documentation changes made for Moab HPC Suite 7.5.0 – Enterprise Edition. Following each change description is a link to the affected page and an associated issue number if applicable.

Features new to this release have been documented but are not listed on this page. For information about those new features and links to their respective documentation, see **New features** on page 1.

- **Moab Workload Manager** on page 24
- **Moab Web Services** on page 26
- **Moab Viewpoint** on page 26
- **Moab Accounting Manager** on page 27
- **TORQUE** on page 27

Moab Workload Manager

Additions

- "Installation Notes for Moab and TORQUE for Cray" was revamped. Two new sections were added to the page: one discusses adding node features for Cray compute nodes and another discusses how to configure TORQUE for ALPS 1.3.

- The new *PURGEONSUCCESSONLY* job flag was added to "Job Attributes/Flags Overview" (AC-6260).

- The new *NORELEASEWHENSCHEDULED* mvcctl flag was added to the "mvcctl" command page. A new "Requiring approval for services to run" page describes how to use it (AC-6307).

- Two new pages, "Connecting to an Oracle Database with an ODBC Driver" and "Installing the Oracle Instant Client" instruct users on connecting Moab to an Oracle database (MOAB-6341).

- Two new sections have been added to "Migrating Your Database to Newer Versions of Moab": "Migrating from Moab 7.2 to Moab 7.2.6" and "Migrating from Moab 7.2.6 to 7.5. These new sections describe the steps required to migrate the database from an early version of 7.2 to 7.5 (DOC-1681).

- The new *PRIORITYPOLICYBLOCKING* scheduler flag was added to "SCHEDCFG flags" (DOC-1764).

- The *NORMSTART* job flag was added to "Job Attributes/Flags Overview" (DOC-1842).

- A new Moab command options table was added to "Scheduler Commands" that describes all of the -- options for the commands (DOC-1831).

- The *ENABLESLURMMEMPERCPU* scheduler flag was documented in "SCHEDCFG flags" (MOAB-6630).

- A new "Accounting properties reported to Moab Accounting Manager" section in the "Allocation Management" page describes the information Moab can send to MAM via charging actions (DOC-1852).

- A note in **CHARGEPOLICY** and Charge Metrics in "Allocation Management" explains the **CHARGEPOLICY** when using NAMI (DOC-1832).

- A section called "Accounting properties reported to Moab Accounting Manager" in "Charging and Allocation Management" contains tables that display the job and reservation information that Moab sends to MAM (DOC-1852).

- The AM* events are documented in a table in "Charging and Allocation Management" (DOC-1867).

Removals

- The **PUSHEVENTSTOWEBSERVICE**, **EVENTLOGWSURL**, **EVENTLOGWSUSER**, and **EVENTLOGWSPASSWORD** parameters were removed from "Appendix A: Moab Parameters" and the "Event logging with web services" section from "Logging Facilities" (DOC-1697).

- All references to node pools were removed (DOC-1825).

- All references to AGFULL were removed (DOC-1837).

Improvements

- A note was added to each of the database configuration pages ("Connecting to a MySQL Database with an ODBC Driver", "Connecting to a PostgreSQL Database with an ODBC Driver", and "Connecting to an Oracle Database with an ODBC Driver") to describe how to find the driver necessary to connect the database to Moab (DOC-1662).

- Information about starting TORQUE and Moab at the same time was added to "Moab-TORQUE Integration Guide" and "Configuring Moab Workload Manager" (DOC-1396).

- The **PROFILECOUNT** parameter description now explains how it works with the **PROFILEDURATION** parameter. See "Appendix A: Moab Parameters" for more information (DOC-1124).

- The *SHOWUSERJOBSONLY* scheduler flag, introduced in 7.2.6, was added to "SCHEDCFG flags" (DOC-1694).

- The synccount and syncwith job dependencies, introduced in 7.2.6, were added to "Job Dependencies" (DOC-1695).

- The **SERVERSUBMITFILTER** parameter, introduced in 7.1.0, was added to "Appendix A: Moab Parameters" and a new section called "Global job submit filter" was added to the "Applying the msub Submit Filter" to explain its use (DOC-1597).

- The links to parameters in the Moab Workload Manager documentation, styled in orange, bold font, support hovering over them with the cursor to generate a pop-up of the parameter's information (format, default, description, and example).

- The Scheduling with backfill image in "Backfill" and Rolling reservation image in "Configuring and Managing Reservations" were animated to better demonstrate Moab's behavior and the "Node Allocation Policies" and "Node Set Overview" images were improved.

- The *ANYOF* and *ONEOF* node set policy descriptions in "Node Set Overview" have been improved (DOC-1841).

- Changed msat_converter description in "Importing Statistics from stats/DAY.* to the Moab Database" to say that it uses the `$MOABHOMEDIR/moab.cfg` file, not `$MOABHOMEDIR/etc/moab.cfg` (DOC-1784).

- The description of **RESERVATIONPOLICY** *HIGHEST* in "Reservation Policies" was improved to provide more clarity (DOC-1824).

Moab Web Services

Additions

- Resource manager configuration instructions were added to "Moab Workload Manager resource manager integration" (AC-5572).

- Documentation was added for storage support in "Reporting state data" and "Storage RM service" (AC-6087).

Removals

- The installation and upgrade instructions were removed from the MWS documentation and can now be found in the suite installation documentation.

Improvements

- API version 1 was marked as deprecated in "Requesting specific API versions" (AC-5534).

- A JSON example in "Nodes" was modified to include resourceManagerMessages (MOAB-5563)

Moab Viewpoint

Additions

- A new step was added to "Setting up OpenLDAP on CentOS 6" to hide password hashes from users without permission to see them (DOC-1307).

- The method of customizing interface labels and setting up localization was added to "Customizing Viewpoint to specific markets or customers" (AC-5017).

- Jobs and Reservations were added to "Fields: Node details" (AC-5009).

- The Make Reservation button was documented in "Fields: Node Management"

- New information was added to "Creating a secure HTTPS connection from Viewpoint to MWS" (AC-2354).

- The default permissions were documented on the "Permissions" page (AC-6148).

- A page called "Setting up the job script directory" describes customizing the job script upload directory for your environment (VEW-5258).

- A new note in "About Job Management" explains that users submitting jobs must be in LDAP and Moab (DOC-1862).

Removals

- The installation and security documentation was removed from Viewpoint and added to the Moab HPC Suite – Enterprise Edition Installation Guide.

- Support for Internet Explorer 7 was removed. As a result, the "Displaying gadgets as text only" was also removed (DOC-1585).

Improvements

- All external links now open in pop-up windows to avoid embedded frames (DOC-1500).

- Configuration files, such as `DataviewConfig.groovy` and `gadgets.xml` were documented as existing in the `VIEWPOINT_HOME` directory. The suite-specific sub-directory has been documented to accurately direct you to the files.

Moab Accounting Manager

Additions

- The -C (constraint) option was replaced with -C (CPUTime); -a was replaced with -f; and Network was removed (AC-6261).

- New commands called gmkevent and gchevent were added to "Creating Events" and "Modifying Events" (GOLD-201).

Improvements

- All external links now open in pop-up windows to avoid embedded frames (DOC-1500).

- The "Getting started" chapter was overhauled and its use cases moved into "Appendix A: Alternate use cases" (DOC-6333).

- The Migration chapter was merged into the Upgrading chapter. Both were moved to "Upgrading Moab Accounting Manager" in the *Moab HPC Suite – Enterprise Edition Installation Guide* (DOC-1777).

TORQUE

Additions

- The new features_required queue attribute was added to "Queue attributes" (TRQ-1794).

- The new required_login_property queue attribute was added to "Queue attributes" (TRQ-1832).

- The new environment variable `QBS_QSTAT_NO_COMPLETE` environment variable was added to "qstat" (TRQ-1565).

- Instructions for putting the MOM hierarchy locally on each MOM has been added to "Server configuration" and the related -n (no send) option was added to "pbs_server" (TRQ-2058).

- The new `mom_hierarchy_retry_time` parameter was added to "Parameters" (TRQ-2218).

- `boost-devel` was added to the list of packages required to run TORQUE 4.5.0 in "Installing TORQUE" (DOC-1657).

- The server parameter scheduling has been documented in "Appendix B: Server parameters" (DOC-1611).

- The trqauthd daemon and its two options have been documented on a new command page "trqauthd" (DOC-1769).

- A note was added to the -r section of "qstat" explaining that the elapsed time of a job is not displayed if no walltime was given (TRQ-2376).

- The PBS_GPUFILE environment variable was added to "Exported batch environment variables" (DOC-1797).

- keep_completed was added to "Appendix B: Server parameters" (DOC-1765)

Removals

- The MPICH-CMI section was removed from "Chapter 7: MPI (Message Passing Interface) support" (DOC-1393).

- The `--enable-high-availability` configuration option was removed from "Server high availability" (DOC-1480).

- the ncpus option has been removed from the Assigning queue resource limits table on the "Queue attributes" page (DOC-1571).

- The `scheduler_iteration` server parameter was removed from examples in "Initializing/Configuring TORQUE on the server (pbs_server)", "Manual setup of initial server configuration", "Testing server configuration", and "Frequently asked questions (FAQ)" (DOC-1573).

- `acl_roots` was removed from "Appendix B: Server parameters" (TRQ-1992).

- References to `--with-tcp-retry` were removed from the documentation (TRQ-2147).

Improvements

- "Appendix I: Security overview" has been updated with useful information for trqauthd (4.x and higher) users (TRQ-2012).

- A bullet point detailing that PBS directives should be declared first in job scripts was added to "Job submission" (DOC-1384).

- The -f (force overwrite) option was added to "pbs_server" (DOC-1440).

- The error codes in "Appendix D: Diagnostics and error codes" were updated (DOC-1460).

- Information about `epilogue.parallel` continuing to run even if TORQUE can't open the `.OR` or `.ER` files was added to "Prologue and epilogue scripts time out" (TRQ-2139).

- "Moab and TORQUE configuration for large clusters" and "Starting TORQUE in large environments" have been updated with new suggested startup procedures and configurations for large clusters (DOC-1461).

- A list of Moab environment variables that are available in prologue and epilogue scripts was added to "Script environment" (TRQ-1012).

- A list of the GPU modes was added to "gpumode" (DOC-1634).

- The `PBS_NUM_NODES`, `PBS_NUM_PPN`, and `PBS_NP` environment variables were added to "Exported batch environment variables" (DOC-1637).

- "qalter" and "qsub" were updated with an explanation of how `-j` works with `-e` and `-o` (DOC-1616).

- A note was added to "Keeping completed jobs" to explain how `keep_completed` works when Mother Superior and TORQUE are on the same server (TRQ-2317).

- The `remote_checkpoint_dirs` initialization value was added to "pbs_mom" (DOC-1683).

- The description of tmpdir in the "pbs_mom" command page has been modified to better reflect its use (TRQ-1974).

- Updated the required version of hwloc (TRQ-2319).

- A note was added to the "Compute nodes" page explaining that users who installed via RPMs must configure each node manually (DEVOPS-359).