1 License

TERM SOFTWARE LICENSE AND SUPPORT AGREEMENT

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1. SCOPE: This agreement governs the licensing of the Univa Software and Support provided to Customer.

   • Univa Software is defined as the Univa software described in the order, all updates and enhancements provided under Support, its software documentation, and license keys (Univa Software), which are licensed under this agreement. This Univa Software is only licensed and is not sold to Company.
   • Third-Party Software/Open Source Software licensing terms are addressed on the bottom of this agreement.

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   (b) Make a reasonable number of copies of the Univa Software for archival and backup purposes.

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Customer acknowledges that any misuse or threatened misuse of the Univa Software may cause immediate irreparable harm to Univa for which there is no adequate remedy at law. Univa may seek immediate injunctive relief in such event.

5. PAYMENT. Customer will pay all fees due under an order within 30 days of the invoice date, plus applicable sales, use and other similar taxes.

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7. TERMINATION. Either party may terminate this agreement upon a material breach of the other party after a 30 day notice/cure period, if the breach is not cured during such time period. Upon termination of this agreement or expiration of an order, Customer must discontinue using the Univa Software, de-install it and destroy or return the Univa Software and all copies, within 5 days. Upon Univa’s request, Customer will provide written certification of such compliance.

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9. **LIMITATION OF LIABILITY AND DISCLAIMER OF DAMAGES.** There may be situations in which, as a result of material breach or other liability, Customer is entitled to make a claim for damages against Univa. In each situation (regardless of the form of the legal action (e.g. contract or tort claims)), Univa is not responsible beyond:

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(b) damages for bodily injury (including death), and physical damage to tangible property, to the extent caused by the gross negligence or willful misconduct of Univa employees while at Customer’s facility.

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(b) loss of profits, business, or goodwill or

(c) other special, consequential, or indirect damages

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(b) allows Univa to control, and cooperates with Univa in, the defense and any related settlement.

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This section contains Customer’s exclusive remedies and Univa sole liability for infringement claims.

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(a) Inspection. Univa, or its representative, may audit Customer’s usage of the Univa Software at any Customer facility. Customer will cooperate with such audit. Customer agrees to pay within 30 days of written notification any fees applicable to Customer’s use of the Univa Software in excess of the license.

(b) Entire Agreement. This agreement, and all orders, constitute the entire agreement between the parties, and supersedes all prior or contemporaneous negotiations, representations or agreements, whether oral or written, related to this subject matter.

(c) Modification Only in Writing. No modification or waiver of any term of this agreement is effective unless signed by both parties.

(d) Non-Assignment. Neither party may assign or transfer this agreement to a third party, except that the agreement and all orders may be assigned upon notice as part of a merger, or sale of all or substantially all of the business or assets, of a party.

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(g) Independent Contractors. The parties are independent contractors with respect to each other.

(h) Enforceability. If any term of this agreement is invalid or unenforceable, the other terms remain in effect.

(i) No PO Terms. Univa rejects additional or conflicting terms of a Customer’s form-purchasing document.


(k) Survival. All terms that by their nature survive termination or expiration of this agreement, will survive.

Additional software specific licensing terms:

Grid Engine incorporates certain third-party software listed at the URL below. These licenses are accepted by use of the software and may represent license grants with restrictions in which Univa is bound to provide. We are hereby notifying you of these licenses.

Unicloud Kits

- Third Party Software is defined as certain third-party software which is provided along with the Univa Software, and such software is licensed under the license terms located at: http://www.univa.com/resources/licenses/

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Grid Engine

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Rev: August 2014
2 Supported Operating Systems, Versions and Architectures

Univa Grid Engine supports various platforms, hardware architectures and versions of operating systems. Find the full list in following table:

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Version</th>
<th>Architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLES</td>
<td>10,11,12</td>
<td>x86, x86-64</td>
</tr>
<tr>
<td>RHEL</td>
<td>5 or higher, 6 or higher, 7</td>
<td>x86, x86-64</td>
</tr>
<tr>
<td>CentOS</td>
<td>5 or higher, 6 or higher, 7</td>
<td>x86, x86-64</td>
</tr>
<tr>
<td>Oracle Linux</td>
<td>5 or higher, 6 or higher, 7</td>
<td>x86, x86-64</td>
</tr>
<tr>
<td>Ubuntu</td>
<td>10.04LTS - 16.04LTS</td>
<td>x86, x86-64</td>
</tr>
<tr>
<td>Oracle Solaris</td>
<td>10, 11</td>
<td>x86-64, SPARC 64bit</td>
</tr>
<tr>
<td>HP-UX</td>
<td>11.0 or higher</td>
<td>64bit</td>
</tr>
<tr>
<td>IBM AIX</td>
<td>6.1 or later</td>
<td>64bit</td>
</tr>
<tr>
<td>Apple OS X</td>
<td>10.8 (Mountain Lion) or higher</td>
<td>x86, x86-64</td>
</tr>
<tr>
<td>Microsoft Windows</td>
<td>XP Professional (SP3)</td>
<td>32 bit</td>
</tr>
<tr>
<td>Microsoft Windows</td>
<td>Server 2003 / 2003 R2</td>
<td>32 bit</td>
</tr>
<tr>
<td>Microsoft Windows</td>
<td>Vista Enterprise / Ultimate</td>
<td>32 and 64bit</td>
</tr>
<tr>
<td>Microsoft Windows</td>
<td>Server 2008 / 2008 R2</td>
<td>32 and 64bit</td>
</tr>
<tr>
<td>Microsoft Windows</td>
<td>7 Professional / Enterprise / Ultimate</td>
<td>32 and 64bit</td>
</tr>
<tr>
<td>Microsoft Windows</td>
<td>Server 2012 / 2012 R2</td>
<td>32 and 64bit</td>
</tr>
<tr>
<td>Microsoft Windows</td>
<td>8 / 8.1 Pro / Enterprise</td>
<td>32 and 64bit</td>
</tr>
<tr>
<td>Microsoft Windows</td>
<td>10 Pro / Enterprise</td>
<td>32 and 64bit</td>
</tr>
</tbody>
</table>

Table 1: Supported Operating Systems, Versions and Architectures

**PLEASE NOTE:** Hosts running the Microsoft Windows operations system cannot be used as master or shadow hosts.

**PLEASE NOTE:** Univa Grid Engine qmaster is fully supported on Linux and Solaris. We provide binaries in Univa Grid Engine for running the qmaster on other operating systems but they are not supported and delivered as a courtesy. If you require qmaster support on other architectures please contact us at support@univa.com.

**PLEASE NOTE:** if you require Univa Grid Engine support for older versions of the above operating systems please contact our sales or support team.
3 Fixes and Enhancements

3.1 Summary

3.1.1 Define behaviour if epilog script dies because of signal

The "execd_params RESCHEDULE_ON_KILLED_EPILOG" (see also man page sge_conf(5)) was introduced to allow to prevent rescheduling of a job if the epilog dies because of a signal. The default value is "TRUE" or "1", which leads to the old behaviour, i.e. the queue is set to error state and the job is re-enqueued in the pending job list. If set to "FALSE" or "0", the job finishes, its data is written to accounting and the job is removed from the job list. The "failed" field of such a job is set to "15 : in epilog", but the "exit_status" is the one of the job itself. This is useful in cases where the epilog does just unimportant cleanup work and the job workflow should not be interrupted because of problems doing this cleanup work. To detect if an epilog was signaled solely its exit status is taken into account, i.e. an epilog that exits with a status > 127 is handled like an epilog that was signaled.

3.1.2 Docker integration

Features of the Docker integration

Univa Grid Engine 8.4.4 provides an integration with Docker containers. This allows users to specify that a job has to be started in a Docker container that was created from a specific Docker image. Please see chapter 7.9 “Jobs using Docker Containers” in the UsersGuide and chapter 2.5.2 “Configuring Queues” in the AdminsGuide for details.

New in Univa Grid Engine 8.4.2

Univa Grid Engine allows now to use the Entrypoint that is defined in the Docker image the container is created from. This implies several limitations, but makes it easier to start “batch” containers. To let a job use the defined Entrypoint, submit it as binary job with job script “NONE”, e.g.:

$ qsub -l docker,docker_images="*myapp:latest*" -b y NONE

This is allowed for sequential jobs only. Interactive and parallel jobs are not supported. Please see chapter 7.9 “Jobs using Docker Containers” in the UsersGuide for details.

Known issues and limitations of the Docker integration

- Requirements:
  - Host architecture: lx-amd64. Other architectures are not supported yet.
  - Docker version: from 1.8.3 to 1.12.3. The Docker API is often changed and not in a backwards compatible way, so later versions of Docker are not supported. Because problems with the Docker API are hard to diagnose, if Univa Grid Engine detects a Docker daemon of a version that is not in the supported range on an execution host, it does not even report this host as an available Docker host, instead it reports it as a host that does not have Docker installed.

- Sometimes, the Docker daemon responds with a valid, but empty message to the “docker images” request. The execution daemon cannot distinguish this from a valid response of a Docker installation with no images available. If the execution daemon has a job to start
when it gets such an empty message, then this job fails, because the execution daemon assumes the image was deleted and the job cannot be started.

- Checkpointing a job that runs in a container is not supported.
- Only “builtin” interactive jobs are supported in containers.
- The -xd submission switch is added as an experimental feature. There might be issues with more sophisticated use cases, e.g. the combination of multiple switches for network settings or duplicate specification of data. The -xdv switch is deprecated and can be replaced by -xd -v.

3.1.3 Host resolving and host_aliases file

- The host name reported by a load sensor will get resolved at execution side now. Settings in the host_aliases file are now also used for load reports via external load sensors.
- At startup of qmaster it will verify hostname resolution of spooled objects in the database. If the resulting host names have changed for hosts referenced in the configuration list, the admin host list, the execd list or in the submit host list then all spooled data objects will get adjusted to match the new resulting hostnames.
- The resource hostname request (-l h=<expr>) now supports resolving plain hostnames in regular expression requests. This also includes using aliased hostnames.
- It is now supported to add new entries to the host_aliases file while qmaster daemon is running. Changing already referenced host names will need a qmaster restart. If a change to the current host_aliases needs a restart the qmaster process will log this information into the messages file. In order to change already active host aliases during runtime the corresponding hosts must be removed from Univa Grid Engine. A hostname change that affects the interface of a running sge_qmaster service or sge_execd service will always need a restart of the service (no change in behavior).
- The client tools qping and gethostbyname got a new option (-all_rr) to show the resulting host name after resolving on the service. This tools can be used to wait until a running qmaster daemon is running. Changing already referenced host names will need a qmaster restart. If a change to the current host_aliases needs a restart the qmaster process will log this information into the messages file. In order to change already active host aliases during runtime the corresponding hosts must be removed from Univa Grid Engine. A hostname change that affects the interface of a running sge_qmaster service or sge_execd service will always need a restart of the service (no change in behavior).
- The client tools qping and gethostbyname got a new option (-all_rr) to show the resulting host name after resolving on the service. This tools can be used to wait until a running qmaster has taken over changes to the host_aliases file.
- It is possible to set individual qmaster parameters for internal host name cache (via qmaster_params). The number of cached entries can be obtained via qping or PROF_COMMLIB_TIME qmaster param.

3.1.4 Scheduler specific changes

- The scheduler configuration parameter “params” can be used to enable profiling (PROFILE=true). In combination with the value of “WARN_DISPATCHING_TIME” it can be used to show additional information about the longest and shortest job scheduling time.
- The scheduler profiling is now thread based on architectures that supports thread specific user and system time measurement (linux kernel >= 2.6.26 and solaris operating systems). This results in correct system and user times for the scheduler thread. On other architectures the user and system times are measured for the entire process. This means that only the wallclock times are reflecting the overhead of the scheduler thread. System and user times will show the usage of all threads of the process in this case and is therefore not only scheduler thread specific.
- The profiling summary for the scheduler thread will contain information about time used for RQS (Resource Quota Sets) calculation. If some RQS Rule has an unexpected high
influence on scheduling time the profiling data for this rule will also occur in the profiling output.

- Defined RQS are now sorted alphanumerically on their names in order to have the possibility to define a clear RQS processing order while the scheduler is dispatching the jobs. The processing order might have an influence on the scheduling time and can be optimized now. The rule that limits the most should be the first one.

- The schedule info messages provided by qsub/qalter -w command might now provide different messages because filter rules which are used by scheduler are active now. The resulting scheduling information provided by the simulated scheduling run via qsub/qalter -w should produce better results now.

3.1.5 Execution daemon specific changes

- The implementation of GE-5849 made it necessary to change limit setting and observation behavior especially when the -masterl switch is used. For the parallel environment settings “master_foraks_slave” the resulting limit will be increased by the limit used for the master task itself (see man page sge_pe). The “master_foraks_slave” PE settings are now also used for PE setting “control_slaves” set to false (Loose Integration). If you now hit a limit for jobs using PEs with “control_slaves=false” after installing Univa Grid Engine 8.4.2 you can use “master_foraks_slave=TRUE” to increase the limit depending on the nr of slots for the job.

3.1.6 Intel® Xeon Phi™ x200 (Knights Landing) integration

Univa Grid Engine 8.4.4 provides an integration of Intel® Xeon Phi™ x200 (Knights Landing) Processors. The pre-compiled load-sensor automatically detects the current Cluster as also the current Memory Mode of the x200 machine. Furthermore the current MCDRAM distribution gets reported. Please see “Configure and Install Intel Xeon Phi x200 (Knights Landing) Processors support” in the AdminsGuide for details.
3.2 Full List of Fixes and Enhancements

Univa Grid Engine 8.4.0alpha (also fixed for a 8.3 patch release)

GE-2716 interactive jobs (qlogin, qrsh without command) don't set the
TZ environment variable correctly
GE-3392 Job reservation with wildcards in PE names doesn't work correctly
GE-3858 pe job does not start: cannot run in PE "my_pe" because it only
offers 2147483648 slots
GE-4229 Reduce executable sizes by removing extra symbols
GE-4293 qsub -w e -l exclusive=true rejects job, even if the request
is valid (THIS FIX WAS WITHDRAWN FOR 8.4.0)
GE-4296 the unit of the io usage value is missing in qstat -j <job_id>
output and not explained in the man page
GE-4297 report io wait time and number of io operations
GE-4384 User lists do not handle space separated user names correctly
GE-4404 Rounding error, when memory values are reported by execd
GE-4641 jobs with high job_id may starve when job_id roll over happens
when wait_time is not recognized in job priority calculation
GE-4739 print unique thread names in messages file
GE-4943 shepherd closes FDs, needed by AD authentication
GE-4983 port DRMAA C API to other architectures
GE-5033 setting ENABLE_SUBMIT_LIB_PATH in qmaster_params has no effect
for LD_PRELOAD env variable
GE-5045 qlogin and qrsh without command does not inherit expected
variables (e.g. TERM)
GE-5074 sessionusers ACL not present after installation
GE-5081 wrong reference to "MONITOR_TIME" in admin guide
GE-5156 Non-existing paths for input and error files should be
implicitly created
GE-5268 event client id of DRMAA2 event clients displayed as "unknown"
GE-5289 add a note about the msvc redist dll to the installation guide
GE-5340 hard coded timeout for PE *_proc_args, prolog, epilog of 120 s
not documented and changeable
GE-5401 h_vmem kill done by execd even when cgroups is setup to handle
this limit
GE-5486 introduce per job profiling
GE-5487 introduce performance improvement for -masterq switch
GE-5536 requesting more than one tmpdir per job
GE-5543 drmaa2 functions drmaa2_get_drmaa_name() and
drmaa2_get_drmaa_version() are missing
GE-5557 Add functionality to search primary and secondary groups when
'@' used to specify group in Grid Engine
GE-5587 allow the Cray XC load sensor to update the slots counter in
the queue
GE-5588 communication errors at first startup not logged into
/tmp/execd_messages.<pid> file
GE-5595 GetAdminUser() fails and is setting ADMINUSER to 'default'
3 Fixes and Enhancements

GE-5597 with accounting_summary=true, "wallclock" usage of PE jobs is wrong
GE-5605 test and release qping.exe for win-x86
GE-5619 drmaa2_*session_create() should ignore contact string instead of expecting null
GE-5620 drmaa2_open_msession() should return a msession handle even msession is opened already
GE-5624 Unix group entries in predefined userlist as well as manager or operator list are ignored
GE-5625 CUDA and XEON PHI complex attribute installation fails
GE-5637 jsv task job related params are not transferred for 1 task arrays
GE-5638 Windows (win-x86) does not forward or collect the job exit code
GE-5639 gid range observation not always un-blocking additional group ids
GE-5641 user list man page should mention all predefined lists or list with a special meaning
GE-5643 qalter --when now does not work for PE jobs with exclusive consumables
GE-5647 qconf -mu, -au, -du triggers crashes when RQS'es are configured
GE-5649 add an automated TS test for the error scenario
GE-5653 ulx-amd64 packages seem not to be built with HWLOC library
GE-5654 execd crashes on win-x86 when sending a job related admin mail
GE-5655 Qmaster get unresponsive after error "invalid task number 0"
GE-5656 qconf -ke does not completely cleanup execd information
GE-5663 setting host to unheard might block qmaster under certain conditions
GE-5664 array jobs can oversubscribe consumables with qalter --when now
GE-5672 develop library to communicate with the Docker Remote API
GE-5673 job lost detection is logging strange error regarding granted resource list
GE-5674 qmaster crash can be trigger with qconf -mattr on an execd object.
GE-5675 implement load sensor that reports docker version and available images
GE-5678 add a "--xdv" switch to the submit clients to allow the user to specify directories to mount into a Docker container
GE-5679 forward information about the selected Docker image and the paths to mount to the shepherd
GE-5680 make sure Docker jobs are not registered in PDC/PTF
GE-5681 use Docker API to get online usage of a job
GE-5682 cleanup finished Docker containers after job ended
GE-5683 implement a coshepherd that is started in a Docker container to keep it alive and to run methods and the job
GE-5684 use Docker Remote API to run methods and job and signal container
GE-5687 fix support for foreign filedescriptors in commlib
GE-5689 quota "limit" value rendered as -2^31 for large limits
GE-5691 fix container stats acquisition via docker communication library
GE-5693 Designation of events in logs - many events are labeled as 'Errors', where perhaps they should be 'Warnings'.
GE-5703 non-admin user cannot trigger preemption of own jobs
GE-5718 lothread needs to send reservation information to

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GE-5722 preempted LO job stays in "dr" state after qdel
GE-5723 qalter -p not transferred to LO
GE-5728 suspend/unsuspend endless loop for Preemption of jobs with the same priority
GE-5731 qmod -p is only allowed on admin-hosts
GE-5732 User should get a warning when preempting a higher prio job
GE-5734 execd dumps core when a large tightly integrated parallel job is submitted to that host
GE-5737 for Docker jobs, adjust paths in environment variables set by the container_coshepherd
GE-5740 fix libnuma dependency of shepherd to allow starting the coshepherd in the container
GE-5741 rework container start mechanism in shepherd
GE-5745 Add a man page sge_diagnostics that summarizes and explains output of profiling/monitoring/logging/debug functionalities of UGE and LO
GE-5746 give the docker containers meaningful names
GE-5750 cleanup container creation struct
GE-5756 make the 'docker' and 'docker_images' complexes builtins
GE-5757 qmaster/execd/job protocol lacks check for active_jobs cleanup
GE-5759 show statistics about request types in worker and reader request queues
GE-5760 add information about start and end (duration) of requests to the DEBUG log_level
GE-5763 improve per thread profiling
GE-5764 create a man page sge_diagnostics that summarizes and explains output of profiling/monitoring/logging/debug functionalities of UGE and LO
GE-5765 Add a means to limit the job script size
GE-5768 keep_active sends all files of a job regardless of the file size
GE-5770 add a means to switch on and off debug logging (DPRINTF) of sge_qmaster during runtime
GE-5775 improve logging in all Docker related components
GE-5779 improve error handling in communication with docker daemon
GE-5796 qmaster crashes with MONITOR_REQUEST_QUEUES=1
GE-5798 performance regression with RQS rules
GE-5803 enhance error logging of Windows (win-x86) qloadsensor.exe
GE-5807 enhance scheduler profiling to show information for RQS calculation
GE-5813 On Windows (win-x86), the execd cannot send the first CR to the qloadsensor.exe, causing it to never send load
GE-5814 On Windows (win-x86), the execd logs a misleading warning about load sensors at startup time
GE-5816 commlib external file descriptor support not thread safe
GE-5817 Docker jobs fail if the mount points of the binds are not unique
GE-5818 resource quota cleanup for profiling
GE-5825 improve qdel performance for bulk job deletions
GE-5829 Docker jobs fail to start on some Linuxes because MemorySwappiness cannot be set
GE-5845 possible race condition in event master at event client registration or total update
3 Fixes and Enhancements

GE-5851 jemalloc 3.6.0 can cause qmaster core dump
GE-5853 qalter -tc prints incorrect success message
GE-5858 job_load_adjustments may prevent any job dispatching in scheduler run after parallel job was scheduled
GE-5860 communication specific enhancements for profiling and startup behavior
GE-5865 keep_active option does not copy all job related files into faulty job directory
GE-5870 confirm Windows 10 Pro/Enterprise support and add it to list of supported OS
GE-5876 where and what data structures are not used to prepare data for event clients
GE-5878 inplace upgrade with postgres spooling breaks the upgrade script (inst_sge -upd)
GE-5880 profiling shows zero value for utilization in some scheduler profiling lines
GE-5894 cluster queues are rejected due to missing project even if job has a project request
GE-5895 hosts or qinstances are skipped by dispatch algorithm in scheduler but no valid reason is shown.
GE-5902 a pe job requesting a per slot memory resource is not scheduled despite sufficient resources available
GE-5907 shepherd aborts after a tightly integrated job was killed
GE-5915 locale of qmaster process gets distorted by JVM_thread
GE-5917 jobs are not dispatched with open ended PE requests
GE-5925 wrong qdel message when a job is already in deletion
GE-5929 sge_qmaster crashes when submitting a job to advance reservation using d_rt.
GE-5932 qhost and qmon round NLOAD to integer

Univa Grid Engine 8.4.0alpha

GE-4497 PE job is not scheduled when a non-requestable consumable is setup in global host
GE-4603 Job 124205 cannot run in PE "OpenMP" because it only offers 0 slots
GE-4908 native Windows (win-x86) binaries can't find the SGE_ROOT directory if it is the root directory of a share
GE-5123 qdel array syntax from manpage fails
GE-5129 regular "ckpt_command" in CKPT interface not executed
GE-5135 user has to login at least one time on each native Windows (win-x86) exec host to get the PROFILE created
GE-5258 Using qconf for creating GDI sessions always returns exit status 1
GE-5345 UGE to auto resolve host_aliases
GE-5509 host_aliases not working for resource hostname OR request
GE-5510 host_aliases not working for qconf -purge request
GE-5528 hostname resolving changes should trigger update of all affected data objects at qmaster/execd daemon startup
GE-5559 Grid Engine upgrade procedure is running into an issue with chmod call
GE-5667 describe in win-x86 installer and documentation that the UGE Starter Service doesn't work with mounted network directories
GE-5671 integration of Docker into UGE
GE-5692 enhance sge_container_shepherd to handle stdin/stdout/stderr stream to allow interactive and parallel jobs
GE-5710 changed host aliases can trigger qmaster abort() at startup
GE-5712 need concurrent array jobs where either all tasks run concurrently or no task at all
GE-5714 unbelievable high ru_wallclock values in accounting
GE-5739 qmaster installation script does not add admin host if its hostname cannot be resolved (error message unclear)
GE-5747 sharetree might be wrong if host clock changes
GE-5758 possible segmentation fault in commlib when static clients try do reconnect
GE-5776 bind lists of UGE directories properly into the Docker container
GE-5780 update openssl library to current version 1.0.2
GE-5781 exec host goes into unknown (u) state when the system time is set to an earlier time
GE-5782 reported wallclock time is too low when the system time is set to an earlier time
GE-5792 docker jobs are reported as failed on execd restart
GE-5793 Qmaster uninstall script tries to remove startup-script even if it was not installed
GE-5795 exit dispatching loop immediately when shutdown of scheduler thread is triggered
GE-5820 update Cray XC documentation
GE-5821 remove basic Docker integration that uses load sensor and starter_method when real Docker integration works
GE-5824 fix spelling mistakes in Grid Engine output messages
GE-5834 bad performance of RQS rules on host groups
GE-5836 during scheduling messages explaining why a job is not scheduled are generated but not used
GE-5844 ship SGI MPT integration in Univa Grid Engine mpi folder
GE-5877 max_aj_instances and -tc submit option are not respected with enrolled tasks
GE-5879 when max_aj_instances is set to 0 (unlimited) the submit option -tc does no longer have effect
GE-5913 On native Windows (win-x86), improve error logging of wl_connect_to_service() function and subfunctions
GE-5920 not all functions retrieving passwd information do resize used buffer if it turns out that it is too small
GE-5935 header of HTTP response from Docker daemon > 1.9 not handled properly
GE-5937 Typo in UGE Admin Guide
GE-5955 host_aliases not working for sge_shadow
GE-5962 the Docker daemon doesn’t download an image when its not
3  

Fixes and Enhancements

available locally

Univa Grid Engine 8.4.0beta1

GE-5956  update jemalloc to version 4.1.0
GE-5975  upgrade reports: The built-in complex "docker_images" cannot be deleted
GE-5977  update openssl library to version 1.0.2h
-  fixed several memory leaks in sge_qmaster

Univa Grid Engine 8.4.0beta2

GE-5983  qmake crashes on sol-sparc64
GE-5589  changes to host_aliases file should be updated when hosts are re-resolved

Univa Grid Engine 8.4.0

GE-5991  host names used for host_aliases should be handled case insensitive
GE-5994  sge_qmaster startup fails with critical "setup failed" logging message
GE-5995  job is executed even if prolog fails
GE-5999  preempted jobs stay in P-state
GE-6006  A negative posix priority at submission results in a very high priority value in report
GE-6008  dbwriter installation installs incorrect database version 14 instead of 15
GE-6009  dbwriter cannot parse accounting record with io operations
GE-6010  upgrade script does not recognize patch releases, e.g. 8.3.1p9
GE-6012  Syntax error in installer script causes wrong error message during install

Univa Grid Engine 8.4.1

GE-4293  qsub -w e -l exclusive=true rejects job, even if the request is valid
GE-5850  allow to specify more Docker properties when submitting a job
GE-6016  submitting job dependencies and deleting them again can trigger huge amount of qmaster mem usage
GE-6028  User/group management done via Windows Active Domain might break UGE
GE-6030  Introduce possibility to switch of commlib's internal hostname cache
GE-6031  on native Windows (win-x86), the shepherd of running jobs can produce huge trace files if the UGE job starter service ends the connection unexpectedly
GE-6036  job loss on exed restart after host_aliases changes
GE-6039  clients report "failed to extract authentication information" error
GE-6042  Scheduling run might take longer than with previous versions of UGE
GE-6052  cwd is not mapped into docker container bind
UWSA-80  UWSA-135 wrong headline in installer
UWSA-82  Symmetric Data Types
UWSA-83  UGERest installation is broken, the way how it is documented
UWSA-84  installer should check for dependencies when it starts
UWSA-85  installer can not create certificates
UWSA-87  UWSA-135 UGE REST API exports complexentries instead of complexentrys

Grid Engine Release Notes v 8.4.4
Fixes and Enhancements

UWSA-91  job submission template uses unimplemented DRMAA1 job template attributes
UWSA-96  documentation contains a broken JSON description of a job object
UWSA-99  UWSA-135 allow to modify (qalter) the POSIX priority of a job
UWSA-100 Create combined rest request to "get all host summary"
UWSA-101 Create combined rest request to "get all clusterqueue summary"
UWSA-102 CPU usage returned from hostsummary REST call always 0
UWSA-103  JOBLIST attribute in hostsummary always empty even if jobs are running
UWSA-104  JOB COUNT attribute in hostsummary call always 0
UWSA-105 usedSlots in hostsummary always 0
UWSA-106 Misspelled attribute parallelEnv
UWSA-110 inst_ugerest fails in non CSP mode since the keystore cannot be created correctly
UWSA-112 run / debug rest service from IDE
UWSA-113 UGERestService.pdf - misleading usage for range urls
UWSA-114 UGERestService.pdf - java binding section missing format for challenge.txt file
UWSA-115 UGEWSSClientApi deleteExecHost(id) results in SEGV and crash
UWSA-116 UGEWSSClientApi getExecHostByEd(id) when id doesn't exists returns confusing message
UWSA-117 UGEWSSClientApi modifyExecHost(object) results in SEGV and crash
UWSA-120 Adjust refresh rate for hostsummary to make job updates available in time
UWSA-121 verify if hostsummary and clusterqueue summary are supported in client api bindings
UWSA-133 HostSummary Job start/submit times are incorrect
UWSA-136 HostSummary should show ResourceValues as numeric values where possible
UWSA-138 Missing support for 'expand' type RQS rules
UWSA-139 Unable to get (and perhaps set) Scheduler Configuration
UWSA-141 Sharetree Puts/Posts/Deletes Don't seem to work
UWSA-142 ugerest 8.3.1p10 crashed
UWSA-143 Add block on job manager cache during cache update
UWSA-144 RuntimeException for UserResourceRange call
UWSA-145 The project resource doesn't handle xacl properly
UWSA-146 Expansion of Hosts property is broken on RQS
UWSA-147 In 8.3.1p10 still unable to operate on schedconf
UWSA-151 Fetch additional fields for JobManager in getQinstanceSummary
UWSA-152 ugerest script fails in line 102 due to invalid comparison
UWSA-154 setfileperm.sh does no longer setuid bit for authuser
UWSA-156 Job Context Variables no longer returned
UWSA-158 ugerest service is not starting if the key and keystore passwords are different
UWSA-159 No support for complex resources with '/' in their name
UWSA-160 inst_ugerest fails on root->nobody file systems
UWSA-161 ugerest startup script fails when a stale pidfile exists

Univa Grid Engine 8.4.1p1 (windows package patch)

GE-5135 user has to login at least one time on each native Windows (win-x86) exec host to get the PROFILE created
GE-6022 native Windows (win-x86) execution daemon installer unnecessarily
3 Fixes and Enhancements

needs sgepasswd file
GE-6023 native Windows (win-x86) submit clients need private keys of sgepasswd file
GE-6031 on native Windows (win-x86), the shepherd of running jobs can produce huge trace files if the UGE job starter service ends the connection unexpectedly
GE-6045 on native Windows (win-x86), the win_getpwnam_r() always tries to load the user profile, even if called with insufficient permissions
GE-6076 on native Windows (win-x86), all job spool directories are deleted when the first job on an execution host finishes

Univa Grid Engine 8.4.2

GE-3146 resource reservation is broken with SGE calendar
GE-4158 Some of the job class attributes are incorrect in man page and users guide
GE-4672 default_jc and enforce_jc are not documented in the man page
GE-5492 cuda loadsensor bash script compatibility issue
GE-5547 The install_cuda_complexes.sh doesn’t handle ‘\n’ correctly
GE-5577 Server side JSV parameters l_hard, l_soft and masterl contains job class access specifier
GE-5579 Cray XC integration needs to support multiple Crays in a cluster out-of-the box
GE-5604 install_cuda_complexes.sh produces invalid complex
GE-5675 Fully integrate Univa Grid Engine with systemd
GE-5726 licence_constraints in UGE clusters are not updated
GE-5849 new masterl switch s_rss limit setting is enforced for slave tasks
GE-6025 create hash tables on CULL lists only on demand
GE-6046 infinite loop writing to trace file in docker container
GE-6049 default job class is not used correctly
GE-6051 do docker run option parsing and checking in sge_qmaster instead of on client side
GE-6056 Cray XC integration needs to set unlimited timeout for epilog for newer UGE version
GE-6058 Support for Ubuntu 16.04
GE-6059 job gets rescheduled when epilog gets a SIGABRT signal
GE-6063 a soft consumable extending a hard request might not get granted despite enough resources available
GE-6064 on native Windows (win-x86), error handling of (Un)LoadUserProfile() overwrites real error message
GE-6068 Interactive Docker jobs fail because sge_container_shepherd doesn’t have the permission to "write the shepherd_about_to_exit" file
GE-6070 DRMAA2 submission crashes qmaster
GE-6073 qsub does not support multiple use of "-binding" or "-t" parameters
GE-6087 error message complains about missing Qmaster port when Execd port is missing
GE-6095 log job verification time exceeding a certain threshold
GE-6097 log request processing exceeding a certain threshold
GE-6098 RC script fails to install when the OS is using LSB
3 Fixes and Enhancements

GE-6099 RC script not being uninstalled when update-rc.d is used as RCFILE
GE-6100 the name of the named pipe between UGE Job Starter Service and
UGE_Starter.exe is not always unique
GE-6109 dbwriter log is showing invalid integer value for a_ioops field
GE-6111 sge_qmaster crashes when deleting an advance reservation with a partially
finished array job
GE-6112 ar_attr and ar_log records in reporting have incorrect record time
GE-6113 the SGE_Starter on win-x86 logs always, even if /log was not specified
GE-6117 dbwriter / arcodb - error parsing the reporting file using MySQL backend
GE-6118 the UGE Job Starter service on native Windows (win-x86) sometimes crashes
when starting qrsh with command jobs
GE-6148 uge_js_service.exe crashes on native Windows (win-x86) sometimes crashes
when starting qrsh with command jobs
GE-6149 it is not possible to submit the slave task of a tightly integrated parallel job finishes
GE-6152 log spooling exceeding a certain threshold
GE-6156 execd crashes when a docker job is submitted, requesting memory resources
GE-6159 GE-6152 log spooling exceeding a certain threshold
GE-6163 errors for sge_mirror_process_events() result in scheduler inactivity
GE-6167 add new scheduler profiling line for wait times
GE-6173 Description of certain states for qstat -s is missing in help output
and man page
GE-6176 qdel -f prints unexpected messages, e.g. debug information
GE-6180 automated install still using systemd initscript even when it is
turned off in the config file
GE-6185 job start fails when Docker daemon is busy
GE-6186 the sge_container_shepherd fails to distinguish between yet
unhandled IJS control messages and container related messages
GE-6188 Windows (win-x86) interactive uninstaller should default to remove
the services

Univa Grid Engine 8.4.3

GE-6152 log spooling exceeding a certain threshold
GE-6156 execd crashes when a docker job is submitted, requesting memory resources

Univa Grid Engine 8.4.4

GE-4425 SGE_LONG_QNAMES=-1 lead to qstat seqfault
GE-5524 newline in job submission breaks reporting/accounting lines and qstat -j
GE-6067 adding a queue with calendar generates error messages and no jobs
will be scheduled into this queue
GE-6126 submitting a docker autostart job fails if no job name is given
GE-6163 errors for sge_mirror_process_events() result in scheduler inactivity
until it times out after 600 seconds
GE-6167 add new scheduler profiling line for wait times
GE-6173 Description of certain states for qstat -s is missing in help output
and man page
GE-6176 qdel -f prints unexpected messages, e.g. debug information
GE-6181 automated install still using systemd initscript even when it is
turned off in the config file
GE-6185 job start fails when Docker daemon is busy
GE-6186 the sge_container_shepherd fails to distinguish between yet
unhandled IJS control messages and container related messages
GE-6188 Windows (win-x86) interactive uninstaller should default to remove
the services

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GE-6193 mirror interface reports unexpected error
"callback function ("callback_default") for event MOD QUEUE INSTANCE failed
GE-6195 startup scripts are being installed during the automated install even if ADD_TO_RC=false
GE-6200 child shepherd of builtin interactive job waits infinitely for mutex in shepherd_trace()
GE-6203 communication to Docker daemons built with Go (golang) > 1.6 does not work
GE-6210 Add Intel KNL support
GE-6211 the provided Docker container name is overwritten by automatically generated one
GE-6212 automatic installation fails on OpenIndiana if the -auto switch is not the first in the command line
4 Upgrade Notes

4.1 Upgrade Requirements

This is a summary of the Upgrade Matrix that describes how you can carry out the transition from Sun or Oracle Grid Engine 6.2uX, Univa Grid Engine 8.0.X, 8.1.X, 8.2.X, 8.3.X to Univa Grid Engine 8.4 when you are currently using classic, BDB local spooling or PostgreSQL spooling. If the current version of Grid Engine you are using is missing in the overview, then please look at the full Upgrade Matrix located in the section Updating Univa Grid Engine in the Installation Guide.

<table>
<thead>
<tr>
<th>Version</th>
<th>Upgrade Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Univa Grid Engine 8.3.X</td>
<td>Backup/Restore</td>
</tr>
<tr>
<td>Univa Grid Engine 8.2.X</td>
<td>Backup/Restore</td>
</tr>
<tr>
<td>Univa Grid Engine 8.1.X</td>
<td>Backup/Restore</td>
</tr>
<tr>
<td>Univa Grid Engine 8.0.X</td>
<td>Backup/Restore</td>
</tr>
<tr>
<td>Oracle Grid Engine 6.2u6-6.2u8</td>
<td>Backup/Restore</td>
</tr>
<tr>
<td>Sun Grid Engine 6.2u5</td>
<td>Backup/Restore</td>
</tr>
<tr>
<td>Sun Grid Engine 6.2u1-6.2u4</td>
<td>Upgrade to SGE 6.2u5 and then Backup/Restore</td>
</tr>
<tr>
<td>Sun Grid Engine 6.2 FCS</td>
<td>Upgrade to SGE 6.2u5 and then Backup/Restore</td>
</tr>
</tbody>
</table>

Table 2: Upgrading from SGE, OGE, UGE 8.1.X, UGE 8.2.X to Univa Grid Engine 8.3.X

Upgrading to Univa Grid Engine requires a drained cluster, which means: No pending, running, … jobs are allowed.
5 Compatibility Notes

6 Known Issues and Limitations