

Altair®

PBS Professional®

18.2.3

Release Notes

You are reading the PBS Professional 18.2.3

Release Notes

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Supported Platforms

1.1 Supported Platforms

For the following platforms, you can download all PBS components:

Table 1-1: Supported Platforms

Maker	Version	Chipset	Notes
Red Hat Enterprise Linux RHEL	6, 7	x86_64	
	7	ARM64	
CentOS	6.x, 7.x	x86_64	
	7	ARM64	
Cray	CLE 5.2, 6.0	x86_64	
	CLE 6.0	ARM64	
SuSE SLES	11, 12, 15.x	x86_64	
	12	ARM64	
Ubuntu	16.04	x86_64	
Windows	Win7, Win8, Win10	x86_64	
	Server 2008R2, Server 2012, Server 2012R2	x86_64	
HPE SGI	HPE SGI 8600, HPE MC990X, and HPE Superdome Flex with SLES 11 or SLES 12 HPE MPI	x86_64	
	HPE SGI 8600, HPE MC990X, and HPE Superdome Flex with RHEL 6 or RHEL 7 HPE MPI	x86_64	

1.2 Containers

To run jobs in containers, PBS requires `systemd` enabled and a minimum Docker version of Community Edition 17.03.0 or equivalent.

1.3 Hooks

1.3.1 Python Version

PBS 18.2.2 uses Python 2.7.13.

1.4 MPI

PBS runs jobs with all known implementations of MPI. PBS is integrated more tightly with some versions, providing support for resource tracking and job cleanup after a failure. These are listed here:

Table 1-2: Integrated MPIs

MPI	Version	Platform
MPICH2	1.0.3, 1.0.5, 1.0.7	Linux
Intel MPI	2.0.022, 3, and 4.0.3	Linux
HP MPI	2.0.0	Linux
Platform MPI	8.0	Linux
HPE MPI (MPT)		Linux on HPE SGI platforms, including over InfiniBand
MVAPICH2	1.7	Linux

The following MPIs have taken the steps to integrate tightly with PBS:

Table 1-3: MPIs Self-integrated with PBS

MPI	Version	Platform
LAM/MPI	7.0.6, 7.1.1	Linux
OpenMPI	1.4.2	

1.5 MUNGE

PBS can be configured to use MUNGE version 0.5.11

1.6 CSA

Support for CSA is no longer available on non-Cray machines.

1.7 Altair License Server

For a list of supported platforms for the Altair License Server, see the License Server release notes. These are available from the PBS Works Documentation Download Area:

<https://secure.altair.com/UserArea/docs.php>

1.8 Platform Deprecations

Table 1-4: Platform Deprecations

PBS Version	Change
18.2.2	Support for LAM 6.5.9 is removed
18.2.2	Support for wrapper for MPICH is removed
18.2.2	Support for wrapper for MPICH-GM is removed
18.2.2	Support for wrapper for MVAPICH is removed
18.2.2	Support for Windows Server 2003 is ended
14.2.1	Support for wrapper for MPICH is deprecated
14.2.1	Support for wrapper for MVAPICH is deprecated
13.1	Support for AIX is deprecated
13.1	Support for CentOS 5 is deprecated
13.1	Support for RHEL5 is deprecated
13.1	Support for SuSE SLES10 is deprecated
13.1	Support for Windows Server 2003 is deprecated
13.0	Using <code>pbsrun_wrap</code> and <code>pbsrun_unwrap</code> for Intel MPI is deprecated
12.2	Support for HPCBP jobs is removed
12.0	Support for LAM MPI 6.5.9 is deprecated
12.0	Use of Python 2.5 is deprecated, to be replaced by 2.7 in a future release.
11.3	Globus can still send jobs to PBS, but PBS no longer supports sending jobs to Globus
	Support in PBS for CSA on HPE SGI systems is removed .

Special Notes

2.1 Upgrading

2.1.1 Choosing Between Overlay and Migration Upgrades

We recommend a migration upgrade for the following:

- On Cray: when upgrading from pre-11.0 to 11.0 or newer
- If you are running a PBS version older than 5.3
- When moving between 32-bit and 64-bit versions of PBS
- When certain European or Japanese characters are stored in the datastore on versions of PBS older than 12.0

We recommend an overlay upgrade for the following:

- On Cray: when upgrading from 11.0 and newer
- Other Linux/UNIX platforms: when upgrading from 5.3 or newer

See the *PBS Professional Installation & Upgrade Guide*.

Migration upgrades are not supported for Windows in this release.

2.1.2 Upgrade RPM Command Requirement

When you do a migration upgrade from PBS Professional 14.2.1 or greater, you must add the `--force` parameter to your `rpm` command, because you are installing a package with the same name as an existing package. The `rpm` command in step 4 of section 7.7.9.1 of the *PBS Professional Installation & Upgrade Guide* should read as follows:

```
rpm -i --force --prefix=<new PBS_EXEC location> <path to server sub-package>/pbspro-server-<version>-0.<platform-specific-dist-tag>.<hardware>.rpm
```

2.1.3 Order of Upgrades

When upgrading a PBS complex, make sure that all MoMs are upgraded before upgrading the server. Do not start the new server until all MoMs have been upgraded and restarted.

2.1.4 User Performing Upgrade Must be Database Creator

In order to upgrade the database, the user performing the upgrade must be the same user who created the database. If you will use a different database user after the upgrade, make that change after the upgrade. Perform the upgrade as the user who created the database, then change the user to the new desired user. Follow these steps:

1. Run this command on the PBS database in order to identify the user who originally created the database (this is one line):

```
su - <data_user> -s /bin/sh -c "LD_LIBRARY_PATH=$PBS_EXEC/pgsql/lib $PBS_EXEC/pgsql/bin/psql -U <data_user> -p <data_port> -d pbs_datastore"
```

data_port defaults to "15007"

`data_user` defaults to `"pbsdata"`

- Run this query to get the list of users in the database:

```
pbs_datastore=# select pg_authid.oid, rolname from pg_authid;
```

```
oid | rolname
-----+-----
    10 | pbsdata
16541 | ashrc
(2 rows)
```

- Find the original user who created the database (this is one line):

```
pbs_datastore=# select pg_authid.oid, rolname from pg_authid where pg_authid.oid=10;
```

```
oid | rolname
-----+-----
    10 | pbsdata
(1 row)
```

- Exit from the PBS database
- If the user does not exist, create the user in the system
- Update the current database user to the original user who created the database:

```
pbs_ds_password -C pbsdata
```

- Perform an overlay upgrade
- Reset the current database user to the desired username:

```
pbs_ds_password -C "username"
```

2.1.5 Rolling upgrades

Rolling upgrades are not supported. However, you can perform a rolling upgrade from 14.2 or later to a newer release (you cannot go from pre-13.0 to post-13.0), and in the second paragraph, we provide some information about how to do a rolling upgrade. You should upgrade all MoMs and the server/scheduler at the same time; an older MoM cannot inter-operate with a newer server. For example, an 18.2.2 server will report all pre-13.0 MoMs as down.

Before performing a rolling upgrade, consider stopping the scheduler before beginning the upgrade. When MoMs are upgraded to 18.2.2, they become unable to communicate with the server and vice versa. The scheduler cannot see or use the vnodes, and the MoMs cannot send obits to the server. After the server is upgraded, communication is restored, the scheduler can send jobs, and MoMs can send obits to the server. However, if the scheduler is running during a rolling upgrade, two things may happen:

- Jobs that were top jobs may lose their top job status, and therefore any resources the scheduler has designated for them may be assigned to other jobs. This can delay top jobs.
- As vnodes become unavailable to the scheduler, users may become concerned because their jobs may stay queued with a comment saying that their job can never run. Once all vnodes and the server are upgraded, the jobs can run.

2.1.6 Upgrading Caveats

- Warning when upgrading from 14.2.1: avoid using “`rpm -U`”. Instead, uninstall 14.2.1 using “`rpm -e`”, then install the next version using “`rpm -i`”.
- The `qrerun` command does not requeue job arrays. Instead, it leaves them in the *B* (begun) state. During a migration upgrade, you can work around this problem by using the `qhold` command on the job array, then using `qmove` to move it to the new server, then using the `qrls` command.
- PBS 11.0 and newer uses the Altair License Server. If you are not using socket or node licenses for all machines, you should install and configure the Altair License Server before you upgrade PBS. See the *PBS Professional Installation & Upgrade Guide* and the *Altair License Manager Installation and Operations Guide*.

2.2 Licensing

- As of 11.3, PBS can license jobs using node, socket, or floating licenses. Floating licenses are managed via the Altair License Server. You CANNOT use a FLEX server with PBS 18.2. Follow the instructions in the *Altair License Manager Installation and Operations Guide*.
- The Licensing chapter in the *PBS Professional Installation & Upgrade Guide* describes how to configure PBS Professional for licensing.
- If you find that the PBS server host becomes unresponsive a short time after startup, the server may be trying to contact the wrong license server. See the Troubleshooting chapter in the *PBS Professional Administrator's Guide*.
- The `pbs_license_file_location` server attribute is deprecated. The installation script unsets this attribute during an upgrade. This is intentional. Use instead the `pbs_license_info` server attribute.
- The minimum number of PBS Works licenses that can be checked out is one (1). If the `pbs_license_min` server attribute is set to zero or unset, PBS automatically sets the number to one.
- As of version 13.1, the default value for the `pbs_license_linger_time` server attribute is set to 1 year (31536000 seconds). The previous default value was 3600 seconds. This means that any unused licenses are checked back in to the license server after a year, instead of one hour. This value can be overridden by setting the value of `pbs_license_linger_time` via `qmgr`.
- If you are using socket-based licenses to run PBS Professional, you will be asked for the host ID when generating the license file. You will need to run the `almutil` utility to gather this information. You can get the `almutil` utility from either:
 - An existing LM-X Altair License Server installation
 - A tar file containing `almutil` binaries available on the Altair Registered User License Manager page after selecting "Create New License". Extract the version you need for your PBS server platform.

You can refer to the *Altair License Manager Installation and Operations Guide* (also available from the Registered User Area site) if you are unsure which binary you should use for your particular platform.

- If `/tmp` is mounted `noexec`, this may prevent PBS from checking out licenses.

2.3 Installation

- Any `PBS_START_*` parameters set in the environment are not picked up and set in `pbs.conf`. You must specify these in `pbs.conf`; do not export them.
- Create data service account:

Under UNIX/Linux, we recommend that the PBS administrator creates a new data service account called "pbsdata" before installing PBS. This account must be created correctly, otherwise the database can crash. See the *PBS Professional Installation & Upgrade Guide* for details.

2.3.1 Installing on Ubuntu

To install PBS Professional 18.2.2 on Ubuntu, use the following steps:

1. Choose the .deb package to install. Make sure it is appropriate for the host's function, which could be server, execution, or client host.

2. Use `dpkg -i` to install the .deb package:

```
dpkg -i <.deb package>
```

3. Update `/etc/pbs.conf`: set the `PBS_START_*` parameters to the appropriate values. Here is an example where one host will run all daemons:

```
PBS_EXEC=/opt/pbs
PBS_SERVER=<hostname>
PBS_START_SERVER=1
PBS_START_SCHED=1
PBS_START_COMM=1
PBS_START_MOM=1
PBS_HOME=/var/spool/pbs
PBS_CORE_LIMIT=unlimited
PBS_SCP=/usr/bin/scp
```

4. Each hostname **must** resolve to at least one non-loopback IP address. Typically, the default `/etc/hosts` file does not conform to this prerequisite, so you probably need to do additional network configuration to make PBS work on Ubuntu. You can do this by using DNS or by adding a new entry into `/etc/hosts` that associates the hostname with a non-loopback IP address. To update `/etc/hosts`:

Update the IP address for the server host:

```
127.0.0.1      localhost
192.168.238.135 <server hostname>
```

The following lines are desirable for IPv6-capable hosts:

```
::1      ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
```

5. If the `pbsdata` account does not already exist, create it. See section 3.4.1.3, "Create Required Accounts", in the *PBS Professional Installation & Upgrade Guide*.

6. Start PBS:

```
/etc/init/pbs start
```

2.3.2 Caveats for Uninstalling on Linux

Using `rpm -e`, even on an older package than the one you are currently using, will cause any currently running PBS daemons to shut down, and will also remove the system V init and/or systemd service startup files. If you wish to remove an older rpm without these effects, use `rpm -e --noscripts`.

2.4 General

- Checksum files now use SHA256. The contents of each `.asc` file now use the following format:

1. *SHA-256*

`<SHA256 checksum> <PBS Professional package name>`

- If you set `PBS_LEAF_NAME` on a primary or secondary server host, make sure that `PBS_PRIMARY` and `PBS_SECONDARY` match `PBS_LEAF_NAME` on the corresponding host. If you do not set `PBS_LEAF_NAME` on a server host, make sure that `PBS_PRIMARY` and `PBS_SECONDARY` match the hostnames of the server hosts.
- If you will use GPUs or Xeon Phi with cgroups and you use `pbs_attach` to spawn processes, do not use the standard `pbs_attach`; get a modified version of `pbs_attach` from Altair.
- If you are using `PBS_COMM_ROUTERS` as a comma-separated list, add port information to each entry. Port information has this format: `<port>` and the default port number is `17001`. For example:
`PBS_COMM_ROUTERS=x58-r7:17001,x18-64:17001`
- Do not put a CPU time limit on the `pbsdata` user. The datastore will die, and kill the server.
- PBS-20383: If `$restrict_user` is enabled but `$restrict_user_maxsysid` is not set, `$restrict_user` tries to read the values of `SYSTEM_UID_MAX` from `/etc/login.defs` in the `pbs_init.d` script. Unfortunately on newer OSes `/etc/login.defs` uses `SYS_UID_MAX/MIN` (note old "SYSTEM_" vs. new "SYS_"). Because of the change, the `check_maxsysid()` function in `pbs_init.d` fails and defaults to a value of `UID_MIN - 1`. For example if a `login.defs` file had `UID_MIN 10000` then `$restrict_user_maxsysid` ends up using the value `9999`.
 The workaround is to edit the `/etc/init.d/pbs` and `$PBS_EXEC/libexec/pbs_init.d` scripts on newer OSes (e.g. SLES12) to include the old definitions (`SYSTEM_UID...`)
- PBS-12708 (SPID 300546): sorting vnodes by "ncpus HIGH unused"

When sorting vnodes by "ncpus HIGH unused", vnodes are actually sorted first according to the free CPUs on the host, rather than on the vnode. So where HostA has 3 free CPUs on one vnode, and HostB has two vnodes, each with 2 free CPUs, this sort places a job on HostB instead of HostA.

- The `pbs.server.scheduler_restart_cycle()` function stops the current scheduler cycle, rather than restarting it. This behavior will change in a later release. When a hook's `fail_action` attribute is set to `scheduler_restart_cycle`, it uses the function, so the name of the action doesn't match the action.
- Do not perform partial removal of custom resources. It is important to remove custom resources correctly. See the instructions in the Resources chapter of the *PBS Professional Administrator's Guide*.
- Do not use different versions of PBS within the same complex. All machines using the same PBS server should run the same version of PBS. Do not mix major or minor versions. For example, do not run 14.2 and 18.2 in the same complex.
- Do not use `qmgr` to set or change the vnode sharing attribute, or a vnode's `ncpus`, `vmem` or `mem`. Instead, create a new vnode definition file and use `"pbs_mom -s insert"` to add the file. Then HUP the MoM. There are requirements for the vnode definition file. See the *PBS Professional Administrator's Guide*, "How to Configure MoMs and Vnodes".
- All printable characters are allowed in a resource value, except for comma, space, colon, quotes, and ampersand, but are subject to some restrictions such as those imposed by `select` and `place`. Also, if these resource values are used as pathnames, they are subject to the restrictions of the operating system.
- In the server `periodic` hook that runs `pbs_est`, the `alarm` attribute has no effect. If the `alarm` timeout is reached, the hook terminates, but `pbs_est` continues to run.
- The `qrerun` command does not requeue job arrays. Instead, it leaves them in the *B* (begun) state.
- Enabling X11 forwarding:

In order to enable X11 forwarding, add the path to the `xauth` binary to each MoM's `pbs_environment` file. For example:

```
echo $PATH
```

```
/bin:/user/bin
```

```
-bash-3.2$ which xauth
```

```
/usr/bin/X11/xauth
```

The entry in the `pbs_environment` file should be the following:

```
PATH=/bin:/usr/bin:/usr/bin/X11
```

- PBS-4559 (SPID 247762): `RLIMIT MEMLOCK` unlimited at startup (11.3 and newer)

On systems that are capable of setting a limit for locked memory (RLIMIT_MEMLOCK), MoM sets this to unlimited at startup. This is inherited by jobs.

- Make sure that all machines use the same Locale setting. If you try to modify the **Account** or **Project** attributes of an existing job using the `qalter` command or the `pbs_alterjob()` API so that the attribute will contain a non-ASCII, non-UTF-8 character, the PBS server and database may shut down. This happens when some machines are on a different Locale setting from others.
- If the `node_fail_requeue` server attribute is unset, it behaves as if it is set to zero, until the server is restarted. After the server is restarted, it reverts to its default value of 310.
- The functionality of `qdel -w force` has changed, and may cause unexpected behavior on some systems. See the `qdel` command in the *PBS Professional Reference Guide*.
- As of 13.0, PBS uses TCP instead of UDP for communication. See the Communication chapter in the *PBS Professional Installation & Upgrade Guide*.
- In the past, some PBS components defaulted to `/tmp` for storing temporary files. All components now default to `/var/tmp` which is most likely a persistent storage location. Administrators should take this into account and adjust the cleaning of `/var/tmp` accordingly.
- The exit value of an interactive job is always logged as zero in the accounting record, regardless of actual exit code value.
- When creating a MoM version 2 configuration file that will change natural vnode attributes, always explicitly specify `resources_available.ncpus`. Otherwise, vnodes accept only one job regardless of available CPUs.
- Warnings about using `pbsnodes` command:
 - a. You must define the `nmics`, `ngpus`, and `OS` resources in order to have their values displayed in the summary output.
 - b. While there is a header in the Job Summary output for suspended jobs on the vnode, this functionality is not yet implemented, and the value displayed is always zero.
- If you install a MoM but initially set `PBS_START_MOM=0` in `pbs.conf`, and start PBS, the MoM directories are not created. If you subsequently decide to run a MoM on this vnode, you must run `/opt/pbs/default/etc/pbs_habitat` in order to create the MoM directories.
- PBS-13383 (SPID 334661): If the `holidays` file is incomplete, `pbs_sched` hangs when `strict_ordering` and back-filling are being used.
- When using non-standard characters in file staging paths, make sure that your paths work with your shell and `scp` or `rcp`.

2.5 Hooks

- Sometimes an `exehost_startup` or `exehost_periodic` hook updates a resource. If a job causes an `execjob_begin` or `execjob_prologue` hook to run where the complete update has not taken place, the hook could attempt to use resources that are not yet available, causing an unhandled exception. Make sure that your execution event hooks do not delete jobs if this should happen. Write your hooks so that they trap unhandled exceptions and deal gracefully with the job. For example, you can use `pbs.event().job.rerun()`.

- As PBS copies or deletes execution or periodic hooks to the MoMs, the following messages are printed in the server's log file at 2047:

```
"successfully sent hook file <filename> to <mom_hostname>"
"successfully sent rescdef file <filename> to <mom host name>"
"successfully deleted hook file <filename> from <mom host name>"
"successfully deleted rescdef file <filename> from <mom host name>"
"failed to copy hook file <filename> to <mom host name>"
"failed to copy rescdef file <filename> to <mom host name>"
"failed to delete hook file <filename> from <mom host name>"
"failed to delete rescdef file <filename> from <mom host name>"
```

- You may find that when you remove a hook, it takes some time for the hook to be completely purged. If you run `qmgr -c 'create hook <hook_name>'` where a previous hook of the same `<hook_name>` still exists, you will see the following message:

```
"hook name <hook_name> is pending delete, try another name"
```

Either specify another name for the hook, or retry the `qmgr` request again later, after the previous hook is completely purged.

2.6 Cray

2.6.1 Patch Requirement for Cray

You must patch BASIL in order for PBS Professional to run on CLE 5.2. As per Cray FN #6020 "BASIL inventory change breaks WLM code", apply patch PS63 to CLE 5.2 UP02 and prior 5.2 releases before updating PBS to 12.2.402 or later.

2.6.2 Composition of PBS Complex on Cray

PBS can manage non-Cray Linux vnodes along with Cray systems in the same PBS complex. A single PBS complex can consist of the following:

- The PBS server and scheduler on one of the following:
 - Cray login nodes
 - esLogin nodes
 - Repurposed compute nodes
 - The sdb node
- MoMs on all of the following, simultaneously:
 - Cray login nodes
 - Cray esLogin nodes
 - Repurposed Cray compute nodes, running operating systems supported by PBS

2.6.3 Installing and Upgrading

Installing and upgrading on the Cray has changed. Please see “Installing and Upgrading on Cray” in the *PBS Professional Installation & Upgrade Guide*.

2.6.4 Provisioning

The Xeon Phi provisioning hook is not installed by default. If required, it can be installed by copying the following files from `$PBS_EXEC/lib/python/altair/pbs_hooks` to `$PBS_HOME/server_priv/hooks`:

```
PBS_xeon_phi_provision.HK
PBS_xeon_phi_provision.PY
```

2.6.5 Change in Behavior

The default number of vnodes per NUMA node has changed. Prior to 18.x, PBS created one vnode per NUMA node, but from 18.x forward, PBS creates one vnode per compute node.

2.6.6 Limitations

The following features are not supported or not available on Cray:

- Bursting jobs to the cloud
- Running jobs in containers
- OS provisioning
- Power awareness is not supported on ARM64
- The `execjob_prologue` hook: the `execjob_prologue` hook runs only on login nodes, not on compute nodes
- The `cgroups` hook: the `cgroups` hook runs only on login nodes, not on compute nodes
- Kerberos is not supported on the Cray.
- The `pbs_release_nodes` command and the `release_nodes_on_stageout` job attribute are not supported on Cray.

2.6.7 Do Not Use mpp* Resources

The select/place language used by all other platforms was introduced to Cray platforms with PBS Pro v11.0 in 2010. To ease the transition to this new way of submitting jobs, the mpp* resources then in use on Cray were automatically translated by PBS via a `PBS_translate_mpp` hook into the select/place language. At the same time use of the mpp* resources was deprecated, which meant that support could be dropped in some future release. As of PBS Pro v18.2 the `PBS_translate_mpp` hook is being disabled and **support for mpp* is ended**. The behavior when requesting them for a job is undefined.

2.7 Windows

- Under Windows, PBS may not correctly read the number of CPUs, and report an incorrect value for the `ncpus` resource. The Windows interface may be reporting CPUs on only one socket where there are multiple sockets. You can fix this using `qmgr` to set the correct value for `ncpus`:

```
qmgr -c "set node <vnode name> resources_available.ncpus = <value>"
```

- In this release, migration upgrades are not supported for Windows.
- Under Windows, if the value of an environment variable contains a caret (^), comma (,), single quotes, or double quotes, PBS escapes the special character with a caret (^). The escaped character appears in the output of `qstat -f` and the hooks output of `pbs.event().env` and `pbs.event().job.Variable_List`. For example, given:

```
PROCESSOR_IDENTIFIER=x86 Family 6 Model 58 Stepping 9, GenuineIntel
TEST_COMMA=1,2,3,4
TEST_DQUOTE2=happy days"are"here to stay
TEST_SQUOTE4=that's the way it goes
TEST_CARET=^
```

The output of `qstat -f` is:

```
Variable_List = ...PROCESSOR_IDENTIFIER=x86 Family 6 Model 58 Stepping 9^, GenuineIntel,
  TEST_COMMA=1^,2^,3^,4,TEST_DQUOTE2=happy days^"are^"here to stay,TEST_SQUOTE4=that^'s the way
  it goes,TEST_CARET=^^
```

Under Linux/Unix, the output of `qstat -f` is:

```
Variable_List = ...PROCESSOR_IDENTIFIER=x86 Family 6 Model 58 Stepping 9\, GenuineIntel,
  TEST_COMMA=1\,2\,3\,4,TEST_DQUOTE2=happy days\"are\"here to stay,TEST_SQUOTE4=that\'s the way
  it goes,TEST_CARET=^
```

- (13.1) Support for Windows Server 2003 is ended.
- PBS path information no longer saved in `AUTOEXEC.BAT`:
Any value for `PATH` saved in `AUTOEXEC.BAT` may be lost after installation of PBS. If there is any path information that needs to be saved, `AUTOEXEC.BAT` must be edited by hand after the installation of PBS.

- Change in requirements for submitting jobs under Windows

Each batch script (.bat) in a job script must have "call" in front of it. For example, `MyJob.bat`, which calls `Step1.bat` and `Step2.bat` should look like this:

```
#PBS -l walltime=1:00:00
call E:\Step1.bat
call E:\Step2.bat
```

- If the full path name of a PBS command contains spaces, the path name must be quoted. If an argument to a PBS option contains spaces, it must be quoted. Examples:

```
"\Program Files\PBS Pro\exec\bin\qstat" -Bf
qsub -W stagein="the_input@hostA:c:\Documents and Settings\pbstest\my_input"
```

- Specify only Windows DNS address for Windows host:

For any privileged action requested of the server (e.g. `qmgr` requests), PBS allows it if the requesting user is an admin-type of user (i.e. member of "Domain Admins" or "Administrators"), and the requesting host is the local host. PBS compares what it initially thinks is the local host name against the requesting host name.

The server may return "Unauthorized Request" for privileged actions requested by a legitimate user. The problem arises from having the local host configured with two or more DNS addresses resolving to different names for the local host name. In particular, a site may have set up a UNIX-driven DNS as the root domain, and a Windows-

driven DNS in a subdomain to service domains in an Active Directory environment. Specifying both addresses in the local host's list of DNS addresses may give rise to this problem. So it is important that in this case you specify only the Windows DNS address for the Windows host.

- Requirement for using preemption via `group` soft limits:

All jobs must be submitted using the `-W group_list` option to `qsub`. This ensures that the `egroup` job attribute is set properly, which is required for this type of preemption to work. If the `-W group_list` option to `qsub` is not used, the `egroup` job attribute may not be set properly, and the number of jobs counted as being over or not over their soft limit may be inaccurate.

For example if userA belongs to `pbsgrpA` then the `egroup` will be `pbsgrpA` for the following job submission:

```
qsub -W group_list=pbsgrpA job.script
```

- Windows platform restrictions:

Any platform used for the following should be a Server-type of Windows OS:

- a. Shared `PBS_HOME` in a server failover configuration
- b. Location for network-shared user home directories

- Memory reporting and enforcement:

Physical memory usage can be reported. Memory limits can be enforced. Virtual memory (`vmem`) is not reported.

- Installation Location:

The PBS installer requires and thus installs MSVC++ 2010. Please refer to Microsoft documentation for further details on this package.

- Windows `xcopy` bug: do not use `xcopy` inside job scripts:

The `xcopy` command sometimes expects input from the user. Because of this, it must be assigned an input handle. Since we do not create the job process with an input handle assigned, `xcopy` will fail/ behave abnormally if used inside a PBS job script. This is a bug in `xcopy` for which there is no known patch. Customers are therefore advised not to use the `xcopy` command inside job scripts and use the `copy`, `robocopy`, or `pbs_rcp` command instead.

- On Windows 7 and newer with UAC enabled, if you will use the `cmd` prompt to operate on hooks, or for any privileged command such as `qmgr`, you must run the `cmd` prompt with the "Run as Administrator" option.
- (12.0) PBS-3928 (SPID 196917) Cycle harvesting on Windows has changed. You must use a different method from previous versions of PBS. Please see the PBS Professional Administrator's Guide.
- (13.0) You can use UNC paths to submit jobs or stage files in or out.
- (13.1) If you set `PBS_CONF_REMOTE_VIEWER` to a value other than a specific remote viewer, PBS uses the Windows native Remote Desktop client.

2.7.1 HPC Basic Profile

(12.2) Support for HPC Basic Profile is removed.

2.8 MPI

- The default for starting wrapped mpids is `rsh`. If you are wrapping HP MPI with the PBS `pbs_mpi.hp`, and you want to use something other than `rsh`, be sure to set `PBS_RSHCOMMAND` in `PBS_HOME/pbs_environment`. For example:

```
PBS_RSHCOMMAND=ssh
```

- MPD rings:

As has been observed with mpich2-1.0.3, when starting MPD daemons, only one MPD per user on an execution host can be run; multiple MPD rings can be created per user as long as each participating execution host is in only one ring. Otherwise, jobs with intersecting execution hosts on their MPD rings can interfere with one another.

Suggested workarounds:

Given that only 1 MPD per user on an execution host can be run, do one of the following:

1. Set 1 job per user to run on a PBS node by setting:

```
# qmgr -c "set node <node_name> max_user_run=1"
```

2. Force users to submit jobs to run on nodes exclusively using the *excl* keyword in *-l* place as in:

```
% qsub -l select=2:ncpus=1:mpiprocs=2 -l place=free:excl job.scr
```

In addition, to set this default job-wide resource on the server, the admin can set:

```
# qmgr -c "set server resources_default.place=free:excl"
```

Note: Workaround 2 prevents other users from using the same node if it has more than 1 `resources_available.ncpus`.

- If you will use suspend/resume with Platform MPI, make sure that `MPI_BUNDLE_MPIDS` is not set.

2.9 Libraries

2.9.1 Dependency on libdl

If you are integrating for example OpenMPI with the PBS `tm` API by using the `--with-tm` option, you need to use `libdl`. Before you configure and make OpenMPI, you can do this:

```
export LIBS=-ldl
```

As of 13.1, `libpbs.a` uses `dlopen`, `dlclose`, `dlsym` etc. for MUNGE-related APIs etc.

2.9.2 Requirement for ALSDK

If you need to have `noexec` on your `/tmp`, do one of the following:

- Set the `TMPDIR` environment variable; the shared library that is extracted to `/tmp/xf-dll` follows `TMPDIR` if it is set
- Install a soft link from `/tmp/xf-dll` pointing to a location on a filesystem that does not have the "noexec" mount flag

Why? The ALSDK `liblmx-altair.so` self-extracts a DSO into `/tmp/xf-dll`, and then tries to map it. If it fails to do so because `noexec` is set, the ALSDK routines simply perform an `exit(1)`, which terminates the server, without any log message in the server log.

2.9.3 Dependencies on Linux Shared Object Libraries

Altair distributes separate PBS packages for different supported Linux distributions. Customers running on SLES and RHEL distributions should take care to use the correct package for their systems. For example, in a complex made up of RHEL 6 and RHEL 7 hosts, the RHEL6 package should be used on the RHEL 6 hosts, and the RHEL7 packages should be used on the RHEL 7 hosts.

If PBS Professional is deployed onto Linux distributions other than the supported SLES and RHEL distributions, there may be runtime problems with dependencies on shared object libraries, typically `libssl.so` or `libcrypto.so`.

Customers who encounter such problems should first determine which supported distribution is most similar to that installed on their systems. For example, openSUSE 10.x is similar to SLES 10, and CentOS distributions are similar to RHEL. The customer should then try the PBS package that is supported for the similar system.

If the runtime dependencies are still not resolved, there are two other approaches that may be tried. Before trying either approach, first run `ldd` on `pbs_mom` to get name and version number of libraries that PBS requires. `pbs_mom` needs to be extracted from the PBS rpm by using the Linux `rpm2cpio` and `cpio` commands.

Here is an example using an installed SLES 10 x86_64 `pbs_mom`:

```
shell> ldd /opt/pbs/default/sbin/pbs_mom
libdl.so.2 => /lib64/libdl.so.2 (0x00002b23b0a59000)
libcrypt.so.1 => /lib64/libcrypt.so.1 (0x00002b23b0b5d000)
libssl.so.0.9.8 => /usr/lib64/libssl.so.0.9.8 (0x00002b23b0c96000)
libc.so.6 => /lib64/libc.so.6 (0x00002b23b0ddd000)
libcrypto.so.0.9.8 => /usr/lib64/libcrypto.so.0.9.8 (0x00002b23b100d000)
/lib64/ld-linux-x86-64.so.2 (0x00002b23b093c000)
```

The Linux incompatibilities are generally associated with `libcrypto.so`, which is required by `libssl.so`.

Having identified the requisite version of `libcrypto.so` and `libssl.so`, there are two options:

1. Locate and install an OpenSSL compatibility library that will satisfy the dependency. In the example above, the library needs to satisfy the dependency on `libcrypto.so.0.9.8`.
2. Download and install a version of OpenSSL that corresponds to the dependency determined above (e.g., `libcrypto.so.0.9.8`).

2.10 Cloud Bursting

You can find all information about configuring and using PBS with cloud bursting in the “Cloud Bursting” chapter of the *PBS Control 2018.3 Administrator’s Guide*. It’s kinder to keep it all in one place. However, we also list the changes to cloud bursting for PBS 18.2.2 in [section 4.1.3, “Cloud Bursting Changes”, on page 30](#).

2.11 Power Provisioning

The interface for enabling and disabling power provisioning has changed. To enable power provisioning, enable the hook (instead of using the `power_provisioning` server attribute.)

New Features and Interface Changes

3.1 New Features

See New Features in the *PBS Professional Administrator's Guide*.

3.2 External Interface Changes

These are the external interface changes introduced in version 12.0 and newer.

3.2.1 Changes in Paths, Parameters, and Environment Variables

Table 3-1: Changes in Parameters and Environment Variables

PBS Version	Change
18.2.1	On Windows, default path for PBS_HOME and PBS_EXEC changed to C:\Program Files (x86)\PBS\home and C:\Program Files (x86)\PBS\exec
14.2.1	New pbs.conf parameter PBS_MOM_NODE_NAME
13.0	The TMPDIR environment variable is deprecated and replaced with PBS_TMPDIR
13.0	The PBS_COMM_LOGMASK parameter is changed to PBS_COMM_LOG_EVENTS
12.1	In pbs.conf, PBS_CORE_LIMIT is set to <i>unlimited</i> by default

3.2.2 Changes in Error Messages Etc.

Table 3-2: Changes in Error Messages, Etc.

PBS Version	Change
13.0	Job and reservation names can be 236 characters
13.0	Fairshare and job sort formulas use Python math functions
12.0	Error message change: "Resources request is impossible to solve, job will never run" is replaced by "Error in calculation of start time of top job"

3.2.3 Changes to Server

Table 3-3: Changes to Server

PBS Version	Change Type	Change
18.2.1	New attribute	New <code>acl_host_moms_enable</code> server attribute
18.2.1	New attribute	New <code>restrict_res_to_release_on_suspend</code> server attribute
14.2.1	New attribute	New <code>python_restart_max_hooks</code> server attribute
14.2.1	New attribute	New <code>python_restart_max_objects</code> server attribute
14.2.1	New attribute	New <code>python_restart_min_interval</code> server attribute
14.2.4	Attribute deprecated	The <code>max_group_res</code> server attribute is deprecated.
14.2.4	Attribute deprecated	The <code>max_group_res_soft</code> server attribute is deprecated.
14.2.4	Attribute deprecated	The <code>max_group_run</code> server attribute is deprecated.
14.2.4	Attribute deprecated	The <code>max_group_run_soft</code> server attribute is deprecated.
14.2.4	Attribute deprecated	The <code>max_running</code> server attribute is deprecated.
14.2.4	Attribute deprecated	The <code>max_user_res</code> server attribute is deprecated.
14.2.4	Attribute deprecated	The <code>max_user_res_soft</code> server attribute is deprecated.
14.2.4	Attribute deprecated	The <code>max_user_run</code> server attribute is deprecated.
14.2.4	Attribute deprecated	The <code>max_user_run_soft</code> server attribute is deprecated.
14.2.4	Attribute deprecated	The <code>max_queueable</code> server attribute is deprecated.
13.1	New attribute	New <code>jobscript_max_size</code> server attribute
13.0	New attribute	New <code>queued_jobs_threshold</code> server attribute
13.0	New attribute	New <code>queued_jobs_threshold_res.<resource></code> server attribute
	Attribute deprecated	The server attribute <code>pbs_license_file_location</code> is deprecated, and replaced by <code>pbs_license_info</code> .

3.2.4 Changes to Scheduler

Table 3-4: Changes to Scheduler

PBS Version	Change Type	Change
18.2.2	Deprecation	The <code>max_starve</code> scheduler parameter is deprecated
18.2.1	New scheduling feature	New <code>multisched</code> feature
18.2.1	New scheduler attribute	New <code>partition</code> scheduler attribute
18.2.1	New scheduler attribute	New <code>scheduling</code> scheduler attribute
18.2.1	New scheduler attribute	New <code>scheduler_iteration</code> scheduler attribute
18.2.1	Deprecation	<code>mom_resources</code> deprecated

Table 3-4: Changes to Scheduler

PBS Version	Change Type	Change
18.2.1	Deprecation	Scheduler reads changes from pbsfs without HUP or restart
18.2.1	Deprecation	The <code>help_starving_jobs</code> scheduler parameter is deprecated. Instead, use <code>eligible_time</code> in the job formula. See also the <code>topjob_ineligible</code> job attribute.
18.2.1	New formula keyword	New <code>fairshare_tree_usage</code> formula keyword
18.2.1	New formula keyword	New <code>fairshare_factor</code> formula keyword
18.2.1	Change in formula keyword	New <code>fairshare_perc</code> formula keyword replaces <code>fair_share_perc</code> ; <code>fair_share_perc</code> is deprecated
14.2.3	Deprecation	The <code>mom_resources</code> line in <code>sched_priv/sched_config</code> is deprecated. Instead, use <code>exechost_periodic</code> hooks. See Example9-15: “Periodically update resources on vnodes” in the <i>PBS Professional Plugins (“Hooks”) Guide</i> .
14.2.1	Server attribute obsolete	The <code>est_start_time_freq</code> server attribute is obsolete
13.1	Scheduler configuration parameter obsoleted	The <code>preempt_priority</code> argument to the <code>job_sort_key</code> scheduler parameter is obsolete (this behavior is the default)
13.1	Scheduler configuration parameter deprecated	The <code>backfill</code> scheduler parameter is deprecated . Use <code>backfill_depth</code> instead.
13.1	New scheduler attribute	New <code>opt_backfill_fuzzy</code> scheduler attribute
13.0	Scheduler configuration parameter deprecated	The <code>half_life</code> scheduler parameter is deprecated, replaced with <code>fairshare_decay_time</code> and <code>fairshare_decay_factor</code>
13.0	Scheduler configuration parameter removed	The <code>sort_queues</code> scheduler parameter has no effect.
13.0	New scheduler attribute	New <code>sched_preempt_enforce_resumption</code> scheduler attribute
13.0	Scheduler parameter deprecated	The <code>preempt_priority</code> argument to the <code>job_sort_key</code> scheduler parameter is deprecated
12.2	Scheduler configuration parameter deprecated	The <code>smp_cluster_dist</code> scheduler parameter is deprecated
12.2	Scheduler configuration parameter deprecated	The <code>sort_queues</code> scheduler parameter is deprecated (this behavior is now automatic)
	Scheduler configuration parameter deprecated	The sort_priority option to job_sort_key is deprecated and is replaced with the <code>job_priority</code> option.
	Scheduler configuration option deprecated	The sync_time scheduler configuration option is deprecated.

3.2.5 Resource Changes and Deprecations

Table 3-5: Resource Changes and Deprecations

PBS Version	Change
18.2.1	New <code>soft_walltime</code> resource
18.2.1	The <code>netwins</code> resource is no longer available. PBS no longer schedules jobs using this resource, and does not track or compute this resource.
18.2.1	The <code>mpp*</code> resources are removed.
18.2.1	The <code>PBScrayseg</code> resource is no longer used.
13.0	New <code>preempt_targets</code> resource
11.0	The <code>mpp*</code> resources are deprecated
	The <code>nodes</code> resource is no longer used.
	The resource <code>arch</code> is only used inside of a select statement.
	The resource <code>host</code> is only used inside of a select statement.
	The <code>nodect</code> resource is obsolete. The <code>ncpus</code> resource should be used instead. Sites which currently have default values or limits based on <code>nodect</code> should change them to be based on <code>ncpus</code> .
	The <code>neednodes</code> resource is obsolete.
	The <code>ssinodes</code> resource is obsolete.
	Properties are replaced by boolean resources.

3.2.6 Command Changes and Deprecations

Table 3-6: Command Changes and Deprecations

PBS Version	Change
18.2.1	“ <code>qmgr <command> sched</code> ” without specifying name is deprecated
18.2.1	New <code>-j</code> sub-option to <code>qsub -m</code>
18.2.1	New <code>pbs_topologyinfo -l</code> option
18.2.1	<code>pbsfs -g</code> prints entity effective usage
18.2.1	New <code>qstat -F json</code> option
18.2.1	New <code>qstat -F dsv</code> option
18.2.1	New <code>qstat -fw</code> option
18.2.1	New <code>admin-resume</code> pseudo-signal for <code>qsig</code>
18.2.1	New <code>admin-suspend</code> pseudo-signal for <code>qsig</code>
18.2.1	The <code>pbs-report</code> command is no longer supported , and has been moved to the unsupported directory
14.2.1	The <code>pbs_probe</code> command is deprecated
14.2.1	New <code>qstat -E</code> option

Table 3-6: Command Changes and Deprecations

PBS Version	Change
14.2.1	The <code>pbs_probe</code> command is deprecated
13.1	The <code>qorder</code> command is deprecated
13.0	You can create custom resources with <code>qmgr</code>
13.0	Added <code>qsub -f</code> option
13.0	The <code>xpbs</code> and <code>xpbsmon</code> interfaces to PBS are deprecated
13.0	Using <code>pbsrun_wrap</code> and <code>pbsrun_unwrap</code> for Intel MPI is deprecated
13.0	The <code>xpbs</code> and <code>xpbsmon</code> interfaces to PBS are deprecated
12.2	The <code>qsub -W interactive = true</code> option is deprecated; use <code>qsub -I</code>
12.2	You can edit the <code>qmgr</code> command line
12.1	The <code>pbs-report</code> command is deprecated and moved to the "unsupported" directory
12.1	<code>qmgr</code> command: question mark now equivalent to "help"
12.0	New <code>pbs_interactive</code> command
	The <code>pbs_hostid</code> command is no longer available.
	The <code>-a</code> option to the <code>pbs_sched</code> command is deprecated.
	<code>qsub</code> : the <code>-lnodes=nodespec</code> form is replaced by the <code>-l select=</code> and <code>-l place=</code> statements.
	The <code>-l resource=rescspec</code> form is replaced by the <code>-l select=</code> statement.
	The <code>-a</code> option to the <code>qselect</code> command is deprecated.
	The <code>-wdelay=nnnn</code> option to the <code>qdel</code> command is deprecated.
	The <code>-c</code> and <code>-d</code> options to the <code>pbsnodes</code> command are deprecated and removed.
	The <code>pbs_tclapi pbsresquery</code> command is deprecated.
	The <code>pbs_resquery</code> command is deprecated.
	The <code>configrm()</code> resource monitor API call is deprecated.

3.2.7 Vnode Changes

Table 3-7: Vnode Changes

PBS Version	Type	Change
18.2.1	New vnode attribute	New <code>maintenance_jobs</code> attribute
18.2.1	New vnode attribute	New <code>last_state_change_time</code> attribute
18.2.1	New vnode attribute	New <code>last_used_time</code> attribute
18.2.1	New vnode attribute	New <code>power_provisioning</code> attribute
18.2.1	New vnode attribute	New <code>partition</code> attribute
18.2.1	New vnode attribute	New <code>poweroff_eligible</code> attribute

Table 3-7: Vnode Changes

PBS Version	Type	Change
18.2.1	New vnode attribute	New <code>provision_enable</code> attribute
18.2.1	New vnode state	New <code>sleep</code> vnode state
18.2.1	New vnode state	New <code>maintenance</code> state
18.2.1	End of support	The <code>max_group_run</code> vnode attribute is no longer supported.
18.2.1	End of support	The <code>max_running</code> vnode attribute is no longer supported.
18.2.1	End of support	The <code>max_user_run</code> vnode attribute is no longer supported.
14.2.4	Deprecation	The <code>max_group_run</code> vnode attribute is deprecated.
14.2.4	Deprecation	The <code>max_running</code> vnode attribute is deprecated.
14.2.4	Deprecation	The <code>max_user_run</code> vnode attribute is deprecated.
12.2	New vnode attribute	The <code>pcpus</code> vnode attribute is deprecated
11.3	New vnode attribute	New <code>license_info</code> attribute
	Vnode type change	The time-shared node type is no longer used, and the :ts suffix is obsolete.
	Vnode type change	The cluster node type is no longer used.

3.2.8 Queue Changes

Table 3-8: New Queue Attributes

PBS Version	Change
14.2.4	The <code>max_group_res</code> queue attribute is deprecated.
14.2.4	The <code>max_group_res_soft</code> queue attribute is deprecated.
14.2.4	The <code>max_group_run</code> queue attribute is deprecated.
14.2.4	The <code>max_group_run_soft</code> queue attribute is deprecated.
14.2.4	The <code>max_running</code> queue attribute is deprecated.
14.2.4	The <code>max_user_res</code> queue attribute is deprecated.
14.2.4	The <code>max_user_res_soft</code> queue attribute is deprecated.
14.2.4	The <code>max_user_run</code> queue attribute is deprecated.
14.2.4	The <code>max_user_run_soft</code> queue attribute is deprecated.
14.2.4	The <code>max_queueable</code> queue attribute is deprecated.
13.1	<code>backfill_depth</code>
13.0	<code>queued_jobs_threshold</code>
13.0	<code>queued_jobs_threshold_res.RES</code>

3.2.9 New Job Attributes

Table 3-9: New Job Attributes

PBS Version	Change
18.2.1	resources_released
18.2.1	resource_released_list
18.2.1	New soft_walltime attribute
18.2.1	New estimated.soft_walltime
13.1	topjob_ineligible
12.0	min_walltime
12.0	max_walltime

3.2.10 New MoM Configuration Variables

Table 3-10: New MoM Configuration Variables

PBS Version	Type	Change
12.0	New MoM configuration variable	\$reject_root_scripts
	MoM configuration variable deprecation	The memreserved MoM configuration option is deprecated.

3.2.11 Hook Changes

Table 3-11: Hook Changes

PBS Version	Type	Change
18.2.2	Behavior change	Power provisioning enabled by enabling hook, instead of by setting power_provisioning server attribute to <i>True</i>
18.2.1	Hook removal	pbs_ibwins.py is no longer available.
13.0	New attribute	fail_action
13.0	New attribute	debug
13.0	New event	execjob_launch
13.0	New event	execjob_attach
13.0	New event	exehost_startup

3.2.12 File Changes

Table 3-12: File Changes

PBS Version	Change
18.2.1	New debuginfo RPM files
13.0	The resourcedef file is deprecated (13.0)

3.2.13 Licensing Changes

Table 3-13: Changes to Licensing

PBS Version	Change
18.2.1	Floating licenses are deprecated.
18.2.1	New node licensing
18.2.1	A complex can use at most one kind of licensing: PBS Works node, socket, or (deprecated) floating.
18.2.1	HWU licensing is deprecated.
18.2.1	HWU licenses cannot be mixed with socket or node licenses.
18.2.1	The use of T licenses is deprecated.

3.3 Documentation Changes

Table 3-14: Documentation Changes

PBS Version	Change
18.2.2	Cloud bursting information moved to the PBS Control 2018.3 Administrator's Guide
18.2.1	New Cray chapter in Install Guide
18.2.1	New Cray chapter in Administrator's Guide
18.2.1	New Cray chapter in User's Guide
18.2.1	New Cloud chapter in Administrator's Guide
18.2.1	New Containers chapter in Administrator's Guide
18.2.1	New Cgroups chapter in Administrator's Guide
18.2.1	New Power Management chapter in Administrator's Guide
18.2.1	Integrations chapter in Administrator's Guide split into MPI and HPE chapters
18.2.1	Resources chapter in Reference Guide now in table format
18.2.1	New notation in command descriptions; see About PBS Documentation in any guide
18.2.1	New features no longer listed in User's Guide or Release Notes; instead see Administrator's Guide
14.2.1	New Hooks Guide; the Hooks Chapter in the Administrator's Guide has been removed.
13.1	Administrator's Guide contains a new Accounting chapter, and the previous Accounting chapter in the Reference Guide has been removed.
13.0	Installation and Upgrade Guide contains a new Communication chapter that describes the new pbs_comm daemon.
13.0	The Hooks chapter in the 13.0 Administrator's Guide has been overhauled. It also includes three new hook events.
12.1	User's Guide has been overhauled, with rewritten chapters on setting up the user's environment, submitting jobs, requesting resources, controlling the job, job arrays, and job file I/O.
12.0	Administrator's Guide chapter on Hooks is expanded and rewritten for the new execution-event hook feature. The "Setting File Transfer Mechanism" in the Administrator's Guide chapter on Administration is new for 12.0. Added "Initial Configuration" chapter to Installation & Upgrade guide for 12.0.

4 Bugs

4.1 Modifications and Bug Fixes

4.1.1 Modifications and Bug Fixes in PBS 18.2.3

The following bugs are fixed in PBS 18.2.3:

Table 4-1: Bugs Fixed in PBS 18.2.3

JIRA ID	Description
PBS-17579	misuse of qrun -H crashes server
PBS-20488	scheduler quasihangs because too many jobs are seen as preemption candidates (and other problems)
PBS-21201	pbs_est (and theoretically pbs_sched) use TCP connection to server which breaks after 1 hour (and neuters requests)
PBS-21203	Scheduler preemption code assumes that preempted jobs release resources as if they were suspended; assumption now invalid
PBS-21291	max_queued and max_queued_res queue limit not working properly, rejecting jobs which should be accepted when limit not reached
PBS-21525	default_qsub_arguments -V not working [Windows Fix]
PBS-21643	An un-burst failure can cause other un-burst requests to error and reject the hook
PBS-21685	pbs_mom crashing on CRAY while running load tests
PBS-21757	Cloud bursting hook sets wrong network name for infiniband jobs
PBS-21825	PBS server reports expired subjobs to scheduler, results in inflated sched logs
PBS-21859	array subjob log files missing array index if -o -e used to point to a directory
PBS-21918	Only ib jobs from the very last bucket in the bucket list get run
PBS-21919	Error in deploy count calculation for jobs requesting different instance type and image in same queue
PBS-21920	IB job's 'cloud_network' value should be read from the job before doing a qalter
PBS-21935	printjob command throwing error while executing on windows
PBS-21976	PBS server appends stdout/stderr file names when directory is passed using -o and -e directives in qsub

4.1.2 Modifications and Bug Fixes in PBS 18.2.2

The following bugs are fixed in PBS 18.2.2:

Table 4-2: Bugs Fixed in PBS 18.2.2

JIRA ID	Description
PBS-16881	On Windows, import json error while accumulating string type resources
PBS-17318	Windows pbs_mom.exe crash in check_pwd()
PBS-18800	pbs_account fails to validate domained USER2 from logon domained USER1 in Windows install
PBS-19020	Jobs don't run properly when MoM started with -N option [WINDOWS]
PBS-19274	Syntax gets messed up while exporting shell functions with qsub -V
PBS-19617	qsub -v option does not accept comma-separated variable value [Regression]
PBS-20233	checkpoint_abort does not work
PBS-20382	On windows pbsdsh call fails to launch command and get the output on sister mom
PBS-21021	default_qsub_arguments -V not working (Linux)
PBS-21087	Failure of any server hook event that is combined with server periodic hook event
PBS-21164	Stranded array subjobs after communication hiccup
PBS-21171	Reservation confirmation oversubscribes nodes
PBS-21202	A qstat job_id.serverA@serverB does not work as specified
PBS-21430	Log system break (sbrk) values in PBS logs at higher debug levels

4.1.3 Cloud Bursting Changes

You can find a full description of how to configure and use cloud bursting in the *PBS Control 2018.3 Administrator's Guide*. The following are changes to cloud bursting in PBS 18.2.2:

Table 4-3: Cloud Bursting Changes in PBS 18.2.2

JIRA ID	Description
PBS-19961	Add ability to burst based on instance type requested in job submission
PBS-19960	Add ability to add image name used for bursting to cloud nodes created in PBS cloud bursting
PBS-21489	Package pclm_0.4.1 library with PBS for cloud bursting
PBS-21473	Cloud Bursting - Node states inconsistent if hook alarms out
PBS-20633	Add ability to burst based on image name per job

4.1.4 Modifications and Bug Fixes in PBS 18.2.1

The following bugs are fixed in PBS 18.2.1:

Table 4-4: Bugs Fixed in PBS 18.2.1

JIRA Issue	Description
PBS-13043	Harden pbs_sched against assuming "Q" job arrays have queued subjobs without checking
PBS-14817	PBS Professional installer for Windows 7 Professional 64bit fails to install on node w/ DM + RGS
PBS-17573	engineering work for PP-617: acl_groups on queue considers only primary group
PBS-17717	Engineering work for PP-732: scheduler's attribute allows to control unset resources in placement sets
PBS-17737	%preun commands run during an upgrade deregistering PBS as a service
PBS-17804	-fPIC error while linking with libpbs.a
PBS-17987	engineering work for PP-764: sched attribute opt_backfill_fuzzy can't be set
PBS-18066	pbs_est should timeout after a configurable limit
PBS-18073	Upgrade ALM client library (ALSDK) to fix server deadlock
PBS-18290	Cloud bursting hook fails to run but says in the logs that it ran successfully
PBS-18397	Commercial license text to be displayed for commercial releases on "pbs_server.bin -t create" or qmgr; help
PBS-18411	Address PP-903: node limits are not working correctly with job equivalence classes feature
PBS-18434	Upgrade Python to 2.7.13 for Linux
PBS-19061	Engineering work for PP-1095: starting "pbs_mom -p" with running job results in SIGSEGV
PBS-19080	Docker and cgroup hook interoperability
PBS-19461	Cloud bursting hook fails to run if no nodes have been added to the server
PBS-19486	Setting any attribute thorough qmgr makes server crash if trial license file is used
PBS-19650	Burst fails and shuts down all nodes on a single node failure
PBS-19665	Cloud hook does not check to see if the default user exists on the pbs server before trying to clean the ssh keys
PBS-19778	cloud bursting hook bursts instances that cannot satisfy the job request
PBS-1978	cloud hook offlines nodes that it already offlined previously
PBS-20232	PBS server crash in leaf_timer_handler -> check_retries
PBS-20293	execjob_prologue hook getting executed twice with a pbsdsh request.
PBS-20295	Do not power-off/ramp-down cray login nodes
PBS-20309	hook fail_action 'offline_vnodes' is not functional
PBS-20325	requested memory not considered by cgroups hook on CRAY
PBS-20327	cgroup hook crashes while discovering devices when files on /dev/shm tmpfs are deleted
PBS-20328	pbs_attach is supposed to attach session, not just PID, but cgroup execjob_attach attaches only PID

Table 4-4: Bugs Fixed in PBS 18.2.1

JIRA Issue	Description
PBS-20329	pbs_cgroups hook do not work if memsw subsystem is disabled
PBS-20330	CUDA_VISIBLE_DEVICES as set in environment by cgroups hook must not have quotes
PBS-20332	Need option to disable unsafe memory fence creation in cgroup hook
PBS-20335	PBS daemons can be restricted by systemd version 226 and later TasksMax setting
PBS-20449	Removal of DNS records by PBS cloud bursting hook needs fix
PBS-20495	fix reservation parse_execvnode leak in scheduler

4.1.5 Modifications and Bug Fixes in PBS 14.2.5

Table 4-5: Bugs Fixed in PBS 14.2.5

JIRA ID	Summary
PBS-18820	moms cannot communicate with one another in a cloud configuration when cloud nodes resolve each other's hostnames to IP addresses not known to the PBS server/comm
PBS-18865	max_queued_res does not obey limit restriction for job arrays
PBS-19172	mom hook updates forgotten if acks not received before timeout
PBS-19177	Global-buffer-overflow at daemon_protect & Job Obit use memory after free
PBS-19199	Accounting E records show -2kb as the mem value in exec_vnode
PBS-19221	pbs_server crash inside of python garbage collection routines
PBS-19222	fix compiler warnings that may lead to memory corruption issues
PBS-19300	deleted job that was not cleared from list, causes server crash in post_discard_job()

4.1.6 Modifications and Bug Fixes in PBS 14.2.4

Table 4-6: Bugs Fixed in PBS 14.2.4

JIRA ID	Summary
PBS-17522	state_count queued jobs count goes negative after server restart
PBS-18078	Variable_List corruption when job is read from .JB file from disk
PBS-18157	It is possible to indefinitely delay the server ping_nodes using a client that registers/deregisters with pbs_comm
PBS-18172	MIN_STACK_LIMIT for stacksize not working for PBS Pro version 14.2.x
PBS-18373	pidcache to cull list of processes to poll in MOM polling is broken by PID recycling; pidcache_truncate doesn't allow for new kthreads
PBS-18457	qsub can crash based on -v value
PBS-18652	Upgrade to ALSDK 13.3.1

4.1.7 Modifications and Bug Fixes in PBS 14.2.3

Table 4-7: Bugs Fixed in PBS 14.2.3

JIRA ID	Summary
PBS-16681	pbs_est should time out after a configurable limit
PBS-17290	Sending large job scripts over TPP causes issues with TPP. Should use direct TCP connection in those cases.
PBS-17324	Tracejob output truncated on jobs using many vnodes
PBS-17535	mom's chk_file_sec messages missing when syslog is being used

Table 4-7: Bugs Fixed in PBS 14.2.3

JIRA ID	Summary
PBS-17558	Upgrade ALSDK to fix server deadlock
PBS-17562	pbs.PERIODIC is documented but not defined in python module
PBS-17860	mom execjob_begin hook alarms when running a large multi-node job

4.1.8 Modifications and Bug Fixes in PBS 14.2.2

Table 4-8: Bugs Fixed in PBS 14.2.2

JIRA Issue	Summary
PBS-15483	scheduler infinite loop after subjob fails to start on node
PBS-17802	Install test failure
PBS-17777	-fPIC error while linking with libpbs.a
PBS-17735	%preun commands run during an upgrade deregistering PBS as a service
PBS-17391	pbs_server has crashed (SIGABRT) when starting pbs_mom on a couple of racks (144 nodes) at the same time
PBS-17289	In high availability setup, "new" server leaf connection to pbs_comm keeps getting rejected because stale connection from old server is still seen
PBS-17280	Systemd PBS service startup times out if there are tens of thousands of jobs present
PBS-17205	logging via syslog does not work
PBS-17172	single or double quote in job env value, and the quote is not the last character in the value, causes qsub -V to lose env variable value as well as other variables when execjob_launch hook is present
PBS-17125	ACL and Array String attributes use memcpy for overlapping memory blocks
PBS-17105	only last SERVER hook of same kind (event) can modify PBS objects
PBS-17074	qdel not working with seq_num.server
PBS-17047	sgigenvodelist.awk script broken on RHEL6
PBS-17005	jobs not getting backfilled when server backfill depth is zero but queue is non-zero
PBS-16562	Server unresponsiveness can hang scheduler while resuming a job during a qdel -Wforce

4.1.9 Modifications and Bug Fixes in PBS 14.2.1

The following bugs are fixed in PBS 14.2.1:

Table 4-9: Bugs Fixed in PBS 14.2.1

JIRA Issue	Summary
PBS-7100	scheduler ignores node/queue association when node_group_key is only set at the server level
PBS-10770	Permission of /tmp on MOM not enforced w/o \$tmpdir in mom_priv/config
PBS-11091	module(s) missing in pbs_python causing import hashlib, no_md5 error
PBS-12763	PBS Server is restarting Python interpreter too often
PBS-13269	pbsnodes -l output trims the hostname to 20 characters
PBS-13379	pbs_postinstall creates db_user file in server_priv with wrong permissions
PBS-13658	Output from qstat -Bf is reporting a negative value for waiting jobs in state_count

Table 4-9: Bugs Fixed in PBS 14.2.1

JIRA Issue	Summary
PBS-13720	execjob_launch fails to setup the environment properly if one of the environment variables has a \n or a comma or quotes
PBS-14042	pbs_tclsh dumps core when called
PBS-14058	PBS schedules jobs on nodes w/o accounting for reservations
PBS-14109	After qordering the jobs, jobs are not considered in the correct order
PBS-14216	Invisible type custom resource is visible in the mails sent to job's mail recipient
PBS-14424	Problem with strict_ordering, jobs running when they shouldn't have
PBS-14499	Installer reports CentOS7 as unsupported platform
PBS-14517	Job attribute is not getting printed through execestost_periodic
PBS-14797	Hook throwing error 'SwigPyObject' object has no attribute 'name'
PBS-14832	Movement of job files now done in main PBS server thread and so can be blocked for very long time leading to server hangs
PBS-14842	PBS kills jobs that are suspended when the pbs_comm is restarted
PBS-14937	pbs.event().progname and pbs.event().argv settings are not remembered/propagated under multiple hooks
PBS-15218	Error when unsetting ncpus, that is ['ncpus'] = None, in modifyjob hook
PBS-15219	Deleting a subjob of a Job Array in User H state in Routing queue causes jobs to fail to route
PBS-15243	Introduce variable to set natural vnode to something else than hostname on MoM
PBS-15258	Server should record last known resource usage while requeueing due to down node
PBS-15271	Very slow preemption (or failure to preempt) when frequently hitting soft/hard limits in 13.0.x
PBS-15274	cpuset_destroy_delay waiting doesn't handle race conditions when stragglers create children
PBS-15307	Some libraries still cannot be used by customer in a shared object
PBS-15335	Hook debug causes file descriptor leak that crashes PBS server
PBS-15349	Sometimes suspended job does not resume after high priority job finishes even though sched_preempt_enforce_resumption is set
PBS-15355	Multi node job fails to start due to hung TPP client
PBS-15466	Pbs_spawn fails when user installed python path is passed rather than PBS Packaged python
PBS-15582	MoM crash when scanf() hits obscure kernel bug while reading unnecessary /proc/<pid>/stat fields
PBS-15592	Job with a root-owned script runs even if reject_root_scripts is set to true
PBS-15630	MoM Join-Job fails when PBS_LEAF_NAME is different from the default hostname
PBS-15641	Windows MoM could call pbs_demux.exe and mom_open_demux.exe w/ unsuitable shell if job sets Shell_Path_List
PBS-15650	Registering data service to systemd in /etc/init.d/pbs is broken on failover configs
PBS-15669	Error reporting code path fails to report all of the errors when setting entity count

Table 4-9: Bugs Fixed in PBS 14.2.1

JIRA Issue	Summary
PBS-15837	preemption not working for host level resources
PBS-15970	When error occurs while adjusting entity usage count for one limit, other limits/resources should be left unaffected
PBS-16004	commands and server performance problem in replying to PBS requests with replies larger than 1024 bytes
PBS-16431	PBS can hang if started initially with incorrect PBS_PRIMARY value
PBS-16760	long -lselect=... resources truncated by hook interface

4.2 Known Bugs, Errors, and Warnings

This section lists known deficiencies and warnings as well as unresolved problem reports filed by customers.

Table 4-10: Open Bugs in PBS 18.2.1

JIRA Issue	Summary
PBS-4196	mpiexec does not support the new SGI performance suite packages (formerly known as ProPack) Workaround: Edit the PBS mpiexec wrapper and replace the test for sgi-release with the equivalent of "true" or Use HPE SGI's mpiexec_mpt instead
PBS-10699	Directories that are staged in are not being cleaned up after the job completes execution.
PBS-11177	Job array subjobs are not being held after failing/requeueing 20 times.
PBS-12374	PBS cannot resolve job state inconsistency between server and MOM after node_fail_requeue
PBS-12531	If custom resource is named the same as formula keyword, formula will quietly use keyword
PBS-12589	non-inventory moms do not report PBSscrayhost or vntype
PBS-12683	Interactive job remains in R state forever after failed attempt to connect to job's host on windows
PBS-12689	When resuming a suspended job, the scheduler will recalculate but not alter the walltime
PBS-12813	The hook on execjob_end times out when using "pbs.server()"
PBS-12821	PBS Pro writing garbage characters in to accounting log entry which makes that record totally unusable for Analytics
PBS-12950	CPUSet not deleted if there are network issues during end of job processing Recommendation: Once identified, stop MOM with SIGINT, remove zombie from mom_priv/jobs, restart MC990X or Superdome Flex MOM with -p flag
PBS-12979	pbsnodes -o" offlines ALL vnodes/compute nodes on a Cray

Table 4-10: Open Bugs in PBS 18.2.1

JIRA Issue	Summary
PBS-12996	MOM-server/scheduler sync issue following overlay upgrade re: which jobs are "done" and can have cpuset destroyed.
PBS-13001	MOM in boot cpuset on linux_cpuset machines breaks socket licensing as "whole system" flag is not passed to hwloc Workaround: Temporarily start MOM in the root cpuset, and move it to the boot cpuset later.
PBS-13247	susp field is not getting updated in pbsnodes -SjL
PBS-13249	Mom hook runs periodically after the event is removed in qmgr
PBS-13260	the command pbs.server().scheduler_restart_cycle() does not restart the scheduling cycle. Workaround: Wait for a job to enter or exit the system.
PBS-13383	pbs_est hangs if holiday file is not complete Workaround: Add missing days.
PBS-13384	pbs_sched hangs with strict_ordering and backfill enabled - holidays file incomplete Workaround: Add missing days.
PBS-13448	PBS assigns jobs to offlined MoMs
PBS-13490	Lack of PBS_CORE_LIMIT in /etc/pbs.conf sets coredumpsize of job processes (soft and hard) to 0 Workaround: Specify PBS_CORE_LIMIT in /etc/pbs.conf
PBS-13517	IntelMPI wrapper support job launch fails when submitting large jobs
PBS-13584	tm_attach (pbs_attach) is unable to get the process user id when forked process is still owned by root
PBS-13603	Epilogue running at the same time as execjob_end for the same job
PBS-13639	pbs_mom is too quick to abort a job
PBS-13660	Can't access reservation Duration attribute in hook
PBS-13706	Preempted jobs fails to resume when the high priority job finishes because another job was scheduled on its resources
PBS-13712	unable to submit jobs on *nix if stagein filename contains '@' symbol
PBS-13715	Zombie jobs from reimaged nodes (when MOM loses PBS_HOME or gets corrupted files in jobs directory) Recommendation: Discover a zombie because users notice that the other jobs don't run, and either qrerun it (for rerunnable jobs) or qdel it.

Table 4-10: Open Bugs in PBS 18.2.1

JIRA Issue	Summary
PBS-13725	cpuset MOM fails to start exclhost multihost jobs Workaround: Don't use -lplace=exclhost when targeting cpuset MOM clusters
PBS-13792	PBS should better handle cpuset MOM resource availability that persistently does not match actual cpuset resource availability resulting in cpuset creation failures
PBS-13798	PBS has changed the contents of \$PBS_NODEFILE, now lists FQDN
PBS-13809	PBS Server hang, seemingly in internal license accounting
PBS-13873	Job array subjob state and array_indices_remaining can become inconsistent Workaround: Change the state in the datastore to make the subjob state and array_indices_remaining attribute consistent
PBS-14013	PBS_CONF_REMOTE_VIEWER configuration parameter (supported only on Windows) is not working appropriately
PBS-14051	High priority job which needs to preempt other jobs relevant to a limit cannot run through preemption if preemption candidates are using different resources.
PBS-14052	pbs_mom is not coming up after using /etc/init.d/pbs restart with running jobs on SLES 12
PBS-14059	Server and sched treat jobs in exiting state as "running" wrt resources_assigned vs. resources_available, but sched treats those jobs as "not running" wrt limits checks such as max_run_res. Workaround: Use resources_available for limit checking, but only works for PBS_ALL.
PBS-14111	PBS does not check for limits.pbs_comm file Workaround: Add a few lines to /etc/init.d/pbs
PBS-14147	Daemons should use malloc() to avoid Linux detuned malloc() behaviour, especially when there are memory leaks
PBS-14225	Hook error with queue.resources_available.keys()
PBS-14300	Scheduler hung while calendaring
PBS-14401	Execution node get autocreated even though it was deleted through qmgr
PBS-14421	Email is not getting triggered when a job fails during stage-in/stage-out
PBS-14494	Primary server takes a long time to come back up, after failover, when lots of jobs are in the queue
PBS-14820	server will almost always fail when attempting to abort a running job during start up
PBS-14833	Job script limit is lower than 1GB due to PostGreSQL, not 2GB Workaround: Avoid setting jobscript_max_size to something so large that it doesn't work.
PBS-14834	Scheduler dumps core for suspended job, when sched cycle is kicked, if requested vnode by job has been deleted
PBS-14998	Custom resources created in mom hook can sometimes cause server crash when mom sends job obit

Table 4-10: Open Bugs in PBS 18.2.1

JIRA Issue	Summary
PBS-15284	pbs_sched respawn on SEGV fails when abort() of original scheduler takes longer than 10 seconds Workaround: Run a cron job doing /etc/init.d/pbs start (or service pbs start, if appropriate, depending on platform) regularly.
PBS-15311	Jobs become zombies when the node is reimaged, the mom loses PBS_HOME or there are corrupted files in the job directory
PBS-15402	PBSPro failover secondary server fails to continuously check whether it needs to start a scheduler locally
PBS-15437	False failovers during job recovery caused by delays to do logging Workaround: Use softlinks to ensure that even when PBS_HOME is shared, the server log files are stored on local disk.
PBS-15442	scheduler error stating a custom resource may be invalid is incorrect due to case sensitivity
PBS-15484	node comments lost after pbs_server restart
PBS-15568	job ignores the delete request and rerun by scheduler (race condition)
PBS-15570	Cannot update estimated_start/vnodes job attributes of a suspended job Workaround: Increase max_starve to a value high enough so that the preempted jobs resume before being marked as starving.
PBS-15572	Scheduler incorrectly logs that jobs in reservation queues do not exist any more
PBS-15577	deleted custom resources which are added by exechoost_startup hook reappearing again after sending SIGHUP signal to mom
PBS-15579	Modifying multiple jobs with the same qalter command clobbers -W depend list Workaround: qalter jobs one at a time
PBS-15598	sched crash under certain circumstances when resource cases don't match
PBS-15961	Non-rerunnable job is not getting aborted as expected (intermittent)
PBS-15963	pbsdsh system errors when scaling to 1024 connections
PBS-16044	Address PP-448: max_run_res limits cannot be read from within queuejob hook
PBS-16091	invisible resources are printed in the server_logs and tracejob
PBS-16139	Queue resources_assigned.ncpus becomes negative and remains even after unset the attribute.
PBS-16368	Long Reservation Length goes negative
PBS-16573	finish_exec() called twice from mom_comm.c
PBS-16736	Secondary PBS server sometimes fails to stop
PBS-16783	log message about warning while reservations get confirmed is not visible anymore in server_logs
PBS-16839	On windows pbsdsh call fails to launch command and get the output on sister mom

Table 4-10: Open Bugs in PBS 18.2.1

JIRA Issue	Summary
PBS-16863	PBS_MOM_NODE_NAME not resolving hostname on windows
PBS-16962	Routing queues do not guarantee in-order routing, cause races when dependencies exist Workaround: No easy one. Admin intervention to temporarily raise limits for the user is usually necessary to break the deadlock.
PBS-17028	node_fail_requeue causes duplicate accounting records for job
PBS-17046	Scheduler may not mark a node for provisioning when it should be
PBS-17092	Job in substate 41 can't be deleted while in transit to MOM
PBS-17830	Unable to submit standing reservations if the actual time is between what was specified as -R and -E and gives error "pbs_rsub: Bad time specification(s)"
PBS-17844	PBS_NODEFILE doesn't include all vnodes
PBS-17896	Not all calls to pbs.server() in cgroup hooks are guarded with dotimeout(10,...)
PBS-17986	Unable to debug server periodic hooks with pbs_python
PBS-18060	Hooks run on MoM before server has sent updated resourcedef file can crash in _svr_types.py (uncaught exception) Workaround: Fix the Python code on site and remove the .pyc and .pyo files
PBS-18153	Jobs with multiple exit records in accounting log
PBS-18312	Jobs copies failing w/o any evidence of network issues
PBS-18552	Insufficient permission for scheduler logs for user
PBS-18601	MoM Hooks don't always run due to unreliable updates/copies
PBS-18661	"systemctl start pbs" fails when PBS_EXEC is not /opt/pbs
PBS-18744	FIFO not working with 14.x, especially when by_queue is false
PBS-18782	Spurious HELLO causes instantiated subjobs to fail to be sent to MoM
PBS-18804	qstat doesn't escape terminal control characters in environment variables
PBS-18815	pbs_habitat does not create directory structure for home if home folder already exists
PBS-18905	pbs_server munge errors in response to commands from remote hosts after reservation is deleted that has routing queues pointing to it
PBS-18926	PBS Pro sister moms do not clean up the job when the mother superior (diskless) get rebooted with a multi-node running job on it

Table 4-10: Open Bugs in PBS 18.2.1

JIRA Issue	Summary
PBS-19079	<p>cgroup hook and cpuset MoM process containment and suspend/resume interoperability</p> <p>Workaround:</p> <p>Disable the cpuset ssystem, but this allows too much CPU usage <u>and</u> more importantly the fences that keep processes on the original socket</p> <p>Ensure that there is only one preempting job on each node</p> <p>Low hanging fruit: fix the cgroup hook to support at least per-socket process containment/pinning together with suspend/resume.</p> <p>If possible, also use cpu shares or cfs period/quota to prevent a job from using too much CPU if there are only per-socket fences and the socket is shared by more than one job.</p>
PBS-19124	<p>"hasnodes" attribute goes missing for queues when there are nodes binded to queue and the total_count of Jobs show negative</p>
PBS-19215	<p>pbs_comm not marking node down when there is job with substate 41</p>
PBS-19401	<p>cgroup exechoost_startup should synchronise resources_available.vntype to what is read from vntype file</p> <p>Workaround:</p> <p>Use qmgr to set the required vntype, and when it is updated offline the nodes until everything is indeed synchronised.</p> <p>The point is that many sites <u>DO NOT</u> get this right, and the fact that some things must be done using qmgr means that the server overrides what MoM is telling it, <u>hiding</u> any inconsistency quite well.</p>
PBS-19402	<p>cgroup hook race: systemd or Docker makes reading controller mount points from /proc/mount unreliable</p>
PBS-19530	<p>Changes to resolv.conf or nsswitch.conf are not reread in the PBS server without a restart</p>
PBS-19555	<p>pbsfs does not exit after printing message on invalid option used with it</p>
PBS-19561	<p>tm_attach broken by new pidcache for cpuset MoM on SGI NUMA machines; /proc and cpuset_move issues with TGID vs. TID</p> <p>Workaround:</p> <p>Build a pbs_attach wrapper that attaches itself to the correct cpuset before it tries to do a TM attach, but it needs to be setuid root and so it's a COLOSSAL security issue (one that the end customer will not countenance).</p> <p>It also only handles the pbs_attach scenario used by arrayd (not others where you try to attach sessions that already exist using pbs_attach -p).</p>
PBS-19562	<p>cpuset MoM on MC990X and Superdome Flex does not handle child cpusets of jobs</p>
PBS-19635	<p>Scheduler dumps core in reorder_nodes</p>
PBS-19697	<p>Stage directives can be evaluated</p>
PBS-19698	<p>heap corruption when PBS is started in an HA environment (i.e. via Pacemaker)</p> <p>Workaround:</p> <p>Setting MALLOC_CHECK_ in the environment (in an attempt to make the malloc library detect the issue) in the script that starts the server prevents the crash.</p>
PBS-19700	<p>pbsnodes -r does not update the node comment</p>
PBS-19783	<p>Scheduler considers suspended subjobs after queued subjobs</p>
PBS-19861	<p>sched crash in create_node_partitions</p>

Table 4-10: Open Bugs in PBS 18.2.1

JIRA Issue	Summary
PBS-19894	-Wumask does not work as expected in case -Wsandbox=PRIVATE is used
PBS-19905	Database backup shows multiple entries in the queue table for the same attributes
PBS-20102	all mom hook events run in a single iteration of the main mom loop are counted against job's walltime on Windows
PBS-20195	Array job comment gets appended with multiple "and finished" string after job_history_duration expiry
PBS-20273	Subjob in substate=41 in R state returns to Q state after Server restart and it can never run
PBS-20593	Invalid initial resource update from MoM on job start if there's an execjob_begin hook present
PBS-20594	cgroups warning, more mem than vmem, if system doesn't have swap
PBS-20648	Syntax gets messed up while exporting shell functions with qsub -V
PBS-20649	Address PP-823: qsub -Wblock=true hangs server for 190 seconds per job at exit if submission host is unresponsive
PBS-20650	Address PP-822: Client not accepting response due to slow network hangs server
PBS-20675	CUDA_VISIBLE_DEVICES needs to be able to count from 0 (when Nvidia libs exclude things inaccessible because of devices cgroup controller) and needs to set CUDA_DEVICE_ORDER
PBS-20683	Hooks : Incorrect states in MoM for suspended job
PBS-20714	Ubuntu: Using event().reject() with a large message string qsub fails with buffer overflow
PBS-20721	Errors during windows upgrade involving 18.2 (both from 13.1 and to 19.x)
PBS-20730	sleep state nodes go to state-unknown,sleep after overlay upgrade and will never be brought up by Power hook
PBS-20749	Unset of resources_available.lic_signature on a cloud node makes it un-useful and also stops cloud bursting in further hook cycles
PBS-20753	resources_used.walltime returns incorrect value in windows
PBS-20755	PBS Hook deadlock: pbs_python in Futex call unfinished causing cgroups hook to alarm
PBS-20814	alps inventory hook exits with exception if pbs.conf contains shell-style comment lines
PBS-20827	Job's error and output file gets created even if the job is deleted(with -Wforce) while it is running
PBS-20832	Error while attempting to get burst hour licenses causes cloud bursting hook to burst cloud nodes continuously
PBS-20974	the qmgr output for nodes(qmgr -c "print node @default") does not display the resource poweroff_eligible whereas pbsnodes -av output does show
PBS-20975	Failed qdel(error - 15016) causes side-effect which suppress the Obit causing and causes MOM to hang
PBS-20976	compute nodes busy with ALPS reservations should be noted in PBS vnodes
PBS-20994	job in limbo if ALPS request to suspend it times out in PBS, and later succeeds in ALPS
PBS-20999	Jobs with walltime greater than high priority job start running eventhough sched_preempt_enforce_resumption is true
PBS-21060	PBS server leaking ~3GB a day at customer NCAR

Table 4-10: Open Bugs in PBS 18.2.1

JIRA Issue	Summary
PBS-21069	the mom-child link is broken in the database when using vnode_pool and after deleting the inventory (first) mom
PBS-21070	node_fail_requeue on cray needlessly requeueing
PBS-21075	Memory leak in pbs_sched when checkpointing jobs Workaround: Kill and restart scheduler when it grows to too large a size
PBS-21186	job_alloc() does not initialize all pointers to NULL and strings to the empty string; too long jobIDs are not handled well by job_purge as called by req_quejob; similar code in mom_comm.c Workaround: Delete all job files on MoM to ensure we do not run into the failing code; may not work for other variable initialization issues discussed.
PBS-21229	Power Provisioning hook delay due to iteration over large number of nodes
PBS-21320	fairshare usage data can become incorrect upon scheduler HUP
PBS-21396	execest_periodic run before execest_startup on Windows
PBS-21397	Mom on windows not running execest_startup hook every time it restarts
PBS-21398	PBS adds extra chars to output of command run via pbs_attach -c on Windows
PBS-21406	PBS Windows Array Jobs do not generate the stdout and stderr in correct format xyz.o/e<jobid>.array_index when qsub -koe is used
PBS-21409	pbs_server crashes with "fail_action=offline_vnodes" on ubuntu os
PBS-21424	ICL - pbsnodes can produce invalid JSON
PBS-21456	PAGG ids set to non-unique session ID on Cray ARM node
PBS-21484	alarm for periodic hook is not working on Windows
PBS-21529	TCL/Tk incomplete in PBS Pro, pbs_tclsh commands do not work
PBS-21574	Peer scheduling doesn't work on Windows
PBS-21602	Several races in suspend/resume at end of job fail suspension
PBS-21737	Node issues with PCLM life-cycle: DNS inconsistencies, PBS node creation issues.
PBS-21788	Address PP-1312: Umask is not working when submitting with '-k oed'
PBS-21818	PBSPro Windows 18.2.2 post installation scripting win_postinstall.py failing
PBS-21835	node licenses not reclaimed upon node deletion if node name and Mom = value do not match
PBS-21836	TPP thread should not use netaddr, can cause intermittent failures in name-resolution related handling
PBS-21858	strict_ordering doesn't work when backfill_depth=0 on queues
PBS-21873	nvidia-docker fails to create container when devices cgroup is in use
PBS-21894	pbs_mom should not touch the stacksize hard limit in case the softlimit is less than 16mb
PBS-21895	encode_f needlessly limits precision of float resources to less than 4 significant digits

Table 4-10: Open Bugs in PBS 18.2.1

JIRA Issue	Summary
PBS-21896	Scheduler broken when float resource values -2 and -1 are used because of conflicts with SCHED_INFINITY and UNDEFINED
PBS-21898	Not able to start/stop PBS using systemctl command on ubuntu
PBS-21903	"Normal" mail at end of job suppressed when calling pbs.event().job.delete()
PBS-21946	pbs_est crashes on Windows
PBS-21978	qstat -f gives inconsistent whitespaces for some Variable_List values
PBS-22003	ALPS inventory hook not enabled automatically after install on Cray XC system

5

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5.1 avltree

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5.2 popen.c

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5.6 hwloc

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5.8 MinGwEditLine

MinGwEditLine: <http://sourceforge.net/projects/mingweditline/>

A BSD-licensed EditLine API implementation for the native Windows Console

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5.9 python-magic

(PBS 18.2)

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5.10 freebsd

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5.11 docopt.py

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