



# ALTAIR

ONLY FORWARD

Altair® PBS Professional® 2025.2.1

Release Notes

You are reading the Altair PBS Professional 2025.2.1

## **Release Notes (RN)**

Updated 8/1/25

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# Supported Platforms

## 1.1 Terminology

### 1.1.1 Deprecate, Remove, Obsolete

We use "deprecated" to mean that something such as a feature or a platform is still supported, but will not be supported beginning with a later release. When a feature is no longer supported, we say it has been removed or is obsolete. When a platform is no longer supported, we remove it from the list of supported platforms.

### 1.1.2 Parameters, Attributes

A parameter is an entry in a configuration file for something you can specify for some part of PBS, such as for a daemon. For example, you can set the `$ideal_load` parameter in the MoM configuration file to specify the load below which the vnode is considered to be "not busy". You specify parameters by editing the appropriate file.

An attribute is an element whose value specifies something about a part of PBS such as the scheduler. For example, you can set the value of the `"log_events"` scheduler attribute to specify which scheduler events are to be logged. You specify attribute values via the `qmgr` command.

## 1.2 Supported Platforms

### 1.2.1 PBS Components

PBS Professional is made up of the following components:

- PBS Professional server/scheduler daemon on PBS Professional server/scheduler host/head node
- PBS Professional MoM daemon on execution host/compute node, with the following options:
  - On premise
  - Burst in cloud via NavOps or PBS Cloud (optional)
- PBS Professional client commands on PBS submission host/client host
- PBS Professional communication daemon on communication host
- PBS Cloud module on service node (optional)
- Budgets server on PBS server host or separate Budgets head node
- Budgets Auth module on Budgets server host or on service node
- Budgets client commands on PBS server host if separate from Budgets server host
- Budgets client commands on Budgets client host (optional)
- Simulate module:
  - When using PBS Cloud, Simulate must be installed on PBS Professional server/scheduler host
  - When not using PBS Cloud, Simulate can be installed on any supported host

## 1.2.2 Supported Platforms for PBS Components

PBS components are supported on the following platforms. A **(d)** indicates that support is deprecated:

**Table 1-1: Supported Platforms**

Maker	Version	Chipset	Components						
			PBS Professional					Budgets	Simulate
			Server Sched	MoM on prem	Comm	Client cmds	MoM burst node	Head node + client cmds	Head node
Red Hat Enterprise Linux RHEL	8	x86_64	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	8	ARM64	Yes	Yes	Yes	Yes	Yes	No	Yes
	9	x86_64	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	9	ARM64	Yes	Yes	Yes	Yes	Yes	No	Yes
Rocky Linux	8	x86_64	Yes	Yes	Yes	Yes	Yes	No	No
	8	ARM64	Yes	Yes	Yes	Yes	Yes	No	No
	9	x86_64	Yes	Yes	Yes	Yes	Yes	Yes	No
	9	ARM64	Yes	Yes	Yes	Yes	Yes	No	No
SUSE SLES	12	x86_64	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	15	x86_64	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	15	ARM64	Yes	Yes	Yes	Yes	Yes	No	Yes
Ubuntu	20.04	x86_64	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	20.04	ARM64	Yes	Yes	Yes	Yes	Yes	No	Yes
	22.04	x86_64	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	22.04	ARM64	Yes	Yes	Yes	Yes	Yes	No	Yes
	24.04	x86_64	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	24.04	ARM64	Yes	Yes	Yes	Yes	Yes	No	Yes
HPE Cray Shasta	1.1 SLES 15	x86_64	Yes	Yes	Yes	Yes	No	Yes	Yes
	1.1 RHEL 7	x86_64	Yes	Yes	Yes	Yes	No	No	Yes
NEC SX-Aurora TSUBASA			Yes	Yes	Yes	Yes	No	No	Yes

## 1.2.3 Support for Intel's Granite Rapids

PBS supports Intel's Granite Rapids architecture.

---

## 1.2.4 Supported Platforms for Nodes Burst in Cloud

- Linux: any Linux platform that supports both PBS MoM and `cloud-init`
- Windows: 10, Server 2012

All versions of `cloud-init` are supported.

## 1.2.5 Restrictions on Simulate Module Location when Using PBS Cloud

If you will use the PBS Cloud module, you must install Simulate on the PBS Professional server/scheduler host (the PBS Professional head node).

## 1.2.6 Restrictions on Auth Module and Auth Module Host

The Auth module used by Budgets must be reachable and usable by job submitters. All users except for the teller must have accounts (with their passwords configured) on the Auth module host.

## 1.2.7 Restrictions on PBS Cloud Host

The PBS Cloud module cannot share a host with Altair Control; the PBS Cloud and Control Cloud modules have the same service name.

# 1.3 Requirement for setcap

PBS requires the `setcap` utility in the `libcap` library to be installed. PBS requires the ability to bind to a restricted port, and permission for this can be granted via the `setcap` utility.

Ubuntu: `libcap2-bin`

Rocky, RHEL, CentOS: `libcap`

SUSE, SLES: `libcap-progs`

## 1.3.1 libatomic on SLES15

On SLES 15, MoM has a runtime dependency on `libatomic`. Make sure that `libatomic` is installed on every SLES15 MoM host:

```
sudo zypper install libatomic1
```

## 1.3.2 HPE

As of PBS version 2020.1, HPE machines use the standard PBS MoM, and therefore do not require a separate package; see [section 2.13, “HPE”, on page 22](#).

## 1.4 Containers

This version of PBS requires the following in order to run jobs in containers:

- Make sure `systemd` is enabled
- Use Docker API 1.35, in Docker version 17.12.1-ce or later

## 1.5 Hooks

### 1.5.1 Python Version

PBS versions 2022.1.0 and later use Python 3.9.\*.

## 1.6 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	Notes
MPICH	1.2.5, 1.2.6, and 1.2.7	Linux	wrapper is <b>deprec</b> ated as of 14.2.1
MPICH2	1.0.3, 1.0.5, 1.0.7	Linux	
MPICH-GM	mpich-1.2.6.14b	Linux	wrapper is <b>deprec</b> ated as of 14.2.1
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 platforms, including over InfiniBand	
MVAPICH	1.2.7	Linux	wrapper is <b>deprec</b> ated as of 14.2.1
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	
OpenMPI	1.4.2		

## 1.7 MUNGE

PBS is tested with MUNGE versions 0.5.10, 0.5.11, 0.5.13, and 0.5.14.

## 1.8 CSA

Support for CSA is no longer available.

## 1.9 Windows

Windows support is not available in this version of PBS Professional, but it is likely to be made available in future versions.

## 1.10 Licensing PBS Professional

This version of PBS Professional requires version 2025.0.0 or newer of the Altair License Management System (ALM), and version 20.0 or newer license features. Make sure the license server is at the new version before installing PBS.

As of version 2025.1, PBS uses Altair Unit Licensing instead of PBSProNodes and PBSProSockets. Support for PBSProNodes & PBSProSockets is completely removed. The computation for the necessary number of licenses (features) has changed. See [section 2.2, “New Altair Unit Licensing Scheme as of Version 2025.1”, on page 11](#).

### 1.10.1 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>



# 2

## 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*.

#### 2.1.2 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.

#### 2.1.3 Move to Python 3

PBS 19.4.1 and later uses Python 3.6. When you upgrade, make sure all of your site-defined hooks (not the built-in hooks), and your hook configuration files, are compatible with Python 3.6 when you upgrade. We include a reminder for this step in the upgrading instructions in the *PBS Professional Installation & Upgrade Guide*. See <https://docs.python.org/3.6/howto/pyporting.html>.

#### 2.1.4 Additional Steps When Upgrading to 2025.2.0

When upgrading to version 2025.2.0, include these additional steps in the normal upgrading instructions contained in the *PBS Professional Installation & Upgrade Guide*.

Because PBS version 2025.2.0 now internally supports cgroups and containers, the corresponding hooks are no longer needed and should be disabled and ultimately removed after all your old hook configuration settings have been replicated in the corresponding JSON configuration files.

### 2.1.4.1 Additional Overlay Upgrade Steps

Follow the existing documented steps, and add the steps described here before you start the new version of the PBS server or MoMs. Add the following steps between section 6.5.16 and section 6.5.17 in the PBS 2024.1 install guide (i.e, before starting the MoM on the execution hosts).

1. Log in as administrator (root)
2. Finish the steps in section 6.5.16 of the PBS install guide
3. Manually set `$PBS_HOME/mom_priv/pbs_cgroups.json` with what is set in the `pbs_cgroups.HK` and `pbs_cgroups.CF` file
  - a. For example, if the `cgroups` hook was enabled, update `$PBS_HOME/mom_priv/pbs_cgroups.json` to enable the `cgroups` feature.
  - b. For example, if `vnode_per_numa_node` was enabled, or `devices`, or the `cgroup` default memory size was changed in the `.CF` file, be sure to update the corresponding field in the `pbs_cgroups.json` file.
4. Manually set `$PBS_HOME/mom_priv/pbs_container.json` with any container-related settings that were in the `PBS_hpc_container.CF` file.
 

For example, if `port_ranges` was set for Docker in the `PBS_hpc_container.CF` file, set `port_ranges` in the `pbs_container.json` file.
5. 3. Now that the JSON configuration files for the new mechanism for managing `cgroups` and containers has been updated, we no longer need the previous hook mechanism. Remove the `pbs_cgroups` and `PBS_hpc_container` hooks.

- a. Here is an example of how to remove the `pbs_cgroups` hook
  1. If you will run a MoM on each server host, disable MoM start in `pbs.conf`, so that it contains this:  
`PBS_START_MOM=0`
  2. Start PBS on the primary server host:
 

```
# systemctl start pbs or <path to init.d>/init.d/pbs start
# qmgr -c delete hook pbs_cgroups
```
  3. Stop PBS:
 

```
systemctl stop pbs or <path to init.d>/init.d/pbs stop
```
  4. In order to ensure the `pbs_cgroups` hook does not run on MoM startup (`exehost_startup` event) before the server can tell the MoM to delete the hook, delete the `pbs_cgroups.{PY,HK,CF}` files from `$PBS_HOME/mom_priv/hooks` on every execution host:
 

```
# cd $PBS_HOME/mom_priv/hooks
# rm pbs_cgroups.{PY,HK,CF}
```
- b. In order to remove the `PBS_hpc_container` hook (which is `pbshook` type), manually remove the hook files from the server and MoM hook areas:
 

```
# cd $PBS_HOME/server_priv/hooks
# rm PBS_hpc_container.{PY,HK,CF} # cd $PBS_HOME/mom_priv/hooks
# rm PBS_hpc_container.{PY,HK,CF}
```

6. Now continue with bringing up the MoMs (PBS install guide section 6.5.17)



## 2.1.4.2 Substitute Migration Upgrade Steps

1. When you are in section 6.7.24.2 of the 2024.1 PBS Professional Installation & Upgrade Guide, modify the cgroups JSON configuration file instead of the cgroups hook configuration file. Manually set `$PBS_HOME/mom_priv/pbs_cgroups.json` with what is set in the `pbs_cgroups.HK` and `pbs_cgroups.CF` file
  - a. For example, if the `pbs_cgroups` hook was previously enabled, update `$PBS_HOME/mom_priv/pbs_cgroups.json` to enable the cgroups feature.
  - b. If `vnode_per_numa_node` was enabled, or `devices`, or the cgroup default memory size was changed in the `.CF` file, be sure to update the corresponding field in the `pbs_cgroups.json` file.
2. Manually set `$PBS_HOME/mom_priv/pbs_container.json` with any container-related settings that were in the `PBS_hpc_container.CF` file.

For example, if `port_ranges` was set for Docker in the `PBS_hpc_container.CF` file, then set `port_ranges` in the `pbs_container.json` file.

3. Now that the JSON configuration files for the new mechanism for managing cgroups and containers has been updated, we no longer need the previous hook mechanism. Either disable or remove the `pbs_cgroups` and `PBS_hpc_container` hooks.
  - a. Here is an example of how to remove the `pbs_cgroups` hook
    1. Make sure you are logged in as administrator
    2. If you will run a MoM on each server host, disable MoM start in `pbs.conf`, so that it contains this:  
`PBS_START_MOM=0`
    3. Start PBS on the primary server host:
 

```
# systemctl start pbs or <path to init.d>/init.d/pbs start
# qmgr -c delete hook pbs_cgroups
```
    4. Stop PBS:
 

```
# systemctl stop pbs or <path to init.d>/init.d/pbs stop
```
    5. In order to ensure the `pbs_cgroups` hook does not run on MoM startup (`exechost_startup` event) before the server can tell the MoM to delete the hook, delete the `pbs_cgroups.{PY,HK,CF}` files from `$PBS_HOME/mom_priv/hooks` on every execution host
 

```
# cd $PBS_HOME/mom_priv/hooks
# rm pbs_cgroups.{PY,HK,CF}
```
  - b. In order to remove the `PBS_hpc_container` hook (which is `pbshook` type), manually remove the hook files:
 

```
# cd $PBS_HOME/server_priv/hooks
# rm PBS_hpc_container.{PY,HK,CF}
# cd $PBS_HOME/mom_priv/hooks
# rm PBS_hpc_container.{PY,HK,CF}
```
4. Ignore section 6.7.26.1 (IG 2024.1 doc) since there is no more cgroups hook.
5. Continue on with the rest of the migration steps.

## 2.1.5 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. Source the PBS configuration file:

```
source /etc/pbs.conf
```

2. 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"

3. 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 | ashhr
```

(2 rows)

4. 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)

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

```
pbs_ds_password -C pbsdata
```

8. Perform an overlay upgrade
9. Reset the current database user to the desired username:

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

## 2.1.6 Upgrading Caveats

- Make sure that your new GPU, cgroups, and container configuration files (\$PBS\_EXEC/etc/pbs\_gpu, \$PBS\_EXEC/etc/pbs\_cgroup, \$PBS\_EXEC/etc/pbs\_containers) contain any modifications from your old configuration files.
- 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.
- The preempt\_order, preempt\_prio, preempt\_queue\_prio, and preempt\_sort preemption settings were scheduler parameters in \$PBS\_HOME/sched\_priv/sched\_config in older versions of PBS. They are now scheduler attributes with the same names and formats. Our new upgrading steps include using qmgr to set the new attributes.

## 2.2 New Altair Unit Licensing Scheme as of Version 2025.1

As of 2025.1, PBS uses version 2025.0.0 or later of the Altair License Management System (ALM) to manage licenses, and PBS uses Altair Unit Licensing instead of PBSProNodes and PBSProSockets. Now you use Altair Units to license cores and GPUs. Support for PBSProNodes and PBSProSockets is completely removed. No other licensing system can be used with PBS Professional 2025.1 and later.

For information about how to license PBS Professional 2025.1, see the *PBS Professional Licensing Guide*.

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.

### 2.2.1 Number of Altair Units Needed

Each Altair Unit allows you to use 1000 HyperWorks licenses.

If you have fewer Altair Units than needed for your cores and GPUs, PBS licenses the nodes in an undefined order.

If you have a machine with more cores/GPUs than you have licenses, the entire machine is not licensed.

Whether or not hyperthreading is in use, only physical cores are licensed.

When PBS bursts a cloud node via NavOps or PBS Cloud, PBS licensing is the same as for on-premise nodes. Other products may require separate Altair Units.

### 2.2.2 Calculating Number of Altair Units Needed

Number of units needed is ( Ceil (( Cores + ( GPUs \* 64 )) \* 1/32 ))

Steps:

1. Multiply the number of GPUs you have by 64
2. Add the number of cores you have
3. Divide this by 32
4. Take the ceiling of the result

Example 2-1: You have 5000 cores and 25 GPUs:

25 GPUs \* 64 = 1600

1600 + 5000 cores = 6600

6600/32 = 206.25

Number of Altair Units required: Ceil (206.25) = 207

## 2.2.3 Using pbs\_topologyinfo to Get License Information

You can use the new version of `pbs_topologyinfo` to get the license information you need.

### 2.2.3.1 pbs\_topologyinfo Synopsis

```
pbs_topologyinfo -a [ [ (-l [<vnode name(s)> ] ) | (-s [<vnode name(s)>] ) ]
```

```
pbs_topologyinfo -auv
```

```
pbs_topologyinfo -l [<vnode name(s)> ]
```

```
pbs_topologyinfo -s [<vnode name(s)> ]
```

```
pbs_topologyinfo -h
```

### 2.2.3.2 pbs\_topologyinfo Usage

`pbs_topologyinfo -au` reports number of Altair Unit licenses needed for all vnodes.

`pbs_topologyinfo -auv` reports number of cores, ngpus and Altair Unit licenses needed for all vnodes.

`pbs_topologyinfo -al` reports number of node licenses needed for all vnodes.

`pbs_topologyinfo -l <vnode name>` reports number of node licenses needed for named vnode.

`pbs_topologyinfo -as` reports socket counts for all vnodes that have reported sockets.

`pbs_topologyinfo -s <vnode name>` reports socket count for named vnode.

### 2.2.3.3 Options for pbs\_topologyinfo

**-a, --all**

Reports requested topological information for all vnodes. When this option is used alone, the command does not report any information.

**-h, --help**

Prints usage and exits.

**-l, --license [<vnode name(s)>]**

Reports number of node licenses required. If you specify *vnode name(s)*, the command reports node licenses needed for the specified vnode(s) only.

**-s, --sockets [<vnode name(s)>]**

Reports derived socket counts. If you specify *vnode name(s)*, the command reports socket count information for the specified vnode(s) only.

**-u, --units**

Requires the `-a` option. Reports number of Altair Unit licenses needed for all vnodes. When used with `-v` option, reports number of cores, ngpus and Altair Unit licenses needed for all vnodes

**-v, --verbose**

Verbose mode. For use with the `-u` option. When used with the `-u` (and `-a`, which is required) options, reports number of cores, ngpus and Altair Unit licenses needed for all vnodes

(no options)

Does not report any information.

## 2.2.4 The License File

PBS uses Altair Unit Licenses in a HyperWorks license file. You should not need to inspect this file, but it contains the following features:

- HyperWorks: required for Altair Units licenses. Despite the name, it is not for the HyperWorks product. The number shown is 1000 times the number of Altair Units purchased, for historical reasons
- GlobalZone: only one zone is required; the number shown is 1000 times the number of Altair Units purchased, for historical reasons
- HWHPCPBSProfessional: product tracking feature used by PBS Professional. This is always set to a very large number so that it is effectively unlimited
- Other product tracking features for other Altair HPC products

The default file contains features for all Altair HPC products, but your account manager may give you a file for just those products you select.

## 2.2.5 Licensing Caveats

- 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 ignored. Use instead the `pbs_license_info` server attribute.
- 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 `/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 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

- GraphQL is not supported on RHEL 7 MLS systems and must remain disabled. Ensure that the `qmgr` attribute `webapi_enable` is set to `false`.
- PBS-29719: Starting with PBS Professional 2022.1.4 the `pbs_comm` daemon's open file limit is now dependent on what the operating system has set at the time of daemon launch. Previously this was hard-coded to 8192.
- PBS-30090: Peer scheduling is not able to pull jobs from IPV6 server to IPV4 server.
- We recommend setting the PBS job ID counter to its maximum value, which is 999999999999. You do this by setting the value of the `max_job_sequence_id` server attribute. The default value is 9999999.  

```
qmgr -c 'set server max_job_sequence_id=999999999999'
```
- Beware of using the vnode attribute named "queue" to associate queues and vnodes where vnodes are created using Version 2 configuration files. Doing so can cause a slowdown in the scheduler. Instead, use custom resources as described in section 4.9.2, "Associating Vnodes with Queues", in the *PBS Professional Administrator's Guide*.
- As of version 2020.1, the prologue and epilogue are deprecated. Hooks with `execjob_epilogue` events prevent the epilogue from running.
- You can use IP addresses as vnode names, but only if you set `PBS_MOM_NODE_NAME` to the IP address in `pbs.conf` on the execution host.
- The only time you can use dots in `PBS_MOM_NODE_NAME` is when it's for an IP address.
- As of PBS 19.4.1, PBS schedulers use the same log event scheme as the other daemons. You use `qmgr` to set the `log_events` scheduler attribute for each scheduler. See ["Specifying Scheduler Log Events" on page 448 in the PBS Professional Administrator's Guide](#).
- As of PBS 19.2.3, PBS ships with an empty `holidays` file. If you will use non-primetime or holidays, you will need to fill in the `holidays` file.
- If `/tmp` or `$TMPDIR` becomes full, your site may experience problems.
- 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 host-names 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,x19-64:17001
```
- 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...`)

- 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*.
- All machines using a particular PBS server (all machines in the same PBS complex) must run the exact same version of PBS, except for platform differences. Do not mix PBS versions. Do not mix major, minor, or patch versions. For example, do not run 2022.1.0 and 2022.1.1 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".
- 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`

- 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.
- 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 parent 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.
- When using non-standard characters in file staging paths, make sure that your paths work with your shell and `scp` or `rcp`.
- The PBS server can take up to 5 minutes to recover a node that has gone into the *offline* state.



## 2.5 Hooks

### 2.5.1 Hook Caveats

- Any `execjob_end` hook no longer blocks `pbs_mom`.
- You can make it faster for execution hooks to read custom job resources. Execution hooks cannot read custom job resources via the event, only via the server. However, you can cache a copy of a custom job resource at the MoMs for faster local reading by execution hooks, by setting the `m` flag for the resource.
- Administrators who are writing provisioning hooks need to be aware that the Python `pbs.event().reject()` function fails to log the error message when used from a provisioning hook. This function behaves correctly for all other hooks supported by PBS Professional.
- If a job tries to run where the complete update has not taken place, a 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>"
```
- The following are hook-related error codes:

**Table 2-1: Hook-related Error Codes**

Error Name	Code	Description
PBSE_MOM_INCOMPLETE_HOOK	15167	Execution hooks not fully transferred to a particular MoM
PBSE_MOM_REJECT_ROOT_SCRIPTS	15168	A MoM has rejected a request to copy a hook-related file, or a job script to be executed by root
PBSE_HOOK_REJECT	15169	A MoM received a reject result from a mom hook
PBSE_HOOK_REJECT_RERUNJOB	15170	Hook rejection requiring a job to be rerun
PBSE_HOOK_REJECT_DELETEJOB	15171	Hook rejection requiring a job to be deleted

- 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 Libraries

### 2.6.1 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.

### 2.6.2 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 `liblms-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.

## 2.7 Using Containers

- You cannot use *resvport* for authentication with interactive jobs in Singularity containers. Use *pwd* or *munge* instead.
- As of version 19.4.1, the interface for containers has changed. For example, the `allows_container` resource is gone. Please see the Containers chapter in the *PBS Professional Administrator's Guide*.

## 2.8 Cloud

- Starting with PBS Cloud 2022.1.3, the `lic_signature` resource is built into PBS; you do not have to create a custom resource for it. This resource is a string which is set by PBS Cloud. The administrator should not set this resource.
- The PBS Cloud module cannot share a host with Altair Control; the PBS Cloud and Control Cloud modules have the same service name.
- The PBS Cloud GUI contains a cloud vendor button named "AliCloud" for the Alibaba Cloud. This functionality is in preview mode; you can use it, but be aware that it is not yet Generally Available. Please contact Altair Support if you would like help with it.

---

## 2.9 Cgroups

### 2.9.1 Caveats and Restrictions for Cgroups

- Using Bright Cluster Manager with cgroups can cause undesired behavior. Contact Altair Support for help.
- 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.

## 2.10 Budgets

### 2.10.1 Budgets 2025.1 Compatible with PBS 2025.2

There is no Budgets upgrade for this release; Budgets 2025.1 is compatible with PBS Professional 2025.2.

### 2.10.2 Requiring Sufficient Credit Before Bursting Cloud Nodes

If you want to restrict node bursting so that you only burst nodes for jobs that have sufficient credit, make sure that you configure PBS Cloud to track this. See section 3.2.7.3, "Configuration Steps for Requiring Sufficient Credit Before Bursting Nodes", in the *PBS Professional Budgets Guide*.

## 2.10.3 Updates to Budgets

- Beginning with version 2022.1.3, Budgets uses a new approach to handling requests. In order to prevent delays caused by heavy demand, Budgets now uses a gateway service which directs requests to an operations service or a transaction service, and these send requests to a database service. Each of these four services uses its own port. Budgets uses new configuration parameters for these services; the new parameters appear in `am.conf`. You manage all of these services with the `amgr {start|stop|restart|status} services` command. These new services require new procedures for installing, upgrading, configuring for failover, etc. For details on installing, configuring, and using this version of Budgets, see the *PBS Professional Budgets Guide*.
- Beginning with version 2022.1.2, Budgets has several new cloud update operations, as well as changes to report output formats. All of these are described in the *PBS Professional Budgets Guide*, and we summarize them here:
  - The `amgr update clouddata` command takes a `scenario` parameter so that you can specify cloud data per scenario.
  - The `amgr ls clouddata` command has a `--scenario <scenario name>` argument so that you can list cloud data per scenario, as well as per cloud account and per instance type.
  - The `amgr update clouddata` command takes an `active` parameter so that you can mark cloud cost entries as active or inactive.
  - You can filter cloud cost data according to whether an (account, scenario, instance type) entry is active or inactive. Each cost entry has a parameter called "active" you can use when generating reports.
  - You can use the new `amgr update clouddata --cloud-account <cloud account> --percentage-overhead <percentage overhead cost>` command to set one percentage overhead for all cloud cost data for a cloud account.
  - The cloud cost data format has been updated with new elements. See section 4.3.3.10, "Updating Cloud Cost Data", in the *PBS Professional Budgets Guide*.
  - Budgets can automatically update cloud cost information using a hook called "am\_cloud\_update". This hook can build your cloud cost table for you, based on your entries in the PBS Cloud bursting hook ("cloud\_hook") configuration file. The cloud cost update hook reads account, scenario, and instance type information from the configuration file for the PBS Cloud hook. The `am_cloud_update` hook discovers, collects, and updates list price cost data for each (account, scenario, instance type), and uses this to build the cloud cost table.
  - Commands that produce reports can create output in table format, raw format, or JSON format. Budgets has improvements to the formats for table and raw output. The format for JSON output is unchanged. See section 4.3.5.2, "Report Output Formats", in the *PBS Professional Budgets Guide*.
  - Budgets has a configuration parameter in `/etc/am.conf` called `AM_WORKER_TIMEOUT`. This parameter sets the timeout allowed for reports. You can use this to prevent connection timeouts that could otherwise be caused by unduly long reporting times.

## 2.10.4 Caveats and Restrictions for Budgets

- When `AM_BALANCE_PRECHECK` is `True` we should check the credit when queueing a job, so that the job will straightaway be rejected when being enqueued, and job submission itself will fail if credit is unavailable for the job. However, the caveat is that when we set `AM_BALANCE_PRECHECK` to `True`, if we already have some queued jobs and we submit a new job, while checking credit availability for a new job being enqueued, we do not consider the amount required by those previously queued jobs. So even if Budgets allows submission of this new job, the job may get rejected at runtime due to credit unavailability because those queued jobs may have already acquired the amount when they ran, resulting in insufficient credit for the new job at runtime.

By default `AM_BALANCE_PRECHECK` is False, so we don't check available credit when enqueueing a job.

- The Budgets administrator account must exist and have the *admin* role at all times. Make sure you never remove the *admin* role from your administrator account. If you have no administrator with *admin* role, you cannot use Budgets. If you do not have another administrator account with the *admin* role, do not disable your administrator account as shown in [section 3.4.5, “Changing Budgets Administrator to New Username”, on page 81](#), step 3, [Optionally, permanently disable pbsadmin. This is not recoverable.](#)
- Soft `walltime` is not supported.
- Shrink-to-fit jobs are not supported.
- If the license server is not reachable, jobs will continue to run for up to 3 hours. After that, jobs cannot start or be reconciled.
- Make sure that any cloud cost entry you want to make inactive is also disabled in the PBS Cloud configuration; see [section 7.2.4, “Enabling or Disabling a Bursting Scenario in PBS Cloud”, on p. CG-164 in the \*PBS Professional Cloud Guide\*](#). Otherwise a user could run jobs without being charged by Budgets.

The `am_cloud_update` hook will mark any valid entries as active; see [section 3.2.1.1, “Tracking and Marking Valid Cost Entries”, on page 78](#).

### 2.10.4.1 Caveats for Postpaid Mode

- In postpaid mode, a job that is deleted via `qdel -wforce` is not billed, because it has no *E* record.
- If, in postpaid mode, two groups invest in the same user or project account, but the first group's investment serves only to bring the account from a negative value up to zero, the second group is given full ownership if you switch to prepaid mode at a time that is not on a period boundary. You can avoid this by always switching between modes on a period boundary.
- In postpaid mode, if the PBS job ID hits reaches its maximum and rolls over, Budgets cannot reconcile jobs whose IDs are repeated. You can minimize this occurrence by setting the value of the `max_job_sequence_id` server attribute to a large value; its maximum value is 99999999999. The default value is 9999999.
- When a job is rerun, it is charged only for the final execution.

This does not affect prepaid mode.

This does not stop jobs from running.

## 2.11 LQS

Liquid Scheduling (LQS) enables the federation of multiple workload managers, allowing jobs to be prioritized and managed as a unified collection. It automatically allocates tasks to the most suitable resources based on priority, policies, and available resources. LQS ensures that workloads are executed in the optimal location, with the correct priority, while aligning with organization-wide business objectives and budgetary constraints.

For further details, refer to the LQS Administrator's Guide and LQS User's Guide, which are provided with PBS Professional. These guides are also available in web format upon LQS installation.

## 2.12 Troubleshooting

As of version 2021.1.2, PBS no longer offers Undo Live Recorder for creating daemon recordings.

## 2.13 HPE

- As of version 2020.1, the cpuset MoM is removed. Use cgroups to manage cpusets. See the *PBS Professional Administrator's Guide*.
- As of version 19.2.5, the cpuset MoM is deprecated. In later releases, HPE platforms will be supported via cgroups.

## 2.14 Cray

### 2.14.1 Support for Shasta

PBS supports Shasta. However, the following features are not available on Shasta:

- Power awareness
- Checkpoint/restart
- GPU and coprocessor scheduling
- SELinux and MLS Integration
- Failover (although this functionality should be available via the Kubernetes environment)
- Peer scheduling
- Releasing unneeded nodes from jobs
- Reliable job startup

### 2.14.2 Workarounds on Shasta

Sending large job scripts (>2MB) from server to MoM on a Cray Shasta system does not work.

Workaround:

- Be sure the directories where the job script exists (e.g. users' home directories) are mounted globally on the compute nodes.
- When submitting jobs requiring large job scripts, use the `qsub "--"` option so that a copy is not necessary.

Staging on Shasta to and from remote directories does not work.

Workaround:

- Be sure the necessary directories are mounted across UAIs and compute nodes (e.g. users' home directories).
- Then configure the `usecp` MoM option so that `cp` is used to copy to and from the globally mounted directories.

## 2.15 MPI

- OpenMPI; issue PBS-29947: If you are building OpenMPI with PBS Task Manager support on RHEL or CentOS 7 then you need to set `LD_LIBRARY_PATH` to `$PBS_EXEC/lib` to fix this issue
- The default for starting wrapped mpids is `rsh`. If you are wrapping HP MPI with the PBS `pbs_mpihp`, 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.

## 2.16 IPv4/6

This version of core PBS Professional, the PBS GraphQL interface, and PBS Simulate support both IPv4 and IPv6. However, PBS Cloud, Budgets, and NavOps can use only IPv4.

You can mix IPv4 and IPv6 in the same PBS complex. We show the supported configurations below:

**Table 2-2: Supported Configurations for Mixing IPv4 and IPv6**

IPv4	IPv6
Budgets, PBS Cloud, PBS server, On-premise MoMs, PBS Simulate	
Budgets, PBS Cloud, PBS server, PBS Simulate	On-premise MoMs
Budgets, PBS Cloud, On-premise MoMs, PBS Simulate	PBS server
Budgets, PBS Cloud, PBS server, On-premise MoMs	PBS Simulate
Budgets, PBS Cloud	PBS server, On-premise MoMs, PBS Simulate
Budgets, PBS Cloud, PBS Simulate	PBS server, On-premise MoMs

## 2.16.1 Caveats for Using IPv6

- PBS-30090: Peer scheduling is not able to pull jobs from IPV6 server to IPV4 server.
- The listening parts of PBS (e.g., pbs\_server) will bind to IPv6 dual stack. It is the choice of the client side (commands, mom, etc.) to choose whether to connect using IPv6 or IPv4. That choice comes from the first IP address that the hostname resolves to. The standard pbs.conf parameters such as PBS\_SERVER\_HOST\_NAME, PBS\_PRIMARY, PBS\_SECONDARY, PBS\_LEAF\_ROUTERS, and PBS\_MOM\_NODE\_NAME can be set to IPv4 addresses to force IPv4 addresses to be used.
- When configuring/building software that uses libpbs (e.g., building OpenMPI with TM support) on RHEL 7 or CentOS 7 systems you must `export LD_LIBRARY_PATH $PBS_EXEC/lib`.
- Peer scheduling fails when pulling jobs from IPV6 server to IPV4 server.

## 2.17 Using GPUs

### 2.17.1 Managing GPUs

You can configure PBS to manage GPU resources. We strongly recommend using cgroups to manage your GPUs. Cgroups give you sophisticated control over GPUs. See [Chapter 7, "Using GPUs", on page 349](#).

### 2.17.2 Requesting GPUs

Your PBS job can request GPUs. How you request GPUs depends on whether PBS uses cgroups to manage GPUs; check with your administrator.

PBS has a resource called `ngpus` to represent the number of GPUs on a vnode.

#### 2.17.2.1 How to Request GPUs

Recommended: On Linux only, PBS can be configured to use cgroups to fence GPUs off, so that when your job requests GPUs it automatically gets exclusive use of its GPUs. You don't have to request exclusivity. When PBS uses cgroups to manage GPUs, you request the number of GPUs you want via the `ngpus` resource:

```
qsub -l select=ngpus=<value>:<rest of chunk specification>
```

#### 2.17.2.2 How to Request Swap Space

When jobs are managed via cgroups, you can explicitly request the amount of memory and the amount of swap space you need, using the `mem` and `swap` resources. For example, if your job needs 32GB of memory and 5GB of private file cache:

```
qsub -l select=mem=32GB:swap=5GB
```

On Linux, when PBS is not using cgroups to manage jobs, the `swap` resource is not available. In this case you would use:

```
qsub -l select=mem=37GB
```

#### 2.17.2.3 Binding to GPUs

PBS Professional allocates GPUs, but does not bind jobs to any particular GPU; the application itself, or the CUDA library, is responsible for the actual binding.



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### 2.17.2.4 Viewing GPU Information for Nodes

You can find the number of GPUs available and assigned on execution hosts via the `pbsnodes` command.

### 2.17.3 Setting GPU-related Environment Variables

If your job will spawn a process that needs GPU environment variables, use `"pbs_attach -j $PBS_JOBID <cmd> <args>"` to spawn the process. When you use `"pbs_attach -j $PBS_JOBID <cmd> <args>"`, `pbs_attach` sets the GPU-related environment variables in the environment of the process being spawned.

You must spawn the process via `pbs_attach` in order to have the environment variables set. If you spawn the process using another method and then use `pbs_attach` to attach it to the job, `pbs_attach` does not set the environment variables.



# New Features and Interface Changes

## 3.1 New Features

For new cgroups behavior, see [Chapter 6, "Configuring and Using PBS with Cgroups", on page 313](#).

For new container behavior, see [Chapter 8, "Configuring PBS for Containers", on page 361](#).

For how to configure GPUs, see [Chapter 7, "Using GPUs", on page 349](#).

For how to use GPUs, see [section 2.17, "Using GPUs", on page 24](#).

For new `pbs_attach` command behavior, see [section 8.1, "pbs\\_attach", on page 111](#).

For new `pbs_update_certs` command, see [section 8.3, "pbs\\_update\\_certs", on page 115](#).

For updates to `pbs_ds_password` command, see [section 8.2, "pbs\\_ds\\_password", on page 113](#).

For new `tm_attach` API behavior, see [section 8.4, "tm\\_attach\(\)", on page 116](#).

For new security features and usage, see [Chapter 9, "Security", on page 117](#).

For new Kubernetes connector, see [Chapter 7, "PBS Kubernetes Connector", on page 101](#).

For all other new features, see New Features in the *PBS Professional Administrator's Guide* and the *PBS Professional Hooks Guide*.

## 3.2 Feature Deprecations

As of 2025.1, the PBS Cloud feature is **deprecated**.

## 3.3 External Interface Changes

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

### 3.3.1 Changes in Paths, Parameters, and Environment Variables

**Table 3-1: Changes in Paths, Parameters, and Environment Variables**

PBS Version	Change
2025.1	New PBS_CERT_DIR environment variable
2024.1	New PBS_WEBAPI_PORT parameter in pbs.conf
2024.1	New PBS_WEBAPI_TLS parameter in pbs.conf
2024.1	New PBS_CLIENT_CONN_RETRY_TIMEOUT parameter in pbs.conf
2024.1	New PBS_CLIENT_CONN_RETRY_INTERVAL parameter in pbs.conf
2022.1.3	New oom_kill_disable configuration variable in cgroups memory section
2022.1.3	New under_oom_kill_delay configuration variable in cgroups memory section
2022.1.0	New PBS_CP parameter in pbs.conf
2022.1.0	New PBS_DAEMON_SERVICE_USER parameter in pbs.conf
2021.1.3	New ngpus_ext_managed parameter in cgroups hook configuration file
2021.1.3	New plugin cloud bursting hook configuration parameter
2021.1.3	New plugin_binary_path cloud bursting hook configuration parameter
2021.1.3	New network_max_group_size cloud bursting hook configuration parameter
2021.1.3	New use_custom_snapshot cloud bursting hook configuration parameter
2021.1.3	The max_vms_for_infiniband_scaleset cloud bursting hook configuration parameter is removed
2021.1.1	New PBS_USER_HOME option to \$jobdir_root MoM parameter
2021.1.1	New cgroups configuration parameter manage_rlimit_as
2021.1.1	New cgroups configuration parameter discover_gpus
2021.1.1	New cgroups configuration parameter manage_cgswap
2021.1.1	New cgroups configuration parameter enforce_default
2021.1.1	New cgroups configuration parameter exclhost_ignore_default
2021.1.1	Changed default values for cgroups configuration file parameters mem_fences, reserve_amount in memory subsystem, vnode_hidden_mb
2021.1	\$PBS_NODEFILE and PBS_NODEFILE environment variable created and set on all of a job's hosts
2021.1	New "shared" directive for \$jobdir_root MoM parameter; set this when directory is shared
2020.1	New PBS_CONTAINER_ARGS environment variable
2020.1	New container_args_allowed parameter to container hook
2020.1	New enable_group_add_arg parameter to container hook
2020.1	The \$dce_refresh_delta MoM parameter is obsolete
2020.1	The load_balancing scheduler parameter is deprecated
2020.1	The cpuset_create_flags MoM parameter is removed.

**Table 3-1: Changes in Paths, Parameters, and Environment Variables**

PBS Version	Change
2020.1	The <code>cpuset_error_action</code> MoM parameter is removed.
2020.1	The <code>cpuset_destroy_delay</code> MoM parameter is removed.
2020.1	New <code>PBS_SCHED_THREADS</code> parameter in <code>pbs.conf</code> and environment variable
19.2.5	<code>PBS_MOM_NODE_NAME</code> can be an IP address
19.2.1	Support for direct manipulation of <code>resourcedef</code> file is removed
18.2.1	On Windows, default path for <code>PBS_HOME</code> and <code>PBS_EXEC</code> changed to <code>C:\Program Files (x86)\PBS\home</code> and <code>C:\Program Files (x86)\PBS\exec</code>
14.2.1	New <code>pbs.conf</code> parameter <code>PBS_MOM_NODE_NAME</code>
13.0	The <code>TMPDIR</code> environment variable is deprecated and replaced with <code>PBS_TMPDIR</code>
13.0	The <code>PBS_COMM_LOGMASK</code> parameter is changed to <code>PBS_COMM_LOG_EVENTS</code>
12.1	In <code>pbs.conf</code> , <code>PBS_CORE_LIMIT</code> is set to <i>unlimited</i> by default

### 3.3.2 Changes to Server

**Table 3-2: Changes to Server**

PBS Version	Change Type	Change
2024.1	New attribute	New <code>webapi_enable</code> server attribute
2024.1	New attribute	New <code>webapi_oidc_provider_url</code> server attribute
2024.1	New attribute	New <code>webapi_oidc_client_id</code> server attribute
2024.1	New attribute	New <code>webapi_auth_issuers</code> server attribute
2024.1	New attribute	New <code>elim_on_subjobs</code> server attribute
2022.1.3	New attribute	New <code>python_gc_min_interval</code> server attribute
2022.1.3	New attribute value	The <code>python_gc_min_interval</code> server attribute accepts zero as a value
2021.1.3	Attribute removed	The <code>Flicenses</code> server attribute is removed.
2020.1	Attribute removed	The <code>single_signon_password_enable</code> attribute is removed.
2020.1	Change in default value	New default for <code>rpp_max_pkt_check</code> attribute of 64
2020.1	New attribute	New <code>reserve_retry_time</code> attribute
2020.1	Attribute deprecated	The <code>reserve_retry_init</code> attribute is deprecated
2020.1	Attribute obsoleted	The <code>reserve_retry_cutoff</code> attribute is obsolete
19.4.1	Platform change	MoMs and client commands supported on Windows, but all other components must run on Linux
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

Table 3-2: Changes to Server

PBS Version	Change Type	Change
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.&lt;resource&gt;</code> server attribute
	Attribute deprecated	The server attribute <code>pbs_license_file_location</code> is deprecated, and replaced by <code>pbs_license_info</code> .
	deprecation	<code>node_pack</code> is deprecated.
	deprecation	<code>lictype</code> is deprecated.

### 3.3.3 Changes to Scheduler

Table 3-3: Changes to Scheduler

PBS Version	Change Type	Change
2022.1.2	Scheduler attribute replaced	The <code>throughput_mode</code> attribute is <b>deprecated</b> and replaced with the <code>job_run_wait</code> attribute
2022.1.0	Scheduler option removed	The <code>pbs_sched -a</code> option is removed
2022.1.0	No more scheduler port specification	Schedulers do not use an assigned port. No more incoming connections. The <code>sched_port</code> scheduler attribute is removed. The <code>-R</code> and <code>-S pbs_sched</code> options are removed. The <code>PBS_SCHEDULER_SERVICE_PORT</code> parameter is removed from <code>pbs.conf</code> . The <code>pbs_server -S</code> option is removed.

Table 3-3: Changes to Scheduler

PBS Version	Change Type	Change
2022.1.0	Scheduler behavior and options removed	Starving is removed; <code>help_starving_jobs</code> , <code>max_starve</code> , the Starving execution priority class, and the <code>starving_jobs</code> preemption level are removed; use eligible time as replacement
2022.1.0	Scheduler options unavailable	The <code>lowest_load</code> option for <code>smp_cluster_dist</code> and the <code>load_balancing</code> options can no longer be used
2022.1.0	Parameter removed	The <code>help_starving_jobs</code> parameter is <b>removed</b>
2022.1.0	Parameter removal	The <code>max_starve</code> parameter is <b>removed</b>
2022.1.0	Parameter removal	The <code>cpus_per_ssinode</code> , <code>mem_per_ssinode</code> , <code>sort_queues</code> , <code>sync_time</code> , <code>preempt_fairshare</code> , <code>preempt_starving</code> , <code>key</code> , and <code>sort_by</code> parameters are <b>removed</b>
2021.1.1	Parameter made obsolete	The <code>cpus_per_ssinode</code> parameter is <b>obsolete</b>
2021.1.1	Parameter made obsolete	The <code>mem_per_ssinode</code> parameter is <b>obsolete</b>
2021.1.1	Parameter made obsolete	The <code>sort_queues</code> parameter is <b>obsolete</b>
2021.1.1	Parameter made obsolete	The <code>sync_time</code> parameter is <b>obsolete</b>
2020.1	Scheduler attribute changed	Only value for <code>preempt_sort</code> attribute is <i>min_time_since_start</i>
2020.1	Parameter removed.	<code>sync_time</code> parameter removed.
2020.1	New feature	Reservations with multischeds
19.4.1	Platform change	Windows MoMs use a Linux scheduler
19.4.1	Parameter obsolete	<code>log_filter</code> parameter is <b>obsolete</b>
19.4.1	New scheduler attribute	New <code>log_events</code> scheduler attribute
19.4.1	Change in parameter	<code>preempt_order</code> parameter changed to scheduler attribute
19.4.1	Change in parameter	<code>preempt_prio</code> parameter changed to scheduler attribute
19.4.1	Change in parameter	<code>preempt_queue_prio</code> parameter changed to scheduler attribute
19.4.1	Change in parameter	<code>preempt_sort</code> parameter changed to scheduler attribute
18.2.2	Deprecation	The <code>max_starve</code> scheduler parameter is deprecated
18.2.1	New scheduling feature	New multisched feature
18.2.1	New scheduler attribute	New partition scheduler attribute
18.2.1	New scheduler attribute	New scheduling scheduler attribute
18.2.1	New scheduler attribute	New <code>scheduler_iteration</code> scheduler attribute
18.2.1	Deprecation	<code>mom_resources</code> deprecated
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 <i>fairshare_tree_usage</i> formula keyword

Table 3-3: Changes to Scheduler

PBS Version	Change Type	Change
18.2.1	New formula keyword	New <i>fairshare_factor</i> formula keyword
18.2.1	Change in formula keyword	New <i>fairshare_perc</i> formula keyword replaces <i>fair_share_perc</i> ; <i>fair_share_perc</i> is deprecated
14.2.3	Deprecation	The <i>mom_resources</i> line in <i>sched_priv/sched_config</i> is deprecated. Instead, use <i>exechost_periodic</i> 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 <i>est_start_time_freq</i> server attribute is <b>obsolete</b>
13.1	Scheduler configuration parameter obsoleted	The <i>preempt_priority</i> argument to the <i>job_sort_key</i> scheduler parameter is obsolete (this behavior is the default)
13.1	Scheduler configuration parameter deprecated	The <i>backfill</i> scheduler parameter is <b>deprecated</b> . Use <i>backfill_depth</i> instead.
13.1	New scheduler attribute	New <i>opt_backfill_fuzzy</i> scheduler attribute
13.0	Scheduler configuration parameter deprecated	The <i>half_life</i> scheduler parameter is deprecated, replaced with <i>fairshare_decay_time</i> and <i>fairshare_decay_factor</i>
13.0	New scheduling feature	Fairshare and job sort formulas use Python math functions
13.0	Scheduler configuration parameter removed	The <i>sort_queues</i> scheduler parameter has no effect.
13.0	New scheduler attribute	New <i>sched_preempt_enforce_resumption</i> scheduler attribute
13.0	Scheduler parameter deprecated	The <i>preempt_priority</i> argument to the <i>job_sort_key</i> scheduler parameter is <b>deprecated</b>
12.2	Scheduler configuration parameter deprecated	The <i>smp_cluster_dist</i> scheduler parameter is deprecated
12.2	Scheduler configuration parameter deprecated	The <i>sort_queues</i> scheduler parameter is deprecated (this behavior is now automatic)
	Scheduler configuration parameter deprecated	The <b>sort_priority</b> option to <b>job_sort_key</b> is deprecated and is replaced with the <i>job_priority</i> option.
	Scheduler configuration option deprecated	The <b>sync_time</b> scheduler configuration option is deprecated.
9.1	Deprecation	<i>cpus_per_ssinode</i> is deprecated.
9.1	Deprecation	<i>key</i> is deprecated.
9.1	Deprecation	<i>load_balancing_rr</i> is deprecated.
9.1	Deprecation	<i>mem_per_ssinode</i> is deprecated.
9.1	Deprecation	<i>preempt_checkpoint</i> is deprecated.
9.1	Deprecation	<i>preempt_fairshare</i> is deprecated.
9.1	Deprecation	<i>preempt_requeue</i> is deprecated.
9.1	Deprecation	<i>preempt_starving</i> is deprecated.



Table 3-3: Changes to Scheduler

PBS Version	Change Type	Change
9.1	Deprecation	preempt_suspend;end is deprecated.
9.1	Deprecation	sort_by is deprecated.
9.1	Deprecation	strict_fifo is deprecated.

### 3.3.4 Resource Changes and Deprecations

Table 3-4: Resource Changes and Deprecations

PBS Version	Change
2025.1	New built-in resource <b>swap</b>
2025.1	New built-in resource <b>ngpus</b> ; this resource is automatically added to sched_config resources: line
2022.1.3	New built-in resource <b>lic_signature</b> replaces custom resource with same name for PBS Cloud
2022.1.0	MoM dynamic resources can no longer be used
19.2.1	Change to dynamic resource scripts: script and its directory must be owned by root on Linux or Admin on Windows, and the script directory must not give write permission to group or others.
18.2.1	New soft_walltime resource
18.2.1	The <b>netwins</b> 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 mpp* resources are removed.
18.2.1	The <b>PBScrayseg</b> resource is no longer used.
13.0	New preempt_targets resource
11.0	The mpp* resources are deprecated
	The <b>nodes</b> resource is no longer used.
	The resource <b>arch</b> is only used inside of a select statement.
	The resource <b>host</b> is only used inside of a select statement.
	The <b>nodect</b> resource is obsolete. The ncpus resource should be used instead. Sites which currently have default values or limits based on nodect should change them to be based on ncpus.
	The <b>neednodes</b> resource is obsolete.
	The <b>ssinodes</b> resource is obsolete.
	<b>Properties</b> are replaced by boolean resources.

### 3.3.5 Command Changes and Deprecations

For changes to Budgets, see [section 3.3.15, “Budgets Changes”, on page 41](#).

**Table 3-5: Command Changes and Deprecations**

PBS Version	Change
2025.1	New <code>-u</code> option for <code>pbs_topologyinfo</code>
2025.1	New <code>-v</code> option for <code>pbs_topologyinfo</code>
2025.1	New <code>-t</code> option for <code>pbs_ds_password</code>
2025.1	New <code>-j</code> option for <code>qstat</code>
2025.1	New <code>pbs_update_certs</code> utility
2022.1.0	New <code>-Wdelete_idle_time</code> option to the <code>pbs_ralter</code> command
2021.1.3	New <code>--config-only</code> option for <code>pbs_snapshot</code> command
2021.1.3	The <code>pbs_lamboot</code> command is removed.
2021.1.3	The <code>pbs_mpilam</code> command is removed.
2021.1.3	The <code>pclm</code> command-line interface is deprecated
2021.1.2	The Undo Live Recorder integration is removed.
2021.1	New <code>%&lt;max subjobs&gt;</code> parameter for <code>qsub -J</code> option
2021.1	New <code>-lselect-&lt;select spec&gt;</code> option to <code>pbs_ralter</code>
2021.1	New <code>-Wforce</code> option to <code>pbs_ralter</code>
2020.1	The <code>pbs_migrate_users</code> command is removed
2020.1	The <code>pbs_password</code> command is removed
2020.1	The <code>qsub -Wpwd</code> option is no longer available
2020.1	New <code>pbs_login</code> command
2020.1	New <code>--job</code> option to <code>pbs_rsub</code> command
2020.1	New <code>-G</code> option to <code>pbs_ralter</code> command
2020.1	New <code>-U</code> option to <code>pbs_ralter</code> command
2020.1	New <code>-D</code> option to <code>pbs_ralter</code> command
2020.1	New <code>-t</code> option to <code>pbs_sched</code> command
2020.1	New <code>-k</code> option to <code>pbs_release_nodes</code> command
2020.1	New <code>-Wdelete_idle_time</code> option to <code>pbs_rsub</code> command
19.4.1	The <code>nqs2pbs</code> command is no longer supported.
19.4.1	The <code>pbs_tclapi</code> functions are deprecated.
19.4.1	The <code>pbs_mpilam</code> command is deprecated.
19.4.1	The <code>pbs_lamboot</code> command is deprecated.
19.4.1	The <code>pbs_rshd</code> command is removed.
19.2.1	The <code>pbs_migration_assistant.bat</code> command is removed.
19.2.1	The <code>nqs2pbs</code> command is deprecated.

Table 3-5: Command Changes and Deprecations

PBS Version	Change
19.2.1	The <code>xpbs</code> and <code>xpbsmon</code> commands are removed.
18.2.1	New <code>pbs_snapshot</code> command
18.2.1	" <code>qmgr &lt;command&gt; 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 <i>admin-resume</i> pseudo-signal for <code>qsig</code>
18.2.1	New <i>admin-suspend</i> pseudo-signal for <code>qsig</code>
18.2.1	The <code>pbs-report</code> command is <b>no longer supported</b> , 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
14.2.1	The <code>pbs_probe</code> command is <b>deprecated</b>
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 <b>deprecated</b>
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 <b>-lnodes=nodespec</b> form is replaced by the <code>-l select=</code> and <code>-l place=</code> statements.
	The <b>-l resource=rescspec</b> form is replaced by the <code>-l select=</code> statement.
	The <code>-a</code> option to the <b>qselect</b> command is deprecated.
	The <b>-wdelay=nnnn</b> option to the <b>qdel</b> command is deprecated.
	The <b>-c</b> and <b>-d</b> options to the <b>pbsnodes</b> command are deprecated and removed.

Table 3-5: Command Changes and Deprecations

PBS Version	Change
	The pbs_tclapi <b>pbsrescquery</b> command is deprecated.
	The <b>pbs_rescquery</b> command is deprecated.
	The <b>configrm()</b> resource monitor API call is deprecated.

### 3.3.6 Vnode Changes

Table 3-6: Vnode Changes

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

### 3.3.7 Queue Changes

**Table 3-7: New Queue Attributes**

PBS Version	Change
2021.1.3	The hasnodes queue attribute is deprecated.
2020.1	The require_cred and require_cred_enable queue attributes are obsolete
14.2.4	The max_group_res queue attribute is deprecated.
14.2.4	The max_group_res_soft queue attribute is deprecated.
14.2.4	The max_group_run queue attribute is deprecated.
14.2.4	The max_group_run_soft queue attribute is deprecated.
14.2.4	The max_running queue attribute is deprecated.
14.2.4	The max_user_res queue attribute is deprecated.
14.2.4	The max_user_res_soft queue attribute is deprecated.
14.2.4	The max_user_run queue attribute is deprecated.
14.2.4	The max_user_run_soft queue attribute is deprecated.
14.2.4	The max_queuable queue attribute is deprecated.
13.1	backfill_depth
13.0	queued_jobs_threshold
13.0	queued_jobs_threshold_res.RES

### 3.3.8 Job and Reservation Changes

**Table 3-8: Job Changes**

PBS Version	Change
2022.1.0	The pset job attribute is removed.
2022.1.0	Default umask for job files is now system default
2022.1.0	New obittime job attribute
2021.1	New max_run_subjobs job attribute
2020.1	Reservations can be created in any partition
2020.1	New reserve_job reservation attribute
2020.1	New create_resv_from_job attribute
2020.1	New delete_idle_time reservation attribute
2020.1	Job attribute pset is deprecated
19.2.1	Job name must consist only of alphabetic, numeric, hyphen (dash, minus), underscore, plus sign, or period characters.
19.2.1	Job name size limit set to 230 characters

Table 3-8: Job Changes

PBS Version	Change
18.2.1	New <code>resources_released</code> attribute
18.2.1	New <code>resource_released_list</code> attribute
18.2.1	New <code>soft_walltime</code> attribute
18.2.1	New <code>estimated.soft_walltime</code> attribute
13.1	New <code>topjob_ineligible</code> attribute
13.0	Job and reservation names can be 236 characters
12.0	New <code>min_walltime</code> attribute
12.0	New <code>max_walltime</code> attribute

### 3.3.9 MoM Changes

Table 3-9: New MoM Configuration Variables

PBS Version	Type	Change
2022.1.0	New feature	MoM can use a custom command for local copy
2022.1.0	Removal	The <code>mom_resources:</code> line is removed
2020.1	Deprecation	The prologue and epilogue are deprecated.
2020.1	Removal	Cpuset MoM is removed
19.2.5	Deprecation	Cpuset MoM is deprecated
12.0	New MoM configuration variable	New <code>\$reject_root_scripts</code>
	MoM configuration variable deprecation	The <b>memreserved</b> MoM configuration option is deprecated.

### 3.3.10 Hook Changes

Table 3-10: Hook Changes

PBS Version	Type	Change
2022.1.0	New hook events	New <code>postqueuejob</code> , <code>jobobit</code> , <code>resv_confirm</code> , <code>modifyresv</code> , <code>resv_begin</code> , <code>management</code> , and <code>modifyvnode</code> hook events
2022.1.0	New vnode state objects	Hooks use new vnode state constants. See "Vnode State Constant Objects" in Chapter 6 of the <i>PBS Professional Hooks Guide</i> . The previous vnode state objects are <b>deprecated</b> .
2022.1.0	New vnode object methods	Vnode objects have new methods for retrieving state information; see <a href="#">“Vnode Object Members” on page 147 of the PBS Professional Hooks Guide</a> .
2022.1.0	New vnode state constants	The old vnode state constants have been replaced with new ones. See <a href="#">“Vnode State Constant Objects” on page 149 of the PBS Professional Hooks Guide</a> .

Table 3-10: Hook Changes

PBS Version	Type	Change
2022.1.0	Deprecation	Old hook event types are deprecated: QUEUEJOB, MODIFYJOB, RESVSUB, RESV_END, MOVEJOB, RUNJOB, PROVISION, EXECJOB_PROLOGUE, EXECJOB_EPILOGUE, EXECJOB_END, EXECJOB_PRETERM, EXECJOB_LAUNCH, EXECJOB_BEGIN, EXECJOB_ATTACH, EXECJOB_POSTSUSPEND, EXECJOB_PRERESUME, EXECHOST_PERIODIC, EXECHOST_STARTUP, PERIODIC
2022.1.0	Deprecation	Old node states are deprecated: <i>ND_FREE</i> , <i>ND_OFFLINE</i> , <i>ND_DOWN</i> , <i>ND_STALE</i> , <i>ND_JOBBUSY</i> , <i>ND_JOB_EXCLUSIVE</i> , <i>ND_RESV_EXCLUSIVE</i> , <i>ND_BUSY</i> , <i>ND_PROV</i> , <i>ND_WAIT_PROV</i> , <i>ND_UNRESOLVABLE</i> , <i>ND_SLEEP</i>
19.4.1	Python version change	Python version changed to 3.6
19.4.1	New hook event	New <code>execjob_postsuspend</code> hook event
19.4.1	New hook event	New <code>execjob_preresume</code> hook event
19.2.1	New hook event	New <code>resv_end</code> hook event
19.2.1	Interface change	Cloud bursting hook moved from PBS Professional to Control
19.2.1	Hook change	Execjob_launch hooks can modify job and vnode attributes: <code>Execution_Time</code> , <code>Hold_Types</code> , <code>resources_used</code> , <code>run_count</code>
18.2.3	Python version change	Python version changed to 2.7.1
18.2.2	Behavior change	Power provisioning enabled by enabling hook, instead of by setting <code>power_provisioning</code> server attribute to <i>True</i>
18.2.1	Hook removal	<code>pbs_ibwins.py</code> is no longer available.
13.0	New attribute	<code>fail_action</code>
13.0	New attribute	<code>debug</code>
13.0	New event	<code>execjob_launch</code>
13.0	New event	<code>execjob_attach</code>
13.0	New event	<code>exechost_startup</code>
12.0	New events	PBS allows hooks that run once a job is at the execution host, and hooks that periodically run on all execution hosts.

### 3.3.11 File Changes

**Table 3-11: File Changes**

PBS Version	Change
2020.1	The sgiICEplacement.sh script is unsupported (in unsupported directory)
2020.1	The sgiICEvnode.sh script is unsupported (in unsupported directory)
2020.1	The sgigenvodelist.awk script is unsupported (in unsupported directory)
19.2.3	PBS ships with an empty holidays file. To use non-primetime or holidays, the administrator must fill in the holidays file.
18.2.1	New debuginfo RPM files
13.0	The resourcedef file is deprecated (13.0)

### 3.3.12 Licensing Changes

**Table 3-12: Changes to Licensing**

PBS Version	Change
2020.1	PBS uses either node (PBSProNodes) or socket (PBSProSockets) licenses, but not both. PBS does not use any other type of license.
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.

### 3.3.13 API Changes

**Table 3-13: Changes to API**

PBS Version	Change
19.4.1	PBS TCL API is deprecated, including <code>pbs_tclapi</code> , <code>pbs_tclsh</code> and <code>pbs_wish</code>

### 3.3.14 MPI Changes

**Table 3-14: Changes to Supported MPIs**

PBS Version	Change
2021.1.3	Support for LAM MPI is removed, including the <code>pbs_mpilam</code> and <code>pbs_lamboot</code> commands.



### 3.3.15 Budgets Changes

**Table 3-15: Changes to Budgets**

PBS Version	Change
2025.1	New <code>am.conf</code> parameter <code>AM_SERVICE_PROTOCOL</code>
2024.1	New <code>am.conf</code> parameters <code>AM_AUTH_USER</code> , <code>AM_SSHLOGIN_PORT</code>
2022.1.3	Separate services for gateway, operations, transactions, database
2022.1.3	New <code>am.conf</code> parameters <code>AM_GATEWAY_PORT</code> (replaces <code>AM_PORT</code> ), <code>AM_OPERATION_PORT</code> , <code>AM_OPERATION_WORKERS</code> , <code>AM_TRANSACTION_PORT</code> , <code>AM_TRANSACTION_WORKERS</code>
2022.1.3	New command to manage services <code>amgr {start stop restart status} services</code>
2022.1.3	New install option <code>./install -n</code>
2022.1.3	New <code>amgr {start stop restart status} services</code> command
2022.1.2	New <code>scenario</code> parameter for <code>amgr update clouddata</code> command
2022.1.2	New <code>--scenario &lt;scenario name&gt;</code> argument for <code>amgr ls clouddata</code> command
2022.1.2	New <code>amgr update clouddata --cloud-account &lt;cloud account&gt; --percentage-overhead &lt;percentage overhead cost&gt;</code> command
2022.1.2	New output format for reports
2022.1.2	Automatic cloud cost updates via <code>am_cloud_update</code> hook
2022.1.2	New <code>--cloud-account &lt;cloud account&gt; --percentage-overhead</code> option to <code>amgr update clouddata</code> command
2022.1.2	New <code>scenario</code> and <code>active</code> parameters for <code>amgr update clouddata</code> command
2022.1.2	New <code>scenario</code> option to <code>amgr ls clouddata</code> command
2022.1.2	New <code>AM_WORKER_TIMEOUT</code> configuration parameter in <code>/etc/am.conf</code>

### 3.3.16 Documentation Changes

**Table 3-16: Documentation Changes**

PBS Version	Change
2024.1	New GraphQL web API guide (available separately and included in Big Book)
2022.1.3	2022.1.3 version of Budgets Guide
2022.1.2	Special Budgets chapter in Release Notes (moved to Budgets Guide in 2022.1.3)
2022.1	Chapter on using PBS Cloud moved from Cloud guide to User's guide
2022.1	Administrator's Guide chapter on Cray combined with chapter on HPE
2022.1	Administrator's Guide chapters reorganized
2022.1	Chapter on using Budgets added to User's guide

Table 3-16: Documentation Changes

PBS Version	Change
2021.1.1	Complete rewrite of Simulate Guide
2021.1	Chapter on NEC SX-Aurora TSUBASA added to Administrator's Guide
2021.1	SELinux chapters added to Administrator's and User's Guides
2021.1	Complete rewrite of Budget Guide
2020.1	Terminology change: "parent vnode" replaces "natural vnode".
2020.1	Four new guides: Licensing for PBS Professional, Cloud, Budget, and Simulate
19.4.1	New Developer Headers and Libraries chapter in Programmer's Guide; Intro chapter removed
19.4.1	Batch Interface Library chapter in Programmer's Guide substantially rewritten
19.4.1	Starting and Stopping chapter in Install Guide split into separate Linux and Windows chapters
19.2.1	Information on how to license PBS Professional is moved to the "Licensing PBS Professional" chapter in the <i>PBS Works Licensing Guide</i> from the <i>PBS Professional Installation &amp; Upgrade Guide</i> .
19.2.1	New Reference Guide chapters for the PBS configuration file and log levels
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 <code>pbs_comm</code> daemon.

**Table 3-16: Documentation Changes**

<b>PBS Version</b>	<b>Change</b>
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 Bug Lists for PBS Professional

For bug lists for Budgets, see [section 4.2, “Bug Lists for Budgets Module”, on page 82](#).

#### 4.1.1 Modifications and Bug Fixes in PBS Professional 2025.2.1

The following bugs are fixed in PBS 2025.2.1:

**Table 4-1: Bugs Fixed in PBS Professional 2025.2.1**

JIRA ID	Description
HPCPBS-31475	Job stuck in either R/substate 4 or E when last reply to server indicating mother superior has purged the job is lost by the comm router network
HPCPBS-31498	Server hangs (and spurious failovers) because of internal task queue processing when job is deleted and dependent jobs are deleted as a consequence
HPCPBS-31540	Scheduler crash while confirming a reservation
HPCPBS-31543	PBS Shepherd supporting CentOS7 containers
HPCPBS-31583	Container mount_paths access control is working only for 1 file
HPCPBS-31584	cherry pick - multinode sandbox job fails running on numa and non-numa nodes with vnode_per_numa_node=true
HPCPBS-31599	K8s hook execjob_end hook running on NON-K8s jobs
HPCPBS-31652	GQL: Eligible Time Discrepancy in PBS qstat Output and GraphQL Query
HPCPBS-31690	Incorrect use of qdel -Wsuppress_email results in segmentation fault
HPCPBS-31705	PBS_cray_atom hook is broken due to using requests module version 2.32.3
HPCPBS-31722	Scheduler not coming up after failback in failover setups
HPCPBS-31725	Incorrect use of qdel -Wsuppress_email results in segmentation fault
HPCPBS-31726	Altering start and end time on a running reservation does not reset the resource_assigned attribute on node.
HPCPBS-31730	pbs_attach -j <jid> -p <pid> : Mom is not attaching the pid with the job in a cgroup env
HPCPBS-31733	qsub in interactive mode does not source user's shell profile (2025.2)
HPCPBS-31740	Unset/Clear Job Dependency General-Use Command
HPCPBS-31785	pg_ctl error during PBS upgrade
HPCPBS-31789	Server crash observed on PBS GQL API scan

**Table 4-1: Bugs Fixed in PBS Professional 2025.2.1**

JIRA ID	Description
HPCPBS-31809	Security escalation with root environment exposed to users with pbs_shepherd
HPCPBS-31823	PBS_sx_aurora Hook Failing to Parse All VEs
HPCPBS-31827	pbs_mom crashes with segmentation fault in get_index_and_parent
HPCPBS-31830	CLONE - pbs_tmrsh/pbsdsh jobs are not finished when cgroups is enabled.
HPCPBS-31837	Cgroups CPU assignment not working correctly on Intel Xeon 6980P (Granite Rapids) platform with 128 CPU cores and 3 NUMA nodes per socket
HPCPBS-31843	During migration upgrade, while moving array jobs from old server to new server failing with "qmove: Job rejected by all possible destinations 3[].master"
HPCPBS-31849	mom is not killing attached (pbs_attach/tm_attach) processes when the job ends
HPCPBS-31884	interactive job not executed successfully.
HPCPBS-31911	Jobs on MLS machines are exiting with exit status 254
HPCPBS-31912	pbs_mom crashed on uv-02-s12 with exclude_cpus.
HPCPBS-31916	pbs_mom goes down when job_id length is less than 11 character and job directory is already present.
HPCPBS-31919	K8s_Connector: Jobs are being submitted within 30 seconds for pending pods, even though the node_init_time and job_submission_threshold values are different.
HPCPBS-31971	Upgrade fails due to insufficient buffer size for db password

### 4.1.2 Modifications and Bug Fixes in PBS Professional 2025.2.0

The following bugs are fixed in PBS 2025.2.0:

**Table 4-2: Bugs Fixed in PBS Professional 2025.2.0**

JIRA ID	Description
HPCPBS-18858	provisioning log message sometimes missing job id
HPCPBS-24003	Scheduler does not check if resource is consumable before adjusting resources_assigned for the queue/server
HPCPBS-28259	Running exclusive reservation nodes showing as free if reconfirmed or altered
HPCPBS-28646	qalter walltime allows change that kills jobs
HPCPBS-28896	Avoiding server hold by changing job dependency (Exploit)
HPCPBS-29096	pbs_snapshot should pass over files it can't read
HPCPBS-29645	PBS is not properly licensing nodes after server restart in the absence of GlobalZoneXX features
HPCPBS-29800	comm crash on multiple restarts
HPCPBS-29823	When a user submits a job with an invalid resource name, instead of the job being rejected and error returned to qsub, the job is accepted and a PBS job ID is returned to the user
HPCPBS-29840	qsub With '-lselect=2 -lplace=scatter' Takes Extra 10s Every Time

**Table 4-2: Bugs Fixed in PBS Professional 2025.2.0**

<b>JIRA ID</b>	<b>Description</b>
HPCPBS-29851	Server is crashing while restarting PBS
HPCPBS-29869	Nodes is not getting licensed even though license is available
HPCPBS-29871	Nodes not using the sockets licenses
HPCPBS-29878	PBS server is using more licenses than the needed
HPCPBS-29948	Failed to configure OpenMPI with PBS TM Interface
HPCPBS-29958	Misconfiguration Causes pbs_server.bin To Repeatedly Spawn Undying Processes
HPCPBS-29990	worrisome mom log message "could not delete job info from gpulib."
HPCPBS-30016	Dependency job submission is failing with "qsub: Access from host not allowed, or unknown host" when PBS configured with PBS_SERVER_HOST_NAME
HPCPBS-30047	history jobs show in general qstat after server restart
HPCPBS-30056	PBS data service not coming up on host with IPv4 and IPv6 configured
HPCPBS-30061	Topology info truncated
HPCPBS-30081	Nodes are not getting licensed after release
HPCPBS-30099	Moved jobs are listed in qstat output after server restart
HPCPBS-30190	New 2024.2 MoM Container Code Inadvertently Modifies PBS_CONTAINER_ARGS
HPCPBS-30191	Job which conflicts with top jobs/reservations can be run by scheduler if the last resource in the select statement requests 0, pushing out start time of top jobs
HPCPBS-30210	Failed to delete 40k jobs using "qdel -Wforce "
HPCPBS-30234	PBS Pro: Comm Daemon has a low limit for max. open files limiting connected mom daemons to circa 500
HPCPBS-30235	Unsetting attribute on all vnodes of multivnode host crashes server (e.g. pbsnodes -C "" <host>)
HPCPBS-30236	Job Stuck in R state - MoM cannot reconnect to server
HPCPBS-30248	Job starter returns hang for minutes when server sends a lot of jobs to start on a node, delaying job starts for minutes
HPCPBS-30254	qsub -jeo and -keo are not supported
HPCPBS-30311	large pbs_comm network breaks too often (marks thousands of nodes down)
HPCPBS-30336	a pbsnodes call for a single node/vnode needlessly gets information for ALL nodes/vnodes
HPCPBS-30362	PBS GQL: Job name is incorrectly limited to 64 characters
HPCPBS-30373	bucket algorithm won't reuse a node between chunks with -lplace=free
HPCPBS-30385	pbs_topologyinfo (and possibly pbs_server) fails to detect GPUs in some circumstances
HPCPBS-30386	pbs_topologyinfo is not properly calculating amount of node licenses based on the number of devices detected
HPCPBS-30452	provided pbs libraries are not being detected
HPCPBS-30461	Sched Daemon Silently Crashes (aka cores)
HPCPBS-30551	hook with event exehost_periodic is running on server

**Table 4-2: Bugs Fixed in PBS Professional 2025.2.0**

<b>JIRA ID</b>	<b>Description</b>
HPCPBS-30567	when using cgroups scheduler may assign jobs to host that deplete swap, leading to killed jobs; handling of mem and memsw too inflexible
HPCPBS-30599	init_msi easy to confuse: when there is only one server, then "we" are the one server and no peer-ing is necessary
HPCPBS-30608	Observed server crash while using ssl library inside Budgets hook on sles12 platform
HPCPBS-30619	Cgroup hook crashes if ANY process on the system has more than two spaces in its name
HPCPBS-30620	default_qsub_arguments broken on 2024.1.0 when doing multiple qsubs from one single user, unless qsub -f is used
HPCPBS-30675	Altair Confidential: qsub -I and qsub -X security problems (authentication)
HPCPBS-30679	qstat is sometimes showing finished jobs when it should not
HPCPBS-30744	Hosts with short names could have csh array jobs to get terminated with "Exit status=1" after moving to mom
HPCPBS-30752	Altair Confidential Security issue: Munge, PWD, TLS auth vulnerability allows any user to impersonate others including root. Daemon to daemon communication missing authorization
HPCPBS-30787	qstat -Bf hangs and /etc/init.d/pbs stop hangs
HPCPBS-30804	Server Crash After MoM Restart
HPCPBS-30836	PBS failover issue when only the server crashes but not the scheduler
HPCPBS-30856	GPU devices of a node is not counted in socket licensing
HPCPBS-30983	Vnodes are not licensed after server restart
HPCPBS-31089	HA failover with IP address takeover by new server host fails to register with comm daemons (improper handling of duplicate registration)
HPCPBS-31106	Critical performance issue in svr_dequejob hangs server if there are a lot of (history) jobs
HPCPBS-31114	Unable to submit jobs using the wlmhpc-token file as the hpctoken filename.
HPCPBS-31117	Segmentation Fault after enabling cgroups on x69
HPCPBS-31125	Jobs are failing with GLIBC issue on SLES12
HPCPBS-31134	JOB_MODIFIED event missing for E state updates
HPCPBS-31140	resources_available.ngpus suddenly appears on the natural vnode after a job is run when vnode_per_numa is enabled
HPCPBS-31146	JOB_MODIFIED events missing for substate changes in case of long file stagein
HPCPBS-31203	Dummy data is getting updated using pbs_update_certs for cert.pem
HPCPBS-31270	Maintenance reservations only work if all nodes specified are on default partition (even though they are accepted for other nodes).
HPCPBS-31271	qsub -X -I fails when IP v6 is disabled
HPCPBS-31272	Listen queue in net_server still "256" and too low
HPCPBS-5607	MoMs that are reimaged or have corrupt JB files create zombie 'R' jobs on reboot



### 4.1.3 Modifications and Bug Fixes in PBS Professional 2025.1.0

The following bugs are fixed in PBS 2025.1.0:

**Table 4-3: Bugs Fixed in PBS Professional 2025.1.0**

JIRA ID	Description
HPCPBS-30678	qstat with -E performance is showing degradation in latest 2024.1.1 build
HPCPBS-31080	Maintenance reservations only work if all nodes specified are on default partition (even though they are accepted for other nodes).
HPCPBS-31218	Add support for per core Altair unit licensing
HPCPBS-31224	ARM build fails with compilation error
HPCPBS-31248	qsub -X -I fails when IP v6 is disabled
HPCPBS-31249	Listen queue in net_server still "256" and too low
HPCPBS-31250	Critical performance issue in svr_dequejob hangs server if there are a lot of (history) jobs
HPCPBS-31251	Job Stuck in R state - MoM cannot reconnect to server
HPCPBS-31252	HA failover with IP address takeover by new server host fails to register with comm daemons (improper handling of duplicate registration)
HPCPBS-31273	pbs_topology have formatting issue

### 4.1.4 Modifications and Bug Fixes in PBS Professional 2024.1.2

The following bugs are fixed in PBS 2024.1.2:

**Table 4-4: Bugs Fixed in PBS Professional 2024.1.2**

JIRA ID	Description
HPCPBS-30361	PBS GQL: Job name is incorrectly limited to 64 characters.
HPCPBS-30536	qsub -Wblock=true blocks the job forever.
HPCPBS-30659	Unable to run container jobs with latest docker(version >= 26.0.0).
HPCPBS-30665	qstat is sometimes showing finished jobs when it should not.
HPCPBS-30672	unable to run container jobs using ngpus in job request.
HPCPBS-30706	In the failover setup, webapi is not starting on the secondary server.
HPCPBS-30707	PBS server crashes when a job is submitted from GQL playground with an empty space in commandArgs field, need to make error handling safe for pbs_server.
HPCPBS-30714	Job reruns 21 times and moves to H state if pbs.event().job.rerun() is called once in a hook.
HPCPBS-30826	Error while enabling pbs on sles15 platforms through systemctl command.
HPCPBS-30849	Nodes are not getting licensed after release.

**Table 4-4: Bugs Fixed in PBS Professional 2024.1.2**

JIRA ID	Description
HPCPBS-30854	PBS is not properly licensing nodes after server restart in the absence of GlobalZoneXX features.
HPCPBS-30982	Vnodes are not licensed after server restart.
HPCPBS-30992	change the pbs_tcp_timeout assignment to avoid TM breakage.
HPCPBS-31032	qstat -Bf hangs and /etc/init.d/pbs stop hangs.

## 4.1.5 Modifications and Bug Fixes in PBS Professional 2024.1.1

The following bugs are fixed in PBS 2024.1.1:

**Table 4-5: Bugs Fixed in PBS Professional 2024.1.0**

JIRA ID	Description
HPCPBS-28272	Running exclusive reservation nodes showing as free if reconfirmed or altered
HPCPBS-29680	pbs snapshot should pass over files it can't read
HPCPBS-29824	When a user submits a job with an invalid resource name, instead of the job being rejected and error returned to qsub, the job is accepted and a PBS job ID is returned to the user
HPCPBS-29834	qsub With '-lselect=2 -lplace=scatter' Takes Extra 10s Every Time
HPCPBS-30061	Topology info truncated
HPCPBS-30193	Job which conflicts with top jobs/reservations can be run by scheduler if the last resource in the select statement requests 0, pushing out start time of top jobs
HPCPBS-30245	Moved jobs are listed in qstat output after server restart
HPCPBS-30276	qsub command failing with libcurl error
HPCPBS-30289	PBS Pro: Comm Daemon has a low limit for max. open files limiting connected mom daemons to circa 500
HPCPBS-30313	large pbs comm network breaks too often (marks thousands of nodes down)
HPCPBS-30314	Unsetting attribute on all vnodes of multivnode host crashes server (e.g. pbsnodes -C "" <host>)
HPCPBS-30325	Job starter returns hang for minutes when server sends a lot of jobs to start on a node, delaying job starts for minutes
HPCPBS-30393	node sort key with UNUSED is does not re-sort when you use placement sets
HPCPBS-30411	bucket algorithm won't reuse a node between chunks with -lplace=free
HPCPBS-30462	Sched Daemon Silently Crashes (aka cores)
HPCPBS-30467	GQL queries/mutations bypass Access Control Lists (like acl users)
HPCPBS-30491	Windows mom is down after making windows-linux cluster
HPCPBS-30539	resources used cput and mem not being accrued/reported on ubuntu platform
HPCPBS-30619	Cgroup hook crashes if ANY process on the system has more than two spaces in its name

## 4.1.6 Modifications and Bug Fixes in PBS Professional 2024.1.0

The following bugs are fixed in PBS 2024.1.0:

**Table 4-6: Bugs Fixed in PBS Professional 2024.1.0**

JIRA ID	Description
PBS-27364	mom fix to vmem enforcement by MoM kills jobs when vmem is requested as per cgroups hook semantics
PBS-28518	Replace interpreter restart with GC
PBS-28611	Ubuntu 22.04 LTS : gcc (Ubuntu 11.2.0-19ubuntu1) 11.2.0 : Compilation warnings and cpack errors
PBS-28727	Server deadlocks because requests issued by server to itself using the network
PBS-28759	user hitting queue limit with less number of jobs in the cluster
PBS-28770	Delete vnodes of cloud nodes before unbursting
PBS-28795	cpupercent wrong for multihost jobs when using cgroup hook
PBS-28829	Queued job started before the resources are released by exiting job
PBS-28973	Job abruptly terminated after a node restart
PBS-28997	Segmentation Fault due to adding multiple management hooks or order=2 with debug=true
PBS-28999	The current check for whether systemd is running does not take into account if the systemctl command is available.
PBS-29033	eligible_time accrual based on a queue limit impacted by what should be an unrelated server limit
PBS-29074	Server cash (and other issues) when using qdel on array with running subjob that hits QDEL_BREAKER_SECS limit
PBS-29079	Server should not accept starting subjobs for arrays in the process of deletion
PBS-29080	qdel of an array without -x purges subjobs immediately
PBS-29081	SVR_CLEAN_JOBHIST_TM should be configurable...or should "autotweak" itself
PBS-29083	Reduce PBS Pro execution RPM file size
PBS-29089	Windows MoM support for \$enforce mem for large jobs
PBS-29094	Overlay upgrade fails when upgrading from 2020.1.0 to 2022.1.1
PBS-29147	tpp_client spurious check breaks PBS_SERVER_HOST_NAME for MoM
PBS-29167	If server has active connection to the scheduler, it won't accept another even if original is dead.
PBS-29220	cgroups typos (pbs.int, pbs.float) and corner cases (resc_used['cpuperecent'] set to None)
PBS-29241	Windows MoM should allow SIGNULL-like suspend and resume signals without terminating job
PBS-29264	standing reservation in unexpected state crashes server and even prevents server restart; pbs_ralter doesn't work either (and may be causing it)
PBS-29274	PBS Server crashes if user request a large walltime
PBS-29280	Setting pbs_license_min large enough to deplete global pool breaks node licensing at startup of server
PBS-29316	qdel corrupts memory with invalid access

**Table 4-6: Bugs Fixed in PBS Professional 2024.1.0**

<b>JIRA ID</b>	<b>Description</b>
PBS-29321	createJobs mutation fails with malloc error even there is enough memory available
PBS-29322	deleteJob mutation select running jobs while it was asked to delete only queued job
PBS-29324	PBS server fails to start after enabling Web API
PBS-29331	Support maximum password length in newer Windows version
PBS-29366	Job not deleted from sister nodes after the Mother superior failure
PBS-29388	getJobs query output difference than qstat
PBS-29410	Need mechanism to avoid spurious OOM killer kills on recent kernels (e.g. 4.18+) when using lots of page cache in cgroup hook
PBS-29412	qstat output "server_host" (SVR_ATR_SvrHost) may be stale when not using PBS failover
PBS-29511	MLS interactive job not working
PBS-29543	Absurdly long dependency list crashes PBS Server
PBS-29621	Sim qsub is crashing
PBS-29685	Improper Memory Exceeded message   PBS v2022.1.3
PBS-29736	Race condition when setting dependencies on jobs when they are between stageout and finished states
PBS-29744	qselect -J is not working as expected
PBS-29745	Node creation and attribute setting unbearably slow on large clusters.
PBS-29761	Failed to install mom on xarm-01-s15 machine
PBS-29805	setting env PBS_CLIENT_CONN_RETRY_INTERVAL=0 should not be accepted
PBS-29835	comm crash on multiple restarts
PBS-29837	pbs_comm segfault and crash in 2022.1.3
PBS-29847	PBS clients must add X-Forwarded-For with ip address of source request in every connect
PBS-29854	Mismatched value for jobPlacement and jobPlacementSharing in GQL schema doc strings
PBS-29898	GQL: PBS qstat doesn't show place value even if it is requested
PBS-30009	localhost is not working with -o option in qsub

## 4.1.7 Modifications and Bug Fixes in PBS Professional 2022.1.7

The following bugs are fixed in PBS 2022.1.7:

**Table 4-7: Bug Fixes in PBS Professional 2022.1.7**

JIRA ID	Description
HPCPBS-30848	Error while enabling pbs on sles15 platforms through systemctl command.
HPCPBS-30853	PBS is not properly licensing nodes after server restart in the absence of GlobalZoneXX features.
HPCPBS-30979	Vnodes are not licensed after server restart.
HPCPBS-30991	change the pbs_tcp_timeout assignment to avoid TM breakage.

## 4.1.8 Modifications and Bug Fixes in PBS Professional 2022.1.6

The following bugs are fixed in PBS 2022.1.6:

**Table 4-8: Bug Fixes in PBS Professional 2022.1.6**

JIRA ID	Description
HPCPBS-30061	Topology info truncated
HPCPBS-30268	Race condition when setting dependencies on jobs when they are between stageout and finished states
HPCPBS-30312	large pbs comm network breaks too often (marks thousands of nodes down)
HPCPBS-30315	Unsetting attribute on all vnodes of multivnode host crashes server (e.g. pbsnodes -C "" <host>)
HPCPBS-30324	Job starter returns hang for minutes when server sends a lot of jobs to start on a node, delaying job starts for minutes
HPCPBS-30335	PBS Pro: Comm Daemon has a low limit for max. open files limiting connected mom daemons to circa 500
HPCPBS-30392	node sort key with UNUSED is does not re-sort when you use placement sets
HPCPBS-30468	Sched Daemon Silently Crashes (aka cores)
HPCPBS-30472	Running exclusive reservation nodes showing as free if reconfirmed or altered
HPCPBS-30482	Windows mom is down after making windows-linux cluster
HPCPBS-30509	Altering A Reservation At The Reservation Start-time Does Not Change Node State
HPCPBS-30539	resources used cput and mem not being accrued/reported on ubuntu platform

### 4.1.9 Modifications and Bug Fixes in PBS Professional 2022.1.5

The following bugs are fixed in PBS 2022.1.5:

**Table 4-9: Bug Fixes in PBS Professional 2022.1.5**

JIRA ID	Description
PBS30192	Job which conflicts with top jobs/reservations can be run by scheduler if the last resource in the select statement requests 0, pushing out the start time of top jobs

### 4.1.10 Modifications and Bug Fixes in PBS Professional 2022.1.4

The following bugs are fixed in PBS 2022.1.4:

**Table 4-10: Bug Fixes in PBS Professional 2022.1.4**

JIRA ID	Description
PBS-29512	MLS interactive job not working
PBS-29715	qmgr command slowness
PBS-29716	pbs_server updates every node in database when runjob rejects a job
PBS-29718	Improper Memory Exceeded message   PBS v2022.1.3
PBS-29719	pbs_comm open file limit hard coded to 8192
PBS-29747	Node creation and attribute setting unbearably slow on large clusters.
PBS-29791	pbs_comm segfault and crash in 2022.1.3
PBS-29801	comm crash on multiple restarts
PBS-29826	Absurdly long dependency list crashes PBS Server
PBS-29846	Server is crashing while restarting PBS

### 4.1.11 Modifications and Bug Fixes in PBS Professional 2022.1.3

The following bugs are fixed in PBS 2022.1.3:

**Table 4-11: Bug Fixes in PBS Professional 2022.1.3**

JIRA ID	Description
PBS-28618	Estimated Start time format incorrect in qstat -w output
PBS-28621	Add Ubuntu 22.04 LTS as a supported platform for x86_64 and ARM
PBS-28818	user hitting queue limit with less number of jobs in the cluster

**Table 4-11: Bug Fixes in PBS Professional 2022.1.3**

<b>JIRA ID</b>	<b>Description</b>
PBS-28846	Server deadlocks because requests issued by server to itself using the network
PBS-29018	pbs_est overwrites fairshare usage file and injects 'future' simulated usage (possibly over and over again)
PBS-29079	Server should not accept starting subjobs for arrays in the process of deletion
PBS-29080	qdel of an array without -x purges subjobs immediately
PBS-29139	Overlay upgrade fails when upgrading from 2020.1.0 to 2022.1.1
PBS-29145	decode_Mom_list dynamic allocation bug crashes server when there are exactly three MoM attribute entries (or silently corrupts heap)
PBS-29149	Setting pbs_license_min large enough to deplete global pool breaks node licensing at startup of server
PBS-29275	PBS Server crashes if user request a large walltime
PBS-29278	pbs_rcp is vulnerable to command injection
PBS-29279	SVR_CLEAN_JOBHIST_TM should be configurable...or should "autotweak" itself
PBS-29281	Job abruptly terminated after a node restart
PBS-29282	Suppression of RPP messages in pbs_rmget output breaks its use as a pbs_comm monitor in HA scripts
PBS-29283	cgroups typos (pbs.int, pbs.float) and corner cases (resc_used['cpuperecent'] set to None)
PBS-29284	PBS 2022.1.1 breaks pbs_server -N
PBS-29304	Cgroups V2 not supported for anything, esp RHEL 9 and Ubuntu 22
PBS-29305	tpp_client spurious check breaks PBS_SERVER_HOST_NAME for MoM
PBS-29306	standing reservation in unexpected state crashes server and even prevents server restart; pbs_ralter doesn't work either (and may be causing it)
PBS-29307	If server has active connection to the scheduler, it won't accept another even if original is dead.
PBS-29308	Mixed Windows/Linux clusters break execjob_launch set argv and thus e.g. container hook
PBS-29309	resources_used end up wrong because sister MoMs send IS_RESCUED_FROM_HOOK to server
PBS-29316	qdel corrupts memory with invalid access
PBS-29317	Windows MoM \$enforce mem and pmem/pvmem limits broken for large jobs
PBS-29320	PBS_DATA_SERVICE_HOST not preventing local DB start and stop
PBS-29342	Support maximum password length in newer Windows version
PBS-29344	submitting a job requesting unknown resources into a routing queue causes DB error on job save and makes server shut down
PBS-29411	Need mechanism to avoid spurious OOM killer kills on recent kernels (e.g. 4.18+) when using lots of page cache in cgroup hook
PBS-29415	Support RHEL 9 on x86_64 and ARM64
PBS-29442	qstat output "server_host" (SVR_ATR_SvrHost) may be stale when not using PBS failover
PBS-29533	Control & PBS Cloud Hook: Update Required to Use Built in Resource and Avoid: Cloud nodes switch to PBS licenses when added with a cloud license signature.

## 4.1.12 Modifications and Bug Fixes in PBS Professional 2022.1.2

The following bugs are fixed in PBS 2022.1.2:

**Table 4-12: Bug Fixes in PBS Professional 2022.1.2**

JIRA ID	Description
PBS-27914	qstat -f -F json with escaped characters can concatenate variables
PBS-28594	Unable to pass environment variables with quotes to job
PBS-28617	Jobs remain in hold state if there are duplicate entries for the parent jobs in dependency list
PBS-28663	run_version recovery by server (from MoMs reporting the job) spuriously kills multihost jobs
PBS-28789	Jobs do not run on vnodes with node hour license
PBS-28838	Migration upgrade from openPBS to 2022.1.0 failed since "pgsql.forupgrade" directory was not present under PBS_HOME path after installing new PBS version
PBS-28912	Cray ATOM hook will offline nodes if a user name is not yet visible from an execution host
PBS-28932	secondary pbs_server process fails to daemonize correctly
PBS-28936	qstat -xf -F json output is escaping ';' with '\;' in environment
PBS-28963	user that has the default login group job gets Held with "No Group Entry for Group -default-" in the mom log
PBS-28968	Upgrade from 19 to 2022 yields unstable pbs_comm network
PBS-28976	cpupercent wrong for multihost jobs when using cgroup hook
PBS-28978	Migration Upgrade from 2020.1.4 to 2022.1.1: Server crashes on upgrade
PBS-28998	Segmentation Fault due to adding multiple management hooks or order=2 with debug=true
PBS-29001	exclhost reservations that use select specifier with multiple chunks using multi-vnode hosts are broken in parse_execvnode
PBS-29013	server crash or memory corruption when the same job id is repeated in a qdel command
PBS-29021	memory 'enforce_default' False broken if /proc/meminfo MemTotal changes on node
PBS-29022	Submit_Host, job owner output and error paths when using Munge over NAT point to the NAT host (breaks file staging, -Wblock=true and host ACLs)
PBS-29024	Recent SLES15 breaks cgroup hook systemd version detection (and systemd interaction)



### 4.1.13 Modifications and Bug Fixes in PBS Professional 2022.1.1

The following bugs are fixed in PBS 2022.1.1:

**Table 4-13: Bug Fixes in PBS Professional 2022.1.1**

JIRA ID	Description
PBS-28616	Daemonized qsub causes foreground qsub failures when it decides to quit.
PBS-28731	simulator works without SIM_LICENSE_LOCATION set
PBS-28803	Job throughput may be reduced with hooks configured
PBS-28810	qstat temporary files are not getting cleared from tmp directory in cloud hook
PBS-28816	Available license count calculation is incorrect in cloud hook
PBS-28817	Delete vnodes of cloud nodes before unbursting
PBS-28850	Jobs would get killed when run with cgroups enabled
PBS-28885	Replace interpreter restart with GC
PBS-28956	Node state and node comments are not persistent after PBS restart

### 4.1.14 Modifications and Bug Fixes in PBS Professional 2022.1.0

The following bugs are fixed in PBS 2022.1.0:

**Table 4-14: Bug Fixes in PBS Professional 2022.1.0**

JIRA ID	Description
PBS-15423	umask is not overridden when used in default_qsub_arguments
PBS-17009	resources_max limits on pulling queue not honored when using local peering
PBS-17028	node_fail_requeue causes duplicate accounting records for job
PBS-17547	possible buffer overflow in scheduler (replace strcpy() with strncpy() or snprintf())
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-19837	Resolve break_comma_list() potential memory leak
PBS-19894	-Wumask does not work as expected in case -Wsandbox=PRIVATE is used
PBS-20048	Resolve check_avail_resources new_schd_error valgrind reported memory leak
PBS-22305	Race condition such that 1st attempt by server to send job back to same mom fails if it was rerun by a hook, succeeds on 2nd attempt
PBS-22431	pbsfs -d/-e does not reset the last decay time.
PBS-22558	Upgrade libical to something more recent than libical 1.0.1 to fix other tickets
PBS-23393	qstat produces invalid json when environment variable has special char or quotes in value

**Table 4-14: Bug Fixes in PBS Professional 2022.1.0**

<b>JIRA ID</b>	<b>Description</b>
PBS-23641	provisioning jobs stay in substate 71 after provisioning otherwise succeeds if ANY node has a pending hook update
PBS-23722	pbs_sched crash when it loses connection to pbs_comm
PBS-23731	PBS fails local peering on server with multiple IPs
PBS-23946	Race condition in receiving resources_used from sister MoM and sending to server
PBS-23963	obfuscate option is broken in pbs_snapshot command
PBS-23988	qstat -f -F json output does not escape embedded double-quotes and breaks the json syntax
PBS-24146	address github tracker 1469: pbs_mom core dump in post_reply()
PBS-24147	address github tracker 1255: qstat JSON output and (non-)numeric environment variables
PBS-24172	small memory leak parsing server_dyn_res scripts on HUP
PBS-24175	release_nodes_on_stageout : 64 CPU jobs that have released 32 CPUs on stageout are requeued on failure as 32cpu jobs
PBS-24270	PBS Container hook fails due to Nvidia docker interface changes
PBS-24297	Unset behavior of scheduler attribute preempt_sort is not working as expected
PBS-24408	jobs can overlap with a reservation after a failed ralter
PBS-24515	pbs_server core dump on restart if “restrict_res_to_release_on_suspend” attribute is empty and there is a suspended job
PBS-24719	Scheduler can hang if HUP’d when reopening its log (for multischeds)
PBS-24814	Jobs don’t accrue eligible time by default
PBS-24816	qmsg to a windows job works but still returns failure message
PBS-24891	pbs command is failing on failover setup with auth: error returned: -1
PBS-24951	Scheduler can run jobs that overlap with reservations with buckets/placement sets
PBS-24974	Incorrect qstat -xf -F json outut when backslashes are used
PBS-24990	Server crash when parent job id is same as dependent child job
PBS-24998	not all qstat attributes exist after a server restart
PBS-25015	pbs_sim -o before -d makes it ignore the output dir path
PBS-25018	Windows: env variable are not set properly for mom hook
PBS-25019	Windows: For frequently submitted job getpass.getuser() from mom hook return wrong value
PBS-25074	-11 JOB_EXEC_RERUN is not set to all jobs if multiple jobs are qrerun in a single command
PBS-25151	Turn off ‘memsw’ parameter in default pbs_cgroups hook config file.
PBS-25223	Big memory leak in simulator
PBS-25224	Add support for high res timestamp in pbs_sim
PBS-25234	If the first occurrence of a standing reservation is moved sooner, it is possible to overlap a reservation over a later occurrence
PBS-25253	If a standing reservation is altered and the server is restarted, the next occurrence will not revert

**Table 4-14: Bug Fixes in PBS Professional 2022.1.0**

<b>JIRA ID</b>	<b>Description</b>
PBS-25254	if a reservation is in state BEING_ALTERED and the server is restarted, the reservation is left in an unstable state
PBS-25255	If a reservation is in state being altered and the server restarts, it will never end
PBS-25273	If hook is run as “pbsuser”, we are unable to connect to server from hook on Windows
PBS-25278	pbs_snapshot with --obfuscate failed on remote hosts.
PBS-25287	pbs_ralter -D will modify duration, but not Resource_List.walltime, display issue, reservation behaves correctly
PBS-25467	pbs_ralter -D on a running reservation will double resources_assigned values
PBS-25566	backfill optimisation fuzziness introduces (preventable) jitter and creep in estimates start times and exec_vnodes
PBS-25618	Fix pbs_probe for nqs2pbs manpage
PBS-25636	simsh + qstat commands do not accept numerical job ids
PBS-25637	simsh <snapshot> pbsnodes offline & clear offline are not effective
PBS-25638	SIGSEGV error observed for an option of pbsnodes using simulator simsh
PBS-25650	SIGSEGV error observed for qselect with queue info using simulator
PBS-25668	out of order node_sort_key config value generates core file of pbs_sched
PBS-25703	pbs_sim and pbs_est have a big memory footprint
PBS-25712	“Number of jobs left over” displayed incorrectly in simulation summary
PBS-25723	stage_file not logging errors in-case of stage-out failures
PBS-25726	“simsh <snapshot> qsub -r n” sets incorrect value of job attribute “Rerunnable = n” instead of “False”
PBS-25735	scheduler does not update node partitions properly
PBS-25753	Ubuntu20.04 : x86 : Fix compilation errors
PBS-25771	PBS container job exits abruptly in MLS build.
PBS-25792	(state_count) Altering snapshot using simsh should update all related static files of it
PBS-25798	scheduler fails to calendar a job
PBS-25817	Standing reservation submission to simulator (simsh) with -D duration option fails
PBS-25821	Setting fairshare_entity to anything besides euser, eggroup, or queue won't work
PBS-25826	Ubuntu20.04 : ARM : Fix compilation errors
PBS-25840	Remove nqs2pbs command
PBS-25932	after uninstall PBS with pbs_cgroups hook, system pbs_job.service is left behind
PBS-25961	Fix invalid read in report_failed_node_hosts_task
PBS-26071	Scheduler crashes on confirming degraded reservation
PBS-26116	Container integration: Remove user's registry namespace container pull
PBS-26118	Specifying “host” in chunks of preempting jobs crashes the scheduler; specifying “vnode” in chunks for preempting jobs results in failure to preempt

**Table 4-14: Bug Fixes in PBS Professional 2022.1.0**

<b>JIRA ID</b>	<b>Description</b>
PBS-26235	Mom hooks not able to connect to server for Windows nodes
PBS-26253	PBS Container: Support multiple registries in token file for Docker access control
PBS-26420	Container hook: Add docker.io as default registry in “allowed_registries” of config
PBS-26422	PBS Container: Job dir mount conflict check is incomplete
PBS-26450	“pbs_sim --version” crashed with core dump
PBS-26453	pbs_tmsh invoked from sister moms errors out - “obit: host “n3” err no matching job found (17006)”
PBS-26546	simsh sim on snapshot path with trailing slash errors out
PBS-26547	pbs_sim SIGSEGV in get_conn_svr_instances()
PBS-26664	Sim : AddressSanitizer: heap-buffer-overflow
PBS-26757	float type formula_value for job structures renders formulas with even moderately large integers imprecise
PBS-26823	pbs_release_nodes not executed when qsig is issued to a running Job
PBS-26825	“pwd” authentication broken on RH8 because of “passwd” pam.d file
PBS-26919	Maintenance reservation doesn’t get confirmed on vnodes
PBS-26945	scheduler may crash when job queried has empty attribute values
PBS-26976	Some time svr_dyn_res_size is not getting updated, due to which test_res_size_runtime of TestServer-DynRes is failing
PBS-27001	Scheduler may oversubscribe node if more than one reservation is confirmed in one cycle
PBS-27006	PBSD_manager() operation(altering/holding/deleting on a job) on jobid cannot stop (exit this function) even after success
PBS-27010	Stats for some of the queues are missing while querying queues
PBS-27011	If primetime starts at midnight, the scheduler considers it 24hr primetime
PBS-27062	_base_types library does not deal well with pbs.size(“0mb”) or similar for gb/tb/pb
PBS-27080	queue_rank for multiple jobs can be same
PBS-27092	qsub sometimes rejects paths including the colon (“:”) character
PBS-27214	When the pbs_est hook alarm fires, it doesn’t kill the pbs_est processes
PBS-27216	PBS daemons fail to start on windows
PBS-27287	valgrind warnings in scheduler
PBS-27305	Cannot send job to mom due to tpp error
PBS-27317	Sandbox directory not deleted if jobs submitted with “-k oed” option
PBS-27352	pbs_snapshot --obfuscate can be very slow
PBS-27378	duplicate directive lines from qsub
PBS-27380	PBS directive extension incorrectly applied to regular comments, causing job script execution errors
PBS-27382	jobscript_max_size broken for scripts larger than 64k
PBS-27418	Volatile cgroup controller mounts (usually made by Docker) break cgroup hook

**Table 4-14: Bug Fixes in PBS Professional 2022.1.0**

<b>JIRA ID</b>	<b>Description</b>
PBS-27419	qdel overwrites the -Wforce flag
PBS-27420	Server can go into infinite loop because of qdel
PBS-27458	Some standard Python modules (e.g. sqlite) do not work on some distros (e.g. CentOS 8) from hooks
PBS-27489	Job is not running in mixed mode environment, if -v argument contains a key with value having ‘,’
PBS-27502	libsec not encoded into libpbs
PBS-27552	Error message “Failed to allocate memory” is confusing
PBS-27573	Resource_List.walltime is used for fairshare calculation instead of resources_used.walltime
PBS-27688	Preemption by checkpointing always succeeds if checkpointing is not set up
PBS-27760	pbs_rsub is throwing segmentation fault error on ubuntu16 container while using --hosts option
PBS-27774	qselect -tg.gt.<value> is broken: expects a datetime but eligible time is a duration
PBS-27777	Logging improvements to be able to do better diagnostics/performance of server
PBS-27834	qdel can sometimes hang forever
PBS-27867	PBS can delete a reservation which moves from degraded back to running
PBS-27898	Scheduler ignores preempted priority status of jobs after it runs one preempted job for that cycle
PBS-27906	deleting a resource which still is used in node_group_key breaks the server on a PBS restart
PBS-27910	possible sched crash if a maintenance reservation steals all nodes from another reservation
PBS-27930	Warning if /proc/cpuinfo CPU flags exceed 1024 characters
PBS-27986	qsub no longer sets PBS_O_HOST correctly (since tentative ‘move’ of assignment to background qsub)
PBS-27996	Altering an exclhost reservation will crash the scheduler
PBS-28000	too many nodes being job-exclusive for a single job
PBS-28022	“Node has no PBS license” message in the scheduler log
PBS-28208	simsh failed to run simulation for multiple options with latest PBS snapshot
PBS-28221	Buffer overrun in server do_schedselect()
PBS-28256	Server crashes when unsetting partition using empty string
PBS-28278	python error on Installation on Windows10 in Korean locale
PBS-28325	pbs_est is missing debug information
PBS-28391	qstat -E is skipping the jobs submitted on the same cluster when it is requested with the jobs of both cluster together
PBS-28436	Resources are not freed even when the node is released after pbs_ralter
PBS-28497	cgroup hook exechost_periodic race puts vnodes online spuriously just after execjob_epilogue has marked them offline
PBS-28505	NEC SX-Aurora TSUBASA topology parsing fails
PBS-28507	Jobs going to hold state on non-Aurora equipped nodes after enabling sx-Aurora pbs hook

**Table 4-14: Bug Fixes in PBS Professional 2022.1.0**

JIRA ID	Description
PBS-28538	Server crashing while altering a job when python_restart_max_objects is set
PBS-28590	pbs_est crashes due to simulator not treating complex dependencies correctly
PBS-28665	Vnodes of cloud nodes with cloud license remain unlicensed

### 4.1.15 Modifications and Bug Fixes in PBS Professional 2021.1.5

The following bugs are fixed in PBS 2021.1.5:

**Table 4-15: Bug Fixes in PBS Professional 2021.1.5**

JIRA Issue	Description
PBS-29480	MLS interactive job not working

### 4.1.16 Modifications and Bug Fixes in PBS Professional 2021.1.4

The following bugs are fixed in PBS 2021.1.4:

**Table 4-16: Bug Fixes in PBS Professional 2021.1.4**

JIRA Issue	Description
PBS-28341	umask is not overridden when used in default_qsub_arguments
PBS-28754	10 second alarm in dis_reply_write makes qstat -x -f fail when encoding reply takes almost 10 seconds
PBS-28845	Nodes in offline or job-busy state gets unlicensed after resetting pbs_license_info

### 4.1.17 Modifications and Bug Fixes in PBS Professional 2021.1.3

The following bugs are fixed in PBS 2021.1.3:

**Table 4-17: Bug Fixes in PBS Professional 2021.1.3**

JIRA Issue	Description
PBS-26742	PBS Windows Array Jobs do not generate the stdout and stderr with array_index when qsub -koe is used, previous job's files get overwritten
PBS-26815	multinode jobs with a hook that sets resources_used.mem=7gb reports 7340039gb used
PBS-27869	PBS can delete a reservation which moves from degraded back to running
PBS-28048	pbs_ralter -l select can release nodes with running jobs on them

**Table 4-17: Bug Fixes in PBS Professional 2021.1.3**

JIRA Issue	Description
PBS-28063	Simsh --version returns wrong sim version
PBS-28077	"Node has no PBS license" message in the scheduler log
PBS-28134	Selectively disable 'ngpus' resource management in the cgroup hook
PBS-28162	PBS Cloud: Correct value of pclm_server?
PBS-28168	No of pcpus and socket information reported incorrectly in Windows multiprocessor (pcpus >= 128), impacting licensing
PBS-28246	Jobs not ending on mother superior
PBS-28248	job equivalence class scheduling algorithm mishandles max_run_subjobs, which can needlessly prevent other jobs/subjobs from running
PBS-28279	pbs_est is missing debug information
PBS-28320	Add config only option to pbs_snapshot command
PBS-28321	Automate snapshot generation to capture the current PBS config within the cloud bursting hook.
PBS-28336	cgroup hook device isolation broken for Nvidia MIG (incorrect assumption about nvidia-smi GPU numbering)
PBS-28384	Runjob dependencies cause server crash when middle job in group submitted that ran terminates
PBS-28385	Nodes are not getting licensed on cpuset machines intermittently
PBS-28477	Cloud hook to provide more details to server_logs in case of "disabled scenario" in PBS Cloud or Altair Control

## 4.1.18 Modifications and Bug Fixes in PBS 2021.1.2

The following bugs are fixed in PBS 2021.1.2:

**Table 4-18: Bug Fixes in PBS Professional 2021.1.2**

JIRA Issue	Description
PBS-26150	subjobs are sometimes aborted on server restart
PBS-26532	Restore pbs_est logging facilities (but coherently with simulator output); integrate --fuzzy extension from 'master'
PBS-26748	PBS Container hook fails due to Nvidia docker interface changes
PBS-26764	pbs_est / job array / subjob estimated start time rollup patch fix
PBS-26812	qdel on job arrays hangs the server for minutes
PBS-27018	Scheduler may oversubscribe node if more than one reservation is confirmed in one cycle
PBS-27306	PBS_power periodic hook may hang (pt. 1)
PBS-27307	PBS daemons may fail to start on windows
PBS-27369	PBS_power periodic hook may hang (pt. 2)
PBS-27470	Server crashes when jobs are moved



**Table 4-18: Bug Fixes in PBS Professional 2021.1.2**

<b>JIRA Issue</b>	<b>Description</b>
PBS-27471	Some standard Python modules (e.g. sqlite) do not work on some distros (e.g. CentOS 8) from hooks
PBS-27515	server crashes after executing qalter if resource request is removed then added again
PBS-27561	After stage-in, job rerun always lands on the same node
PBS-27617	pbs_est is not working properly
PBS-27660	If primetime starts at midnight, the scheduler considers it 24hr primetime
PBS-27700	switch to obtaining nvidia a100 MIG identifier/UUID from nvidia-smi directly, rather than constructing tuple format
PBS-27711	pbs_rsub --hosts will frequently crash (dereferences uninitialized pointers)
PBS-27809	Latest libpbs.so built and shipped require libsec to be linked as well; breaks many MPI configure scripts
PBS-27820	PBS server slows down while recovering large number of jobs
PBS-27840	libsec not encoded into libpbs
PBS-27843	Remove Undo LR (Live Recorder) integration from PBSPro
PBS-27849	Logging improvements to be able to do better diagnostics/performance of server
PBS-27850	pbs_server restart breaks jobs dependency
PBS-27852	Server should update node state when it changes from sleep state for all nodes except cray_compute
PBS-27929	Warning if /proc/cpuinfo CPU flags exceed 1024 characters
PBS-28043	Qstat command Json output field types are not consistent
PBS-28045	Unsetting a resource via hook assigned to zero value instead of getting deleted

### 4.1.19 Modifications and Bug Fixes in PBS 2021.1.1

The following bugs are fixed in PBS 2021.1.1:

**Table 4-19: Bug Fixes in PBS 2021.1.1**

<b>JIRA Issue</b>	<b>Description</b>
PBS-25237	vmem enforcement by MoM kills jobs when vmem is requested as per cgroups hook semantics
PBS-26157	Nvidia A100 GPU: support MIG instances
PBS-26749	mom hooks raise exception if Debug is True and try to execute server functions
PBS-26900	Stop PBS from checking out GlobalZoneXX license FEATURES
PBS-26907	cgroup hook slows down job startup/teardown in device/GPU discovery even when 'devices' is disabled or no GPU mgmt is wanted
PBS-26933	MoM core dump when MOM_ALPS is enabled because of dereference of pointer to freed structure
PBS-26977	address github tracker 1469: pbs_mom core dump in post_reply()
PBS-27021	Job directory on MLS systems not getting deleted due to which job goes into H state



**Table 4-19: Bug Fixes in PBS 2021.1.1**

<b>JIRA Issue</b>	<b>Description</b>
PBS-27249	When the pbs_est hook alarm fires, it doesn't kill the pbs_est processes
PBS-27252	qsub sometimes rejects paths including the colon (":") character
PBS-27253	\$jobdir_root 'shared' directive does not handle sandbox on default location (in home dir)
PBS-27256	when using cgroup hook scheduler may assign jobs to host that deplete swap, leading to killed jobs; "defaults" for mem and memsw too inflexible
PBS-27323	server_dyn_res script hitting alarm leaks pipe file descriptors
PBS-27353	pbs_snapshot --obfuscate can be very slow
PBS-27379	duplicate directive lines from qsub
PBS-27381	PBS directive extension incorrectly applied to regular comments, causing job script execution errors
PBS-27383	jobscript_max_size broken for scripts larger than 64k
PBS-27407	jobs requesting 20 or more chunks and request nves fail
PBS-27408	Unexpected VE process placement on SX-Aurora
PBS-27423	cgroups hook execjob_resize broken by recent change to configure_job parameters
PBS-27428	Recent systemd version breaks cgroup hook systemd version detection
PBS-27469	Job is not running in mixed mode environment, if -v argument contains a key with value having ','
PBS-27488	User Environment is not getting passed from PBS when pbs starts running the job
PBS-27503	Bursting not triggered on customer system
PBS-27513	Windows MoM crashes if a job is submitted without running pbs_login

## 4.1.20 Modifications and Bug Fixes in PBS 2021.1

The following bugs are fixed in PBS 2021.1:

**Table 4-20: Bug Fixes in PBS 2021.1**

<b>JIRA Issue</b>	<b>Description</b>
PBS-13517	IntelMPI wrapper support job launch fails when submitting large jobs
PBS-25605	Simulator: pbsfs sub-command does not work with simsh
PBS-25636	simsh + qstat commands do not accept numerical job ids
PBS-25637	simsh <snapshot> pbsnodes offline & clear offline are not effective
PBS-25638	SIGSEGV error observed for an option of pbsnodes using simulator simsh
PBS-25639	Inconsistency with header output "### Snapshot: <snapshot path> ###"
PBS-25650	SIGSEGV error observed for qselect with queue info using simulator
PBS-25712	"Number of jobs left over" displayed incorrectly in simulation summary
PBS-25726	"simsh <snapshot> qsub -r n" sets incorrect value of job attribute "Rerunnable = n" instead of "False"

**Table 4-20: Bug Fixes in PBS 2021.1**

<b>JIRA Issue</b>	<b>Description</b>
PBS-25792	(state_count) Altering snapshot using simsh should update all related static files of it
PBS-25817	Standing reservation submission to simulator (simsh) with -D duration option fails
PBS-25818	SIGSEGV observed on submitting maintenance reservation in simulator
PBS-25843	pbs_sim does not work with relative path when PBS_SNAPSHOT_PATH is configured in sim.conf
PBS-25935	Optimization turn off option in simulation gives "unrecognized option" error when given as is in help message
PBS-26147	race condition in execution of endjob hook and job purge leads to mom crash
PBS-26148	Fix qstat JSON formatting issues with special characters
PBS-26149	jobs can overlap with a reservation after a failed ralter
PBS-26152	Specifying "host" in chunks of preempting jobs crashes the scheduler; specifying "vnode" in chunks for preempting jobs results in failure to preempt
PBS-26153	Upgrade libical to something more recent than libical 1.0.1
PBS-26155	Scheduler fails to find some types of ghost jobs/marks others as ghost jobs that it shouldn't, resulting in less/more resources available to run jobs
PBS-26156	release_nodes_on_stageout : 64 CPU jobs that have released 32 CPUs on stageout are queued on failure as 32cpu jobs
PBS-26251	Hook files not deleted from state down mom when node is deleted from server
PBS-26345	Scheduler server_dyn_res leaves trail of zombies depleting host PID space
PBS-26434	Unexpected behavior of unset attribute command in simsh <snapshot> qmgr -c "unset <attr>"
PBS-26439	Simulator licensing should work with PBSProNodes & PBSWorksNodes
PBS-26482	pbs_tmsh invoked from sister moms errors out - "obit: host "n3" err no matching job found (17006)"
PBS-26492	pbs_mom crash in _destroy_connection while processing hooks
PBS-26507	nd_index duplication leads to incorrect PBS_NODEFILE contents
PBS-26530	Wrong vnode map (and nodefile) due to mismatch in execvnode and execest2 parsing causes job start failure
PBS-26565	Some multinode jobs are not running properly with ,Äúplace=scatter:exclhost"
PBS-26636	simsh version displayed is incorrect
PBS-26732	python memory leak in hooks env due to not cleaning up reference count of objects
PBS-26735	print server command with invalid server attribute with simulator simsh gives SIGABRT
PBS-26739	sometime server crashed while deleting runone dependent job.
PBS-26878	PBS fails local peering on server with multiple IPs
PBS-27047	Scheduler loses connection with server and does not recover

## 4.1.21 Modifications and Bug Fixes in PBS 2020.1.2

The following bugs are fixed in PBS 2020.1.2:

**Table 4-21: Bug Fixes in PBS 2020.1.2**

JIRA Issue	Description
PBS-26251	Hook files not deleted from state down mom when node is deleted from server
PBS-26346	Scheduler server_dyn_res leaves trail of zombies depleting host PID space
PBS-26452	PBS_est hook getting request reject (2020.1)
PBS-26491	pbs_mom crash in _destroy_connection while processing hooks
PBS-26508	nd_index duplication leads to incorrect PBS_NODEFILE contents
PBS-26527	Wrong vnode map (and nodefile) due to mismatch in execvnode and execlhost2 parsing
PBS-26565	Some multinode jobs are not running properly with place=scatter:exclhost"
PBS-26660	potential daemon crash when some log messages exceed 4096 bytes (observed in pbs_mom, others possible)
PBS-26725	Cloud nodes switch to PBS licenses when added with a cloud license signature.
PBS-26731	memory leak observed during stess/long running testing

## 4.1.22 Modifications and Bug Fixes in PBS 2020.1.1

The following bugs are fixed in PBS 2020.1.1:

**Table 4-22: Bug Fixes in PBS 2020.1.1**

JIRA Issue	Description
PBS-24937	qsub command hangs for 60 secs when it is executed from a python script in windows.
PBS-25289	pbs_ralter -D will modify duration, but not Resource_List.walltime, display issue, reservation behaves correctly
PBS-25454	Job runs with unset resources in pset even if only_explicit_psets is set to 'True'
PBS-25459	If stage-in file path which doesn't exist, it never comes out of stage-in Job state in case of SCP
PBS-25460	Job stuck in Running state forever
PBS-25505	bucket topjobs can starve in bucket/non-bucket environments, start time pushed out into future
PBS-25607	Hook properties are not synced with Mom completely
PBS-25722	stage_file not logging errors in-case of stage-out failures
PBS-25724	Add logs to stagein/out
PBS-25733	At idle state mom daemon in Windows having cpu usage approx 25-27 % most of the time
PBS-25736	Improve wsystem error logging
PBS-25773	man page updates missing from 20201.0 release
PBS-25871	Upgrade to Python 3.6.12 and libexpat to 2.2.9

### 4.1.23 Modifications and Bug Fixes in PBS 2020.1

The following bugs are fixed in PBS 2020.1:

**Table 4-23: Bug Fixes in PBS 2020.1**

JIRA Issue	Description
PBS-10356	Address PP-305: scheduler patiently waits forever if server_dyn_res script does not return on Linux
PBS-13566	When we delete a job that is a predecessor in a dependency of another job we shouldn't delete jobs that are running
PBS-16139	Queue resources_assigned.ncpus becomes negative and remains even after unset the attribute.
PBS-16702	Windows qsub -Wpwd fails outputting "qsub.exe has stopped working"
PBS-17127	Scheduler doesn't know about node maintenance state
PBS-19176	qmgr doesn't quote exported settings correctly
PBS-20558	job_sort_formula doesn't work for multischeds with different "sched home", all use same formula as default scheduler
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-21075	Memory leak in pbs_sched when checkpointing jobs
PBS-22009	pbs_mom fails to start while mom hook is running.
PBS-22554	cgroup hook vnode offlining broken when vnode_per_numa_node enabled
PBS-23127	cgroups not cleaned up on secondary nodes in case of checkpoint_abort
PBS-23128	restart of a checkpoint_aborted job does not have cgroups created for it
PBS-23201	qsub crashes if environment variables contain backslashes
PBS-23335	use_hypermthreads plus ncpus_are_cores is broken when some nodes have only one thread per core
PBS-23388	Address github tracker bug 1257: Pbs_mom may dump core when direct write jobs are preempted / canceled / qrerun
PBS-23415	qstat doesn't supply full machine name with -n when nodes added by IP address
PBS-23476	cgroups hook under big cpuset systems not assigning cpuset.cpus,mems correctly
PBS-23503	Multinode Windows job fails when nodes are created using ip address
PBS-23523	PBS Pro does not provide estimated start times for jobs under non-default schedulers
PBS-23619	node license not working in windows interoperability.
PBS-23758	pbs_snapshot fails because file command not found
PBS-23763	Server failing to recover queue on restart and having panic shutdown
PBS-23777	Issues with preemption by requeue of jobs submitted with static consumable resources
PBS-23781	windows client installation failed with key_error.
PBS-23800	Container hook continues even when "docker pull" failed

**Table 4-23: Bug Fixes in PBS 2020.1**

<b>JIRA Issue</b>	<b>Description</b>
PBS-23832	For standing reservations values of resources_assigned in server in not released when occurrence finishes
PBS-23838	PBS_ALL resource softlimits are applied to jobs that do not request the resource
PBS-23840	pbs_ralter will reconfirm a resv on nodes across placement sets
PBS-23841	If pbs_ralter fails, the nodes used by the reservation can be oversubscribed
PBS-23857	Mom dumped core while running test SmokeTest.test_job_sort_formula_threshold on container setup
PBS-23858	mom segfaults when doing a rerun with an epilogue script
PBS-23862	scheduler fails to start
PBS-23873	Mom crashed when using release_nodes_on_stageout
PBS-23877	job stays in substate 41 after qrerun in epilogue script and a single rerun with an execjob_end hook leads to run_count 3 and intermittently Exit_Status=-3
PBS-23884	Sched segfaults accessing free'd node partition cache
PBS-23896	During preemption, scheduler sometimes unnecessarily filters running jobs
PBS-23897	High priority job fails to preempt when resource in contention is a convert select RASSN resource
PBS-23900	pbs start/stop script fails to stop a busy scheduler
PBS-23907	Possible server crash in node_down_requeue
PBS-23912	pbs_topologyinfo (and likely pbs_server itself) mis-counts GPU devices for licensing purposes when the device is reported as both a render and as a control device by hwloc
PBS-23917	Server resolves ip to hostname when nodes are added using ip address
PBS-23920	pbs_container rejects openmpi calls
PBS-23930	sched SIGPIPE handler doesn't get called
PBS-23932	FIFO scheduling can break every 48 days due to qrank overflow
PBS-23951	change the socket path to use the new ATOM path
PBS-23963	obfuscate option is broken in pbs_snapshot command
PBS-24035	Degraded standing reservation won't become confirmed again if vnode comes back up after first occurrence
PBS-24114	PBS_cray_atom hook tries to offline all vnodes associated with a job
PBS-24115	PBS_cray_atom hook fails to read exception message
PBS-24133	pbs_snapshot should use PTL library from pbs/unsupported dir
PBS-24144	Can't alter start time of running reservation with no jobs if there are finished history jobs
PBS-24186	RE: Found/fixed issue in pbs_cgroups hook
PBS-24202	PBS Container hook failes to launch nvidia/cuda:10.0-runtime image for singularity
PBS-24225	Invalid memory read in clear_non_blocking() function
PBS-24377	cgroup hook logic to prevent recently created jobs with JB files from being "cleaned up" is broken
PBS-24388	pbs_est does not estimate job start time leaving it as Left Over

**Table 4-23: Bug Fixes in PBS 2020.1**

<b>JIRA Issue</b>	<b>Description</b>
PBS-24394	Buffer overflow corrupts heap in MoM child responsible for file staging
PBS-24463	On a restart PBS server fails to recover the previously created reservation queues
PBS-24478	Can't set Mail_Points in a hook
PBS-24510	get_wm should not call dlsym repeatedly (i.e. for every process and every MOM poll cycle)
PBS-24560	qdel's -Wsuppress_email=-1 does not work
PBS-24616	Cred related errors with stage in failure on Windows cluster
PBS-24627	Fix for tcp_recv goes to infinite loop at times when the other party shuts down or closes
PBS-24628	memory leaks for some of obj_save_db functions in case of db save failures
PBS-24645	cgroups hook events unexpected error if Hugepagesize is not in meminfo
PBS-24649	When a job is added to the calendar, its fairshare usage is increased, but the political order is not resorted
PBS-24667	Add -h hostname argument to docker run in Container hook
PBS-24687	Replace existing pbs_est with simulator pbs_est binary in PBS rpm
PBS-24706	When a job does not run because of INSUFFICIENT_RESOURCE for a non-consumable resource, preemption candidate list is culled too aggressively, leading to failure to preempt
PBS-24787	qsub -S causes a mom crash when submitting a windows job from linux
PBS-24793	systemd Delegate=yes requested by cgroup hook broken; systemd tampers with cgroups set up by hook and breaks them (e.g. "devices" for GPUs)
PBS-24867	Deprecate load_balancing
PBS-24928	update URL displayed at install time pointing to EULA in commercial spec file
PBS-24939	pbs_topologyinfo does not work in Linux windows Interoperability
PBS-24951	Scheduler can run jobs that overlap with reservations with buckets/placement sets
PBS-24990	Server crash when parent job id is same as dependent child job
PBS-25018	Windows: env variable are not set properly for mom hook
PBS-25019	Windows: For frequently submitted job getpass.getuser() from mom hook return wrong value
PBS-25089	PBS RPMs bundle postgres version 9.3.12, which has severe security vulnerabilities
PBS-25191	PBS epilogue: Wrong word used in table header for energy consumption column
PBS-25216	Issue while upgrade from pbspro version 19 to openpbs(new name) version 20 rpm
PBS-25278	pbs_snapshot with --obfuscate failed on remote hosts.
PBS-25352	qrun not working on Array subjob
PBS-9424	A job submitted w/ dependency on a finished job will never run

## 4.1.24 Known Bugs, Errors, and Warnings in PBS Professional

### 4.1.24.1 Known Bugs in PBS Professional 2025.2.1

**Table 4-24: Open Bugs in PBS Professional 2025.2.1**

JIRA ID	Description	Workaround
HPCPBS-31468	pbs reports all available GPUs in node status when all GPUs are added in <code>exclude_gpu_uuids</code> and HUP the <code>pbs_mom</code> .	None
HPCPBS-31936	PBSPro reports threaded cores, when <code>use_hyperthreading</code> is turned off while <code>cgroups</code> is turned ON.	Restart the MOM and then delete and recreate nodes if you change <code>cgroups/gpu</code> configurations for the node.
HPCPBS-31945	Changes to <code>cgroups</code> configuration do not take effect on MoM reboot	None
HPCPBS-31996	In MLS build the job Fails with "setup of memory limit-cgroups failed"	Run with <code>cgroups</code> disabled.
HPCPBS-32004	<code>exclude_cpus</code> does not work when we have a single NUMA node Or when <code>vnode_per_numa_node</code> is disabled in multi-numa noded system.	None for a single-vnoded system. In multi-vnoded system, enable <code>vnode_per_numa_node</code> and use <code>exclude_cpus</code> .
HPCPBS-32014	Mounting of users home directory from host to the container using config file does not work. It conflicts with the users home that is already mounted as private.	Use <code>sandbox=PRIVATE</code> , then users home directory can be mounted from the container config file. Mount the <code>/home</code> in the container config file, but this would also end up mounting all other users home from the host into the container.
HPCPBS-32061	<code>preempt_order</code> parameter is not being honored	None

### 4.1.24.2 Known Bugs in PBS Professional 2025.2.0

**Table 4-25: Open Bugs in PBS Professional 2025.2.0**

JIRA ID	Description
HPCPBS-30298	<code>memoryUtilization_max</code> reports 0 on "Tesla V100" GPU This report comes from DCGM and is transferred to PBS
HPCPBS-30537	Peer scheduling is not able to pull jobs from IPV6 server to IPV6 server.
HPCPBS-30771	When using <code>v1 cgroups</code> and disabling a controller, shepherd should not leave processes in <code>system.slice/pbs.service</code>
HPCPBS-30777	singularity job <code>std_err</code> file contains informative message This error message can be safely ignored.



**Table 4-25: Open Bugs in PBS Professional 2025.2.0**

JIRA ID	Description
HPCPBS-30830	Jobs are getting terminated immediately with exit status=51 on UV machines. This happens when there are more than one cpuset mounted. We should have only one cpuset mount and that should be under the cgroups. If you have any other cpuset mounts, it will work fine if you remove them.
HPCPBS-30861	pbs_ds_password is failing on slower machines This is intermittent and if this happens, you have to stop all the daemons (for example using init scripts) and then start it again.
HPCPBS-31309	PBS Shepherd supporting CentOS7 containers PBSPro 2025.2.0 supports does not support RHEL7/CentOS7 based containers. It supports containers which are RHEL8/CentOS8/Rocky8 onwards, SLES12 sp3 onwards and Ubuntu 20 onwards). CentOS7/RHEL7 is planned to be made available in future patches.
HPCPBS-31311	sometimes Job walltime is less than GPU walltime. Occasionally there is a difference of 1 to 2 seconds between walltime and GPU walltime. GPU walltime is more.
HPCPBS-31415	Error decrypting the DB password when upgrading from 2025.1 to 2025.2
HPCPBS-31443	PBS "TMPDIR" seems to have a value that is not accurate and Shepherd is adding SGE values/path on some environment variables Currently, the TMPDIR passed to the shepherd is hardcoded, so the only way to make it work is to use the same format. Here's what you can do: Set TMPDIR in the expected format: eg. TMPDIR=/tmp/\$PBS_JOBID.1.all.q Also mount /tmp using the mount_paths option in the container configuration file.
HPCPBS-31455	ROCR_VISIBLE_DEVICES=<uuid> cannot be used for partitioned MI300 GPUs Workaround: unset ROCR_VISIBLE_DEVICES in job scripts and as arguments to pbs_tmsh/pbs_attach like 'unset ROCR_VISIBLE_DEVICES;<command>'
HPCPBS-31456	exclude gpu will not work with MI300 system with partition mode. When we partition MI300 each partition gets the same UUID due to a bug in ROCm. So we are unable to exclude individual partitions (it's still possible to exclude a whole GPU)
HPCPBS-31457	AMD GPU: PBS exclude_gpus feature won't be working because of GPU UUID string mismatch We check for a GPU prefix with UUID for all vendor GPUs but AMD does not have this prefix. Workaround: Admins have to convert the id that they get via rocm-smi in order to be able to exclude AMD GPUs in PBS. For example ROCm reports Unique ID: 0x8a034d0fdebb161c PBS expects GPU-8a034d0fdebb161c



**Table 4-25: Open Bugs in PBS Professional 2025.2.0**

JIRA ID	Description
HPCPBS-31468	pbs reports all available GPUs in node status when all GPUs are added in exclude_gpu_uuids and HUP the pbs_mom.  When we exclude all gpus of a device, hup does not work and restart is required. However if we exclude only some of the gpus of the device, hup and restart works fine.  Workaround: If we configure exclude_gpu_uuids, always restart.
HPCPBS-31484	cgroups enabled gpu container multinode job goes in H state when first vnode doesn't request gpus and second vnode requests gpus and container in job submission.  Workaround : Request a GPU on each node
HPCPBS-31520	Error encountered while deleting duplicate array job  Workaround: Delete fails. Try again without duplicate job id.
HPCUWEB-337	rocm-smi/amd-smi report that AGML processes are using a GPU even though they are not using any  Workaround: Shutdown pbs_mom if partitions of MI300 should be changed
PBS-10699	Directories that are staged in are not being cleaned up after the job completes execution.
PBS-12689	When resuming a suspended job, the scheduler will recalculate but not alter the walltime
PBS-13249	Mom hook runs periodically after the event is removed in qmgr
PBS-13584	Address PP-118: tm_attach (pbs_attach) is unable to correctly get the process user id when stat file of non-root process is owned by root
PBS-13660	Can't access reservation Duration attribute in hook
PBS-13712	unable to submit jobs on *nix if stagein filename contains '@' symbol
PBS-14013	PBS_CONF_REMOTE_VIEWER configuration parameter (supported only on Windows) is not working appropriately
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
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-14515	server attribute "pbs_license_min" is not getting printed through reservation hook
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 4-25: Open Bugs in PBS Professional 2025.2.0**

<b>JIRA ID</b>	<b>Description</b>
PBS-15126	Address PP-1010: Job is not getting held even after getting rejected by mom more than 21 times (very high run_count).
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-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-15440	custom resource creation/modification via qmgr is case sensitive
PBS-15442	scheduler error stating a custom resource may be invalid is incorrect due to case sensitivity
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 starved.
PBS-15577	deleted custom resources which are added by exehost_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-15617	KNL nodes are getting bypassed in the powering off cycle
PBS-15961	Non-runnable job is not getting aborted as expected (intermittent)
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-16197	Address PP-464 (PBS-13646): PBS Accounting Logs - Incorrect Escaping
PBS-16783	log message about warning while reservations get confirmed is not visible anymore in server_logs
PBS-16860	Mom crashes when an execjob_begin hook calls pbs.reboot() on Windows
PBS-16863	PBS_MOM_NODE_NAME not resolving hostname on windows
PBS-16963	When large number of jobs are submitted, few of them remains in Q state with comment "Execution server rejected request"
PBS-17084	Cray BUG #847796: race between MoM suspension and aprun that is just starting
PBS-17092	Job in substate 41 can't be deleted while in transit to MOM
PBS-17507	When suspension of job by scheduler fails because of a bad state, scheduler should not continue on to other preemption methods in some cases, but decide how to handle this based on actual (sub)state
PBS-17651	Missing "Successfully deleted hook file..." message from server logs

**Table 4-25: Open Bugs in PBS Professional 2025.2.0**

<b>JIRA ID</b>	<b>Description</b>
PBS-17844	PBS_NODEFILE doesn't include all vnodes
PBS-17986	Unable to debug server periodic hooks with pbs_python
PBS-18154	PBS behaves differently depending on /etc/hosts setting
PBS-18223	pbsnodes -avjS reports duplicate job-ids, hence showing a wrong number for njobs
PBS-18238	pbs_mom not giving the correct log message when deleting a hook
PBS-18599	pbs_est does not set estimated.start_time to 0 for jobs it can't estimate
PBS-18625	Crash on job stageout, followed by different streams of tasks for job exit for job recovered in JOB_SUBSTATE_STAGEOUT with race conditions (Cray CAST-7990 BUG 852721 and CAST-17142)
PBS-18701	Address PP-996: systemctl fails accurately report status of started daemons if they were stopped via mechanism other than systemctl
PBS-18781	Address PP-1025: File descriptor leak in PBS mom while deleting jobs
PBS-18782	Spurious HELLO causes instantiated subjobs to fail to be sent to MoM
PBS-18801	Address PP-1033: After a server restart, a Cray node that was in state "maintenance" became "job-exclusive,maintenance"
PBS-18928	mom state changes from free to state-unknown on server restart and does not change back to free as expected
PBS-18963	address PP-1073: error message faulty when node assigned to queue that isn't part of a particular partition
PBS-19079	cgroup hook and cpuset MoM process containment and suspend/resume interoperability Workaround: Disable the cpuset subsystem, but this allows too much CPU usage and more importantly the fences that keep processes on the original socket Ensure that there is only one preempting job on each node Low hanging fruit: fix the cgroup hook to support at least per-socket process containment/pinning together with suspend/resume. 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
PBS-19124	"hasnodes" attribute goes missing for queues when there are nodes bound to queue after removing queue attr on one node
PBS-19145	Address PP-1157: Ghost jobs are not getting reported in some scenarios
PBS-19319	PBS Pro commandline client unable to connect to server which has a lot of jobs in queue ~1.5 million

**Table 4-25: Open Bugs in PBS Professional 2025.2.0**

JIRA ID	Description
PBS-19401	cgroup execheap_startup should synchronise resources_available.vntype to what is read from vntype file Workaround: Use qmgr to set the required vntype, and when it is updated offline the nodes until everything is indeed synchronised. 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.
PBS-19555	pbsfs does not exit after printing message on invalid option used with it
PBS-19570	Address PP-1233: tracejob does not parse all the logs of Multisched even if they are present on the same machine where trace job is run
PBS-19627	pbs_release_nodes call results in a long, rewritten 'select' spec
PBS-19630	mom's child process (job process) crashes at time of stageout from a remote machine
PBS-19698	heap corruption when PBS is started in an HA environment (i.e. via Pacemaker) Workaround: 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.
PBS-19700	pbsnodes -r does not update the node comment
PBS-19740	Fix Cgroups clamping vmem
PBS-19767	resolve valgrind reported error regarding uninitialized values in force_qsub_daemons_update
PBS-19898	get_device_name throws exception when trying to convert wildcard "*" to int; breaks GPU assignment
PBS-19931	pbsdsh command's complete output not found in job's output file
PBS-19985	Scheduler crashes when using indirect resources with node_partition
PBS-19991	Scheduler logs an error message per node every cycle - "Unknown license type: u"
PBS-20015	Walltime is set to zero after restart on windows
PBS-20035	Cannot delete reservation from non-server node
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-20303	PBS on Windows does not count GPU devices for licensing purposes
PBS-20516	PBS_COMM_ROUTERS is not working for multi comms Workaround: 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
PBS-20593	Invalid initial resource update for job from MoM during first seconds following start if there's an execjob_begin hook present

**Table 4-25: Open Bugs in PBS Professional 2025.2.0**

JIRA ID	Description
PBS-20594	cgroups warning log message and less vmim than should really be available, if system doesn't have swap
PBS-20683	Incorrect states in MoM for suspended job propagated to exec* hooks
PBS-20714	Ubuntu: Using event().reject() with a large message string qsub fails with buffer overflow Workaround: Limit message size
PBS-20730	sleep state nodes go to state-unknown,sleep after overlay upgrade and will never be brought up by Power hook Workaround: Make sure there are no nodes in sleep state before upgrading. Manually use capmc to bring the nodes back after disabling power provisioning then upgrade.
PBS-20753	resources_used.walltime returns incorrect value in windows
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 Workaround: Use pbsnodes to gather values for poweroff_eligible
PBS-20975	Due to race condition qdel at job end can fail and also suppress the Obit causing MOM to hang
PBS-21069	If using vnode_pool deleting the inventory (first) mom can cause 1st compute node in the exec_host list becomes the natural vnode instead of linking to remaining mom Workaround: Delete the compute nodes, create the MoM nodes with ALPS inventory not working, enable ALPS on the main inventory node to get the compute node vnode behind everything
PBS-21229	Power Provisioning hook delay due to iteration over large number of nodes
PBS-21396	execest periodic run before execest startup on Windows
PBS-21398	PBS adds extra chars to output of command run via pbs_attach -c on Windows
PBS-21602	Several races in suspend/resume at end of job fail suspension
PBS-21894	pbs_mom should not reduce the stack size hard limit in case the environment sets a soft limit less than 16mb, causes fatal job errors Workaround: Don't set soft limit for stack size to less than 16MB.
PBS-22497	When a hook decided to delete (rather than requeue) a job, qstat -fx exit status should be consistent with end of job accounting record's exit status
PBS-22500	problematic treatment of "delete job" and "rerun jobs" (if done by pbs_sched) for jobs that are exiting, normal jobs vs. array subjobs
PBS-22718	PBS giving error "PBS server internal error (15011) in set_entity_resc_sum_max, Error in LIM_USER for euser pbsuser for resource ncpus" when entity limits are set on server.
PBS-22752	mom crash when using reliable job startup features and job requests host but not ncpus
PBS-22871	pbs_cgroups hook checks run_only_on_host attribute too late; causes "Cgroup paths not detected"
PBS-22901	PBS job killed after stopping PBS with systemctl if MOM killed by -INT
PBS-23158	qsub -I using 99-100% cpu on Windows 10 , and keep system to hung state
PBS-23166	Soft limits set to zero do not enable true anti-express queue behaviour; negative limits not accepted

**Table 4-25: Open Bugs in PBS Professional 2025.2.0**

JIRA ID	Description
PBS-23171	server can hang for 10 minutes in MUNGE authentication to a different frozen server or if hostname resolution conditions cause the server to attempt to authenticate itself
PBS-23214	pbs_tmsh in a container job has badly formatted output
PBS-23451	<p>Prologue and Launch job hooks started with stdin connected. Hook commands which open stdin cause jobs to exit instantly.</p> <p>Workaround:</p> <p>For the ssh case, one workaround is to start the ssh with the -n argument that tells connects stdin to /dev/null and avoids the issue. e.g.</p> <pre>cmd = ['/bin/sudo', '-u', jobuser, '/bin/ssh', '-n', '-oStrictHostKeyCheck- ing=no', node, '/bin/hostname', '2&gt;/dev/null']</pre> <pre>process = subprocess.Popen(cmd, shell=False, stdout=subprocess.PIPE, stderr=sub- process.PIPE)</pre> <pre>hostname, err = process.communicate()</pre> <p>A more general fix is to use the following code:</p> <pre>try:     os.close(0) except:     pass</pre> <p>This should be at the start of a python hook to close stdin before running the body of the script which should be robust for general cases.</p>
PBS-23633	Path for qsub -S doesn't take special characters in linux
PBS-23658	cgroups hook ignores job mem request when vnodes added under an alternate name, hook .in file missing some pbs.event().vnode_list["node_name"].resources_assigned values
PBS-23679	Upon checkpoint and rerun with transmogrify set, job is killed with "walltime exceeded limit" when the limit has not been exceeded
PBS-23699	Job stuck in E state when job submitted from client host and if Error_Path and Output_Path has blank space
PBS-23796	sending of large job scripts fails on Shasta
PBS-23850	acl_roots feature doesn't work for Windows "Administrators" type users in Interoperable cluster
PBS-24002	qsub: illegal -S value when a job is submitted on a Linux client with a -S set to a Windows path
PBS-24085	Mom unresponsive to requests to suspend a job hangs scheduler for 10 minutes _repeatedly_ per cycle
PBS-24095	Memory leak in PBSD_rdrpy_sock()
PBS-24771	cgroup execjob_resize might migrate cpusets and break jobs even on nodes where requested resources are unchanged
PBS-25212	last_used_time attribute is not updated on node used for resv if resv deleted while running via pbs_rdel
PBS-25229	In mixed mode setup, block job is not working as expected
PBS-25250	qsub -u fails to CreateProcessAsUser while stageing-out out/err files in windows
PBS-25319	Interactive job doesn't start with prologue script on windows

**Table 4-25: Open Bugs in PBS Professional 2025.2.0**

<b>JIRA ID</b>	<b>Description</b>
PBS-25382	When creating vnodes, if the configuration file does not have a newline at the end, mom crashes
PBS-25461	Stage-in with scp failed when there are spaces in the path
PBS-25645	Node attributes set to None via hook are not getting reflected
PBS-25744	Multiple entries in the mail list is broken when using username@hostname Workaround: Multiple entries list works when sending mail to users within the same domain. Do not use full email address definitions.
PBS-25822	Staging in a directory to an existing directory fails and job goes to W state
PBS-25945	Client commands that get large responses from the server seem to hang the server
PBS-26381	Windows MoM crashes while submitting job with custom resource having 'm' flag
PBS-26447	pbs_topologyinfo (and likely pbs_server itself) mis-counts GPU devices for licensing purposes when card* and renderD* lines happen to be reversed
PBS-26667	Unsuppressable stageout error mails for large number of jobs lead to hung server
PBS-26753	When executing a sequence of EXECHOST_STARTUP hooks, later hooks cannot see changes to the vnode list made by earlier hooks Workaround: HUP the MoM as soon as it has executed all exechohost_startup hook events so that all hooks get a second pass at doing things. Imperfect because that leaves a race window in which MoM will accept jobs but might not be fully initializes. A better one, if you can predict what the hooks are supposed to end up with, is to define the vnodes and resources and attributes that later hooks might need in v2 config files in the same manner as what the hooks will come up with. Obviously that is not desirable since that defeats the purpose of EXECHOST_STARTUP in hooks, which is to define what to do dynamically, but if the hardware configuration etc. does not change is often feasible.
PBS-26765	Container hook should be nested in cgroup hook and destroy its cgroups (by stopping container) before cgroup hook tries to destroy its cgroups Workaround: Contact Altair support if the cgroup hook fails to destroy the cgroups for a job using containers.
PBS-27016	checkpoint restart problem in configurations that use credentials file (SELinux/MLS, pwd)
PBS-27056	Server connection to pbs_comm becomes sick without triggering server to try other pbs_comm; loss of communications from all MoMs
PBS-27247	After migration upgrade, jobs submitted to new server failing with error "qsub: Job with requested ID already exists"
PBS-27248	In case of errors, stageout of "everything in sandbox" can simply recursively copy whole home directory ad nauseam
PBS-27405	Job keeps running forever if the mom goes down or is restarted while the job is in substate 41
PBS-27452	qdel crash when deleting nonexistent job
PBS-27508	On RHEL 8, pbs_ds_password with pbs server and dataservice succeeds intermittently
PBS-27615	pbs_rstat command with simsh in simulator gives SIGSEGV



**Table 4-25: Open Bugs in PBS Professional 2025.2.0**

<b>JIRA ID</b>	<b>Description</b>
PBS-27623	execjob_attach event is not getting triggered even if the job has executed pbs_attach
PBS-27905	<p>Server python interpreter restart hangs for tens of seconds (hanging server)</p> <p>Workaround:</p> <pre>set server python_restart_max_hooks=1000 (or some even larger number)</pre> <pre>set server python_restart_min_interval=&lt;some large interval of time&gt;</pre> <p>will make the hook restarts more frequent, and by lowering and raising them again you can schedule them at off-peak moments</p>
PBS-27949	MLS PBS does not work in peer scheduling configuration
PBS-28005	Job Attributes set in execjob_begin hook are not getting updated as per hook when the hook is rejected.
PBS-28011	PBS MoM Windows \$usecp calls 'copy' from 32-bit cmd.exe and cannot copy large files -- needs to use Sysnative cmd.exe instead
PBS-28064	simulator: resources_used.walltime is reported as 00:00:00 for subjob even though the subjob ran
PBS-28209	Windows Jobs are going on Hold state when submitted in large number of jobs
PBS-28244	<p>restrict_user breaks stagein for jobs using new TPP job send mechanism Workaround:</p> <p>Don't use restrict_user, and limit access to nodes using another mechanism (e.g. using an sshrc file that uses pbs_attach).</p>
PBS-28259	Running exclusive reservation nodes showing as free if reconfirmed or altered
PBS-28349	net_close(-1) dereferences svr_conn[sock] without checking whether it is NULL; caused server child process core dumps and server core dumps on exit at customer site
PBS-28429	wait_request should be robust when it tries to process requests -- closing FD 0 e.g. in a hook makes it corrupt server connection structures
PBS-28432	Issue with standing reservation after cluster update
PBS-28639	qsub correctly refuses job submissions that specify host-level readonly resources via -lselect, but qalter allows changing them
PBS-28653	Failure to generate pbs snapshot on a system that's only running pbs_mom on MLS machine
PBS-28865	buffer overflow in ubuntu 20 queuejob hook trying to set large value for walltime
PBS-28910	tm_attach fails with process does not exist error in interactive job
PBS-28946	windows mom becomes unresponsive after alarm is hit for execjob_begin and execjob_prologue hook
PBS-28967	When MoM loses server_stream but server can still send to MoM, no net restore handler is called; MoM is unable to offline vnode if necessary without it
PBS-28991	UKMO/HPE Failover issue, job discarded - connection issue
PBS-29026	qstat -f -FJSON does not handle empty variables in the Variable_List correctly and outputs broken JSON when variable starts with comma
PBS-29031	When job array is running maximum amount of subjobs running (when using -J M-N%X syntax) the array should not be accruing eligible time



**Table 4-25: Open Bugs in PBS Professional 2025.2.0**

<b>JIRA ID</b>	<b>Description</b>
PBS-29101	job is not run on nodes in an overlapping reservation
PBS-29134	kill -INT of MoM and pbs_mom -p interoperability issues with systemd Workaround: Either manage things manually (e.g. start MoM in a shell that was added manually to the systemd cgroup for pbs.service's list of tasks) or use the cgroup hook (which detaches jobs from the pbs.service systemd service. Alternatively, fix the Unit file and/or implement the necessary wrappers in the field, after installation.
PBS-29240	Power hook scaling problems
PBS-29265	Server delay/hang after decrementing ncpu value in qmgr
PBS-29362	pmem/pvmem limits broken for large jobs on Windows MOM
PBS-29579	scheduler infinite loop when suspended job is deleted during cycle when scheduler tries to resume it Workaround: Kill and restart the scheduler in a log tail processor when it detects an infinite loop
PBS-29642	node status shows down and pbs_mom not writing logs
PBS-29645	PBS is not properly licensing nodes after server restart in the absence of GlobalZoneXX features
PBS-29651	pbs_snapshot fails obfuscate with traceback Workaround: Send unobfuscated snapshot. Which is not viable for many government sites.
PBS-29690	Database is crashing while saving job
PBS-29723	PBS Scheduler in hung state
PBS-29740	If pbs_mom is unresponsive (e.g. hung), node is not marked down and jobs are stuck in send_job forever Workaround: A potential workaround is monitoring an execest_periodic hook by a cron job to detect when pbs_mom got stuck (and so will no longer execute the execest_periodic hook). Ideally, of course, this should not run on the node but on a separate node with access to a shared filesystem that the execest_periodic hook can write to (obviously the execest_periodic can also use ssh/scp if there is no shared filesystem).
PBS-29746	qsub -V causes bash function lines injection in Variable_List that crashes the simulator parser Workaround: Don't use qsub -V. or Sanitize the snapshot (but this is only possible for manual invocations/snapshotting) before running the simulator, e.g. with the script above. A better script would not nuke all of the Variable_List but only the bash function stuff that confuses the parser.
PBS-29779	Qsub -Wblock hangs indefinitely even after job completes in windows
PBS-29813	Simulation with accounting logs not working
PBS-29816	Updated time zone doesn't reflect in edit session
PBS-29823	When a user submits a job with an invalid resource name, instead of the job being rejected and error returned to qsub, the job is accepted and a PBS job ID is returned to the user

**Table 4-25: Open Bugs in PBS Professional 2025.2.0**

<b>JIRA ID</b>	<b>Description</b>
PBS-29869	Nodes is not getting licensed even though license is available
PBS-29871	Nodes not using the sockets licenses
PBS-29878	PBS server is using more licenses than the needed
PBS-30080	Altering start and end time on a running reservation does not reset the resource_assigned attribute on node.
PBS-30099	Moved jobs are listed in qstat output after server restart
PBS-30185	Standing reservation doesn't get deleted when any of the resv node is down
PBS-30191	Job which conflicts with top jobs/reservations can be run by scheduler if the last resource in the select statement requests 0, pushing out start time of top jobs
PBS-30234	PBS Pro: Comm Daemon has a low limit for max. open files limiting connected mom daemons to circa 500
PBS-30236	Job Stuck in R state - MoM cannot reconnect to server
PBS-30254	qsub -jeo and -keo are not supported
PBS-5607	MoMs that are reimaged or have corrupt JB files create zombie 'R' jobs on reboot

## 4.2 Bug Lists for Budgets Module

### 4.2.1 Bug Fixes in Budgets 2025.2.1 Module

The following bugs are fixed in the Budgets module for 2025.2.1:

**Table 4-26: Bug Fixes in Budgets 2025.2.1 Module**

<b>JIRA ID</b>	<b>Description</b>
HPCBGT-909	Jobs without budgets are getting reconsidered in loop reducing cluster utilization
HPCBGT-910	Reconcile for a job fails when we have a resource containing ';' in its value

### 4.2.2 Bug Fixes in Budgets 2025.2.0 Module

The following bugs are fixed in the Budgets module for 2025.2.0:

**Table 4-27: Bug Fixes in Budgets 2025.2.0 Module**

<b>JIRA ID</b>	<b>Description</b>
HPCBGT-869	AMS installation for budget fails on RHEL9/Rocky9

### 4.2.3 Bug Fixes in Budgets 2025.1.0 Module

The following bugs are fixed in the Budgets module for 2025.1.0:

**Table 4-28: Bug Fixes in Budgets 2025.1.0 Module**

JIRA ID	Description
HPCBGT-584	Reconcile command throwing exception when there are no E records in accounting logs
HPCBGT-828	Missing description for "jobs" help text while executing command "amgr precheck"
HPCBGT-829	amgr help text info "precheck" description doesn't show all its usages

### 4.2.4 Bug Fixes in Budgets 2022.1.3 Module

The following bugs are fixed in the Budgets module for 2022.1.3:

**Table 4-29: Bug Fixes in Budgets 2022.1.3 Module**

JIRA ID	Description
AM-390	Project report performance issues.
AM-753	amgr command takes too long to generate the report
AM-754	amgr report command errors out for project with huge number of records
AM-759	Budget gives error using long type custom resource in formula
AM-766	Upgrade is failing due to mismatch in Budgets datastore file version
AM-785	Gateway service is timing out for the large reports

### 4.2.5 Bug Fixes in Budgets 2022.1.0 Module

The following bugs are fixed in the Budgets module for 2022.1.0:

**Table 4-30: Bug Fixes in Budgets 2022.1.0 Module**

JIRA ID	Description
AM-127	am_precheck returns errors in my use cases
AM-266	got python error while trying to login with a control user not configured in AM
AM-320	Reconcile with same amount as acquired amount adds 2 extra transactions with 0.0 amount
AM-342	No error message if user tries to delete a unknown record
AM-354	Stakeholder long format(-l) report throws invalid date format error when only End date is provided
AM-555	precheck command fails for user account if AM_BALANCE_PRECHECK is disabled
AM-700	Security issue (SQL injection) found during ZAP run
AM-727	cloud budgets - jobs are going to held state even though budget is available in the project
AM-728	cloud budgets - cloud hook is getting rejected if one of the jobs/project/user is inactive

## 4.2.6 Bug Fixes in Budgets 2021.1.3 Module

The following bugs are fixed in the Budgets module for 2021.1.3:

**Table 4-31: Bug Fixes in Budgets 2021.1.3 Module**

JIRA Issue	Description
AM-700	Security issue (SQL injection) found during ZAP run

## 4.2.7 Bug Fixes in Budgets 2021.1.2 Module

The following bugs are fixed in the Budgets module for 2021.1.2:

**Table 4-32: Bug Fixes in Budgets 2021.1.2 Module**

JIRA Issue	Description
AM-656	Fix "Path Traversal" issue reported by ZAP (high risk category)
AM-657	Fix " Remote OS Command Injection" issue reported by ZAP (high risk category)
AM-661	Job submission to project is successful even if project is not started in postpaid
AM-662	Budget Manager : Charging of Budget in case of overrun
AM-663	If we upgrade from version < 2021.1.0 we have two postgres functions for acquire and release with different parameters list
AM-664	account_summary section in global(project/user) report gives wrong report for postpaid mode
AM-665	In postpaid project user wise(-U) report always shows 'total_debits_reconciled' and 'total_debits_authorized' as 0 even if user has consumed an amount from the project
AM-666	Budget Manager : slowing down of PBS Pro due to am_hook due to restart runs
AM-667	In postpaid reconcile command fails in subsequent execution if executed for multiple serviceunit separately for same transaction id
AM-668	Analysis - Budget Manager : slowing down of PBS Pro due to am_hook due to restart runs
AM-671	Installation in non-default AM_HOME: Summary of issues
AM-672	Documentation: Procedure for installing to non-default directories.

## 4.2.8 Known Bugs, Errors, and Warnings in Budgets Module

This section lists known deficiencies and warnings for the Budgets module, as well as unresolved problem reports filed by customers.

**Table 4-33: Open Bugs in Budgets 2022.1.3 Module**

JIRA ID	Description
AM-166	Reconcile fails when job is re-queued at pbs-mom failure
AM-167	Wrong error message shown when user tries to withdraw more than available amount
AM-209	The service unit formula is not evaluating correctly if job attributes are modified at execjob_epilogue
AM-229	Ensure am_* commands report errors in json format when using the -j option.
AM-243	Reconcile fails when transaction finishes in undefined period
AM-247	Proportionate policy: acquire in an undefined period throws unexpected error message
AM-278	am_update for multiple users: Error message misleading when one user is invalid.
AM-281	if token file permission is compromised then hook will not process any requests
AM-282	need better error message if control server is unreachable
AM-324	Possible database corruption due to user error using failover.
AM-327	Unable to get transaction info in project report when startdate of filter equal to transaction created date
AM-333	The updated date and user are not correctly reflected while updating records.
AM-338	python exception while updating role without any options
AM-339	Custom role with permissions to create, update, delete, read for projects is not working
AM-352	Adding period data with incorrect data shows unexpected error message via API
AM-353	unexpected error message with wrong url for delete API
AM-359	the logs added by AM hook in server log is eating disk space
AM-372	Upgrade script does not checks if connection to PBS Control Server is down
AM-377	Tests are failing due to periodic hook triggering scheduling cycle
AM-407	Transaction short report shows AM admin as a transaction user after refund is done.
AM-417	The value of am_job_amount is incorrectly calculated in case of PBS failover.
AM-471	Filter internal APIs and allow access only to external APIs
AM-474	Issue with precheck=true not respecting default chunks applied to destination queues.
AM-512	AM does not charge for the run duration before requeue when job gets scheduled on peer server(PBS)
AM-513	hanging amgr reconcile commands made system load very high
AM-514	Inconsistent behaviour between amgr checkbalance and report of project service unit for teller role
AM-515	AM charges for the requested amount instead of used amount when PBS failover happens near the end of job run.
AM-522	Admin is able to deposit & withdraw from project/user account even he is not linked as a Manager to the group

**Table 4-33: Open Bugs in Budgets 2022.1.3 Module**

<b>JIRA ID</b>	<b>Description</b>
AM-528	Improve error message when AM unable to contact AMS
AM-556	Alloc Manager fails to run the requeued jobs again if PBS failover occurs
AM-557	"Allocation Manager" label seen in CLI output when an required timed out
AM-559	No need of alsdk directory in client package
AM-560	am Install script with '-t upgrade' option proceeds even if Budget Manager is not installed already and with -u option
AM-561	am_auth_register gives wrong error message when AM_AUTH_ENDPOINT is not provided inside am.conf
AM-584	reconcile command throwing exception when there are no E records in accounting logs
AM-603	Incorrect error message when submitting jobs to "not connected" clusters
AM-617	Report(project/user) api fails to validate filter string, if we provide filters ',' separated instead of '&' separated.
AM-618	Failover doesn't happen if no space available on a node.
AM-638	data service inconsistent when failover triggered when budget daemon didn't start on node1
AM-646	Unrelated budget error msg on doing qmove on a running job
AM-687	PBS Budgets server and client should not untar in the same directory
AM-699	Provide suitable error message when cluster name doesn't match pbs server name
AM-706	amgr acquire/precheck/reconcile command for user account does not verify user account name(-n) and user (-u) name to be same.
AM-708	Still referring Budget Manager in error message
AM-714	Bandit - Use of insecure MD2, MD4, MD5, or SHA1 hash function.
AM-715	Bandit - subprocess call - check for execution of untrusted input.
AM-716	Bandit - Audit url open for permitted schemes. Allowing use of file:/ or custom schemes is often unexpected.
AM-736	Budget: Job deleted through -W force option doesnt get reconciled
AM-742	Python vulnerabilities
AM-743	Click Vulnerabilities
AM-763	am_update_cloud hook should check for cloud_hook and am_hook
AM-764	am_update_cloud raising unhandled exception for wrong API key of scenario
AM-767	Reconcile will not happen for a repeated job id after PBS job counter reset in postpaid mode
AM-772	negative integer comparison doesn't work in AM
AM-779	budget hook throws error on qmove
AM-781	Error when adding multiple uses in a project.

**Table 4-33: Open Bugs in Budgets 2022.1.3 Module**

<b>JIRA ID</b>	<b>Description</b>
AM-783	Exceptions in ams periodic hook
AM-784	Failed jobs are not reconciled
AM-786	Altair Budgets installation : keys have expired stopping the installation





# 5

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File: lang/c++/api/Boost.hh

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## 5.7 base64.c

-\*- mode: c; c-basic-offset: 4; indent-tabs-mode: nil -\*-

util/support/base64.c - base64 encoder and decoder

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## 5.8 Base64.c

/\*- mode: c; c-basic-offset: 4; indent-tabs-mode: nil \*/

include/k5-base64.h - base64 declarations

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## 5.11 charset-normalizer

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## 5.12 cJSON

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## 5.14 cpython

### A. HISTORY OF THE SOFTWARE

Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <https://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <https://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations, which became Zope Corporation. In 2001, the Python Software Foundation (PSF, see <https://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation was a sponsoring member of the PSF.

All Python releases are Open Source (see <https://opensource.org> for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

Release	Derived	Year	Owner	GPL: from compatible? (1)
0.9.0 thru 1.2		1991-1995	CWI	yes
1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes

Release	Derived	Year	Owner	GPL: from compatible? (1)
2.1.1	2.1+2.0.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
2.2 and above	2.1.1	2001-now	PSF	yes

Footnotes:

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## 5.15 `crc.c`

<http://web.mit.edu/freebsd/head/usr.bin/cksum/crc.c>

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## 5.16 `curl`

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@(#)extern.h 8.1 (Berkeley) 5/31/93

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## 5.34 [google.golang.org/genproto/googleapis/api](https://google.golang.org/genproto/googleapis/api)

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## 5.35 google.golang.org/genproto/googleapis/rpc

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## 5.37 go-oidc

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## 5.38 gorilla/websocket

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## 5.41 grpc-ecosystem/grpc-gateway

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## 5.53 jqast/wcwidth/

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## 5.56 labstack/gommon

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## 5.66 ltmain.sh

*buildutils/ltmain.sh*

*m4/libtool.m4*

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Written by Gordon Matzigkeit, 1996

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## 5.68 mattn/go-colorable

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## 5.70 MinGwEditLine

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

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## 5.71 mitchellh/mapstructure

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## 5.72 natefinch/lumberjack

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## 5.73 numactl

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## 5.88 pathnames.h

<http://web.mit.edu/freebsd/head/libexec/fingerd/pathnames.h>

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## 5.94 protobuf

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## 5.96 Pygresql

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## 5.97 pyjwt

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## 5.98 pypa/wheel/

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## 5.99 Python

### 5.99.1 HISTORY OF THE SOFTWARE

Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

**Table 5-1: Python Releases**

Release	Derived from	Year	Owner	GPL-compatible? (1)
0.9.0 thru 1.2		1991-1995	CWI	yes
1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.2	2.1.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
2.2 and above	2.1.1	2001-now	PSF	yes

Footnotes:

1. GPL-compatible doesn't mean that we're distributing Python under the GPL. All Python licenses, unlike the GPL, let you distribute a modified version without making your changes open source. The GPL-compatible licenses make it possible to combine Python with other software that is released under the GPL; the others don't.
2. According to Richard Stallman, 1.6.1 is not GPL-compatible, because its license has a choice of law clause. According to CNRI, however, Stallman's lawyer has told CNRI's lawyer that 1.6.1 is "not incompatible" with the GPL.

Thanks to the many outside volunteers who have worked under Guido's direction to make these releases possible.

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## 5.102 python-dateutil

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dateutil - Extensions to the standard Python datetime module

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## 5.104 rapidjson

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## 5.105 rcmd.c

*src/lib/Libwin/rcmd.c*

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## 5.106 rcp.c

<http://web.mit.edu/freebsd/head/bin/rcp/rcp.c>

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Last Update: December 30, 2023

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## 5.109 requests-unixsocket

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Version 2.0, January 2004

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## 5.110 sosodev/duration/

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## 5.112 typing\_extensions

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In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <https://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations, which became Zope Corporation. In 2001, the Python Software Foundation (PSF, see <https://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation was a sponsoring member of the PSF.

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1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
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2.1.1	2.1+2.0.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
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## 5.113 urllib3

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## 5.114 util.c

<http://web.mit.edu/freebsd/head/bin/rcp/util.c>

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## 5.120 zlib.h

[https://www.zlib.net/zlib\\_license.html](https://www.zlib.net/zlib_license.html)

`zlib.h` -- interface of the 'zlib' general purpose compression library, version 1.2.11, January 15th, 2017

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