



ALTAIR

Altair PBS Professional 2022.1.1

Release Notes

You are reading the Altair PBS Professional 2022.1.1

Release Notes (RN)

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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 When a feature is no longer supported, we say it has been removed or is obsolete.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 a 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 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 (where AMS module runs) (optional)
- Budgets server on Budgets head node (optional)
- Budgets AMS module on service node (where PBS Cloud module runs) (optional)
- 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	Chip set	Components							
			PBS Professional				Cloud + AMS		Budgets	Simulate
			Server Sched	MoM on prem	Comm	Client cmds	Cloud module + AMS	MoM burst node	Head node + client cmds	Head node
CentOS	7	x86_64	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
	7	ARM64	Yes	Yes	Yes	Yes	No	Yes	No	No
Red Hat Enterprise Linux RHEL	7	x86_64	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	7	ARM64	Yes	Yes	Yes	Yes	No	Yes	No	Yes
	7 MLS	x86_64	Yes	Yes	Yes	Yes	No	No	No	No
	8	x86_64	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	8	ARM64	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Rocky Linux	8	x86_64	Yes	Yes	Yes	Yes	No	Yes	No	No
	8	ARM64	Yes	Yes	Yes	Yes	No	Yes	No	No
SUSE SLES	12	x86_64	Yes	Yes	Yes	Yes	Yes *	Yes	Yes	Yes
	12	ARM64	Yes	Yes	Yes	Yes	No	Yes	No	No
	15	x86_64	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
	15	ARM64	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Ubuntu	18.04	x86_64	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
	18.04	ARM64	Yes	Yes	Yes	Yes	No	Yes	No	Yes
	20.04	x86_64	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
	20.04	ARM64	Yes	Yes	Yes	Yes	No	Yes	No	Yes
HPE Cray Shasta	1.1 SLES 15	x86_64	Yes	Yes	Yes	Yes	Yes *	No	Yes *	Yes
	1.1 RHEL 7	x86_64	Yes	Yes	Yes	Yes	No	No	No	Yes
NEC SX-Aurora TSUBASA			Yes	Yes	Yes	Yes	No	No	No	Yes
Windows	10 Pro	x86_64	No	Yes	No	Yes	No	Yes	No	No

Table 1-1: Supported Platforms

Maker	Version	Chip set	Components							
			PBS Professional				Cloud + AMS		Budgets	Simulate
			Server Sched	MoM on prem	Comm	Client cmds	Cloud module + AMS	MoM burst node	Head node + client cmds	Head node
	11 Pro	x86_64	No	Yes	No	Yes	No	Yes	No	No
	Server 2016	x86_64	No	Yes	No	Yes	No	Yes	No	No
	Server 2019	x86_64	No	Yes	No	Yes	No	Yes	No	No

1.2.2.1 * SLES Restrictions for Cloud and Budgets Nodes

The following restrictions apply when using SLES on service node host for PBS Cloud or head node host for Budgets:

- Each SLES host must be registered with the SUSE Customer Center via SUSEConnect, and have a support contract. This happens automatically for cloud nodes.
- SLES hosts require Docker Enterprise Edition.

1.2.3 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.

1.2.4 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).

1.2.5 HPE

As of PBS version 2020.1, HPE machines use the standard PBS MoM, and therefore do not require a separate package; see [section 2.6, “HPE”, on page 15](#).

1.3 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

1.4 Hooks

1.4.1 Python Version

PBS versions 2022.1.0 and later use Python 3.9.10.

1.4.2 OpenSSL Requirement

Hooks require OpenSSL 1.1.1. See the installation instructions in [section 2.5.1, “OpenSSL Requirement for Hooks”, on page 12.](#)

1.5 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 deprec 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 deprec 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 deprec 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		

1.6 MUNGE

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

1.7 CSA

Support for CSA is no longer available.

1.8 Windows

- If you have Windows execution hosts, execution and client hosts can be either all Windows or some Windows and some Linux
- You can run MoMs and client commands on Windows machines, but all other PBS components must run on Linux hosts
- Domain requirements:
 - All Windows hosts must be in a domained environment
 - All Windows hosts must be part of the same domain
 - Active Directory Service domains are supported
 - Windows NT domains are not supported

For more specific Windows platform information, see [section 2.8, “Windows”, on page 16](#)

1.9 Licensing PBS Professional

PBS Professional 2022.1 requires version 14.5 or newer of the Altair License Management System (ALM), and version 20.0 or newer license features.

1.9.1 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>

1.10 Platform Deprecations and Removals

Table 1-4: Platform Deprecations and Removals

PBS Version	Change
2022.1.0	Support for Cray XC/ALPS is removed
2022.1.0	Support for Xeon Phi/MICs is deprecated
2021.1.3	Support for <code>init.d</code> is deprecated
2021.1	Support for CLE 7.0 (ALPS) is deprecated
2021.1	Support for CentOS 8.x is deprecated
2020.1	Support for CLE 5.2 and 6.0 is deprecated
2020.1	Support for Ubuntu 16.04 is deprecated
2020.1	Support for Windows Server 2012 R2 is deprecated
19.4.1	Use of Python 2.x is deprecated. PBS 19.4.1 uses Python 3.6.
19.2.5	Support for Windows 8 and Server 2012 deprecated
19.2.1	Support for CentOS 6 is deprecated.
19.2.1	Support for SLES 11 is deprecated.
19.2.1	Support for SLES 11 for HPE MC990X is deprecated.
19.2.1	Support for SLES 11 for HPE 8600 is deprecated.
19.2.1	Support for Windows Server 2008 R2 is deprecated.
19.2.1	Support for Windows 7 is deprecated.
14.2.1	Support for wrapper for MPICH is deprecated
14.2.1	Support for wrapper for MVAPICH is deprecated
13.1	Support for AIX is deprecated
13.1	Support for CentOS 5 is deprecated
13.1	Support for RHEL5 is deprecated
13.1	Support for SuSE SLES10 is deprecated
13.1	Support for Windows Server 2003 is deprecated
13.0	Using <code>pbsrun_wrap</code> and <code>pbsrun_unwrap</code> for Intel MPI is deprecated
12.2	Support for HPCBP jobs is removed
12.0	Support for LAM MPI 6.5.9 is deprecated
12.0	Use of Python 2.5 is deprecated, to be replaced by 2.7 in a future release.
11.3	Globus can still send jobs to PBS, but PBS no longer supports sending jobs to Globus
	Support in PBS for CSA on HPE SGI systems is removed .

Special Notes

2.1 Upgrading

2.1.1 Choosing Between Overlay and Migration Upgrades

We recommend a migration upgrade for the following:

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

We recommend an overlay upgrade for the following:

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

See the *PBS Professional Installation & Upgrade Guide*.

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 User Performing Upgrade Must be Database Creator

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

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

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

data_port defaults to "15007"

`data_user` defaults to `"pbsdata"`

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

```
pbs_datastore=# select pg_authid.oid, rolname from pg_authid;
oid | rolname
-----+-----
    10 | pbsdata
16541 | ashr
(2 rows)
```

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

```
pbs_datastore=# select pg_authid.oid, rolname from pg_authid where pg_authid.oid=10;
oid | rolname
-----+-----
    10 | pbsdata
(1 row)
```

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

```
pbs_ds_password -C pbsdata
```

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

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

2.1.5 Upgrading Under Windows

As of version 19.4.1, PBS server, scheduler, and comm daemons run on Linux only. MoMs and client commands can run on Windows, but all other PBS components must run on Linux hosts. Install the MoM and client commands as usual. When you install the Linux components, follow the normal Linux instructions.

2.1.6 Upgrading Caveats

- Warning when upgrading from 14.2.1: avoid using `"rpm -U"`. Instead, uninstall 14.2.1 using `"rpm -e"`, then install the next version using `"rpm -i"`.
- The `qrerun` command does not requeue job arrays. Instead, it leaves them in the *B* (begun) state. During a migration upgrade, you can work around this problem by using the `qhold` command on the job array, then using `qmove` to move it to the new server, then using the `qrls` command.
- 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 Licensing

As of 2020.1, PBS uses version 14.5 of the Altair License Management System (ALM) to manage licenses. Each ALM can serve either node (PBSProNodes) or socket (PBSProSockets) licenses, but not both. Therefore each PBS complex can be either completely licensed via node licenses or socket licenses, but not both. No other licensing system can be used with PBS Professional.

For information about how to license PBS Professional 2022.1, see the *PBS Professional Licensing Guide*.

- 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 you are using socket-based licenses to run PBS Professional, you will be asked for the host ID when generating the license file. You will need to run the `almutil` utility to gather this information. You can get the `almutil` utility from either:
 - An existing LM-X Altair License Server installation
 - A tar file containing `almutil` binaries available on the Altair Registered User License Manager page after selecting "Create New License". Extract the version you need for your PBS server platform.

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

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

2.3 Installation

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

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

2.3.1 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

- 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, and as of version 2020.1, the cgroups hook includes an `execjob_epilogue` event.
- 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 430 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 OpenSSL Requirement for Hooks

PBS 2022.1.1 requires Python 3.9. Python 3.9 needs OpenSSL $\geq 1.0.2$. Most OSes have OpenSSL 1.1.1 included now. Some platforms like CentOS 7, RHEL7, and SLES12 SP1 have OpenSSL 1.0.1 by default; on these, you need to install OpenSSL 1.1.1 in order to use many hooks, including the cloud bursting hook.

2.5.1.1 Impact of not upgrading to OpenSSL 1.1.1

There is no impact on the functioning of core PBSProfessional. The impact is limited to server hooks that need SSL. Notably, cloud bursting needs SSL, so cloud bursting will not function if we do not have the minimum version of OpenSSL. If a site hook needs the SSL module, that hook will be impacted.

2.5.1.1.i Error Seen for Hooks Which Import SSL:

Traceback (most recent call last):

```
File "<stdin>", line 1, in <module>
File "/opt/pbs/python/lib/python3.9/ssl.py", line 98, in <module>
import _ssl          # if we can't import it, let the error propagate
ModuleNotFoundError: No module named '_ssl'
```

2.5.1.1.ii PBS Behavior if OpenSSL 1.1.1 Not Available

(During installation from postinstall script)

```
WARNING: Unable to find OpenSSL version 1.1.1, hence python's ssl module will not work
```

During startup (from init script)

```
WARNING: Unable to find OpenSSL version 1.1.1, hence python's ssl module will not work
```

2.5.1.2 Installation Notes

Suggestions/notes on installing OpenSSL 1.1.1 when needed:

- On RHEL7 you may find OpenSSL in the EPEL repo and you may use a package manager to install OpenSSL
- On SLES12 SP1 we find OpenSSL 1.0.1. You may consider upgrading to higher SP versions. For SP2 onwards, SLES12 has OpenSSL 1.0.2. For SP4 onwards, there is an option to install OpenSSL 1.1.1.
- Do a source install of OpenSSL 1.1.1.

2.5.1.2.i Installation Instructions Using yum

1. Log in as root

2. Add the EPEL Repo:

```
yum -y install epel-release
```

3. Explicitly request an install of 1.1.1, otherwise it will leave 1.0 in place if you just ask for an update:

```
yum install openssl11.x86_64
```

4. Verify:

```
list installed | grep openssl
```

```
openssl-libs.x86_64          1:1.0.2k-25.el7_9          @updates
openssl11.x86_64           1:1.1.1k-4.el7            @epel
openssl11-libs.x86_64      1:1.1.1k-4.el7            @epel
```

2.5.1.2.ii Installation on Ubuntu

Log in as root.

Run the following:

```
wget http://security.ubuntu.com/ubuntu/pool/main/o/openssl/openssl_1.1.1f-1ubuntu2.16_amd64.deb
wget http://archive.ubuntu.com/ubuntu/pool/main/o/openssl/libssl1.1_1.1.1f-1ubuntu2_amd64.deb
dpkg -i libssl1.1_1.1.1f-1ubuntu2_amd64.deb openssl_1.1.1f-1ubuntu2.16_amd64.deb
dpkg -i pbspro-server_2022.1.0.20220623165250-1_amd64.deb
```

2.5.2 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 HPE

- As of version 2020.1, the cpuset MoM is removed. Use the cgroups hook 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.

2.7 Cray

2.7.1 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

2.7.2 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 UAI 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.

2.8 Windows

- As of PBS 2020.1, PBS supports two configurations involving Windows:
 - Linux server/sched/comm host, Windows execution and client hosts
 - Linux server/sched/comm host, Linux and Windows execution and client hosts
- As of PBS 2020.1, job submitters provide passwords using only one method, by caching them via the `pbs_login` command.
- As of PBS 2020.1, all Windows hosts and job submitters must belong to the same domain.
- As of PBS 19.4.1, Windows machines can run MoMs and client commands, while the server, schedulers, and comms run on Linux hosts.
- Under Windows, PBS may not correctly read the number of CPUs, and report an incorrect value for the `ncpus` resource. The Windows interface may be reporting CPUs on only one socket where there are multiple sockets. You can fix this using `qmgr` to set the correct value for `ncpus`:


```
qmgr -c "set node <vnode name> resources_available.ncpus = <value>"
```
- Change in requirements for submitting jobs under Windows

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

```
#PBS -l walltime=1:00:00
call E:\Step1.bat
call E:\Step2.bat
```
- If the full path name of a PBS command contains spaces, the path name must be quoted. If an argument to a PBS option contains spaces, it must be quoted. Examples:


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

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

The PBS installer requires and thus installs MSVC++ 2010. Please refer to Microsoft documentation for further details on this package.
- Windows `xcopy` bug: do not use `xcopy` inside job scripts:

The `xcopy` command sometimes expects input from the user. Because of this, it must be assigned an input handle. Since we do not create the job process with an input handle assigned, `xcopy` will fail/ behave abnormally if used inside a PBS job script. This is a bug in `xcopy` for which there is no known patch. Customers are therefore advised not to use the `xcopy` command inside job scripts and use the `copy`, `robocopy`, or `pbs_rcp` command instead.
- On Windows 7 and newer with UAC enabled, if you will use the `cmd` prompt for any privileged command such as `qmgr`, you must run the `cmd` prompt with the "Run as Administrator" option.
- On Windows, when configuring MoM, the path to `scp` cannot contain spaces.
- On Windows, staging paths cannot have spaces.

2.8.1 Mixed-mode Complexes (Linux and Windows Execution Hosts)

- You cannot use `qsub -G` to submit GUI Windows jobs, from either Linux or Windows clients
- When submitting a Windows job from a Linux client, you cannot use `qsub -S` to specify a different shell or interpreter
- You cannot submit an interactive Windows job from a Linux client

2.8.2 HPC Basic Profile

(12.2) Support for HPC Basic Profile is removed.

2.9 MPI

- 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.

2.10 Libraries

2.10.1 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`, `dlopen`, `dlsym` etc. for MUNGE-related APIs etc.

2.10.2 Requirement for ALSDK

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

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

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

2.11 Using Containers

- 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*.

2.12 Troubleshooting

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

2.13 Cloud

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.

2.14 Budgets

When a job is rerun, it is charged only for the final execution.

2.15 Avoiding Memory Hogging by Python Scripts

PBS server python hook scripts can cause memory leaks, which can use up too much memory. Previously, PBS periodically restarted the Python interpreter as a way to manage memory usage by Python hooks. As of version 2022.1.1, PBS offers Python garbage collection, in addition to restarting the interpreter, as a way to manage hook memory usage. PBS can do the following periodically:

- Trigger Python garbage collection
- Restart the Python interpreter

2.15.1 Using Garbage Collection

You can choose whether to use periodic garbage collection, and how often.

You specify the frequency of garbage collection in the new server attribute named "python_gc_min_interval". The default value for this attribute is 30 seconds.

To avoid using garbage collection, set the value of this attribute to zero.

2.15.2 Restarting the Python Interpreter

You can choose whether to periodically restart the interpreter, and how often.

The default interval for restarting the Python interpreter is one hour; you can set this interval in the server attribute named "python_restart_min_interval".

To avoid restarting the Python interpreter, set the value of this attribute to zero (this behavior is new; previous releases of PBS did not allow setting this value to zero).

2.15.3 Attributes for Managing Python Memory Usage

python_gc_min_interval

Server attribute

Specifies frequency for Python garbage collection. For no garbage collection, set this to zero.

Format: integer seconds

Default: 30 seconds

python_restart_min_interval

Server attribute

Specifies frequency for Python interpreter restart. For no interpreter restart, set this to zero.

Format: integer seconds

Default: 3600 seconds (1 hour)

New Features and Interface Changes

3.1 New Features

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

3.2 External Interface Changes

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

3.2.1 Changes in Paths, Parameters, and Environment Variables

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

PBS Version	Change
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

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

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

3.2.2 Changes to Server

Table 3-2: Changes to Server

PBS Version	Change Type	Change
2022.1.1	New attribute	New python_gc_min_interval server attribute
2022.1.1	New attribute value	The python_gc_min_interval server attribute accepts zero as a value
2021.1.3	Attribute removed	The Flicenses server attribute is removed.
2020.1	Attribute removed	The single_signon_password_enable attribute is removed.
2020.1	Change in default value	New default for rpp_max_pkt_check attribute of 64
2020.1	New attribute	New reserve_retry_time attribute
2020.1	Attribute deprecated	The reserve_retry_init attribute is deprecated
2020.1	Attribute obsoleted	The reserve_retry_cutoff 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 acl_host_moms_enable server attribute

Table 3-2: Changes to Server

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

3.2.3 Changes to Scheduler

Table 3-3: Changes to Scheduler

PBS Version	Change Type	Change
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.
2022.1.0	Scheduler behavior and options removed	Starving is removed; <code>help_starving_jobs</code> , <code>max_starve</code> , the <code>Starving</code> 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 removed
2022.1.0	Parameter removal	The <code>max_starve</code> parameter is removed
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 removed
2021.1.1	Parameter made obsolete	The <code>cpus_per_ssinode</code> parameter is obsolete
2021.1.1	Parameter made obsolete	The <code>mem_per_ssinode</code> parameter is obsolete
2021.1.1	Parameter made obsolete	The <code>sort_queues</code> parameter is obsolete
2021.1.1	Parameter made obsolete	The <code>sync_time</code> parameter is obsolete
2020.1	Scheduler attribute changed	Only value for <code>preempt_sort</code> attribute is <code>min_time_since_start</code>
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 obsolete
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

Table 3-3: Changes to Scheduler

PBS Version	Change Type	Change
18.2.1	New scheduler attribute	New scheduling scheduler attribute
18.2.1	New scheduler attribute	New scheduler_iteration scheduler attribute
18.2.1	Deprecation	mom_resources deprecated
18.2.1	Deprecation	Scheduler reads changes from pbsfs without HUP or restart
18.2.1	Deprecation	The help_starving_jobs scheduler parameter is deprecated. Instead, use eligible_time in the job formula. See also the topjob_ineligible job attribute.
18.2.1	New formula keyword	New fairshare_tree_usage formula keyword
18.2.1	New formula keyword	New fairshare_factor formula keyword
18.2.1	Change in formula keyword	New fairshare_perc formula keyword replaces fair_share_perc; fair_share_perc is deprecated
14.2.3	Deprecation	The mom_resources line in sched_priv/sched_config is deprecated. Instead, use exechost_periodic 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 est_start_time_freq server attribute is obsolete
13.1	Scheduler configuration parameter obsoleted	The preempt_priority argument to the job_sort_key scheduler parameter is obsolete (this behavior is the default)
13.1	Scheduler configuration parameter deprecated	The backfill scheduler parameter is deprecated . Use backfill_depth instead.
13.1	New scheduler attribute	New opt_backfill_fuzzy scheduler attribute
13.0	Scheduler configuration parameter deprecated	The half_life scheduler parameter is deprecated, replaced with fairshare_decay_time and fairshare_decay_factor
13.0	New scheduling feature	Fairshare and job sort formulas use Python math functions
13.0	Scheduler configuration parameter removed	The sort_queues scheduler parameter has no effect.
13.0	New scheduler attribute	New sched_preempt_enforce_resumption scheduler attribute
13.0	Scheduler parameter deprecated	The preempt_priority argument to the job_sort_key scheduler parameter is deprecated
12.2	Scheduler configuration parameter deprecated	The smp_cluster_dist scheduler parameter is deprecated
12.2	Scheduler configuration parameter deprecated	The sort_queues scheduler parameter is deprecated (this behavior is now automatic)
	Scheduler configuration parameter deprecated	The sort_priority option to job_sort_key is deprecated and is replaced with the job_priority option.
	Scheduler configuration option deprecated	The sync_time scheduler configuration option is deprecated.

Table 3-3: Changes to Scheduler

PBS Version	Change Type	Change
9.1	Deprecation	cpus_per_ssinode is deprecated.
9.1	Deprecation	key is deprecated.
9.1	Deprecation	load_balancing_rr is deprecated.
9.1	Deprecation	mem_per_ssinode is deprecated.
9.1	Deprecation	preempt_checkpoint is deprecated.
9.1	Deprecation	preempt_fairshare is deprecated.
9.1	Deprecation	preempt_requeue is deprecated.
9.1	Deprecation	preempt_starving is deprecated.
9.1	Deprecation	preempt_suspend is deprecated.
9.1	Deprecation	sort_by is deprecated.
9.1	Deprecation	strict_fifo is deprecated.

3.2.4 Resource Changes and Deprecations

Table 3-4: Resource Changes and Deprecations

PBS Version	Change
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 netwins 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 PBSscrayseg resource is no longer used.
13.0	New preempt_targets resource
11.0	The mpp* resources are deprecated
	The nodes resource is no longer used.
	The resource arch is only used inside of a select statement.
	The resource host is only used inside of a select statement.
	The nodect 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 neednodes resource is obsolete.
	The ssinodes resource is obsolete.
	Properties are replaced by boolean resources.

3.2.5 Command Changes and Deprecations

Table 3-5: Command Changes and Deprecations

PBS Version	Change
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>pc1m</code> command-line interface is deprecated
2021.1.2	The Undo Live Recorder integration is removed.
2021.1	New <code>%<max_subjobs></code> parameter for <code>qsub -J</code> option
2021.1	New <code>-lselect-<select_spec></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 for Windows
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.
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 <command> sched</code> " without specifying name is deprecated
18.2.1	New <code>-j</code> sub-option to <code>qsub -m</code>
18.2.1	New <code>pbs_topologyinfo -l</code> option

Table 3-5: Command Changes and Deprecations

PBS Version	Change
18.2.1	<code>pbsfs -g</code> prints entity effective usage
18.2.1	New <code>qstat -F json</code> option
18.2.1	New <code>qstat -F dsv</code> option
18.2.1	New <code>qstat -fw</code> option
18.2.1	New <code>admin-resume</code> pseudo-signal for <code>qsig</code>
18.2.1	New <code>admin-suspend</code> pseudo-signal for <code>qsig</code>
18.2.1	The <code>pbs-report</code> command is no longer supported , and has been moved to the unsupported directory
14.2.1	The <code>pbs_probe</code> command is deprecated
14.2.1	New <code>qstat -E</code> option
14.2.1	The <code>pbs_probe</code> command is deprecated
13.1	The <code>qorder</code> command is deprecated
13.0	You can create custom resources with <code>qmgr</code>
13.0	Added <code>qsub -f</code> option
13.0	The <code>xpbs</code> and <code>xpbsmon</code> interfaces to PBS are deprecated
13.0	Using <code>pbsrun_wrap</code> and <code>pbsrun_unwrap</code> for Intel MPI is deprecated
13.0	The <code>xpbs</code> and <code>xpbsmon</code> interfaces to PBS are deprecated
12.2	The <code>qsub -W interactive = true</code> option is deprecated; use <code>qsub -I</code>
12.2	You can edit the <code>qmgr</code> command line
12.1	The <code>pbs-report</code> command is deprecated and moved to the "unsupported" directory
12.1	<code>qmgr</code> command: question mark now equivalent to "help"
12.0	New <code>pbs_interactive</code> command
	The <code>pbs_hostid</code> command is no longer available.
	The <code>-a</code> option to the <code>pbs_sched</code> command is deprecated.
	<code>qsub</code> : the <code>-lnodes=nodespec</code> form is replaced by the <code>-l select=</code> and <code>-l place=</code> statements.
	The <code>-l resource=rescspec</code> form is replaced by the <code>-l select=</code> statement.
	The <code>-a</code> option to the <code>qselect</code> command is deprecated.
	The <code>-wdelay=nnnn</code> option to the <code>qdel</code> command is deprecated.
	The <code>-c</code> and <code>-d</code> options to the <code>pbsnodes</code> command are deprecated and removed.
	The <code>pbs_tclapi pbsrescquery</code> command is deprecated.
	The <code>pbs_rescquery</code> command is deprecated.
	The <code>configrm()</code> resource monitor API call is deprecated.

3.2.6 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 maintenance_jobs attribute
18.2.1	New vnode attribute	New last_state_change_time attribute
18.2.1	New vnode attribute	New last_used_time attribute
18.2.1	New vnode attribute	New power_provisioning attribute
18.2.1	New vnode attribute	New partition attribute
18.2.1	New vnode attribute	New poweroff_eligible attribute
18.2.1	New vnode attribute	New provision_enable attribute
18.2.1	New vnode state	New sleep vnode state
18.2.1	New vnode state	New maintenance state
18.2.1	End of support	The max_group_run vnode attribute is no longer supported.
18.2.1	End of support	The max_running vnode attribute is no longer supported.
18.2.1	End of support	The max_user_run vnode attribute is no longer supported.
14.2.4	Deprecation	The max_group_run vnode attribute is deprecated.
14.2.4	Deprecation	The max_running vnode attribute is deprecated.
14.2.4	Deprecation	The max_user_run vnode attribute is deprecated.
12.2	New vnode attribute	The pcpus vnode attribute is deprecated
11.3	New vnode attribute	New license_info attribute
	Vnode type change	The time-shared node type is no longer used, and the :ts suffix is obsolete.
	Vnode type change	The cluster node type is no longer used.

3.2.7 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.

Table 3-7: New Queue Attributes

PBS Version	Change
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_queueable queue attribute is deprecated.
13.1	backfill_depth
13.0	queued_jobs_threshold
13.0	queued_jobs_threshold_res.RES

3.2.8 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
18.2.1	New resources_released attribute
18.2.1	New resource_released_list attribute
18.2.1	New soft_walltime attribute
18.2.1	New estimated.soft_walltime attribute
13.1	New topjob_ineligible attribute
13.0	Job and reservation names can be 236 characters
12.0	New min_walltime attribute
12.0	New max_walltime attribute

3.2.9 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 memreserved MoM configuration option is deprecated.

3.2.10 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 deprecated .
2022.1.0	New vnode object methods	Vnode objects have new methods for retrieving state information; see " Vnode Object Members " on page 147 of the <i>PBS Professional Hooks Guide</i> .
2022.1.0	New vnode state constants	The old vnode state constants have been replaced with new ones. See " Vnode State Constant Objects " on page 148 of the <i>PBS Professional Hooks Guide</i> .
2022.1.0	Deprecation	Old hook event types are deprecated: <code>QUEUEJOB</code> , <code>MODIFYJOB</code> , <code>RESVSUB</code> , <code>RESV_END</code> , <code>MOVEJOB</code> , <code>RUNJOB</code> , <code>PROVISION</code> , <code>EXECJOB_PROLOGUE</code> , <code>EXECJOB_EPILOGUE</code> , <code>EXECJOB_END</code> , <code>EXECJOB_PRETERM</code> , <code>EXECJOB_LAUNCH</code> , <code>EXECJOB_BEGIN</code> , <code>EXECJOB_ATTACH</code> , <code>EXECJOB_POSTSUSPEND</code> , <code>EXECJOB_PRERESUME</code> , <code>EXECHOST_PERIODIC</code> , <code>EXECHOST_STARTUP</code> , <code>PERIODIC</code>
2022.1.0	Deprecation	Old node states are deprecated: <code>ND_FREE</code> , <code>ND_OFFLINE</code> , <code>ND_DOWN</code> , <code>ND_STALE</code> , <code>ND_JOBBUSY</code> , <code>ND_JOB_EXCLUSIVE</code> , <code>ND_RESV_EXCLUSIVE</code> , <code>ND_BUSY</code> , <code>ND_PROV</code> , <code>ND_WAIT_PROV</code> , <code>ND_UNRESOLVABLE</code> , <code>ND_SLEEP</code>
19.4.1	Python version change	Python version changed to 3.6

Table 3-10: Hook Changes

PBS Version	Type	Change
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 <code>True</code>
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>execheost_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.

3.2.11 File Changes

Table 3-11: File Changes

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

3.2.12 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.

3.2.13 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>

3.2.14 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 Documentation Changes

Table 3-15: Documentation Changes

PBS Version	Change
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
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 & 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.

Table 3-15: Documentation Changes

PBS Version	Change
13.0	Installation and Upgrade Guide contains a new Communication chapter that describes the new <code>pbs_comm</code> daemon.
13.0	The Hooks chapter in the 13.0 Administrator's Guide has been overhauled. It also includes three new hook events.
12.1	User's Guide has been overhauled, with rewritten chapters on setting up the user's environment, submitting jobs, requesting resources, controlling the job, job arrays, and job file I/O.
12.0	Administrator's Guide chapter on Hooks is expanded and rewritten for the new execution-event hook feature. The "Setting File Transfer Mechanism" in the Administrator's Guide chapter on Administration is new for 12.0. Added "Initial Configuration" chapter to Installation & Upgrade guide for 12.0.

4 Bugs

4.1 Bug Lists for PBS Professional

For bug lists for PBS Cloud and Budgets, see [section 4.2, “Bug Lists for PBS Cloud Module”, on page 59](#) and [section 4.3, “Bug Lists for Budgets Module”, on page 61](#).

4.1.1 Modifications and Bug Fixes in PBS Professional 2022.1.1

The following bugs are fixed in PBS 2022.1.1:

Table 4-1: 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

4.1.2 Modifications and Bug Fixes in PBS Professional 2022.1.0

The following bugs are fixed in PBS 2022.1.0:

Table 4-2: 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())

Table 4-2: Bug Fixes in PBS Professional 2022.1.0

JIRA ID	Description
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
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 output 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

Table 4-2: Bug Fixes in PBS Professional 2022.1.0

JIRA ID	Description
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 rerun 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
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

Table 4-2: Bug Fixes in PBS Professional 2022.1.0

JIRA ID	Description
PBS-25817	Standing reservation submission to simulator (simsh) with -D duration option fails
PBS-25821	Setting fairshare_entity to anything besides euser, egroup, 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
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

Table 4-2: Bug Fixes in PBS Professional 2022.1.0

JIRA ID	Description
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
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()

Table 4-2: Bug Fixes in PBS Professional 2022.1.0

JIRA ID	Description
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 execest_ 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
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

4.1.3 Modifications and Bug Fixes in PBS Professional 2021.1.3

The following bugs are fixed in PBS 2021.1.3:

Table 4-3: 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
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

Table 4-3: Bug Fixes in PBS Professional 2021.1.3

JIRA Issue	Description
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

4.1.4 Modifications and Bug Fixes in PBS 2021.1.2

The following bugs are fixed in PBS 2021.1.2:

Table 4-4: 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
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

Table 4-4: Bug Fixes in PBS Professional 2021.1.2

JIRA Issue	Description
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

4.1.5 Modifications and Bug Fixes in PBS 2021.1.1

The following bugs are fixed in PBS 2021.1.1:

Table 4-5: Bug Fixes in PBS 2021.1.1

JIRA Issue	Description
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
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

Table 4-5: Bug Fixes in PBS 2021.1.1

JIRA Issue	Description
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

4.1.6 Modifications and Bug Fixes in PBS 2021.1

The following bugs are fixed in PBS 2021.1:

Table 4-6: Bug Fixes in PBS 2021.1

JIRA Issue	Description
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"
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

Table 4-6: Bug Fixes in PBS 2021.1

JIRA Issue	Description
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 requeued 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

4.1.7 Modifications and Bug Fixes in PBS 2020.1.2

The following bugs are fixed in PBS 2020.1.2:

Table 4-7: 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 execest2 parsing
PBS-26565	Some multinode jobs are not running properly with place=scatter:exclhost"

Table 4-7: Bug Fixes in PBS 2020.1.2

JIRA Issue	Description
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 stress/long running testing

4.1.8 Modifications and Bug Fixes in PBS 2020.1.1

The following bugs are fixed in PBS 2020.1.1:

Table 4-8: 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

4.1.9 Modifications and Bug Fixes in PBS 2020.1

The following bugs are fixed in PBS 2020.1:

Table 4-9: 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.

Table 4-9: Bug Fixes in PBS 2020.1

JIRA Issue	Description
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_hyphertreads 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
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

Table 4-9: Bug Fixes in PBS 2020.1

JIRA Issue	Description
PBS-23873	Mom crashed when using release_nodes_on_stageout
PBS-23877	job stays in substate 41 after rerun 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
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

Table 4-9: Bug Fixes in PBS 2020.1

JIRA Issue	Description
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

4.1.10 Known Bugs, Errors, and Warnings in PBS Professional

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

Table 4-10: Open Bugs in PBS Professional 2022.1.1

JIRA ID	Description
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 <i>PBS_ALL</i> .
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
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

Table 4-10: Open Bugs in PBS Professional 2022.1.1

JIRA ID	Description
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 starving.
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
PBS-17844	PBS_NODEFILE doesn't include all vnodes
PBS-17894	Cray ticket 851294: If preemption mechanisms "C" or "S" fail for a job during a cycle, scheduler should remember it when it selects preemption candidates for a new job
PBS-17986	Unable to debug server periodic hooks with pbs_python

Table 4-10: Open Bugs in PBS Professional 2022.1.1

JIRA ID	Description
PBS-18060	Hooks run on MoM before server has sent updated resourcedef file can crash in <code>_svr_types.py</code> (uncaught exception) Workaround: Fix the Python code on site and remove the <code>.pyc</code> and <code>.pyo</code> files
PBS-18154	PBS behaves differently depending on <code>/etc/hosts</code> setting
PBS-18223	<code>pbsnodes -avjS</code> reports duplicate job-ids, hence showing a wrong number for <code>njobs</code>
PBS-18238	<code>pbs_mom</code> not giving the correct log message when deleting a hook
PBS-18599	<code>pbs_est</code> does not set <code>estimated.start_time</code> 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 <code>JOB_SUBSTATE_STAGEOUT</code> with race conditions (Cray CAST-7990 BUG 852721 and CAST-17142)
PBS-18701	Address PP-996: <code>systemctl</code> fails accurately report status of started daemons if they were stopped via mechanism other than <code>systemctl</code>
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-18815	<code>pbs_habitat</code> does not create directory structure for home if home folder already exists
PBS-18926	PBS Pro sister moms do not clean up the job when the mother superior (diskless) get rebooted with a multi-node running job on it
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-19077	Natural nodes in <code>_multi_vnode_host</code> nodes break ascending node sorts on resources -- probably need "ascending but non zero" sorting keyword
PBS-19079	<code>cgroup</code> hook and <code>cpuset</code> MoM process containment and suspend/resume interoperability Workaround: Disable the <code>cpuset</code> 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 <code>cgroup</code> hook to support at least per-socket process containment/pinning together with suspend/resume. If possible, also use <code>cpu shares</code> or <code>cfs period/quota</code> 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 4-10: Open Bugs in PBS Professional 2022.1.1

JIRA ID	Description
PBS-19401	cgroup execest_startup should synchronise resources_available.vntype to what is read from vntype file Workaround: Use <code>qmgr</code> to set the required <code>vntype</code> , and when it is updated offline the nodes until everything is indeed synchronised. The point is that many sites <code>_DO NOT_</code> get this right, and the fact that some things must be done using <code>qmgr</code> means that the server overrides what MoM is telling it, <code>_hiding_</code> 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 <code>MALLOC_CHECK_</code> 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-19739	Fix cgroups numa memory discovery and assignment
PBS-19740	Fix Cgroups clamping vmem
PBS-19767	resolve valgrind reported error regarding uninitialized values in <code>force_qsub_daemons_update</code>
PBS-19898	<code>get_device_name</code> 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 <code>node_partition</code>
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 <code>job_history_duration</code> expiry
PBS-20303	PBS on Windows does not count GPU devices for licensing purposes
PBS-20516	<code>PBS_COMM_ROUTERS</code> is not working for multi comms Workaround: If you are using <code>PBS_COMM_ROUTERS</code> as a comma-separated list, add port information to each entry. Port information has this format: <code><port></code> and the default port number is <code>17001</code> . For example: <code>PBS_COMM_ROUTERS=x58-r7:17001,x18-64:17001</code>
PBS-20593	Invalid initial resource update for job from MoM during first seconds following start if there's an <code>execjob_begin</code> hook present
PBS-20594	cgroups warning log message and less vmem than should really be available, if system doesn't have swap

Table 4-10: Open Bugs in PBS Professional 2022.1.1

JIRA ID	Description
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 <code>capmc</code> 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(<code>qmgr -c "print node @default"</code>) does not display the resource <code>poweroff_eligible</code> whereas <code>pbsnodes -av</code> output does show Workaround: Use <code>pbsnodes</code> to gather values for <code>poweroff_eligible</code>
PBS-20975	Due to race condition <code>qdel</code> at job end can fail and also suppress the Obit causing MOM to hang
PBS-21069	If using <code>vnode_pool</code> deleting the inventory (first) mom can cause 1st compute node in the <code>exec_host</code> list becomes the natural <code>vnode</code> 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 <code>vnode</code> behind everything
PBS-21229	Power Provisioning hook delay due to iteration over large number of nodes
PBS-21396	<code>exehost_periodic</code> run before <code>exehost_startup</code> on Windows
PBS-21398	PBS adds extra chars to output of command run via <code>pbs_attach -c</code> on Windows
PBS-21529	TCL/Tk incomplete in PBS Pro, <code>pbs_tclsh</code> commands do not work Workaround: You can probably work around this by extracting copies of the missing files from a 14.2 RPM package and putting them in place in a 19.2 installation directory
PBS-21602	Several races in suspend/resume at end of job fail suspension
PBS-21788	Address PP-1312: Umask is not working when submitting with <code>,Äö-k oed,Äö</code>
PBS-21894	<code>pbs_mom</code> 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, <code>qstat -fx</code> exit status should be consistent with end of job accounting record's exit status
PBS-22718	PBS giving error "PBS server internal error (15011) in <code>set_entity_resc_sum_max</code> , Error in <code>LIM_USER</code> for euser <code>pbsuser</code> for resource <code>ncpus</code> " when entity limits are set on server.
PBS-22752	mom crash when using reliable job startup features and job requests host but not <code>ncpus</code>

Table 4-10: Open Bugs in PBS Professional 2022.1.1

JIRA ID	Description
PBS-22871	pbs_cgrouops 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
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>/dev/null'] process = subprocess.Popen(cmd, shell=False, stdout=subprocess.PIPE, stderr=sub- process.PIPE) 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	cgrouops 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-24401	decode_Mom_list dynamic allocation bug crashes server when there are exactly three MoM attribute entries (or silently corrupts heap)

Table 4-10: Open Bugs in PBS Professional 2022.1.1

JIRA ID	Description
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 staging-out out/err files in windows
PBS-25319	Interactive job doesn't start with prologue script on windows
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 execlist_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 <i>dynamically</i> , 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-27248	In case of errors, stageout of "everything in sandbox" can simply recursively copy whole home directory ad nauseam

Table 4-10: Open Bugs in PBS Professional 2022.1.1

JIRA ID	Description
PBS-27364	mom fix to vmem enforcement by MoM kills jobs when vmem is requested as per cgroups hook semantics
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
PBS-27623	execjob_attach event is not getting triggered even if the job has executed pbs_attach
PBS-27905	Server python interpreter restart hangs for tens of seconds (hanging server) Workaround: set server python_restart_max_hooks=1000 (or some even larger number) set server python_restart_min_interval=<some large interval of time> will make the hook restarts more frequent, and by lowering and raising them again you can schedule them at off-peak moments
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-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	restrict_user breaks stagein for jobs using new TPP job send mechanism Workaround: Don't use restrict_user, and limit access to nodes using another mechanism (e.g. using an sshrc file that uses pbs_attach).
PBS-28259	Reservation node state showing as free
PBS-28260	Compute nodes created with IP addresses cannot be managed by the pbsnodes command
PBS-28347	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-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-28472	chunk split across multiple vnodes with vscatter arrangement
PBS-28492	Simulator: Not able to query parent job array through qstat
PBS-28564	10 second alarm in dis_reply_write makes qstat -x -f fail when encoding reply takes almost 10 seconds Workaround: Reduce the job history duration so that the encoding of the reply takes less than 10 seconds, and only use these commands that return long replies on the server. Avoid qsub -V which makes qstat -f -x output a lot larger. Not always possible to use this workaround -- some sites rely on large job history durations, or have such a large number of jobs that even moderate job history durations run afoul of this bug.

Table 4-10: Open Bugs in PBS Professional 2022.1.1

JIRA ID	Description
PBS-28565	Unable to pass environment variables with quotes to job
PBS-28633	scheduler can crash when HUP'd
PBS-28653	Failure to generate pbs snapshot on a system that's only running pbs_mom on MLS machine
PBS-28705	performance degradation in setting and unsetting the node state as offline when node is already offline
PBS-28722	Server Failover : Primary server is in "active" state even though primary is down in qstat -B <primary server name>
PBS-28727	Server deadlocks because requests issued by server to itself using the network Workaround: Make sure not to use PBS_SERVER_HOST_NAME on the server's /etc/pbs.conf, make sure to make the first entry in PBS_LEAF_NAME match PBS_SERVER (if possible), in a PBS failover pair make sure that PBS_PRIMARY also matches PBS_SERVER, etc. Note that many more advanced configurations (using external HA, containerized server services etc.) may not be able to implement all that is necessary, and I have certainly not assured myself that the workarounds are sufficient (except for some test cases I could reproduce).
PBS-28780	Jobs do not run on vnodes with node hour license
PBS-28786	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

4.2 Bug Lists for PBS Cloud Module

4.2.1 Bug Fixes in PBS Cloud 2022.1.1 Module

The following bugs are fixed in the PBS Cloud module for 2022.1.1:

Table 4-11: Bug Fixes in PBS Cloud 2022.1.1 Module

JIRA ID	Description
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

4.2.2 Bug Fixes in PBS Cloud 2022.1.0 Module

The following bugs are fixed in the PBS Cloud module for 2022.1.0:

Table 4-12: Bug Fixes in PBS Cloud 2022.1.0 Module

JIRA ID	Description
PBS-27340	PBS Cloud: Hook: Should take account of a license resource (per scenario) when bursting.
PBS-27504	PBS Cloud: Hook: Should take account of a license resource (per scenario) when bursting.
PBS-28116	PBS: Cloud: Update hook to support OCI (Azure and others) IB need for per burst network
PBS-28162	PBS Cloud: Correct value of pclm_server?
PBS-28350	cloud_hook raises exception when parsing sched log file (because of lines sliced in two while parsing)
PBS-28428	Add support for multiple cloud hooks
PBS-28477	Cloud hook to provide more details to server_logs in case of "disabled scenario" in PBS Cloud or Altair Control

4.2.3 Bug Fixes in PBS Cloud 2021.1.3 Module

The following bugs are fixed in the PBS Cloud module for 2021.1.3:

Table 4-13: Bug Fixes in PBS Cloud 2021.1.3 Module

JIRA Issue	Description
PBS-25400	Cloud hook fails with a KeyError when use_node_hour_license is set to "false" in hook config file
PBS-28162	PBS Cloud: Correct value of pclm_server?
PBS-28350	cloud_hook raises exception when parsing sched log file (because of lines sliced in two while parsing)
PBS-28437	Cloud hook to provide more details to server_logs in case of "disabled scenario" in PBS Cloud or Altair Control

4.2.4 Known Bugs, Errors, and Warnings in PBS Cloud Module

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

Table 4-14: Open Bugs in PBS Cloud 2022.1.1 Module

JIRA ID	Description
PBS-24196	Check if each scenario in cloud hook config file is Unique
PBS-27923	PBS Pro: Cloud Bursting Hook: pbs.conf file parsing robustness
PBS-28780	Jobs do not run on vnodes with node hour license

4.3 Bug Lists for Budgets Module

4.3.1 Bug Fixes in Budgets 2022.1.0 Module

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

Table 4-15: 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

4.3.2 Bug Fixes in Budgets 2021.1.3 Module

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

Table 4-16: Bug Fixes in Budgets 2021.1.3 Module

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

4.3.3 Bug Fixes in Budgets 2021.1.2 Module

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

Table 4-17: 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

Table 4-17: Bug Fixes in Budgets 2021.1.2 Module

JIRA Issue	Description
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.

4.3.4 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 4-18: Open Bugs in Budgets 2022.1.1 Module

JIRA ID	Description
AM-282	need better error message if control server is unreachable
AM-352	Adding period data with incorrect data shows unexpected error message via API
AM-390	Project report performance issues
AM-417	The value of am_job_amount is incorrectly calculated in case of PBS failover
AM-512	AM does not charge for the run duration before requeue when job gets scheduled on peer server(PBS)
AM-515	AM charges for the requested amount instead of used amount when PBS failover happens near the end of job run.
AM-528	Improve error message when AM unable to contact Access Manager
AM-556	Alloc Manager fails to run the requeued jobs again if PBS failover occurs
AM-561	am_auth_register gives wrong error message when AM_AUTH_ENDPOINT is not provided inside am.conf
AM-603	Incorrect error message when submitting jobs to "not connected" clusters
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

5

Legal Notices

This product may contain the following third-party software:

3.1	AVLtree	AG-7
3.2	Certifi	AG-8
3.3	chardet	AG-12
3.4	cJSON	AG-20
3.5	Click	AG-20
3.6	echo	AG-20
3.7	Editline	AG-21
3.8	Expat	AG-21
3.9	FreeBSD	AG-22
3.10	Go JOSE	AG-22
3.11	go-oidc	AG-25
3.12	gqlgen	AG-28
3.13	gqlparser	AG-29
3.14	Gunicorn MIT	AG-29
3.15	hwloc	AG-30
3.16	IDNA	AG-30
3.17	libical	AG-31
3.18	listsort.c	AG-32
3.19	ltmain.sh	AG-32
3.20	lumberjack	AG-32
3.21	MinGwEditLine	AG-33
3.22	OpenSSL 1_1_0	AG-34
3.23	OpenTelemetry-Go	AG-35
3.24	OpenTelemetry-Go Contrib	AG-38
3.25	popen.c	AG-41
3.26	PostgreSQL	AG-42
3.27	PrettyTable	AG-42
3.28	Pygresql	AG-43
3.29	pyjwt	AG-43
3.30	Python 3.6	AG-44
3.31	Python Extensions for Windows	AG-48
3.32	Python Six	AG-48
3.33	python-dateutil 2.7.5	AG-48
3.34	pytz	AG-49
3.35	remd.c	AG-50
3.36	requests 2.22	AG-50
3.37	requests-unixsocket	AG-50
3.38	TCL/TK 8.6.6	AG-53
3.39	urllib3	AG-54
3.40	uuid	AG-54
3.41	Werkzeug BSD	AG-54
3.42	zlib.h	AG-55

5.1 AVLtree

AVL index routines by Gregory Tseytin

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\$FreeBSD: src/lib/libc/gen/popen.c, v 1.14 2000/01/27 23:06:19

5.2 Certifi

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5.18 listsort.c

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5.19 ltmain.sh

buildutils/ltmain.sh

m4/libtool.m4

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Written by Gordon Matzigkeit, 1996

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5.20 lumberjack

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

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5.27 PrettyTable

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With contributions from:

- Chris Clark
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- "maartendb"

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Written by D'Arcy J.M. Cain (darcy@druid.net)

Based heavily on code written by Pascal Andre (andre@chimay.via.ecp.fr)

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5.29 pyjwt

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5.30 Python 3.6

5.30.1 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

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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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5.32 Python Six

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5.33 python-dateutil 2.7.5

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dateutil - Extensions to the standard Python datetime module

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5.34 pytz

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5.35 rcmd.c

src/lib/Libwin/rcmd.c

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5.36 requests 2.22

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5.37 requests-unixsocket

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5.39 urllib3

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5.40 uuid

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5.42 zlib.h

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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