

PBS Access Web 2018.2

Administrator's Guide



 Altair | PBS Works™

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Technical Support

Location	Telephone	e-mail
Australia	+1 800 174 396	anz-pbssupport@india.altair.com
China	+86 21 6117 1666	es@altair.com.cn
France	+33 (0)1 4133 0992	pbssupport@europe.altair.com
Germany	+49 (0)7031 6208 22	pbssupport@europe.altair.com
India	+91 80 66 29 4500 +1 800 425 0234 (Toll Free)	pbs-support@india.altair.com
Italy	+39 800 905595	pbssupport@europe.altair.com
Japan	+81 3 6225 5821	pbs@altairjp.co.jp
Korea	+82 70 4050 9200	support@altair.co.kr
Malaysia	+91 80 66 29 4500 +1 800 425 0234 (Toll Free)	pbs-support@india.altair.com
North America	+1 248 614 2425	pbssupport@altair.com
Russia	+49 7031 6208 22	pbssupport@europe.altair.com
Scandinavia	+46 (0) 46 460 2828	pbssupport@europe.altair.com
Singapore	+91 80 66 29 4500 +1 800 425 0234 (Toll Free)	pbs-support@india.altair.com
South Africa	+27 21 831 1500	pbssupport@europe.altair.com
South America	+55 11 3884 0414	br_support@altair.com
United Kingdom	+44 (0)1926 468 600	pbssupport@europe.altair.com

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Latest features available with PBS Access.

Job Submission Enhancements

Schedule jobs by selecting an input file, by selecting a job profile or while monitoring jobs.

Refining Job Monitoring

Use a filter to refine your job monitoring criteria to view all jobs or subsets of jobs.

Flexible Customization of Job Listing Display

Add or remove job attributes in the job monitoring display, adjust the column size, and sort the list.

Job Custom Action

Execute a custom action while a job is in a particular state.

Improved Job Management

Move a job to a different queue, terminate a job, remove unwanted jobs, resubmit and download jobs.

Profile Management

Create and manage profiles so that you can submit multiple jobs to the same application with the same arguments, thereby streamlining job submission.

Folder and File Management

Perform folder and file operations like creating a folder, uploading job input files, viewing and working on files, and viewing image files.

Remote Sessions

Activate a remote session by submitting interactive jobs.



Note: The result visualization features available with Compute Manager (formerly known as RVS) are not available with PBS Access 2018.2. It is planned for a future release. Contact the Altair support team for updates.

Multiple File Download

PBS Access provides an option to select multiple files and download them from Job details tabs i.e., Input and Output.

Adding a Directory Path as a Favorite

PBS Access allows you to add a specific file path in the Files section that is consistently used as a bookmark or favorite.

Creating New Files in Job Details

Now you create new file for running a job script or job master file in Job Output or Running Folder.

Customized Application Icons

PBS Access supports you to customize application icons, so that it gets displayed in the Job Submission form and in other Application display list.

Switching between Multiple Remote Session

PBS Access provides an option to view the list of active remote sessions when the session is in maximized view. This helps you to also switch from one remote active session to another.

Remote Session Job Submission Enhancement

PBS Access supports you to choose the Server and Version of an application while submitting an interactive job.

Configuring Default Columns in Job List View

PBS Access allows you to configure the job properties columns that are displayed in the job list view in Jobs Tab.

Use PBS Access to submit jobs to a Workload Manager.

This chapter covers the following:

- [2.1 Document Conventions](#) (p. 7)
- [2.2 System Requirements for PBS Access](#) (p. 8)
- [2.3 System Requirements for Interactive Application Component](#) (p. 10)
- [2.4 Supported Product Configurations](#) (p. 11)
- [2.5 Prerequisites for Installing PBS Access](#) (p. 12)
- [2.6 Prerequisites for Installing Interactive Application Components](#) (p. 13)

Altair's new PBS Access provides a simple, powerful, and consistent interface for submitting and monitoring jobs on remote clusters, clouds, or other resources. Engineers and researchers can now focus on core activities and spend less time learning how to run applications or moving data around. The PBS Access remote visualization and collaboration capabilities bring access to an expensive, high-end 3D visualization datacenter hardware right to the user.

PBS Access features:

- **Novice to Expert:** simple and powerful
- **Same UX:** desktop and web
- **Secure:** protected access to HPC resources
- **End-to-end:** submit, monitor progress, steer, fix, and rerun jobs
- **Collaborate:** shared 3D analysis
- **3D Remote Visualization**
- **Save time:** Simplify job submission and management thanks to a powerful GUI with smart, simplified interfaces
- **Be more productive:** Spend more time focused on work and not IT tasks - for example, monitor jobs graphically without having to download huge job files
- **Increase ROI:** Consolidate access to applications and optimize license availability
- **Reduce errors and improve consistency:** Embed your company's best-practice "know how" directly into Application Definitions used for job submission

2.1 Document Conventions

Common typographical conventions for PBS Access technical publications.

PA_HOME

The PBS Access home directory which contains configuration and logging files. Default location is `/var/spool/PBS_Access/2018.2/home`, however this can be overridden during the installation of PBS Access.

PA_EXEC

The PBS Access execution directory which contains binaries and scripts. Default location is `/opt/altair/PBS_Access/2018.2/exec`, however this can be overridden during the installation of PBS Access.

PBSWORKS_HOME

The PAS home directory which contains configuration and logging files. Default location is `/var/spool/pbsworks/pas/2018.2/home`, however this can be overridden during the installation of PAS.

PBSWORKS_EXEC

The PAS execution directory which contains binaries and scripts. Default location is `/opt/altair/pbsworks/pas/2018.2/exec`, however this can be overridden during the installation of PAS.

PBS_HOME

The PBS Professional home directory which contains configuration and logging files. Default location is `/var/spool/pbs`, however this can be overridden during the installation of PBS Professional.

PBS_EXEC

The PBS Professional execution directory which contains binaries and scripts. Default location is `/opt/pbs`, however this can be overridden during the installation of PBS Professional.

2.2 System Requirements for PBS Access

Supported platforms and browsers, hardware requirements, and required ports.

Supported Platforms

PBS Access is supported on the following Linux 64-bit platforms:

- Red Hat Enterprise Linux 7.4
- Cent OS 7.4
- SLES 12 SP2

Supported Browsers

PBS Access is supported on the following browsers:

Windows

- Firefox latest ESR (Only Extended Support Release is supported. Please refer to <https://www.mozilla.org/en-US/firefox/organizations/>)
- Google Chrome latest
- Microsoft Internet Explorer 11
- Microsoft Edge (limited testing)
- Safari (limited testing)

Linux

- Not supported at this time.

OSX

- Firefox latest ESR (Only Extended Support Release is supported. Please refer to <https://www.mozilla.org/en-US/firefox/organizations/>)
- Google Chrome latest
- Safari Latest

Hardware Requirements

PBS Access requires a minimum hardware configuration:

Hardware	Minimum Requirement	Recommended
CPU	2 CPU cores with a minimum speed of 2.5 GHz	4 CPU cores with a minimum speed of 2.5 GHz
Memory (Physical)	2 GB	8 GB
Disk Space	4 GB	10 GB

Ports Used by PBS Access

The PBS Access installer does not have any auto-port detection logic in place, so these ports must be **free** for PBS Access to be installed successfully.

Table 1: Ports Used by PBS Access

Port	Service Using the Port
4443	Gateway
4543	Web Server
4643	Postgres Database
4743	Message Broker (ActiveMQ)
4822	Interactive Application Component Proxy
4843	Interactive Application Component Webserver
4909	Interactive Application Component Job Update

See Also

[Changing Port Numbers](#)

2.3 System Requirements for Interactive Application Component

Hardware and system requirements necessary for running an interactive application.

Graphics

- Only NVIDIA and [AMD] ATI cards are supported.
- Install the 3D adapter drivers provided by the manufacturer.
- Full 3D acceleration or Pixel Buffer support should be enabled by the Linux drivers.

GPU Cores and Memory

Specific to the interactive applications being run.

CPU Cores and Physical Memory

Specific to the interactive applications being run.


Other

- For running interactive sessions, X Server and application on local display must be configured and working.
- X Server must be configured to export True Color (24 bit or 32 bit) visuals.
- Use Virtual Private Networking or secured channels for communication between clients and interactive server if encryption is required.
- The PBS Professional execution host must be able to access and run the applications available through PBS Access

2.4 Supported Product Configurations

Supported product configurations for using PBS Access.

PBS Access	PAS	PBS Professional	Hyperworks
2018.2	2018.2	18.2.1 18.1.1 (Open source)- only on CentOS 7.4 14.2.4 14.1.0 (Open source)- only on CentOS 7.4 13.1.3	14.0 2017.2

 **Note:** HyperWorks is required to plot and visualize CAE results.

2.5 Prerequisites for Installing PBS Access

Mandatory requirements for PBS Professional, PAS and the Service User.

Portal Owner

The Service User that owns PBS Access services and the files in PA_HOME and PA_EXEC is by default "pbsworks". After installation, you cannot start PBS Access unless this user exists and has a home directory or you can change the owner to an existing user on the system after installation.

PBS Professional

Ensure that a supported version of PBS Professional is installed on the HPC cluster.

PAS

To take full advantage of all the new features available with PBS Access, the cluster must be updated to the latest version of PAS. Using an older version of PAS may cause unexpected behavior.

Remove Earlier Installations

Uninstall previous versions of PBS Access that may have already been installed.

PBSJobApp Application Definition

Delete the PBSJobApp application definition that is installed by default during the installation of PAS.

2.6 Prerequisites for Installing Interactive Application Components

PBS MoM permissions and libraries required for the installation of the Interactive Application components.

PBS Access

PBS Access must be installed prior to installing the Interactive Application components.

PAS

To take full advantage of all the new features available with PBS Access, the cluster must be updated to the latest version of PAS. Using an older version of PAS may cause unexpected behavior.


Host Name

It is recommended to configure hostname resolution, so that the PBS MoMs can connect to the PBS Access server using its hostname rather than IP address. After installing the Interactive Application component, view the value of the `jobsub.monitor.host` variable in the file `PA_HOME/config/displaymanager/dmrest.properties` to confirm the configured hostname. If there is no access through hostname, then a slight delay may occur when removing the interactive session from the PA user interface when a job completes.

Prerequisites for Installing on the PBS MoM

For the PBS Access Interactive Application installer to set the custom resource at each execution host, the root user of all execution hosts must be granted operator access. Prior to starting the Interactive Application installer, issue the following command to grant this access:


```
qmgr: s s operators+=root@*
```

 **Note:** After installation, remove the root user of the PBS MOMs from the operators list on the PBS server.

If this access is not granted, then you will manually have to set the custom resource by issuing a `qmgr set` command for each execution host after installation of Interactive Application. For example:

```
set node <node> resources_available.ngpus = 4
```

After applying such a setting, every user named root from any host on any network will be able to operate on jobs from other users.

 **Warning:** Restricting it to a specific subdomain still allows anyone running Linux on the subdomain access to the PBS Server.

After installing the Interactive Application components, you can remove the root user of the PBS MOMs from the operators list on the PBS server using the command:

```
qmgr: s s operators-=root@*
```

Prerequisite Resource Libraries for Interactive Application

The following libraries must be installed on the machine hosting the PBS Access interactive proxy (these libraries do not need to be installed on the PBS Server or the PBS MoM) before attempting to install the Interactive Application component. Use the appropriate system tool (e.g. RPM, YUM, YAST etc.) to install them.

<ul style="list-style-type: none">• libc.so.6()(64bit)• libc.so.6(GLIBC_2.2.5)(64bit)• libc.so.6(GLIBC_2.3)(64bit)• libcrypt.so.1()(64bit)• libdl.so.2()(64bit)• libdl.so.2(GLIBC_2.2.5)(64bit)• libGL.so.1()(64bit)• libGLU.so.1()(64bit)• libICE.so.6()(64bit)• libm.so.6()(64bit)• libm.so.6(GLIBC_2.2.5)(64bit)• libpam.so.0()(64bit)	<ul style="list-style-type: none">• libpthread.so.0()(64bit)• libpthread.so.0(GLIBC_2.2.5)(64bit)• libpthread.so.0(GLIBC_2.3.2)(64bit)• libSM.so.6()(64bit)• libX11.so.6()(64bit)• libXaw.so.7()(64bit)• libXcursor.so.1()(64bit)• libXext.so.6()(64bit)• libXmu.so.6()(64bit)• libXt.so.6()(64bit)• libXv.so.1()(64bit)• libz.so.1()(64bit)
--	---

Installing PBS Access and the Interactive Component

3

Instructions for installing PBS Access so that interactive and non-interactive jobs can be submitted.

This chapter covers the following:

- [3.1 Installing PBS Access](#) (p. 16)
- [3.2 Installing Interactive Application Components](#) (p. 17)

3.1 Installing PBS Access

Install PBS Access so that you can submit non-interactive jobs to the Workload Manager.

- Review the [system requirements](#) and [prerequisites](#) for installation.
- [Uninstall](#) previous versions of PBS Access.
- Delete the PBSJobApp application definition that is installed by default during the installation of PAS.

A binary or executable needs to be downloaded or obtained using your usual Altair support channels.

1. Login to the machine as root where you want to install PBS Access.
2. Enter the command:

```
./PBSAccessWeb_<Version>_<Build ID>_<YYYYMMDD>_<Timestamp>.bin -i console
```

3. Read the introduction and press **ENTER**.
4. Page through the license agreement by pressing **ENTER** until you are asked to accept its terms and conditions.
5. Accept the license agreement by entering **Y** and pressing **ENTER**.
6. Enter the license server details and press **ENTER**.
7. Enter the service user and press **ENTER**.



Note: The default service user is 'pbsworks' and the PBS Access service is registered under this user.

8. Enter the location where the PBS Access binaries are to be installed.
You may choose to install in the default location.
9. Enter the location where the PBS Access configuration and logs files are to be installed.
You may choose to install in the default location.
10. Review the installation summary and press **ENTER**.
The installation starts. It may take a few minutes for the installation to complete.
11. Login to the machine hosting the PBS Server.
12. As a PBS Operator or Manager enter the following command:

```
qmgr -c 'set server job_history_enable=True'
```

If you want to run interactive jobs, you must now install the [Interactive Application component of PBS Access](#).

3.2 Installing Interactive Application Components

Install components necessary to enable the interactive application capabilities of PBS Access.

Review the [system requirements](#) and [prerequisites](#) for installation.

A binary that installs the Interactive Application components needs to be downloaded or obtained using your usual Altair support channels.

The installer will need to be run multiple times across several machines and must be performed in the following sequence:

1. Install the Interactive Application component on the PBS Professional headnode. This installation will:
 - add a custom resource to PBS Professional called "ngpus"
 - creates an interactive queue called "iworkq"
 - add a new interactive application definition "GlxSpheres" to PAS
 - restart PAS and PBS Professional
2. Install the Interactive Application component on all PBS MoMs on which you want to run interactive jobs.
3. Install proxy software necessary for running interactive applications on the machine hosting PBS Access.

3.2.1 Installing the Interactive Component on the PBS Professional Server

Install binaries and configure PBS Professional and PAS to support interactive applications.


Review the [system requirements](#) and [prerequisites](#) for installation.

This installation will:

- add a custom resource to PBS Professional called "ngpus"
 - add an interactive queue called "iworkq"
 - restart PAS
 - restart PBS Professional
1. Login to the machine as root where the PBS Professional Server is installed as root.
 2. Enter the command:

```
./PBSRemoteSessionAgent_<Version>_<Build ID>_<YYYYMMDD>_<Timestamp>.bin -i console
```
 3. Read the introduction and press ENTER.
 4. Page through the license agreement by pressing ENTER until you are asked to accept its terms and conditions.
 5. Accept the license agreement by entering Y and pressing ENTER.
 6. PBS Professional is restarted during the installation process, choose whether you want to proceed:
 - Choose No to exit and run the installer at a more suitable time.

- Choose Yes to run the installer.

 **CAUTION:** It is advisable that you run the installer when critical jobs are not running.

Four options are displayed.

7. Enter 1 to configure the PBS and PAS servers and press **ENTER**.
8. Enter the number of GPUs that are available in the cluster and press **ENTER**.
If you have a cluster with 10 execution hosts and only two of those execution hosts have associated GPUs, then add up the number of GPUs for both execution hosts and enter this number.
9. Review the installation summary and press **ENTER**.
The installation starts. It may take a few minutes for the installation to complete.
10. Press **ENTER** to complete the installation process.

Verify that `iworkq` is created and a `GPU resource` is configured for PBS Professional.

Verifying the Existence of the Interactive Queue

Verify that a PBS Professional interactive queue has been created.

After running the interactive installer on the PBS Professional Server, a queue called "iworkq" should exist. All interactive jobs are submitted to this queue. The attribute `max_queued_res.ngpus` denotes the number of GPUs available in the cluster and should reflect the number entered during installation. Other attributes used internally by PBS Access are `resource_max.ngpus` and `resource_min.ngpus`. These two attributes are always to set the value of "1".

Enter the command:

```
qmgr -c "p q iworkq"
```

Output similar to the following is displayed:

```
#  
# Create queues and set their attributes.  
#  
#  
# Create and define queue iworkq  
#  
create queue iworkq  
set queue iworkq queue_type = Execution  
set queue iworkq Priority = 150  
set queue iworkq max_queued_res.ngpus = [o:PBS_ALL=7]  
set queue iworkq resources_max.ngpus = 1  
set queue iworkq resources_min.ngpus = 1  
set queue iworkq resources_default.arch = linux  
set queue iworkq resources_default.place = free  
set queue iworkq default_chunk.mem = 512mb  
set queue iworkq default_chunk.ncpus = 2  
set queue iworkq enabled = True  
set queue iworkq started = True
```

Verifying the Existence of the Interactive Custom Resource

Verify that a new resources called `ngpus` has been added to PBS Professional.

After running the interactive installer on the PBS Professional headnode, a new custom resource called `ngpus` is added to PBS Professional. This resource is necessary to run interactive jobs. You can

verify the existence of this custom resource by viewing the contents of the PBS Professional resource definition file and the scheduler's configuration file.

1. Navigate to the location `PBS_HOME/server_priv`.

2. Enter the command:

```
grep -A3 "DM STATIC" resourcedef
```

The resource `ngpus` should be defined in this file.

```
# ***** BEGINNING OF DM STATIC RESOURCES SECTION.DO NOT EDIT BY HAND *****  
ngpus type=long flag=nh  
# ***** END OF DM STATIC RESOURCES SECTION.DO NOT EDIT BY HAND *****
```

3. Navigate to the location `PBS_HOME/sched_priv`.

4. Enter the command:

```
grep ngpus sched_config
```

The resource `ngpus` should be displayed in the list of resources defined in this file.

```
resources: "ncpus, mem, arch, host, vnode, netwins, aoe, ngpus"
```

Verifying the Installation of the Interactive Application Definition

Verify that a new application definition called `GlxSpheres` is installed on the PAS Server.

1. Login to the machine hosting the PAS Server as root or a user with sudo permissions.
2. Navigate to the directory `PBSWORKS_HOME/data/pas/targets/localhost/repository/applications`.
3. Verify that a new application definition has been placed in this location called `GlxSpheres`.

3.2.2 Installing the Interactive Component on the PBS MoMs

Install binaries and configure the PBS Mom to support interactive applications.

Review the [system requirements](#) and [prerequisites](#) for installation.

Install necessary components on the PBS MoM to support interactive applications, including TurboVNC and Virtual GL. The installer also configures a new resource called "ngpus".



Note: This installation process must be repeated for all execution hosts where you want to run interactive jobs.

1. Login to the machine as root where the PBS Professional MoM is installed as root.
2. Enter the command:


```
./PBSRemoteSessionAgent_<Version>_<Build ID>_<YYYYMMDD>_<Timestamp>.bin -i console
```

3. If you are installing the PBS MoM interactive component on a machine hosting both the PBS Professional Server and the MoM you will see the below message, enter 1 and press **ENTER**.

```
Manage Instances  
-----  
->1- Install a new instance  
   2- Modify an existing instance
```


4. Read the introduction and press **ENTER**.

5. Page through the license agreement by pressing `ENTER` until you are asked to accept its terms and conditions.
6. Accept the license agreement by entering `Y` and pressing `ENTER`.
7. PBS Professional is restarted during the installation process, choose whether you want to proceed:
 - Choose No to exit and run the installer at a more suitable time.
 - Choose Yes to run the installer.

 **CAUTION:** It is advisable that you run the installer when critical jobs are not running.

Four options are displayed.

8. Enter `2` and press **ENTER**.
9. Enter the location where the binaries are to be installed and press **ENTER**.
You may choose to install in the default location.
10. Enter the location where the configuration and logs files are to be installed and press **ENTER**.
You may choose to install in the default location.
11. Enter the number of GPUs available on the execution host and press **ENTER**.
12. Review the installation summary and press **ENTER**.
The installation starts. It may take a few minutes for the installation to complete.
13. Press **ENTER** to complete the installation process.
The TurboVNC and Virtual GL is installed to support interactive applications by configuring xserver.

 **Tip:** If xserver does not start after installation is complete, then issue the following command:

```
init 3;  
init 5
```

Verify that "ngpus" resource has been added to the execution host by executing the command:

```
pbsnodes -av
```

The new resource should be listed and it should be assigned the value entered for the available GPUs entered during installation.

```
resources_available.ngpus = <NGPUS>
```

3.2.3 Installing the Interactive Proxy on the PBS Access Server

Install the Guacomole proxy server on the machine hosting PBS Access to support interactive applications.

Review the [system requirements](#) and [prerequisites](#) for installation.

1. Login to the machine as root where PBS Access is installed as root.
2. Enter the command:

```
./PBSRemoteSessionAgent_<Version>_<Build ID>_<YYYYMMDD>_<Timestamp>.bin -i console
```


3. If you are installing the Interactive Proxy server on a machine hosting either the PBS Professional Server or the MoM you will see the below message, enter 1 and press **ENTER**.

```
Manage Instances
-----
->1- Install a new instance
   2- Modify an existing instance
```

4. Read the introduction and press **ENTER**.
5. Page through the license agreement by pressing **ENTER** until you are asked to accept its terms and conditions.
6. Accept the license agreement by entering **Y** and pressing **ENTER**.
7. PBS Professional is restarted during the installation process, choose whether you want to proceed:
 - Choose No to exit and run the installer at a more suitable time.
 - Choose Yes to run the installer.



CAUTION: It is advisable that you run the installer when critical jobs are not running.

Four options are displayed.

8. Enter 4 and press **ENTER**.
9. Enter the location where the binaries are to be installed and press **ENTER**.
You may choose to install in the default location.
10. Enter the location where the configuration and logs files are to be installed and press **ENTER**.
You may choose to install in the default location.
The installation starts. It may take a few minutes for the installation to complete.
11. Press **ENTER** to complete the installation process.

Verify that the Guacamole proxy daemon is installed and running by issuing the following command:

```
service guacd status
```

Configuring PBS Access After Installation

4

Mandatory configuration steps that must be completed before PBS Access can be started.

This chapter covers the following:

- [4.1 Copying Application Definitions and Site Configuration File](#) (p. 23)
- [4.2 Configuring the PBS Access Service User](#) (p. 24)
- [4.3 Configuring the License Server](#) (p. 25)
- [4.4 Logging into PBS Access](#) (p. 26)
- [4.5 Adding a Service Cluster](#) (p. 27)
- [4.6 Onboarding an Application Definition](#) (p. 29)

Before you start the PBS Access service, you must copy over default application definitions provided by Altair and a corresponding PAS site configuration file. Additionally, a PBS Access Service User must be configured.

4.1 Copying Application Definitions and Site Configuration File

Copy default application definitions and a PAS site configuration file.

Default application definitions and a site configuration file are provided to get you up and running quickly. Obtain them through your usual Altair support channels.

1. Login to the machine where PAS is installed.
2. Copy any default application definitions required for your site to the location: `PBSWORKS_HOME/data/pas/targets/localhost/repository/applications`
3. Copy the default `site-config.xml` file to `PBSWORKS_HOME/data/pas/targets/localhost/repository`.
4. Edit the `site-config.xml` file.
5. For each application, update the value of the XML element `<Executable>` to the location of the application's executable.

```
<Application id="Abaqus">
  <ApplicationVersions>
    <ApplicationVersion>
      <Option>13.0</Option>
      <Executable>/opt/scripts/abaqus</Executable>
    </ApplicationVersion>
  </ApplicationVersions>
</Application>
```

6. Restart the PAS server by entering the following command:

```
/etc/init.d/pas restart
```

4.2 Configuring the PBS Access Service User

Configure a user who will own the PBS Access services.

By default, PBS Access assumes that a user called "pbsworks" exists. When PBS Access is started, all services run under this user and the user owns the files in PA_HOME and PA_EXEC. To start PBS Access, the "pbsworks" user must exist as a local or network user with a /home/pbsworks directory. Alternately, you can configure the service user to be an existing user on the system.


1. Choose one from the following options:
 - Create a "pbsworks" user and create a /home/pbsworks directory.
 - Edit the /etc/pbsworks-pa.conf file and change the value of PORTAL_NON_ROOT_USER to an existing user on the system.
2. Start the PBS Access server by entering the following command:

```
/etc/init.d/pbsworks-pa start
```

4.3 Configuring the License Server

Configure the license server after PBS Access installation in console mode.

During the installation PBS Access, you are prompted to provide a license server in the format `port@hostname`. If this information is not provided at this time, then the license server must be configured post-installation.

 **Note:** You must have administrative privileges to configure the PBS Access license server.

1. Login to the machine where PBS Access is installed as the portal administrator.
2. Open the file `app.properties` located at `PA_HOME/config/license/`.
3. Change the value of `pbsworks.license.server` to the port and hostname of the license server in the format `port@hostname`.

```
Licensed application name
pbsworks.license.application=PBSAccess

#server location for license server
pbsworks.license.server=6200@cntrlicsrv03
```

4. Restart PBS Access for these changes to take effect by entering the following command:

```
/etc/init.d/pbsworks-pa restart
```

4.4 Logging into PBS Access

Log into PBS Access so that you can submit and monitor jobs.

Review the [supported browsers](#) before logging into PBS Access.

Before you can submit a job, a service cluster must be added. Only the portal administrator can add service clusters. The first person to login to PBS Access after installation is considered the portal administrator.

1. Enter the URL `https://<hostname>:4443/pbsworks` in the address bar of a supported browser. where `<hostname>` is the IP address or hostname of the machine where PBS Access is installed. The PBS Access login screen is displayed.
2. Enter your username and password.
3. Click **Log In**.

Before you can submit jobs you must [add a service cluster](#).

4.5 Adding a Service Cluster

Establish a connection to an HPC cluster so that you may begin submitting jobs.

Before you can configure a cluster, you must know the hostname of the PAS Server installed on the PBS Professional headnode.

The first person to login to PBS Access after installation is considered the portal administrator. The portal administrator is the only user who can add or delete service clusters. A service cluster must be added before jobs can be submitted to the Workload Manager.

1. Choose one of the following options:
 - If no service clusters have been configured, click the **Configure one or more services** link.
 - Click ☰ and then click **Add**.

The Add Service Cluster screen is displayed.

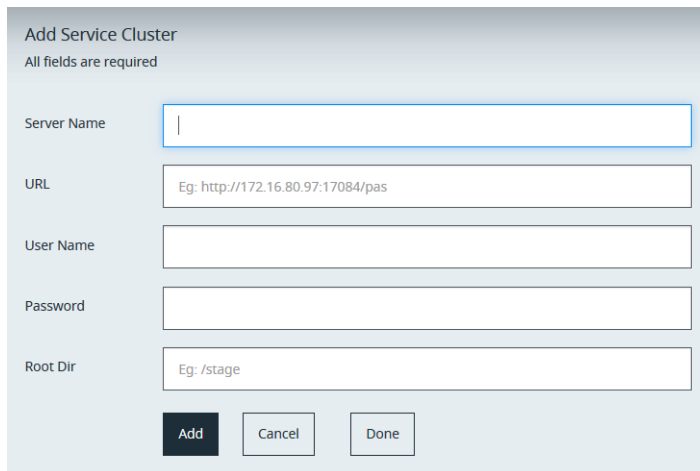


Figure 1: Add Service Cluster

2. For **Server Name**, enter a short name describing the cluster.
3. For **URL**, enter the URL for connecting to the Workload Manager.


The URL is in the format `http://<hostname>:17084/pas` or `https://<hostname>:17443/pas` where `<hostname>` is the hostname of the machine where the PAS Server is installed (typically the PBS Professional headnode).




Note: It is recommended to add a cluster using the hostname of the PAS Server rather than the IP address. This prevents connectivity issues from arising when an IP address is changed (DHCP, etc.).

4. For **User Name** and **Password**, enter your login credentials.
The user name and password must be available in PAS.
5. For **Root Dir**, enter the pathname where user job input and result files are stored.
Ex: `/home`, `/users`, `/stage`
6. Click **Add**.

If the service cluster is added successfully, then a notification is displayed.

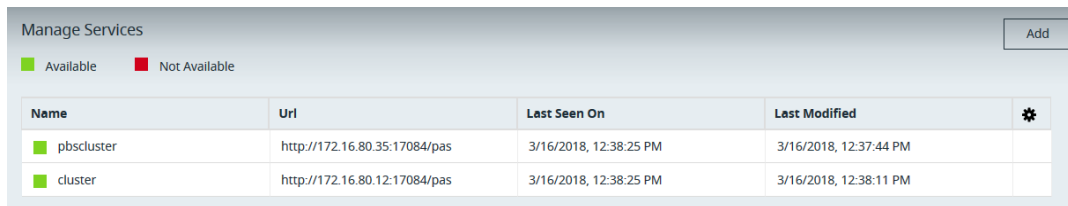
 **Note:** Whenever a new service cluster is added, a notification is displayed to all users logged into PBS Access informing them that a service cluster has been added.

 **Note:** A notification is displayed to all users logged into PBS Access if the service cluster goes down or if it is unreachable.

7. Repeat steps 2 through 6 to add additional service clusters.

8. Click **Done**.

A list of service clusters that have been added is displayed.



The screenshot shows a web interface titled "Manage Services" with an "Add" button in the top right. Below the title are two status indicators: a green square for "Available" and a red square for "Not Available". A table lists two service clusters, both marked as available with green squares. The table has columns for Name, Url, Last Seen On, Last Modified, and a settings gear icon.




Name	Url	Last Seen On	Last Modified	
 pbscluster	http://172.16.80.35:17084/pas	3/16/2018, 12:38:25 PM	3/16/2018, 12:37:44 PM	
 cluster	http://172.16.80.12:17084/pas	3/16/2018, 12:38:25 PM	3/16/2018, 12:38:11 PM	


Figure 2: Service Clusters List

The green color next to the service cluster indicates that it is available to use. The red color indicates that the service cluster is not available. A service cluster may not be available because it is down for maintenance.

4.6 Onboarding an Application Definition

Port an application definition from a legacy version of PBS Works so that it can be used by PBS Access.

Application definitions must have a PRIMARY_FILE argument defined in the application definition input file that represents the primary input file for the solver. If a legacy application definition calls the primary input file something other than PRIMARY_FILE, then a mapping file must be updated to port the application definition. Additionally, if the legacy application definition contains an application argument that represents the queue to which the job is submitted, the name of the application argument must be QUEUE. If it is not, the mapping file must be updated.

 **Note:** You can onboard an application definition at any time.

1. Edit the file `PA_HOME/config/pa/appmapping/applicationmapping.json`.
2. Add the following JSON between the bracket `[]`

```
{
  "serverName": "server-1", "version": "13.1", "applications":
  [
    {
      "applicationName": "RADIOSS-SMP",
      "primaryFile": "MASTER_FILE",
      "queue": "Queues"
    }
  ]
}
```

3. Change the value of `serverName` to the name of the server provided when adding the service cluster to PBS Access.

```
"serverName": "server-1",
```

4. Change the value of `version` to the legacy version of PBS Works that you are porting from.

```
"version": "13.1",
```

5. Change the value of `applicationName` to the name of the application that you want to port.

Denoted by the XML element `<ApplicationName>` in the legacy application definition. The legacy XML looks like this:

```
<ApplicationName>Optistruct</ApplicationName>
```

The JSON should look like this:

```
"applicationName": "Optistruct"
```

6. Change the value of `primaryFile` to the name of the application argument that represents the application input file for the solver.

Denoted by the XML element `<Name>` in the legacy application definition. The legacy XML looks like this:

```
<ArgumentChoice>
  <ArgumentFileName>
    <Name>MASTER_FILE</Name>
    <Description>Select your Optistruct Master file.</Description>
    <DisplayName>Master File</DisplayName>
    <InputRequired>true</InputRequired>
  </ArgumentFileName>
</ArgumentChoice>
```

The JSON should look like this:

```
"primaryFile": "MASTER_FILE"
```

7. Change the value of `queue` to the name of the application argument that represents the queue to which the job is submitted.

Denoted by the XML element <Name> in the legacy application definition. The legacy XML looks like this:

```
<ArgumentChoice>
  <ArgumentStringEnumerated>
    <Name>BATCH_QUEUE</Name>
    <Description>Select the batch queue you would like to submit to.</Description>
    <DisplayName>Batch Queue</DisplayName>
    <InputRequired>>false</InputRequired>
    <Option>workq</Option>
    <Option>testq</Option>
    <DefaultValue>workq</DefaultValue>
  </ArgumentStringEnumerated>
</ArgumentChoice>
```

The JSON should look like this:

```
"queue": "BATCH_QUEUE"
```

8. Add additional applications by repeating previous step 5-7 making sure that when you add the next application to the JSON mapping file you separate the applications using a comma.

```
"applications":
[
  {
    "applicationName": "PBSJobApp",
    "primaryFile": "JOB_SCRIPT"
  },
  {
    "applicationName": "Optistruct",
    "primaryFile": "MASTER"
  }
]
```

9. Save the file.
10. Copy your legacy application definitions to the PAS repository.
11. Restart PAS by issuing the command:

```
/etc/init.d/pas restart
```

The following notification is displayed to any users that are logged into PBS Access:

```
There is a change in configuration data. Application will reload.
```

Once PBS Access reloads, the new application definition is available.

Uninstalling PBS Access and Interactive Application Component

5

Instructions for uninstalling previous version of PBS Access and interactive application component.

This chapter covers the following:

- [5.1 Uninstalling PBS Access](#) (p. 32)
- [5.2 Uninstalling Interactive Application Components](#) (p. 33)

5.1 Uninstalling PBS Access

Remove a previous version of PBS Access.

You must stop PBS Access before uninstalling. For more information about stopping PBS Access, see [PBS Access Service Commands](#).

1. Login as root to the machine where PBS Access is installed.
2. Navigate to the `/opt/altair/PBS_Access/2018.2/_PBS_Access_installation` directory.
3. Execute the uninstall script by entering the following command:

```
./Change\ PBS_Access\ Installation -i console
```


The command must contain spaces with escape characters.

4. Follow the instructions provided by the uninstaller.

5.2 Uninstalling Interactive Application Components

Uninstall previous version of interactive application components.

You must stop PBS Access before uninstalling. For more information about stopping PBS Access, see [PBS Access Service Commands](#).

 **CAUTION:** It is advisable that you run the installer when critical jobs are not running.

The uninstall will perform the following:

- Deletes the interactive queue
- Unconfigure GPUs as a custom resource
- Uninstall interactive application definition

If it is a distributed deployment, then perform the following:

- Login to the PBS Professional server and uninstall Interactive Application Components
- Login to each of the PBS MoM and uninstall Interactive Application Components
- Login to the machine hosting and uninstall Interactive Application Components to remove the proxy


1. Login as root to the machine where PBS Access is installed.
2. Navigate to the `/opt/altair/pbsworks/2018.2/dmagent/_PBSRemoteSessionAgent_Installer_<Version>_installation` directory.

3. Execute the uninstall script by entering the following command:

```
./Change\ PBSRemoteSessionAgent_Installer_<Version>\ Installation -i console
```

The command must contain spaces with escape characters.

4. Follow the instructions provided by the uninstaller.

 **Note:** This will uninstall the Interactive Application component and Interactive Proxy only if you installed PBS Access on the same machine as the PBS Professional Server.

5. PBS Professional is restarted during the installation process, choose whether you want to proceed:
 - Choose No to exit and run the installer at a more suitable time.
 - Choose Yes to run the installer.

 **CAUTION:** It is advisable that you run the installer when critical jobs are not running.

Four options are displayed:

6. Enter 3 and press **ENTER**.

Commands for starting, stopping, restarting and checking the status of PBS Access.

The below commands should be executed by the root or by portal owner as defined in `/etc/pbsworks-pa.conf`.

Starting PBS Access

```
/etc/init.d/pbsworks-pa start
```

Stopping PBS Access

```
/etc/init.d/pbsworks-pa stop
```

Restarting PBS Access

```
/etc/init.d/pbsworks-pa restart
```

Determining the Status of PBS Access

```
/etc/init.d/pbsworks-pa status
```

Managing Service Clusters

7

Add, edit, and delete service clusters.

This chapter covers the following:

- [7.1 Adding a Service Cluster](#) (p. 36)
- [7.2 Editing a Service Cluster](#) (p. 38)
- [7.3 Deleting a Service Cluster](#) (p. 40)

Only the portal administrator can add, edit, and remove service clusters. Regular users are unable to access the Manage Services page.

7.1 Adding a Service Cluster

Establish a connection to an HPC cluster so that you may begin submitting jobs.

Before you can configure a cluster, you must know the hostname of the PAS Server installed on the PBS Professional headnode.

The first person to login to PBS Access after installation is considered the portal administrator. The portal administrator is the only user who can add or delete service clusters. A service cluster must be added before jobs can be submitted to the Workload Manager.

1. Choose one of the following options:
 - If no service clusters have been configured, click the **Configure one or more services** link.
 - Click ☰ and then click **Add**.

The Add Service Cluster screen is displayed.

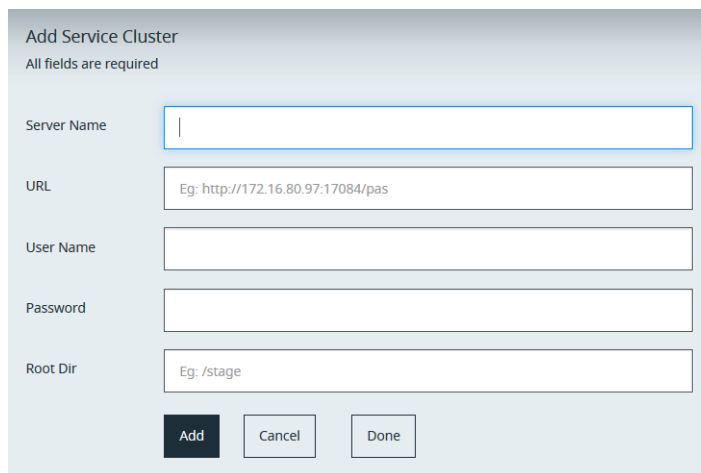


Figure 3: Add Service Cluster

2. For **Server Name**, enter a short name describing the cluster.
3. For **URL**, enter the URL for connecting to the Workload Manager.


The URL is in the format `http://<hostname>:17084/pas` or `https://<hostname>:17443/pas` where `<hostname>` is the hostname of the machine where the PAS Server is installed (typically the PBS Professional headnode).




Note: It is recommended to add a cluster using the hostname of the PAS Server rather than the IP address. This prevents connectivity issues from arising when an IP address is changed (DHCP, etc.).

4. For **User Name** and **Password**, enter your login credentials.
The user name and password must be available in PAS.
5. For **Root Dir**, enter the pathname where user job input and result files are stored.
Ex: `/home`, `/users`, `/stage`
6. Click **Add**.

If the service cluster is added successfully, then a notification is displayed.

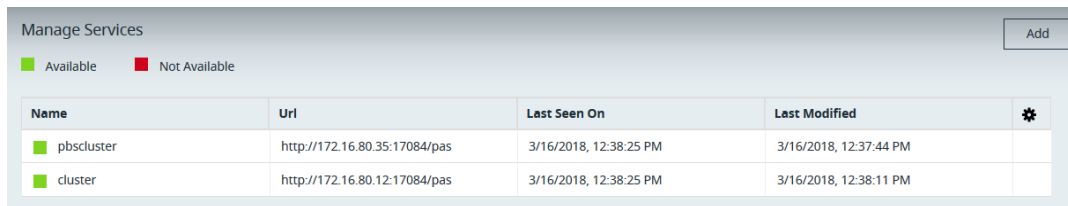
 **Note:** Whenever a new service cluster is added, a notification is displayed to all users logged into PBS Access informing them that a service cluster has been added.

 **Note:** A notification is displayed to all users logged into PBS Access if the service cluster goes down or if it is unreachable.

7. Repeat steps 2 through 6 to add additional service clusters.

8. Click **Done**.

A list of service clusters that have been added is displayed.



The screenshot shows a web interface titled "Manage Services" with an "Add" button in the top right. Below the title are two status indicators: a green square for "Available" and a red square for "Not Available". A table lists two service clusters, both marked as available with green squares. The table has columns for Name, Url, Last Seen On, Last Modified, and a settings gear icon.





Name	Url	Last Seen On	Last Modified	
 pbscluster	http://172.16.80.35:17084/pas	3/16/2018, 12:38:25 PM	3/16/2018, 12:37:44 PM	
 cluster	http://172.16.80.12:17084/pas	3/16/2018, 12:38:25 PM	3/16/2018, 12:38:11 PM	

Figure 4: Service Clusters List

The green color next to the service cluster indicates that it is available to use. The red color indicates that the service cluster is not available. A service cluster may not be available because it is down for maintenance.

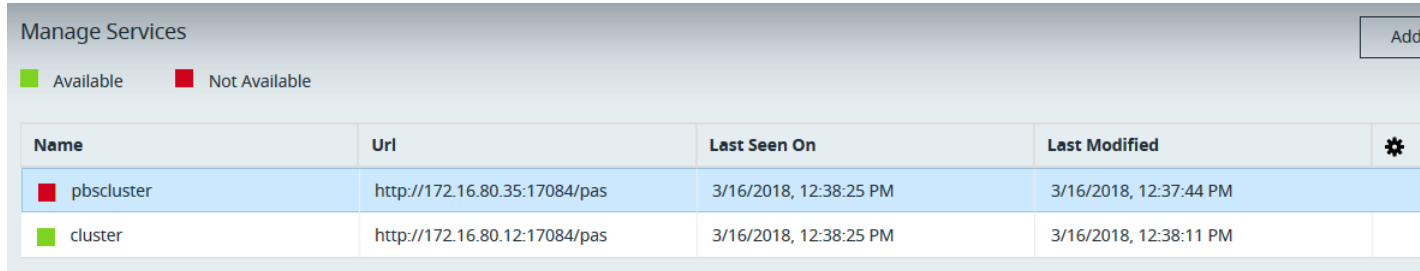
7.2 Editing a Service Cluster

Update a service cluster password or root directory so that you can continue to submit your jobs.

 **Note:** Only the portal administrator can edit a service cluster.

1. Click .

A list of service clusters that have been previously added is displayed.



The screenshot shows the 'Manage Services' interface. At the top right is an 'Add' button. Below it are two status indicators: a green square for 'Available' and a red square for 'Not Available'. The main part of the interface is a table with the following columns: Name, Url, Last Seen On, Last Modified, and a gear icon for actions. The table contains two rows:




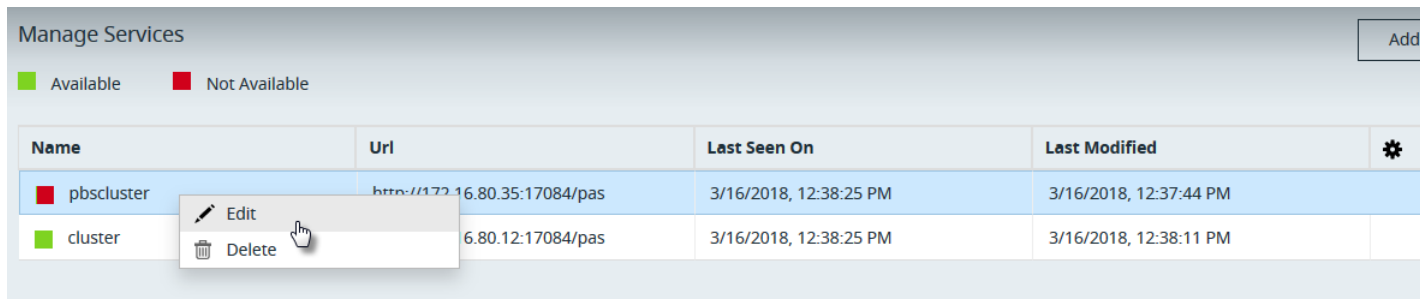
Name	Url	Last Seen On	Last Modified	
 pbscluster	http://172.16.80.35:17084/pas	3/16/2018, 12:38:25 PM	3/16/2018, 12:37:44 PM	
 cluster	http://172.16.80.12:17084/pas	3/16/2018, 12:38:25 PM	3/16/2018, 12:38:11 PM	

Figure 5: Manage Services

2. Right-click the cluster that you want to edit.
3. Click **Edit** from the context menu.



This screenshot is similar to Figure 5, but a context menu is open over the 'pbscluster' row. The menu has two options: 'Edit' (with a pencil icon) and 'Delete' (with a trash can icon). A mouse cursor is pointing at the 'Edit' option.




Name	Url	Last Seen On	Last Modified	
 pbscluster	http://172.16.80.35:17084/pas	3/16/2018, 12:38:25 PM	3/16/2018, 12:37:44 PM	
 cluster	http://172.16.80.12:17084/pas	3/16/2018, 12:38:25 PM	3/16/2018, 12:38:11 PM	

Figure 6: Cluster Edit Option

The Edit Service Cluster screen is displayed.

Edit Service Cluster
All fields are required

Server Name

URL


User Name


Password

Root Dir

Figure 7: Edit Service Cluster

4. Update the service cluster information.
5. Click **Save**.


 **Note:** A notification is displayed to all users logged into PBS Access informing them that a service cluster has been updated.

 **Note:** A notification is displayed to all users logged into PBS Access if the service cluster goes down or if it is unreachable.

6. Click **Done**.

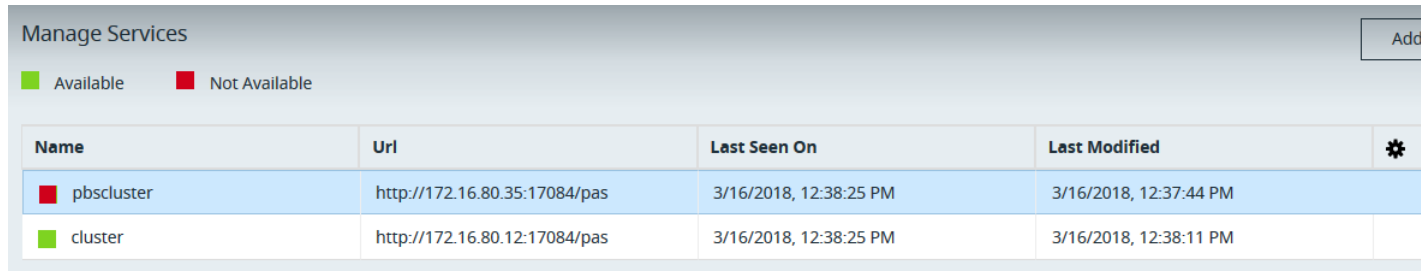
7.3 Deleting a Service Cluster

Remove a service cluster when you no longer want to submit and manage jobs on that cluster.

 **Note:** Only the portal administrator can delete a service cluster.

1. Click .

A list of service clusters that have been previously added is displayed.



The screenshot shows the 'Manage Services' interface. At the top right is an 'Add' button. Below it are two status indicators: a green square for 'Available' and a red square for 'Not Available'. The main part of the interface is a table with the following columns: 'Name', 'Url', 'Last Seen On', 'Last Modified', and a gear icon for settings. There are two rows in the table:




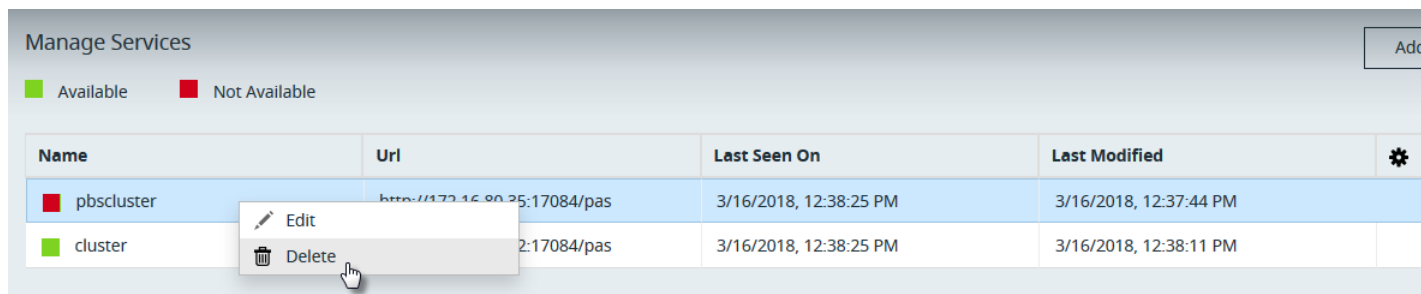
Name	Url	Last Seen On	Last Modified	
 pbscluster	http://172.16.80.35:17084/pas	3/16/2018, 12:38:25 PM	3/16/2018, 12:37:44 PM	
 cluster	http://172.16.80.12:17084/pas	3/16/2018, 12:38:25 PM	3/16/2018, 12:38:11 PM	

Figure 8: Manage Services


2. Right-click the cluster that you want to remove.
3. Click **Delete** from the context menu.




This screenshot is similar to Figure 8, but a context menu is open over the 'pbscluster' row. The menu has two options: 'Edit' (with a pencil icon) and 'Delete' (with a trash can icon). A mouse cursor is pointing at the 'Delete' option.

Figure 9: Server Cluster Delete

4. Click **Yes**.
The files and jobs from this cluster will no longer be accessible.

 **Note:** A notification is displayed to all users logged into PBS Access informing them that a service cluster has been deleted.

 **Note:** A notification is displayed to all users logged into PBS Access if the service cluster goes down or if it is unreachable.

5. Click **Done**.

Advanced configurations for PBS Access.

This chapter covers the following:

- [8.1 Changing Port Numbers](#) (p. 42)
- [8.2 Configuring the Interactive Application Component](#) (p. 47)
- [8.3 Setting the Double-Click Delay Time](#) (p. 50)
- [8.4 Configuring Default File Viewer](#) (p. 51)
- [8.5 Configuring Default Columns in Job List View](#) (p. 52)
- [8.6 Changing the Maximum File Upload Size](#) (p. 53)
- [8.7 Changing the File Opening behavior of a Remote Session Application](#) (p. 54)

8.1 Changing Port Numbers

Change the default port numbers used by PBS Access.


You must stop PBS Access before changing the port number. For more information about stopping PBS Access, see [PBS Access Service Commands](#).

8.1.1 Changing the Gateway Port Number

Change the port that the Gateway service listens on.

You must stop PBS Access before changing the port number. For more information about stopping PBS Access, see [PBS Access Service Commands](#).

The gateway port number has to be updated in the files `nginx.conf`.

 **Note:** The default gateway port number is 4443.

1. Login to the machine where PBS Access is installed as root.
2. Navigate to `PA_HOME/config/api_gateway`.
3. Edit the `nginx.conf` file and update the default value of 4443 of *listen* of *server*:

```
server {  
    listen        4443;  
    server_name  localhost;  
    add_header  X-Frame-Options "SAMEORIGIN";  
}
```

4. Start PBS Access by entering the command:

```
/etc/init.d/pbsworks-pa start
```


8.1.2 Changing the Web Server Port Number

Change the port that the PBS Access web server listens on.


You must stop PBS Access before changing the port number. For more information about stopping PBS Access, see [PBS Access Service Commands](#).

The web server port number has to be updated in the following files:

- `server.xml`
- `nginx.conf`
- `dmrest.properties`
- `dmrest.properties.template`
- `app.properties`
- `ServiceRegistry.json`

 **Note:** The default web server port number is 4543.

1. Login to the machine where PBS Access is installed as root.
2. Navigate to `PA_HOME/config/pa/tomcat/conf`.
3. Edit the `server.xml` file and update the port number.

 **Note:** Search for the Connector port and replace 4543 with the new port number.

4. Navigate to `PA_HOME/config/api_gateway`.
5. Edit the `nginx.conf` file and update the port number.

```
upstream pbsaccess {  
    server localhost:4543;  
}
```

6. Navigate to `PA_HOME/config/displaymanager`.
7. Edit the `dmrest.properties` file and update the port number.
8. Edit the `dmrest.properties.template` file and update the port number.

```
pbsaccess.storage.service.host=https://localhost:4543/storage
```

```
pbsaccess.storage.service.host=https://localhost:4543/storage
```

9. Navigate to `PA_HOME/config/shared`.
10. Edit the `app.properties` file and update the port number.

```
pbsworks.ams.url = https://localhost:4543/AAService/aaservice/authn/oauth2
```

11. Edit the `ServiceRegistry.json` file and update the port number.

```
{"service":[{"name":"ams","host":"localhost","port":"4543","service_name":"AAService","scheme":"https"}]}
```


12. Start PBS Access by entering the command:

```
/etc/init.d/pbsworks-pa start
```

8.1.3 Changing the Postgres Port Number

Change the port that Postgres listen on.

You must stop PBS Access before changing the port number. For more information about stopping PBS Access, see [PBS Access Service Commands](#).

 **CAUTION:** Changing the Postgres port requires the removal and recreation of the Postgres database. The script that performs this work also removes all log files located at `PA_HOME/logs`. Additionally, this script allows the Service User who owns the Postgres database and the files in `PA_HOME` and `PA_EXEC` to be changed. If you do not want to change the Service User, then provide the username of the current Service User when executing the script. The current Service User can be determined by viewing the contents of `/etc/pbsworks-pa.conf`.

The Postgres database port number has to be updated in the files `configure.sh` and `app.properties`

 **Note:** The default Postgres database port number is 4643.

1. Login to the machine where PBS Access is installed as root.
2. Navigate to `PA_EXEC/database/scripts`.

3. Edit the `configure.sh` file and update the port number.

```
PG_PORT=4643;
```

4. Navigate to `PA_HOME/config/shared`.

5. Edit the `app.properties` file and update the port number.

```
spring.datasource.url=jdbc:postgresql://localhost:4643/pbsworks
```

6. Navigate to `PA_EXEC/init/script`

7. Run the command:

```
./configure-pa-user.sh <NEW_PORTAL_USER>
```


where `<NEW_PORTAL_USER>` is the username of the new Service User. All PBS Access services will run under this user and this user will own the Postgres database and the files in `PA_HOME` and `PA_EXEC`.

8.1.4 Changing the Message Broker Port Number

Change the port that the message broker (ActiveMQ) listens on.

You must stop PBS Access before changing the port number. For more information about stopping PBS Access, see [PBS Access Service Commands](#).

The Message Broker port number has to be updated in the files `message-app.properties`, `env` and `activemq.xml`.

 **Note:** The default Message Broker port number is 4743.

1. Login to the machine where PBS Access is installed as root.
2. Navigate to `PA_HOME/config/shared`.
3. Edit the `message-app.properties` file and update the port number.

```
pbsworks.messaging.broker.url=tcp://localhost:4743
```

4. Navigate to `PA_EXEC/shared/thirdparty/apache/activemq/bin`.

5. Edit the `env` file and update the port number.

```
ACTIVEMQ_QUEUEMANAGERURL="--amqurl tcp://localhost:4743"
```

6. Navigate to `PA_EXEC/shared/thirdparty/apache/activemq/conf`

7. Edit the `activemq.xml` file and update the port number.

```
<transportConnector name="openwire"  
uri="tcp://0.0.0.0:4743?maximumConnections=1000&wireFormat.maxFrameSize=104857600">
```

8. Start PBS Access by entering the command:

```
/etc/init.d/pbsworks-pa start
```


8.1.5 Changing the Interactive Proxy Port Number

Change the port that the Interactive Proxy (GUACD) listens on.

You must stop PBS Access before changing the port number. For more information about stopping PBS Access, see [PBS Access Service Commands](#).

The Interactive Proxy port number has to be updated in the following files:

- `guacd.conf`
- `guacamole.properties`
- `guacamole.properties.template`

 **Note:** The default Interactive Proxy port number is 4822.

1. Login to the machine where PBS Access is installed as root.
2. Navigate to `/etc/guacamole/`.
3. Edit the `guacd.conf` file and update the port number.

```
bind_port = 4822
```

4. Navigate to `PA_HOME/config/displaymanager`.
5. Edit the `guacamole.properties` file and update the port number.

```
guacd-port: 4822
```

6. Navigate to `PA_HOME/config/displaymanager`
7. Edit the `guacamole.properties.template` file and update the port number.

```
guacd-port: 4822
```

8. Start PBS Access by entering the command:

```
/etc/init.d/pbsworks-pa start
```

9. Restart the Interactive Proxy by entering the command:

```
/etc/init.d/guacd restart
```


8.1.6 Changing the Interactive Application Web Server Port Number

Change the port that the Interactive Application Web Server listens on.


You must stop PBS Access before changing the port number. For more information about stopping PBS Access, see [PBS Access Service Commands](#).

The Interactive Application web server port number has to be updated in the following files:

- `server.xml`
- `nginx.conf`
- `guacamole.properties`
- `guacamole.properties.template`

 **Note:** The default Interactive Application web server port number is 4843.

1. Login to the machine where PBS Access is installed as root.
2. Navigate to `PA_HOME/config/pa/tomcat/conf`.
3. Edit the `server.xml` file and update the port number.

 **Note:** Search for the Connector port and replace 4843 with the new port number.

4. Navigate to `PA_HOME/config/api_gateway`.

5. Edit the `nginx.conf` file and update the port number.

```
upstream pbsaccess {  
    server localhost:4843;  
}
```

6. Navigate to `PA_HOME/config/displaymanager`.
7. Edit the `guacamole.properties` file and update the port number.

```
dm-host: https://localhost:4843/displaymanager
```

8. Navigate to `PA_HOME/config/displaymanager`.
9. Edit the `guacamole.properties.template` file and update the port number.

```
dm-host: https://localhost:4843/displaymanager
```

10. Start PBS Access by entering the command:


```
/etc/init.d/pbsworks-pa start
```

8.1.7 Change the Interactive Application Job Update Port Number

Change the port that the Interactive Application Job Update listens on..

You must stop PBS Access before changing the port number. For more information about stopping PBS Access, see [PBS Access Service Commands](#).

The Interactive Application Job Update port number has to be updated in the files `dmrest.properties` and `dmrest.properties.template`.

 **Note:** The default Interactive Application Job Update port number is 4909.

1. Login to the machine where PBS Access is installed as root.
2. Navigate to `PA_HOME/config/displaymanager`.
3. Edit the `dmrest.properties` file and update the port number.

```
jobsub.monitor.port=4909
```

4. Navigate to `PA_HOME/config/displaymanager`
5. Edit the `dmrest.properties.template` file and update the port number.

```
jobsub.monitor.port=4909
```

6. Start PBS Access by entering the command:

```
/etc/init.d/pbsworks-pa start
```

8.2 Configuring the Interactive Application Component

Configurations when you install interactive application component.

8.2.1 Changing the Session Timeout Value for Interactive Applications

Change the duration an Interactive session remains active.

The default interactive session timeout is 30 minutes . The session is killed if the user does not access the interactive session within this time.


1. Login to the machine where PBS Access is installed as the PBS Access Service User.
2. Navigate to `PA_HOME/config/displaymanager`.
3. Edit the file `dmrest.properties`.
4. Update the value of `jobaction.expiry_time` in seconds.

```
jobaction.expiry_time=1800
```

8.2.2 Changing the Job Submission Host for Interactive Applications

Change the hostname or IP address of the machine from which jobs are being submitted.

Interactive jobs connect to the Interactive Application service to provide job status updates. When the hostname or IP address of the machine where PBS Access is installed changes, the Interactive Application service must be updated with the new value.

 **Note:** This hostname or IP address must be accessible from all execution hosts.


1. Login to the machine where PBS Access is installed as the PBS Access Service User.
2. Navigate to `PA_HOME/config/displaymanager`.
3. Edit the file `dmrest.properties`.
4. Update the value of `jobsub.monitor.host` to the new hostname or IP address.

```
jobsub.monitor.host=dm-05
```

8.2.3 Changing the Job Submission Port for Interactive Applications

Change the port that the Interactive Application component listens on for job status updates.

Interactive jobs connect to the Interactive Application service to provide job status updates. Modify the default port that the Interactive component listens on for these updates if the default port is already being used by a different process.

 **Note:** The default port that the Interactive component listens on for job status updates is 4909.

1. Login to the machine where PBS Access is installed as the PBS Access Service User.
2. Navigate to `PA_HOME/config/displaymanager`.
3. Edit the file `dmrest.properties`.
4. Update the value of `jobsub.monitor.port` to the new port number.

```
jobsub.monitor.port=4909
```

8.2.4 Configuring GPU Limits when the Number of GPUs Change

Reconfigure the Interactive Application component when GPUs are added or removed from a cluster.

The installer configures all the node and cluster limits for GPUs. Follow the below procedure in situations where these limits might change (e.g. a node going down or being removed, adding new graphical nodes post-installation, etc.)

Modifying the Cluster GPU Limit

Modify the available number of GPUs in a cluster when graphical nodes or devices are added or removed.

A queue (`iworkq`) is created when the Interactive Application installer is run on the PBS Server. This queue exclusively handles interactive job requests. An attribute is set on the queue which limits the number of GPUs that can be allocated to jobs queued in or running from this queue. Modify the value of this attribute to accommodate any changes in the limit due to the addition or removal of graphical nodes or devices.

1. Login to the machine hosting the PBS Server as root or a user with sudo permissions.
2. Enter the command:

```
qmgr -c "p q iworkq"
```

Output similar to the below is displayed.

```
#  
# Create queues and set their attributes.  
#  
#  
# Create and define queue iworkq  
#  
create queue iworkq  
set queue iworkq queue_type = Execution
```

```
set queue iworkq Priority = 150
set queue iworkq max_queued_res.ngpus = [o:PBS_ALL=5*]
set queue iworkq resources_max.ngpus = 1
set queue iworkq resources_min.ngpus = 1
set queue iworkq enabled = True
set queue iworkq started = True
```

The value of *max_queued_res.ngpus* is the available GPU limit for the cluster. This is the cumulative number of all the GPUs available in the cluster managed by the PBS server.

3. Change the value of *max_queued_res.ngpus* using the command:

```
qmgr -c "set queue iworkq max_queued_res.ngpus= [o:PBS_ALL=<GPUS>]"
```

where <GPUS> is the new number of GPUs available in the cluster.

Modifying the Node GPU Limit

Modify the available number of GPUs for any execution hosts when graphical nodes or devices are added or removed.

When the Interactive Application installer is run on the PBS MoM, an attribute is set on each graphical node which defines the number of available GPUs for the node. Modify the value of this attribute to accommodate any changes in the limit due to the addition or removal of GPUs.



Note: This must be done for any execution hosts that have had graphical nodes or devices added or removed.

1. Enter the command:

```
pbsnodes -a
```

Output similar to the below is displayed.

```
interactive-05
Mom = interactive-05.cad.company.com
Port = 15002
pbs_version = PBSPro_13.1.3.170747
ntype = PBS
state = free
pcpus = 32
resources_available.arch = linux
resources_available.host = interactive-05
resources_available.mem = 131727204kb
resources_available.ncpus = 32
resources_available.ngpus = 3
resources_available.vnode = interactive-05
resources_assigned.accelerator_memory = 0kb
resources_assigned.mem = 0kb
resources_assigned.naccelerators = 0
resources_assigned.ncpus = 0
resources_assigned.netwins = 0
resources_assigned.ngpus = 0
resources_assigned.vmem = 0kb
resv_enable = True
sharing = default_shared
```

The value of *resources_available.ngpus* is the available GPU limit for the node, this is the cumulative number of all the graphical devices available for a particular node.

2. Change the value of *resources_available.ngpus* using the command:


```
qmgr -c "set node <VNODENAME> resources_available.ngpus=<NGPUS>"
```

where <VNODENAME> is the name of the node and <NGPUS> is the new number of GPUs available on this execution host.

8.3 Setting the Double-Click Delay Time

Change the delay time required between two consecutive clicks for a double-click.

The default delay time between two consecutive clicks is set to 500ms (500 millisecond)


 **Note:** You must have administrative privileges to change the double-click delay time.

1. Login to the machine where PBS Access is installed as the portal administrator.
2. Navigate to `PA_HOME/config/pa`.
3. Open the `configuration.json` file and change the value of the `doubleClickDelay`.

8.4 Configuring Default File Viewer

Configure default file viewer to open the file based on the file extension.


By default, the file extension .out, .Log, .stat, .rad, .fem will open in the file viewer by double-clicking the files.

 **Note:** You must have administrative privileges to change the double-click delay time.

1. Login to the machine where PBS Access is installed as the portal administrator.
2. Navigate to `PA_HOME/config/pa`.
3. Open the `nativeviewer.json` file.
4. Add the file extensions under `ApplicationFileExtension` value.

```
"ApplicationFileExtension": {  
  "type": "array",  
  "items": {  
    "type": "string"  
  },  
  "value": [".sh",  
    ".fem",  
    ".py",  
    ".env",  
    ".txt",  
    ".Log",  
    ".stat",  
    ".rad",  
    ".out"  
  ],  
  "Displayable": false  
}
```


The file extensions mentioned in `ApplicationFileExtension` value will open with the default file viewer.

 **Note:** If you double-click or open a file with unknown file extension, then an application list dialog box is displayed to choose the desired application to view the file.

8.5 Configuring Default Columns in Job List View

Configure the job properties columns that are displayed in the job list view.

By default, the job properties columns displayed in the job list view in Jobs tab are Job ID, Job Name, Job State, Creation Time and User Name. You can add or remove the `defaultGridColumn` property value in the `jobpropertiesmap.json` file.

 **Note:** You must have administrative privileges to change the default job properties value.

1. Login to the machine where PBS Access is installed as the portal administrator.
2. Navigate to `PA_HOME/config/pa`.
3. Open the `jobpropertiesmap.json` file.
4. Update the `defaultGridColumn` value.

```
"defaultGridColumn": ["jobId", "jobName", "jobState", "creationTime", "userName"]
```

The updated job properties value will be displayed in the job list view in Jobs tab.

8.6 Changing the Maximum File Upload Size

Change the default file upload size based on your requirement.

You must stop PBS Access before changing the maximum file upload size. For more information about stopping PBS Access, see [PBS Access Service Commands](#).

1. Login to the machine where PBS Access is installed as the portal administrator.
2. Navigate to `PA_HOME/config/api_gateway/`.
3. Open the `nginx.conf` file.
4. Update the `client_max_body_size` value in MB.

```
#set max file upload size to 4GB  
client_max_body_size 4096m;
```

5. Start PBS Access using the following command:

```
/etc/init.d/pbsworks-pa start
```

8.7 Changing the File Opening behavior of a Remote Session Application

Change the file opening behavior of a remote session application from cross mounted file system to non-shared file system.


The default application definition provided with PBS Access is configured such that the selected file is not copied to the execution node. The remote session will open the file in execution node with the assumption that the file name and file path is available in execution node. This option is the cross mounted file system where the file system is available on the execution node and head node.

In the case of non-shared file system, there is no shared file system between the execution node and head node. The PBS Access will copy the file to execution node job directory and remote application will open with the copied file from job directory.


The default interactive application definition provided with PBS Access provides the flexibility to work in both the environment. By default, the sample application definition is configured to work in cross mount file system environment.

Perform on the following choices to change the behavior in PBS Access:

- Uncheck the "Run from job directory" field from Job Submission Form while submitting.

 **Note:** The "Run from job directory" field is displayed only if you select "All Fields" option in Job Submission form. The behavior will be changed for that session only.

- Update the Application Definition Input file and change the default value of "Run from job directory" to true.

 **Note:** This change will be implemented for all the sessions.

Application Definitions

PAS requires a predefined set of instructions, called application definitions, to describe your application parameters to users, store their responses, and prepare those responses for job execution via PBS Professional.

This chapter covers the following:

- [9.1 Application Definition Components](#) (p. 56)
- [9.2 Sample Application Definition PBSJobApp](#) (p. 58)
- [9.3 Mapping Icons to an Application](#) (p. 59)
- [9.4 Administration of Application Definition](#) (p. 60)
- [9.5 Sitewide Settings](#) (p. 62)
- [9.6 Interactive Application Definitions](#) (p. 65)

An application definition provides a flexible set of instructions that can be manipulated to allow for precise control over all aspects of application-specific parameters and job execution. These application definitions are stored in a central repository and will make PBS Professional aware of each of them upon server startup. The location of the application directory for a typical installation of PAS is: `PBSWORKS_HOME/data/pas/targets/localhost/repository/applications`.

9.1 Application Definition Components

Overview of application definition components.

An application definition is comprised of a set of Python scripts and two XML files which could include references to site wide configuration settings. A separate application definition with application-specific details is required for each application that will be integrated into PAS. Application definitions are compliant with the Open Grid Forum High Performance Computing Basic Profile (HPCBP), Business Process Execution Language (BPEL), and Job Submission Description Language (JSDL) standards.

For more comprehensive information about application definitions and their associated files see *Diving Into Application Definitions*.

9.1.1 Application Input File

The application input file is where administrators can define the allowed arguments for a given application. This file is also used by graphical, web-based and even command-line tools to display these arguments to users for job submission.

The mandatory naming convention for the application input file is `app-inp-applicationname.xml` where `applicationname` is whatever name you choose to give your application.

9.1.2 Application Converter File (HPCBP Converter)

The application converter file is where administrators take the values received by the user via the input file and communicates this information to the PAS and PBS Professional. This file allows the PAS administrator to configure the job submission environment.

The mandatory naming convention for the application converter file is `app-conv-applicationname.xml` where `applicationname` is whatever name you decide to give to your application.

9.1.3 Application Runtime Scripts

The application runtime scripts are what really get executed on the execution hosts. The runtime script, `start.py`, is what will be executed as the "job script". This script file is responsible for executing the application associated with your application definition, using the information entered by the user (defined by the application input file) and converted (via the application converter file). Additional scripts can also be included that support and enhance the runtime script. Administrators can directly edit these runtime script(s), taking full advantage of Python to add further inspection and complexity to job submission and finally execution of the application itself. This adds tremendous flexibility as nearly infinite possibilities for job control exist at this phase of job description.

For information about how to use runtime scripts see the tutorials *Enhancing your Application with Runtime Scripts*, *Executing Actions on a Running Job* and the *Recipes* section in *Diving Into Application Definitions*.

9.1.4 Site Configuration File

The site configuration file, `site-config.xml`, is meant to make application definitions more portable by consolidating data that may change from cluster to cluster in a central location. It is where administrators can define things like policies, version, and path information for all the available applications, billing account information, etc. The data in this file is used by the application input and converter files.

For information on how to reference the site configuration file in an application definition see the tutorial *Maintaining Multiple Versions of an Application*, recipes *How to Configure & Use Sitewide Billing Accounts*, *How to Configure & Use Sitewide Policies*, and *How to Configure & Use Application Policies* section in *Diving Into Application Definitions*.

9.2 Sample Application Definition PBSJobApp

PAS provides a sample application definition, PBSJobApp, which is located in the application definition directory.

PBSJobApp is an example of how an administrator could create an application definition enabling users to use custom job scripts akin to the more common PBS Professional job script. PBSJobApp allows these job scripts to be written in any language by using its runtime script, `start.py`, to parse the first line (shebang line) to determine the correct interpreter to execute your job script against. PBSJobApp's versatility allows the following:


- extra arguments to be passed to the job script
- specification of advanced multi-node placement options
- the inclusion of additional files

This application definition in conjunction with the *Diving Into Application Definitions* documentation will assist administrators to create and deploy application definitions.


9.3 Mapping Icons to an Application

Icons can be mapped to an application so that it gets displayed in the context menu and in the application list.

The application input file is where administrators can map an icon for a given application. The icon mapped in this file is displayed in the context menu and in the application list.

 **Note:** Only Administrators can map an icon to the application.

1. Login to the machine where PBS Access is installed as root.
2. Navigate to `PBSWORKS_HOME/data/pas /targets/localhost/repository/applications/<appname>`.
where `<appname>` is the application folder. For example, let's assume that we are adding icon to the `PBSJobApp` application definition.
3. Create an `avatar` directory.
4. Navigate to the `avatar` directory.
5. Place the application icon.

 **Note:** You have to place two different images, one for the context menu (smaller size) and the other for the list menu (bigger size) .

6. Navigate to `PBSWORKS_HOME/data/pas /targets/localhost/repository/applications/PBSJobApp`.
7. Edit the application input file and add the `ApplicationIconSmall` xml element to display the icon in context menu and `ApplicationIconMedium` xml element to display the icon in the application list.

```
<ApplicationId>PBSJobApp</ApplicationId>  
<ApplicationName>PBSJobApp</ApplicationName>  
<ApplicationExtension>.fem</ApplicationExtension>  
<ApplicationIconSmall>PBSJobAppIconSmall.jpg</ApplicationIconSmall>  
<ApplicationIconMedium>PBSJobAppIconMedium.jpg</ApplicationIconMedium>
```
8. Repeat steps 2 through 7 for all applications.
9. Restart the PAS Server.

9.4 Administration of Application Definition

PAS has a central location for storing application definitions - `PBSWORKS_HOME/data/pas/targets/localhost/repository/applications`.

9.4.1 Adding a New Application Definitions

Adding an application definition to the applications directory, followed by a restart of PAS, will expose your application definition to the user. Follow these steps to add an application definition:

1. Login to the machine hosting the PAS Server.
2. Navigate to the applications directory located at `PBSWORKS_HOME/data/pas/targets/localhost/repository/applications`.
3. Create a directory called `appname`.
where `appname` is the name of the application.
4. Place the application definition input file (`app-inp-appname.xml`) and the application definition converter file (`app-conv-appname.xml`) in the application directory.
5. Navigate to the `appname` directory.
6. Create a subdirectory called `runtime` and navigate to that subdirectory.
7. Place any runtime scripts into the runtime directory.
8. Restart the PAS Server.

9.4.2 Application Definition Validation

When the PAS Server starts, it performs a validation of the existing application definitions. If application definitions fail to meet key criteria, they will be moved to an invalid application directory. This directory will be created if it does not exist. The location of this directory is: `PBSWORKS_HOME/data/pas/targets/localhost/repository/private/generated/invalid_applications`

In addition, PAS will restore the site configuration file from the last valid backup - `site-config.backup`.

Error messages will be displayed in the PAS log file indicating why the application definition was invalid. Invalid application definitions can be retrieved from the `invalid_applications` directory and modified to meet the criteria necessary to be considered valid. An invalid application definition will not prevent the PAS Server from starting up.

9.4.3 Maintenance of Existing Application Definition

Existing application definitions can be modified or removed. To make PAS aware of the modification or the removal of an application definition, restart the PAS Server.

Updating an Application Definition

You can easily modify an existing application definition using your favorite XML editor.

1. Login to the machine hosting the PAS Server.
2. Navigate to the applications directory located at `PBSWORKS_HOME/data/pas/targets/localhost/respository/applications`.
3. Edit and make any modifications necessary to the application definition files.
4. Restart the PAS Server.

Removing an Application Definition

Removing an application definition from PAS is also very simple.

Simply remove the application definition directory from the applications folder. You have to restart PAS to remove your application definition from PAS. Follow these steps to remove an application definition:

1. Login to the machine hosting the PAS Server.
2. Navigate to the applications directory located at: `PBSWORKS_HOME/data/pas/targets/localhost/respository/applications`.
3. Remove the application directory and all of its content including the `runtime` subdirectory and associated files.
4. Restart the PAS Server.

9.5 Sitewide Settings

PAS provides a central repository for site specific information such as executable paths, policies, and billing account information. This information is stored in a site configuration file, `site-config.xml`. By putting some site specific application information in the, `site-config.xml` application definitions can be made more portable and reusable among different PBS Professional complexes. For example, putting binaries locations and version availability information here, makes the rest of the application definition reusable on a different cluster just by modifying that cluster's `site-config.xml`. The location of this file is `PBSWORKS_HOME/data/pas/targets/localhost/repository`.

9.5.1 Site Configuration File Content

This file can hold virtually any sort of information, since the information stored in the file can be referenced by any application definition XML file. Altair has included certain data in the site configuration file for the integration and support of other products from the PBS Professional family. The example below shows a sample of the site configuration file with the sections currently used by the PBS Professional product suite:

- Applications - This section holds application specific information.
- Application versions - For each application, you can insert site supported versions and for each version its binary pathname.
- Job projects (billing accounts) - This section is for integrating PAS with other products from Altair. Here you can list a set of strings to be used as "accounting" information to be attached to jobs.
- Policies - Site policies are values that can be used in a site's application definition XML files and/or as values available in job runtime environment (policies are included as environment variables for the jobs).
- Application policies - This section is for setting policies that are specific to an application.

9.5.2 Initial Site Configuration File after Installation of PAS

After installation of PAS the site configuration file will contain references to `PBSJobApp`, an application definition that is provided out-of-the-box. Placeholders for billing accounts and policies are provided, but will need to be updated according to your site specifications.

```
<?xml version="1.0" encoding="UTF-8"?>
<SiteConfiguration xmlns="http://schemas.altair.com/pbs/2007/01/site-config"
  xmlns:site-config="http://schemas.altair.com/pbs/2007/01/site-config"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://schemas.altair.com/pbs/2007/01/site-config ../schemas/site-config.xsd">
  <Applications>
    <Application id="PBSJobApp">
      <ApplicationVersions/>
    </Application>
  </Applications>
  <JobProjects id="BILLING_ACCOUNT"/>
  <Policies/>
</SiteConfiguration>
```

9.5.3 Sample of a Site Configuration File

Here is an example of a site configuration file with modifications for site supported application versions, application policies, billing accounts, and sitewide policies:

```
<?xml version="1.0" encoding="UTF-8"?>
<SiteConfiguration xmlns="http://schemas.altair.com/pbs/2007/01/site-config"
  xmlns:site-config="http://schemas.altair.com/pbs/2007/01/site-config"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://schemas.altair.com/pbs/2007/01/site-config ../schemas/site-config.xsd">
  <Applications>
    <Application id="PBSJobApp">
      <ApplicationVersions/>
      <Policies>
        <Policy>
          <Option>MAX_CPUS</Option>
          <Value>4</Value>
        </Policy>
      </Policies>
    </Application>
    <Application id="Optistruct">
      <ApplicationVersions>
        <ApplicationVersion>
          <Option>8.0</Option>
          <Executable>/opt/hyperworks/11.0/altair/scripts/optistruct</Executable>
        </ApplicationVersion>
        <ApplicationVersion>
          <Option>9.0</Option>
          <Executable>/sw/optistruct9/optistruct</Executable>
        </ApplicationVersion>
      </ApplicationVersions>
    </Application>
  </Applications>
  <JobProjects id="BILLING_ACCOUNT">
    <Option>Company1</Option>
    <Option>Company2</Option>
  </JobProjects>
  <Policies>
    <Policy>
      <Option>MAX_CPUS</Option>
      <Value>4</Value>
    </Policy>
  </Policies>
</SiteConfiguration>
```

9.5.4 Using Site Configuration Information in an Application Definition

For information on how to reference the site configuration file in an application definition see the tutorial *Maintaining Multiple Versions of an Application*, recipes *How to Configure & Use Sitewide Billing Accounts*, *How to Configure & Use Sitewide Policies*, and *How to Configure & Use Application Policies in Diving Into Application Definitions*.

9.5.5 Site Configuration File Backup

Upon server start-up, PAS will validate the content of the site configuration file and the content of application definitions. If the content of both the site configuration file and application definitions is valid, the site configuration file will be backed up to a file called `site-config.backup`. If the content of either the site configuration file or any application definition is invalid, the site configuration file will be backed up to a file called `site-config.YYYYMMDDMMSS` where `YYYYMMDDMMSS` is the file creation timestamp. The site configuration file will be restored from the last valid backup, `site-config.backup`.

Up to five (5) backups will be maintained. All backup files will be maintained in the same directory as the site configuration file.

9.5.6 Site Configuration File Validation

Upon server startup, PAS validates the site configuration file. It is validated against its XML schema. An XML schema defines the legal building blocks of a particular XML document. An XML schema:

- defines elements that can appear in a document
- defines attributes that can appear in a document
- defines which elements are child elements
- defines the order of child elements
- defines the number of child elements
- defines whether an element is empty or can include text
- defines data types for elements and attributes
- defines default and fixed values for elements and attributes

The validation process also determines if the content of the site configuration file is well-formed (valid). The content is well-formed if the following criteria is met:

- It must have a root element.
- XML elements must have a closing tag.
- XML tags are case sensitive.
- XML elements must be properly nested.
- XML attribute values must be quoted.

9.6 Interactive Application Definitions

Interactive application definition mandatory and special arguments.

9.6.1 Mandatory Interactive Application Definitions Changes

XML tags that are required for an interactive application definition.

For an application to be identified as interactive, the corresponding application definition must contain the `Interactive` element and its value must be set to `true` in the application input file.

```
<Interactive>true</Interactive>
```

Additionally, a boolean argument is necessary to run an interactive application which controls how many GPUs are requested at job submission.

```
<ArgumentChoice>  
  <ArgumentBooleanWithDescription>  
    <Name>GPU</Name>  
    <Description>Is GPU required ?</Description>  
    <DisplayName>GPU (?)</DisplayName>  
    <InputRequired>>false</InputRequired>  
    <Value>true</Value>  
  </ArgumentBooleanWithDescription>  
</ArgumentChoice>
```

The `Value` element controls the request for GPUs. For 2D applications set it to `false` and a request for GPUs will not be made for the application. For 3D applications, `Value` option has to be set to `true`.

9.6.2 Special Interactive Application Arguments

Arguments that can be added to an interactive application definition.

The following interactive application specific arguments can be added to an application definition to pass arguments and environment variables to the application, define a job working directory, create a backup of job input files, and change the viewing mode from Applet to HTML5.

Arguments

A special string argument having the name `DM_APP_ARGS` can be added to an application definition so that arguments can be passed to the application. Multiple arguments can be passed to the application by separating them by `'\n'`.

```
<ArgumentChoice>  
  <ArgumentString>  
    <Name>DM_APP_ARGS</Name>  
    <Description>' \n ' separated args</Description>  
    <DisplayName>Arguments</DisplayName>  
    <InputRequired>>false</InputRequired>  
  </ArgumentString>  
</ArgumentChoice>
```

Environment

A special string argument having the name `DM_APP_ENVS` can be added to an application definition so that environment variables can be passed to the application. Multiple variables can be passed to the application by separating them by `'\n'`.

```
<ArgumentChoice>
  <ArgumentString>
    <Name>DM_APP_ENVS</Name>
    <Description>'\\n' separated envs</Description>
    <DisplayName>Environments</DisplayName>
    <InputRequired>>false</InputRequired>
  </ArgumentString>
</ArgumentChoice>
```

WorkDirectory

A special string argument having the name `DM_APP_WDIR` can be added to an application definition so a job working directory is created when the job is submitted.

```
<ArgumentChoice>
  <ArgumentString>
    <Name>DM_APP_WDIR</Name>
    <Description>Working dir</Description>
    <DisplayName>Workding Dir</DisplayName>
    <InputRequired>>false</InputRequired>
  </ArgumentString>
</ArgumentChoice>
```



Note: The arguments mentioned above are disabled by default. Enable them by setting the `InputRequired` field to true.

Copy Back Files

A special boolean argument having the name `COPY_BACK_FILES` can be added to an application definition so that job input files are copied to the stageout directory.

```
<ArgumentChoice>
  <ArgumentBooleanWithDescription>
    <Name>COPY_BACK_FILES</Name>
    <Description>Should job file(s) be staged out</Description>
    <DisplayName>Copy back files</DisplayName>
    <InputRequired>>true</InputRequired>
    <FeatureEnabled>>false</FeatureEnabled>
    <RefreshOnUpdate>>true</RefreshOnUpdate>
  </ArgumentBooleanWithDescription>
</ArgumentChoice>
```



Note: The `COPY_BACK_FILES` arguments is disabled by default. Enable this field by setting the `FeatureEnabled` option to true. When `FeatureEnabled` is set to true, the person who is submitting the job can choose whether to stageout job input files.

Client View Mode

A special enumerated list argument having the name `DM_CLIENT_VIEW_MODE` can be added to an application definition so that the person submitting the job can choose the type of mode to view the job results.

```
<ArgumentChoice>
  <ArgumentStringEnumerated>
    <Name>DM_CLIENT_VIEW_MODE</Name>
    <Description>Viewer mode</Description>
    <DisplayName>Viewer Mode</DisplayName>
    <InputRequired>>false</InputRequired>
    <Option>Desktop</Option>
    <Option>HTML5</Option>
    <Option>Applet</Option>
    <Value>HTML5</Value>
  </ArgumentStringEnumerated>
</ArgumentChoice>
```

```
</ArgumentStringEnumerated>  
</ArgumentChoice>
```

 **Note:** By default, the HTML5 view mode is enabled.

Mandatory/Optional Application Converter File Changes

In the `app-conv-AppName` application definition file, the following section determines which jobs are displayed in PBS Access.

```
<jsdl-hpcp:Environment name="DM_JOB">True</jsdl-hpcp:Environment>
```

If this is set to `False`, apart from the interactive application jobs, all the other jobs belonging to the user will be displayed. Ensure that this is set to `True`.

9.6.3 Adding a New Interactive Application

Create a new interactive application definition by copying a default interactive application definition and making application specific changes.

Any time a new application is added to your HPC, a corresponding application definition needs to be written. Writing a specific interactive application definition is a bit more complex than writing simple application definitions. We recommend the following procedure of copying and modifying the GLXSpheres application definition which is available after installing the Interactive Application components of PBS Access.

1. Navigate to `PBSWORKS_HOME/data/pas/targets/localhost/repository/applications`.
2. Copy the GlxSpheres application definition directory and rename it to the name of the new application.

If the new application is HyperView, then execute the following command:

```
cp -rp GlxSpheres HyperView
```

3. Rename the GlxSpheres application definition files to the name of the new application.

```
mv app-actions-GlxSpheres.xml app-actions-HyperView.xml  
mv app-conv-GlxSpheres.xml app-conv-HyperView.xml  
mv app-inp-GlxSpheres.xml app-inp-HyperView.xml
```

4. Edit the application input file.

- a) Change the value of the `<ApplicationId>` element to the name of the new application.

```
<ApplicationId>HyperView</ApplicationId>
```

- b) Change the value of the `<ApplicationName>` element to the new application name.

```
<ApplicationName>HyperView</ApplicationName>
```

- c) Locate the application argument `<ArgumentChoice>` called `VERSION`.

```
<ArgumentChoice>  
  <ArgumentStringEnumerated>  
    <Name>VERSION</Name>  
    <Description>Version of the interactive application you  
      selected to start </Description>  
    <DisplayName>Version</DisplayName>  
    <xi:include href="site-config.xml" pointer="xpath1  
      (//Application[@id='GlxSpheres']/ApplicationVersions//Option)" />  
  <ArgumentStringEnumerated>  
</ArgumentChoice>
```

- d) Change the attribute `@pointer` of the `<xi:include>` element to point to the path of the new application:

```
<xi:include href="site-config.xml" pointer="xpath1  
  (//Application[@id='HyperView']/ApplicationVersions//Option)" />
```

5. Edit the application action file.

- a) Change the value of the <ApplicationId> element to the name of the new application.

```
<ApplicationId>HyperView</ApplicationId>
```

- b) Change the value of the <ApplicationName> element to the new application name.

```
<ApplicationName>HyperView</ApplicationName>
```

6. Edit the application converter file.

- a) Change the value of the <ApplicationId> element to the name of the new application.

```
<ApplicationId>HyperView</ApplicationId>
```

- b) Change the value of the <ApplicationName> element to the new application name.

```
<ApplicationName>HyperView</ApplicationName>
```

- c) Set the site specific required environment for the application.

You can set the ALTAIR_LICENSE_PATH, NCPUS, ngpus, MEMORY etc according to the requirements for the application.

```
<jsdl-hpcp:Environment name="ALTAIR_LICENSE_PATH">6200@licsrv</jsdlhpcp:Environment>
```

7. Navigate to the directory PBSWORKS_HOME/data/pas/targets/localhost/repository.

8. Edit the site-config.xml file.

- a) Add a new <Application> element that points to the new application executable.

```
<Application id="HyperView">  
  <ApplicationVersions>  
    <ApplicationVersion>  
      <Option>13.2</Option>  
      <Executable>/altair/hw/13.2/altair/scripts/hv</Executable>  
    </ApplicationVersion>  
  </ApplicationVersions>  
</Application>
```



Tip: You can also define multiple executable versions for the application.

```
<Application id="HyperView">  
  <ApplicationVersions>  
    <ApplicationVersion>  
      <Option>13.1</Option>  
      <Executable>/altair/hw/13.1/altair/scripts/hv</Executable>  
    </ApplicationVersion>  
  
    <ApplicationVersion>  
      <Option>13.2</Option>  
      <Executable>/altair/hw/13.2/altair/scripts/hv</Executable>  
    </ApplicationVersion>  
  </ApplicationVersions>  
</Application>
```

9. Restart PAS for these changes to take effect.

Once PAS is restarted, the new application is available in PBS Access.