



ALTAIR

Altair Access Web 2020.3

Administrator's Guide

Updated: 10/27/2020

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Telephone and E-mail

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New features available in Altair Access™ Web.

Scalability and Performance

The following enhancements have improved scalability and performance:

- Integrated -E option with qstat and qselect in PAS provides improved performance.
- Access Web can now scale efficiently to support 300 concurrent users for batch jobs and 200 concurrent users for interactive jobs.

Results Visualization Service Template Validation

Results Visualization Service now validates a selected template before applying it to a plot result file. If a default template is valid for a selected result file, the plot is displayed automatically.

Compose Integration

Results Visualization Service now uses Compose instead of HMath for post processing results and generating plot data. The Compose installation path has to be configured for generating plots.

Launch Remote Sessions from Job Monitoring or Job Summary Page

When an interactive job is running, click the Connect button in the Job Monitoring page or the Job Summary page to launch a remote session.

Cluster Registration Enhancements

Usage of environment variables like \$HOME (PAS home location), \$USER_HOME (Users home location), and %U (username) is supported. The Autocreate Directory feature, which is enabled by default, will create the specified root directory if it is not already available.

White Theme

The Access Web theme is now compliant with Unity 2020 guidelines. The theme enhances visual styling and usability by improving font sizing, colors, margins, padding, notifications, and labeling of components.

Access Web Feedback

Access Web now has an option to provide your feedback from the portal. You can reach out to the product development team regarding the application, enhancements, features, or any troubleshooting issues through feedback form.

Paginated View for Easier Navigation

The files information view in the Running Directory and Output tab is displayed in multiple pages, making it easier to navigate and search.

Supported Platforms

SLES 12 SP5 and SLES 15 are now supported. Results Visualization Service does not support SLES 15.

PBS Professional 2020.1 Support

Access Web now supports PBS Professional 2020.1. Access Web will continue to use Python 2.7 which is shipped with Access Web instead of Python 3 version in PBS Professional. Access Web will distribute Python 2.7 to the HPC execution hosts when you perform the Modern Communication Module steps.

Refer to *Modern Communication Module on Linux* and *Modern Communication Module on Windows* topics in *Access Web 2020.3 Administrator's Guide* for more information.

This chapter covers the following:

- [2.1 Document Conventions](#) (p. 18)
- [2.2 About Access Web](#) (p. 19)
- [2.3 System Requirements](#) (p. 20)
- [2.4 Supported Product Configurations](#) (p. 25)
- [2.5 Authentication and Authorization](#) (p. 26)
- [2.6 PBS Works Licensing](#) (p. 27)
- [2.7 Architecture](#) (p. 28)

2.1 Document Conventions

Common typographical conventions for Altair Access Web™ technical publications.

PA_HOME

The Access Web home directory which contains configuration, data, and logging files. Default location is:

- on Linux: `/var/spool/pbsworks/2020.3/access/home`
- on Windows Docker: `/opt/altair/access/home`

However, this can be overridden during the installation of Access Web.

PA_EXEC

The Access Web execution directory which contains binaries and scripts. Default location is:

- on Linux: `/opt/altair/pbsworks/2020.3/access/exec`
- on Windows Docker: `/opt/altair/access/exec`

However, this can be overridden during the installation of Access Web.

PBS_HOME

The location where the PBS Professional daemon/service configuration files, accounting logs, etc. are installed. Default is:

`/var/spool/pbs`

PBS_EXEC

The location where the PBS Professional executable programs are installed. Default is:

`/opt/pbs/`

PAS_HOME

The Windows PAS home directory which contains configuration, data, and logging files. Default location is: `C:\Program Files\altair\pas\2020.3\PAS\home`, however this can be overridden during the installation of PAS on Windows.

PAS_EXEC

The Windows PAS execution directory which contains binaries and scripts. Default location is: `C:\Program Files\altair\pas\2020.3\PAS\exec`, however this can be overridden during the installation of PAS on Windows.

2.2 About Access Web

Use Access Web to submit jobs to a Workload Manager.

Altair's new Access Web 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 Access Web remote visualization and collaboration capabilities bring access to an expensive, highend 3D visualization datacenter hardware right to the user. Access Web provides an ability to visualize the results by extracting plot and animation data. You can view plots for running jobs as well as for jobs which have been successfully completed. You can download and view animations using the Altair HyperView Player. Results Visualization Service allows you to compare two or more plots in the result viewer, save the plot you generated with the data as .rvs file and directly view your saved plots with the selected data.

Access Web 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

2.3 System Requirements

System requirements for all components of Access Web.

2.3.1 Access Web System Requirements

Supported platforms and hardware requirements.

Supported Platforms

Access Web is supported on the following Linux 64-bit (x86_64) platforms:

- Red Hat Enterprise Linux (RHEL) 7.1 to 7.7 and 8
- CentOS 7.1 to 7.7, 8 and 8.1
- SUSE Enterprise Linux Server (SLES) 12 SP1 to 12 SP3, 12 SP5, and 15
- Windows Server 2016
- Ubuntu 18 platform support for Execution Node

 **Note:** HyperWorks Desktop and Compose are not tested on the platforms RHEL 8, CentOS 8, 8.1 and SLES 15.

Hardware Requirements

The minimum hardware configuration required for Access Web is:

Hardware	Minimum Requirement	Recommended
	Up to 50 Concurrent Users	Up to 300 Concurrent Users
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)	8 GB	16 GB
Disk Space	100 GB	500 GB

PBS and PAS should be on the same server. Session proxy should be on a separate server with the 10 Gigabit interconnection.

The minimum hardware configuration required for Remote Sessions Proxy is:

Hardware	Recommended
CPU	1 core per session and a total of 8 cores for scalability

Hardware	Recommended
Memory (Physical)	16 to 32 GB
Disk Space	100 GB
Network	15 to 20 Mbps per session

 **Note:** On cloud deployment, the vCPU should be twice the core mentioned above (double the core counts ie., 2 x cores)

8 CPU cores and 16 GB of RAM is recommended for running Windows docker containers of Access Web.

 **Note:** For high user load installations please contact Altair PBS Works Support (pbssupport@altair.com).

See Also

[Verify that Interactive Applications are Configured for the Desktop Manager](#)

2.3.2 Supported Browsers

Supported Browsers in Access Web.

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)

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

2.3.3 Remote Visualization System Requirements

System Requirements for the Graphical Execution Hosts

Requirements for the Remote Sessions component that is installed on the execution hosts.

To run interactive applications on the HPC execution hosts ensure that following requirements are met.

Hardware Requirements

Access Web uses the Guacamole protocol, which is a protocol for remote display rendering and event transport. guacd is the Guacamole proxy daemon which dynamically loads support for remote desktop protocols (called "client plugins") and connects them to remote desktops based on instructions received from the web application. guacd uses approximately 80-90% of a core for a single interactive session, therefore a minimum hardware requirement of 1 core is required. It is recommended to size your hardware based on the number of users who will be running interactive sessions concurrently. Additional CPUs, GPUs, disk space and memory are required specific to the interactive applications being run.

Hardware	Minimum Requirement
CPU	1 CPU core
Disk Space	1 GB
Memory	1 GB

Desktop Manager

By default, the Remote Sessions component installed on the PBS execution hosts to run interactive applications uses GNOME 3 as a Desktop Manager. Additionally, the default interactive application definitions (for example, GlxSpheres) are also configured to use GNOME 3. GNOME 3 requires 3D acceleration, therefore a graphics card is required.

Other Desktop Managers such as KDE and MATE do not require 3D acceleration, therefore a graphics card is optional, however you will have to reconfigure your interactive application definitions to use these Desktop Managers rather than GNOME.

If your site chooses to use GNOME 3 and GNOME 3 is not installed on the PBS execution hosts as part of the Linux distribution, then it must be installed.

Graphics Card

If your site chooses to install a graphics card, it must meet these hardware requirements:

- Only Nvidia and ATI (AMD) graphics cards are supported.
- The drivers provided by the manufacturer of the graphics card must be installed.
- Full 3D acceleration must be enabled for the graphic card drivers.
- Pixel Buffer support must be enabled for the graphic card drivers.

- Direct rendering must be enabled for the graphics card drivers.

Encryption

Use Virtual Private Networking or secured channels for communication between clients and the interactive server if encryption is required.

X Server

VirtualGL requires access to the application server's 3D graphics card so that it can create off-screen pixel buffers (Pbuffers) and redirect the 3D rendering from applications into these Pbuffers. Accessing a 3D graphics card on Linux requires going through an X server. Therefore:

- For running interactive sessions, X Server must be configured and working.
- Target interactive applications must be installed, configured and working (i.e., verify the interactive application is working by plugging a monitor into the machine that the application is running on to verify that is being displayed properly).
- Users that will be running interactive applications must have permission to access the 3D X Server. Please follow these instructions to configure and validate - see http://www.virtualgl.org/vgldoc/2_2_1/#hd005001.
- X Server must be configured to export True Color (24bit or 32bit) visuals.

See Also

[Remote Sessions Precheck Diagnosis Script](#)

2.3.4 Results Visualization System Requirements

System requirements for installing and using the Results Visualization Service.

HyperWorks Desktop

Results Visualization Service is automatically installed with Access Web. To extract animation data Altair HyperWorks Desktop must be installed. Access Web and HyperWorks Desktop can be installed on the same machine or separate machines. If HyperWorks Desktop is installed on a separate machine, it can be made accessible to Access Web by creating a mounting point for the HyperWorks installation directory on the machine where Access Web is installed.

Altair Compose

To extract plot data Compose must be installed. Access Web and Compose can be installed on the same machine or separate machines. If Compose 2020 is installed on a separate machine, it can be made accessible to Access Web by creating a mounting point for the Compose installation directory on the machine where Access Web is installed.

Network Connectivity

RVS requires good network connectivity to all the connected file servers such as the PAS Server and the PBS execution hosts. A minimum speed of 100mbps is required while a speed of 1gbps is recommended.

Recommendations

When Access Web and PAS are installed separately, it is recommended to mount the PAS staging directory and scratch directory on the Access Web Server to improve performance.

2.4 Supported Product Configurations

Supported product configurations for using Access Web.

When installing Access Web, all components including PAS and Remote Sessions must be the same version.



Note: Altair License Server 14.5.1 or newer is required for Access Web 2020.3.

Linux Support

The currently supported Access Web product configurations for Linux are:

Access Web	PBS Professional	HyperWorks	Compose
2020.3	2020.1 19.2.6 19.2.5 19.2.4 19.2.3 19.2.2 19.1.1	2020 2019.1 2017.2	2020

Windows Support

The currently supported Access Web product configurations for Windows Server 2016 are:

Access Web	PBS Professional	HyperWorks	Compose
2020.3	19.2.7 19.2.6 19.2.5 19.1.1	2020 2019.1 2017.2	2020

Result Visualization

- Altair HyperWorks Desktop and Compose are required to visualize CAE results.
- Altair HyperWorks Desktop 2019.1 supports only animation.

2.5 Authentication and Authorization

Authentication

HPC administrators expend a lot of time and energy deciding upon and implementing authentication policies for various machines in their HPC. Keeping this in mind, the most straightforward way to setup authentication for web portals, like Access Web, is to authenticate against the local machine. In this way, users who can login to the machine where Access Web is installed can also login to Access Web. This strategy provides a turn-key installation without having to configure Access Web with Active Directory or SSH server details.

Therefore, by default, authentication for Access Web is handled thorough SSH2 on Linux platforms and Windows Authentication on Windows platforms. Access Web assumes that if a user can login to the machine where Access Web is installed, then they should be able to login to Access Web. When managing authentication using services such as NIS or Active Directory, it is recommended to configure these services directly with SSH or Windows Authentication.

While the above defaults should work for most sites, Access Web also comes with a plug-in based architecture to accommodate more complex authentication use cases and it is possible to extend the default authentication mechanism. Please consult Altair professional support services for more information.

Authorization

The Service User is automatically assigned managerial privileges (is assigned a Manager role) and has unrestricted access to all features of Access Web. Actions that a Manager can do that a regular user cannot:

- add, edit, and delete server clusters (a PAS Server that is connected to an HPC complex).
- restrict other user's access to applications.
- assign managerial privileges to other users.

Regular users (those that are not assigned a Manager role) have access to all features of Access Web except for those detailed above.

Job Submission User Authorization

When a user submits a job from a system other than the one on which the PBS server is running, system-level user authorization is required. This authorization is needed for submitting the job and for PBS to return output files. For more information on how to set up this authorization see *Linux User Authorization* or *Windows User Authorization* in the *PBS Professional Installation & Upgrade Guide*.

See Also

[Establish Access Controls](#)

2.6 PBS Works Licensing

Licensing model for Access Web.

Licenses must be installed and available via an Altair License Server version 14.5.1 or newer. Licenses consumed by Access Web are:

PBSWorksUsers

This is the number of simultaneously logged in users; each user who logs in checks out one PBSWorksUsers license.

If a user logs into Access Web and then opens a second browser window to access Access Web, a single PBSWorksUsers license is consumed.

PBSWorksUsers stack, not level, across products. So if 10 users are logged into Access, and 10 users are logged into Control, 20 PBSWorksUsers are checked out, even if they are the same users.

2.7 Architecture

2.7.1 Access Web Components

Components and their associated responsibility.

Access Web consists of a collection of components and their associated services, accessed and invoked via a common interface.

Access Web Service

Access Web is a job submission and monitoring portal which enables users to run, monitor and manage workloads on distributed resources remotely. Access Web uses the High-Performance Computing (HPC) workload management capability of Altair's PBS Application Services (PAS) and PBS Professional for efficient resource utilization, access to the cloud for job submission, and subsequent accounting.

Results Visualization Service

Results Visualization Service (RVS) provides features to access, process and visualize CAE results from anywhere, without installing any post-processing desktop applications through the user friendly web interface of Access Web. CAE analysts can monitor simulations in real-time by tracking and visualizing relevant parameters from solver log files. Meaningful plots and animations can also be created remotely without downloading huge raw results files from compute clusters or remote networks locations. A variety of FEA and MBD solvers are supported - see [Supported Result File Types](#).

RVS is automatically installed with Access Web. To extract plot and post process the plot results Altair Compose must be installed. To extract animation data Altair HyperWorks Desktop must be installed.

PBS Application Services

PBS Application Services (PAS) is a middleware component that communicates with the PBS Professional complex and the operating system, and provides services for the front end client applications such as graphical user interfaces. This middleware component is used as the preferred method of communication between the integration of client applications and the PBS Professional complex.

PAS can be installed with Access Web or it can be installed separately on the PBS Server.

Remote Sessions

Remote Sessions provides a platform for collaboration and remote visualization of graphics-intensive applications and data. It enables high performance remote display of applications over the networks using a web browser. Users can share sessions fostering teamwork and collaboration.

Depending upon the deployment option selected, Remote Sessions components must be distributed across several machines. Installation of the Remote Sessions components is done through a separate installer from Access Web. The Remote Sessions installer must be run on the following machines:

- PAS
 - GlxSpheres application definition is installed.

- PBS Server
 - Custom resource "ngpus" is added.
 - Interactive queue "iworkq" is added.
- PBS MoM
 - TurboVNC is installed.
 - VirtualGL is installed.
 - Remote Sessions Interactive Proxy (guacd) is installed.

2.7.2 Basic Architecture Overview

Basic architecture of Access Web.

The basic architecture including the services and third party dependencies of Access Web is described as follows:

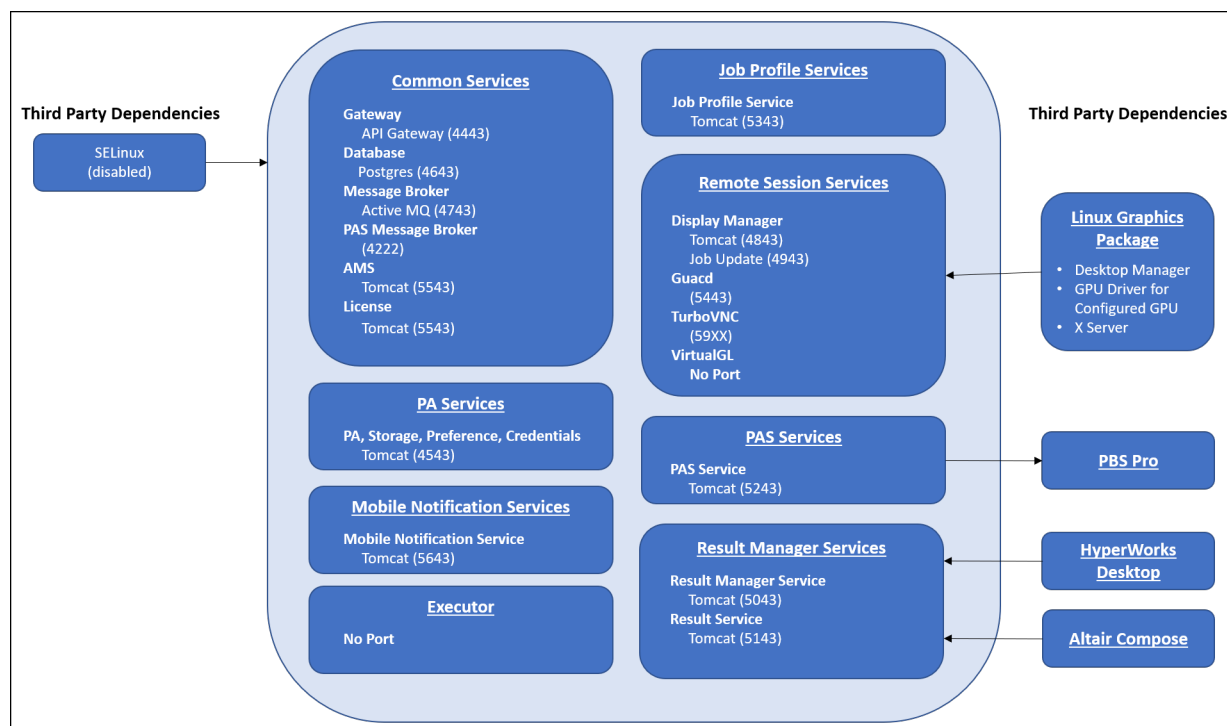


Figure 1: Basic Architecture Overview

2.7.3 File Staging Local Filesystem vs Shared Filesystem

File staging requirements for a local filesystem in comparison to a shared filesystem.

File Staging of Local Files

For a user to submit a job, job input files are required such as scripts, master files, includes files, etc. These files are typically:

- uploaded to the Access Web server and stored in a user directory, for example `/home`.
- located on a remote system, for example stored on a user's laptop or workstation.

When selecting job input files that are located on a user's laptop or workstation during job submission, the job files are copied to the Job File Stage Area. The Job File Stage Area is defined when installing PAS (default is `/stage` on Linux and `C:\stage` on Windows). Once the job is submitted, the job files are copied from the Job File Stage Area to the HPC complex. Once the job completes, the job files are copied back to the Job File Stage Area.

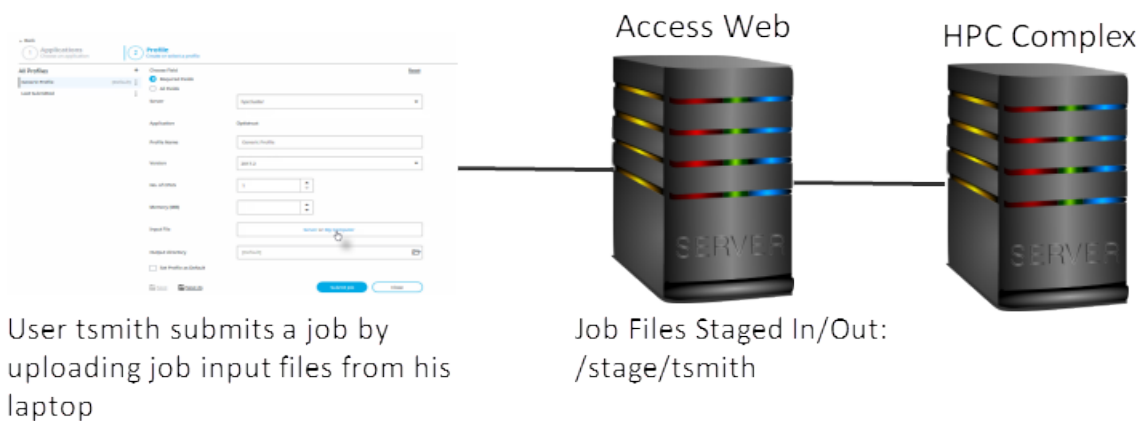


Figure 2: File Staging from User's Laptop or Workstation

Job files that are stored on the Access Web server are copied to the HPC complex from the location where the job files are stored. Once the job completes, the job files are copied back to the same location and placed in a job output directory.

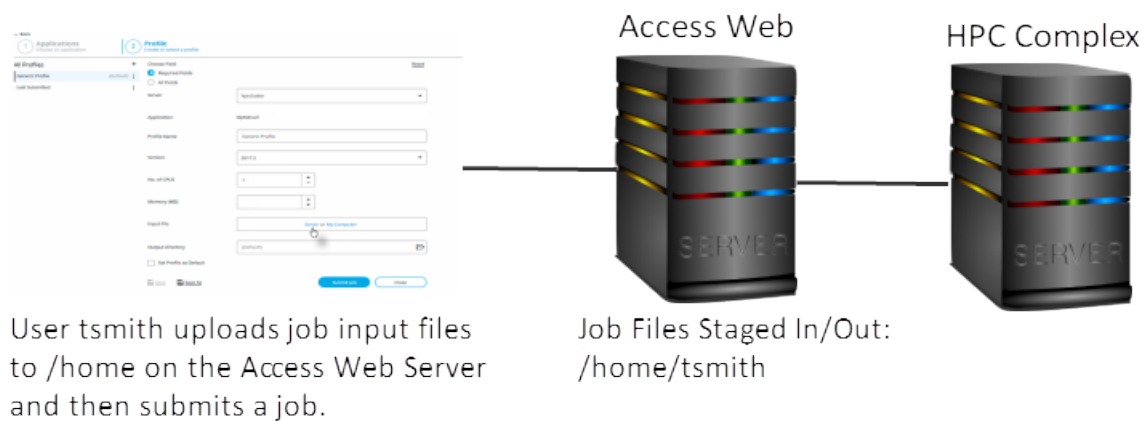


Figure 3: File Staging from User Directory on Access Web Machine

The mechanism for copying the job files between the Access Web server to the HPC complex is defined and configurable at the PBS level. For more information see *Setting File Transfer Mechanism* in the *PBS Professional Administrator's Guide*. By default, the copy mechanism depends on whether the job files are remote or local files. To copy remote files, system-level user authorization is required. Several methods for setting up this authorization are outlined in the *PBS Professional Installation & Upgrade Guide*. For example, through SSH key-based authentication or host-based authentication.

File Staging on a Shared Filesystem

A distributed filesystem can be mounted to share the following directories:

- User directories (ex. /home)
- Job File Stage Area (ex. /stage)
- Scratch directory (ex. /scratch)
- Application directory where solvers are installed (ex. /software)

This avoids having to remotely copy job input files, avoids having to distribute solvers across execution hosts, and does not require SSH keys to be generated and distributed across machines when user-ssh key authentication is being used.



Note: Application definitions must be modified so that staging of job files is done correctly when using a shared filesystem.

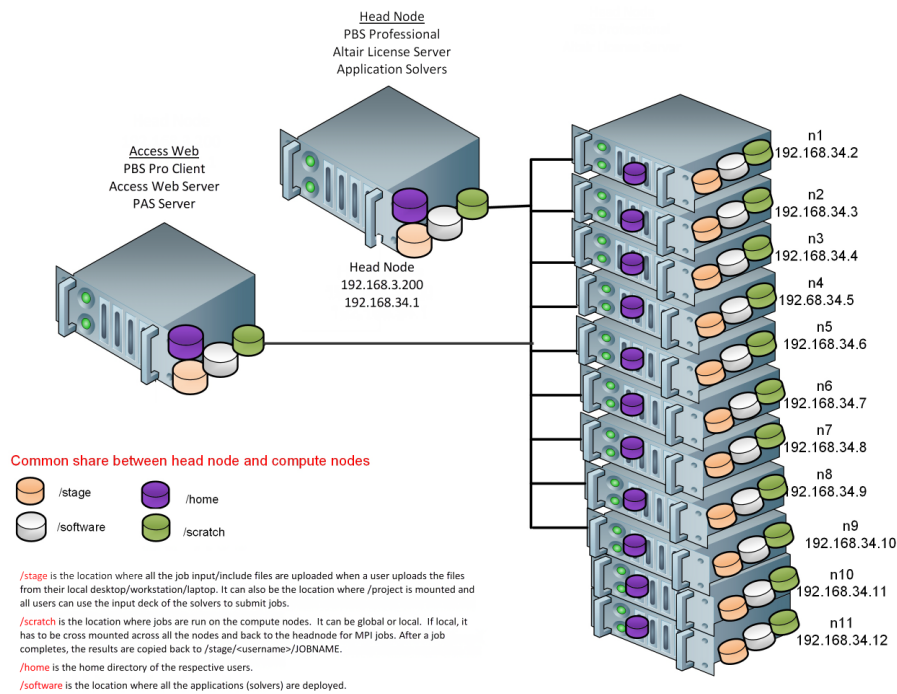


Figure 4: Shared Filesystem

See Also

[Shared File System Support](#)

2.7.4 Ports and Service Memory Usage

Overview of ports and memory used by Access Web services.

Ports Used by Access Web

A list of ports used by Access Web services and components.

The Access Web installer has auto-port detection logic in place and ports are chosen for each service within a specified range.

If the required port is not available during the installation, then Access Web will increment the port number and try again. This will continue until a free port is found, or until 100 consecutive ports are refused at which point the installer will ask for a port.

Below is a table of all ports and the port range used by Access Web and its services.

Ports used by Access Web

Port	Port Range	Service Using the Port	Description
4443	4443 - 4542	Gateway	Orchestrator for all access services.
4543	4543 - 4642	Access Web Server	Service which provides GUI and live job updates.
4643	4643 - 4742	Postgres Database	Service for data storage.
4743	4743 - 4842	Message Broker (ActiveMQ)	Service to provide async (event base) internal communication.
5343	5343 - 5442	Job Profiles Service	On-demand service to provide Access Desktop central repository for application definitions.
5543	5543 - 5642	AMS Service	Service to provide Authentication and Authorization.
5643	5643 - 5742	Mobile Notification Service	On-demand service to provide push notification support for Access Mobile.

Ports used by Results Visualization Service (RVS)

Port	Port Range	Service Using the Port	Description
5043	5043 - 5142	Result Manager Service	Service to provide integration between Access and RVS.
5143	5143 - 5242	Result Core Service	Service to support all RVS capabilities.

Ports used by PBS Application Services (PAS)

Port	Port Range	Service Using the Port	Description
4222	4222 (no port range)	PAS Message Broker Service	Service to provide async modern communication for faster running job operations.
5243	5243 - 5342	PAS	Service for Files and HPC operations.

Ports used by Remote Sessions

Port	Port Range	Service Using the Port	Description
4843	4843 - 4942	Remote Sessions Service Webserver	Service to provide Remote Sessions capabilities.
4943	4943 - 5042	Remote Sessions Service Job Update	Service to receive faster job updates for remote sessions.
5443	5443 - 5542	Remote Sessions Service Proxy	Service to transmit data through websockets (gaucd).
5743		VNC Router	Service used for Remote Sessions Handoff to Desktop Viewer.
5843		Remote Sessions Edge Gateway for Web Remote Sessions	Service used for Remote Sessions Handoff to Desktop Viewer using edge gateway proxy.
5943		Remote Sessions Edge Gateway for Desktop Remote Sessions	Service used for edge gateway for web Remote Sessions

Ports used by Remote Sessions on the PBS MoM

Port	Port Range	Service Using the Port	Description
5901	5901 to 59XX	Turbo VNC Server	Service to provide VNC sessions.

Open Ports

It is recommended to configure a firewall on the Access Web server and block all Access Web ports from the outside world except:

- 4222
- 4443
- 4943

See Also

[Change Port Numbers](#)

Memory Usage by Service

Overview of default Java heap space memory usage by each service.

The table below provides the amount of memory used by Access Web services and the file where this memory value can be configured post-installation.

The amount of memory can be adjusted by editing the associated configuration file and increasing the default value to a larger value. For example, when OutofMemory errors are noted in the Access Web log files.

Table 1: Memory Usage by Service

Service	Configuration Path and File	Value
Gateway	PA_HOME/config/api_gateway/nginx.conf	512 MB
Access Web Server	PA_EXEC/pa/scripts/setenv.sh	512 MB
Message Broker (ActiveMQ)	PA_EXEC/shared/thirdparty/apache/activemq/bin/env	64 MB -512 MB
Remote Sessions Services Webserver	PA_EXEC/displaymanager/scripts/setenv.sh	512 MB
Result Manager Services	PA_EXEC/resultmanager/scripts/setenv.sh	512 MB
Result Core Services	PA_EXEC/resultservice/scripts/setenv.sh	512 MB
Job Profiles Services	PA_EXEC/jobprofiles/scripts/setenv.sh	512 MB
AMS Services	PA_EXEC/ams/scripts/setenv.sh	512 MB
Mobile Notification Service	PA_EXEC/mobile_notification_service/scripts/setenv.sh	512 MB
Executor	PA_EXEC/executor/scripts/setenv.sh	512 MB
VNC Router Service	PA_EXEC/vnc_router/scripts/setenv.sh	512 MB

See Also

[Change Memory used by the Services](#)

Prepare for Installation or Upgrade

Deployment options, installation prerequisites, and requirements for the Service User.

This chapter covers the following:

- [3.1 Deployment Options on Linux](#) (p. 37)
- [3.2 Deployment Option on Windows](#) (p. 42)
- [3.3 Prerequisites for Installation](#) (p. 44)
- [3.4 Service User](#) (p. 49)

3.1 Deployment Options on Linux

Overview of deployment options for Linux platforms.

Access Web consists of a collection of components and their associated services, accessed and invoked via a common interface.

Information requested during installation of Access Web:

- License server
- Service user
- Installation location for the home (PA_HOME) and execution directories (PA_EXEC)
- HyperWorks installation location (for RVS features)
- Compose installation location (for RVS features)

Information requested during installation of PAS:

- Staging directory
- Installation location for the home (PA_HOME) and execution directories (PA_EXEC)

Information requested during installation of Remote Sessions:

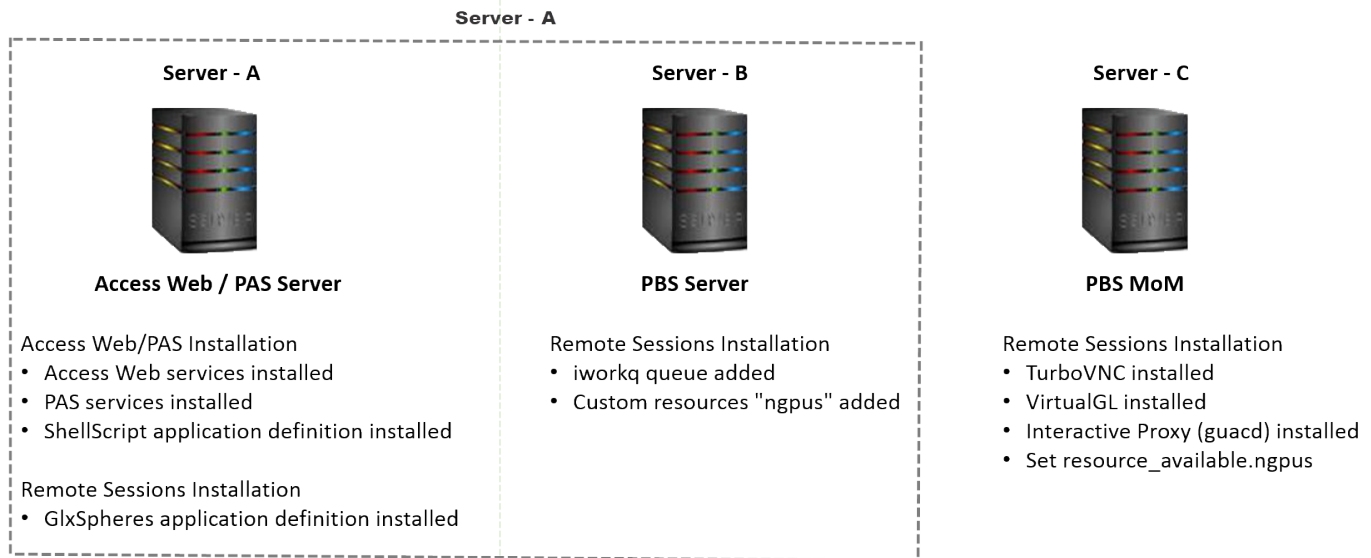
- Installation location for the home and execution directories
- Number of GPUs available on the execution host

3.1.1 Deployment Option 1

Install Access Web and PAS on a single machine and then install the Remote Sessions components on the HPC cluster.

Figure 5:Deployment Option 1

Deployment Option 1



 **Note:** The PBS 2020.1 MoMs can be on Hybrid Linux or Windows.

Deploy Access Web and PAS on the PBS Server

Install Access Web and PAS on the PBS Server.

This deployment option is best suited for smaller sites that do not have spare hardware for installing Access Web and PAS on a stand-alone machine, have a small set of users, and do not have high utilization such that Access Web and PAS will place too much of a load on the PBS Server.

Installation Steps

1. Install Access Web and PAS on the PBS Server.
 - Installs Access Web and PAS services.
 - Installs ShellScript application definition.
 - Default server cluster is automatically added.
2. Set up Modern Communication.
3. Install the Remote Sessions component on the PBS Server.
 - Configures the PBS Server and PAS for Remote Sessions.
 - Adds iworkq queue.
 - Adds custom resource *ngpus*.
 - Install the Glxspheres application definition.
4. Install the Remote Sessions component on the PBS MoM.
 - Installs TurboVNC and VirtualGL.
 - Installs the Interactive Proxy (guacd).

- Sets the number of GPUs available on the node.

Deploy Access Web and PAS on a Separate Server

This is the recommended deployment option for larger sites with a single HPC cluster. It insulates the PBS Server so that PBS is not fighting for resources with Access Web and PAS.

This deployment option requires that the PBS Client be installed on the machine hosting Access Web/PAS and the PBS Client must be configured to point to the PBS Server.

Installation Steps

1. Install the PBS Client on Server-A.
2. Install Access Web and PAS on Server-A.
 - Installs Access Web and PAS services.
 - Installs ShellScript application definition.
 - Default server cluster is automatically added.
3. Set up Modern Communication.
4. Install the Remote Sessions component on the PBS Server.
 - Configures the PBS Server for Remote Sessions.
 - Adds iworkq queue.
 - Adds custom resource *ngpus*.
5. Install the Remote Sessions component on the PBS MoM.
 - Installs TurboVNC and VirtualGL.
 - Installs the Interactive Proxy (guacd).
 - Sets the number of GPUs available on the node.
6. Install the Remote Sessions component on Server-A.
 - Configures PAS for Remote Sessions.
 - Installs the GlxSpheres application definition.

3.1.2 Deployment Option 2

Install Access Web on a standalone machine and install PAS on the PBS Server.

This is the recommended deployment option for larger sites with multiple HPC complexes. PAS must be installed on the PBS Server of each HPC complex.

Deployment Option 2

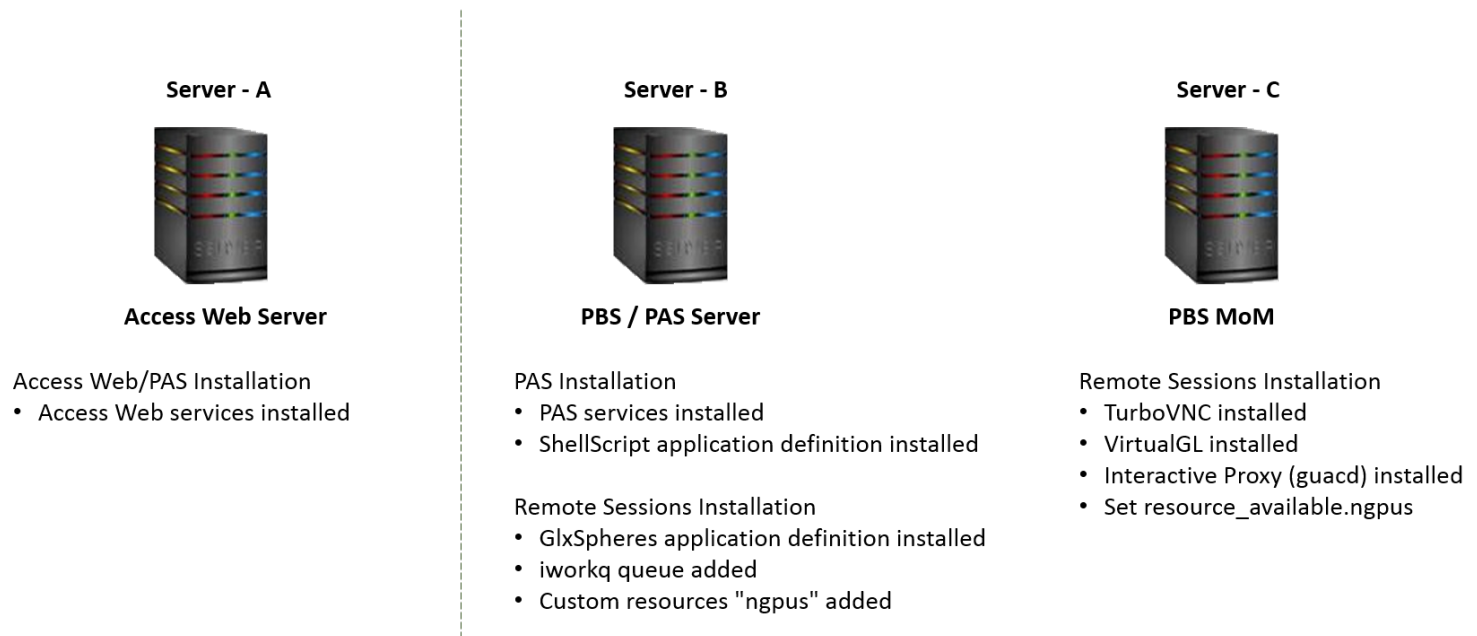


Figure 6: Deployment Option 2



Note: The PBS 2020.1 MoMs can be on Hybrid Linux or Windows.

Server Clusters

A server cluster is a PAS Server that is connected to an HPC complex. After installation, the Service User must add server clusters to Access Web so that users can submit jobs to an HPC complex. Access to the local filesystem is also configured through the server cluster. When adding a server cluster, configure access to any directories that users may need access to such as user home directories, for example `/home`.

Installation Steps

1. Install Access Web on Server-A.
 - Installs Access Web services.
2. Install PAS on the PBS Server.
 - Installs PAS services.
 - Installs the ShellScript application definition.
3. Set up Modern Communication.
4. Install the Remote Sessions component on the PBS Server.
 - Configures the PBS Server and PAS for Remote Sessions.
 - Installs the GlxSpheres application definition.

- Adds iworkq queue.
 - Adds custom resource *ngpus*.
- 5.** Install the Remote Sessions component on the PBS MoM.
- Installs TurboVNC and VirtualGL.
 - Installs the Interactive Proxy (guacd).
 - Sets the number of GPUs available on the node.

3.2 Deployment Option on Windows

Overview of deployment option for Windows platforms.

Access Web consists of a collection of components and their associated services, accessed and invoked via a common interface.

Information requested during installation of Access Web:

- License server
- Service user
- Installation location for the home (PA_HOME) and execution directories (PA_EXEC)
- HyperWorks Desktop installation location (for RVS features)
- Compose installation location (for RVS features)

Information requested during installation of PAS:

- Installation location for PAS (PAS_HOME and PAS_EXEC)
- Staging directory

Information requested during installation of Remote Sessions:

- Installation location for the home and execution directories

3.2.1 Deployment Option

Install Access Web and PAS on the PBS Server, then install the Remote Sessions components on the HPC execution hosts. Access Web is installed inside a Windows Docker container.

Currently, only a single deployment option is supported for Windows platforms.

Figure 7:Deployment Option 1

Deployment Option

Server - A



PBS Server / Access Web / PAS Server

Access Web/PAS Installation

- Access Web services installed
- PAS services installed
- ShellScript application definition installed

Remote Sessions Installation

- Notepad application definition installed
- Interactive Proxy (guacd) installed

Server - B



PBS MoM

Remote Sessions Installation

- DMAgent Service will be running

Installation Steps

1. Install PAS on the PBS Server.
 - Installs PAS Services.
 - Installs the ShellScript application definition.
2. Set up Modern Communication.
3. Install Docker.
4. Install Access Web inside a Windows Docker container.
 - Installs Access Web services.
5. Install the Remote Sessions component on the PBS Server.
 - Installs the Notepad application definition.
 - Installs the Interactive Proxy (guacd).
6. Install the Remote Sessions component on the PBS MoM.
 - DMAgent Service will be running.

3.3 Prerequisites for Installation

Prerequisites and planning for installing Access Web, PBS Application Services, and Remote Sessions.

3.3.1 Prerequisites for Installing Access Web

Mandatory requirements for installing Access Web.

The following are the general prerequisites for installation:

- Installation must be done as root or as a user with sudo permissions.
- Installation must be done on a machine running on a supported platform and meet system requirements.
- You will be prompted for a license server during the installation of Access Web, therefore an Altair License Server version 14.5.1 or newer must be installed prior to installing Access Web.
- You will be asked to provide a username that will be the Service User during the installation of Access Web. Review the requirements for this user account before installing Access Web.
- PBSWorksUsers licenses must be purchased.
- Zip and Unzip package must be installed and available.
- The Access Web Server must be reachable and its hostname resolvable from the HPC complex execution hosts.



Note: A license server and a Service User are not required for installing PAS or the Remote Sessions components.

Additional Prerequisites for Installation on Windows

The following are the prerequisites for installation on Windows:

- Ensure that the PBS Professional cluster for Windows is installed and running.
- Docker is installed and running on the machine where you are going to install Access Web. Refer to [Install Docker Desktop for Windows](#) for more information.

PBS Client

For deployment option 1, when installing Access Web and PAS on a machine separate from the PBS Server, the PBS Client must be installed before installing Access Web. For more information see *Install PBS on Client Hosts* in the *PBS Professional Installation and Upgrade Guide*.

Time Synchronization

The clocks on the Access Web server and the PBS Server must be synchronized using NTP or some other kind of mechanism. When clocks are asynchronous, operations such as getting job updates, files update times, etc. will not work correctly.

PBS Professional

Ensure that a supported version of PBS Professional is installed.

PBS Application Services (PAS)

When deploying Access Web such that PAS is installed on the PBS Server (Deployment Option 2), the version of PAS installed on the PBS Server must match the version of Access Web that is being installed.

PAS Staging Directory

During the installation of PAS, you will be prompted to enter a value for the staging directory (referred to as the Job File Stage Area by the installer). The staging directory is where the necessary job files are transferred after job submission via a client, for example Access Web, for transfer to PBS Professional for execution.

The default location of the staging directory is: `/stage` on Linux and `C:\stage` on Windows.

However, you have the option to choose a custom staging directory during installation.

Following are considerations for selecting the staging directory:

- The stage area can grow quite large, depending on the size of the average job. Give careful consideration to the disk usage and disk capacity.
- The pathname for the staging directory should not contain spaces.
- PAS implements an automatic staging directory cleanup such that any data in the staging directory that is not generated by PAS is at risk of being purged without notice. It is recommended to select a staging directory where only PAS data files will be stored. Use of a directory that contains important data is not recommended. The automatic staging directory cleanup does not delete any files in the user's home directory. When the staging directory is set to `$USER_HOME` (for example: `$USER_HOME/stage`), the files in that directory are not automatically cleaned up and the responsibility for maintaining the staging directory falls on the individual user.

Compose

To extract plot data Compose must be installed. Access Web and Compose can be installed on the same machine or separate machines. If Compose is installed on a separate machine, it can be made accessible to Access Web by creating a mounting point for the Compose installation directory on the machine where Access Web is installed.

The installation should be in a location where all users have read and write permission. It should not be in `/root` or any user's home directory.

On Linux platform, install these library packages for Compose:

- For CentOS 8 and 8.1, install the library `libgomp` package using the command: `yum install libgomp`.
- For SLES 12 and SLES 15, install the library `libgomp` using the command `zypper install libgomp` and the library `libXss` using the command `zypper install libXss`.

Altair HyperWorks Desktop

Results Visualization Service is automatically installed with Access Web. To extract animation data Altair HyperWorks Desktop must be installed. Access Web and HyperWorks Desktop can be installed on the same machine or separate machines. If HyperWorks Desktop is installed on a separate machine, it

can be made accessible to Access Web by creating a mounting point for the HyperWorks installation directory on the machine where Access Web is installed.

To install HyperWorks Desktop, follow the instructions in the *Altair HyperWorks Installation Guide*. The installation should be in a location where all users have read and write permission. It should not be in `/root` or any user's home directory.

On Linux platform, install these library packages for Altair HyperWorks Desktop:

- For CentOS 8 and 8.1, install the library `libgomp` package using the command: `yum install libgomp` and the library `libGLU` package using the command `yum install libGLU`.
- For SLES 12 and SLES 15, install the library `libgomp` package using the command `zypper install libgomp`.

RVS Network Connectivity

RVS requires good network connectivity to the PAS Server and the HPC execution hosts. A minimum speed of 100mbps is required while a speed of 1gbps is recommended.

 **Tip:** When PAS is installed on a machine separate from Access Web, mount the staging directory and scratch directory on the Access Web machine to improve performance of RVS.

Configure SSH to Allow Username-Password Authentication

SSH may be configured so that username-password authentication is disabled for cloud provider virtual machines such as Azure. Verify that the parameter `PasswordAuthentication` is set to 'yes' in `/etc/ssh/sshd_config`. Changing this parameter requires reloading SSHD (`systemctl reload sshd`).

SELinux Status

The SELinux must be disabled before installing Access Web. Check the SELinux status by using the command:

```
sestatus
```

See Also

[System Requirements](#)

[Supported Product Configurations](#)

[PBS Works Licensing](#)

[Service User](#)

3.3.2 Prerequisites for Installing Remote Sessions

Mandatory requirements for Remote Sessions components.

The following are the general prerequisites for installation:

- Installation must be done as root or as a user with sudo permissions.
- Installation must be done on a machine running on a supported platform and meet system requirements.

- Access Web must be installed prior to installing the Remote Sessions components.

Host Name and Port

Access Web communicates with the PBS MoMs through the Remote Sessions Service Job Update port. It is recommended to configure hostname resolution, so that the PBS MoMs can connect to the Access Web server using its hostname, rather than IP address.

The Access Web Service should be able to connect to the interactive execution host through hostname and the Remote Sessions Service Proxy (guacd, default port is 5443).

Prerequisites for Installing on the PBS MoM

- By default, the Remote Sessions component assumes that Gnome is being used as the Remote Sessions Desktop Manager. If Gnome is not installed on the PBS MoM as part of the Linux distribution, then it must be installed.
- Graphics cards, if necessary, are installed and configured properly.
- The PBS Professional execution host must be able to access and run the interactive applications available through Access Web.

Prerequisite Resource Libraries for Remote Sessions Interactive Agent

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

- | | |
|---|---|
| <ul style="list-style-type: none">• /bin/bash• /bin/sh• /etc/init.d• /sbin/chkconfig• /sbin/ldconfig• /usr/bin/perl• bash >= 2.0• ld-linux-x86-64.so.2()(64bit)• ld-linux-x86-64.so.2(GLIBC_2.3)(64bit)• libc.so.6()(64bit)• libc.so.6(GLIBC_2.2.5)(64bit)• libc.so.6(GLIBC_2.3)(64bit)• libc.so.6(GLIBC_2.4)(64bit)• libcrypt.so.1()(64bit)• libdl.so.2()(64bit)• libdl.so.2(GLIBC_2.2.5)(64bit)• libGL.so.1()(64bit)• libICE.so.6()(64bit)• libm.so.6()(64bit) | <ul style="list-style-type: none">• libpam.so.0(LIBPAM_1.0)(64bit)• 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)• libXi.so.6()(64bit)• libXmu.so.6()(64bit)• libXt.so.6()(64bit)• libXtst.so.6()(64bit)• libXv.so.1()(64bit)• libz.so.1()(64bit)• rpmlib(CompressedFileNames) <= 3.0.4-1• rpmlib(FileDigests) <= 4.6.0-1• rpmlib(PayloadFilesHavePrefix) <= 4.0-1• rpmlib(PayloadIsXz) <= 5.2-1 |
|---|---|

- | | |
|---|---|
| <ul style="list-style-type: none"> • libm.so.6(GLIBC_2.2.5)(64bit) • libpam.so.0()(64bit) | <ul style="list-style-type: none"> • rtdld(GNU_HASH) |
|---|---|

Prerequisite Resource Libraries for Remote Sessions Interactive Proxy

The following libraries must be installed on the machine hosting the Access Web Server (these libraries do not need to be installed on the PBS Server or the PBS MoM) before attempting to install the Remote Sessions Interactive Proxy. 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) • 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) |
|---|--|

See Also

[System Requirements](#)

[Supported Product Configurations](#)

[Ports Used by Access Web](#)

3.4 Service User

Information about the Service User.

During the installation of the Access Web Server, you are asked to provide a user account that will be the Service User. This user will own the Access Web services and the files in PA_HOME and PA_EXEC.

Managerial Privileges

The Service User is automatically assigned managerial privileges (is assigned a Manager role) and has unrestricted access to all features of Access Web. Actions that a Manager can do that a regular user cannot:

- add, edit, and delete server clusters (a PAS Server that is connected to an HPC complex).
- restrict other user's access to applications.
- assign managerial privileges to other users.

Prerequisites for the Service User

The user account chosen for the Service User must meet the following requirements:

- Existing user account on the machine where Access Web is being installed.
- Non-root account.
- Account is enabled.
- User account must be able to login to the machine hosting Access Web with a password.

Default Service User

The default user account that Access Web uses as the Service User is "pbsworks". Create this user account or choose a different user account that meets the prerequisites.

Instructions for installing Access Web, PBS Application Services, and Remote Sessions components, so that interactive and non-interactive jobs can be submitted.

This chapter covers the following:

- [4.1 Check the Status of SELinux](#) (p. 51)
- [4.2 Install Access Web](#) (p. 52)
- [4.3 Update Access Web Server Hostname](#) (p. 54)
- [4.4 Modern Communication Module on Linux](#) (p. 55)
- [4.5 Install Remote Sessions Components](#) (p. 58)
- [4.6 Open Ports](#) (p. 64)
- [4.7 Enable Job History](#) (p. 65)

4.1 Check the Status of SELinux

Check the status of SELinux and disable SELinux before installing Access Web.

SELinux must be disabled before installing Access Web.

1. Check the status of SELinux using the command:

```
sestatus
```

The message may be:

```
SELinux status: disabled  
or  
SELinux status: enabled
```

2. If the status of the SELinux is *enabled*, then follow the steps to disable:

- a) Edit the `/etc/selinux/config` file.
- b) Set the value of SELINUX to *disabled*.

```
SELINUX=disabled
```

- c) Reboot the system.

4.2 Install Access Web

Install Access Web to submit jobs to the Workload Manager.

- Review [system requirements](#) of Access Web.
- Review [prerequisites](#) of Access Web.
- [Uninstall](#) previous versions of Access Web.

Ensure that you have the following information before starting the installation:

- license server details
- an user account that will be the Service User
- HyperWorks location
- Compose location

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

Installation must be done as root or as a user with sudo permissions.

The Access Web 2020.3 installer provides an option for installing Access Web, PAS, or both. If you are installing both Access Web and PAS on the same machine, then you will only need to run through this installation process once. If you are installing them on a separate machine then you will have to run this installation process once to install Access Web and a second time to install PAS.

1. Login to the machine where Access Web/PAS is to be installed.
2. Enter the command:

```
./AltairAccessWeb_<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. Choose one of the following options:
 - Enter **1** and press **ENTER** to install Access Web Services.
 - Enter **2** and press **ENTER** to install PBS Application Services.
 - Enter **3** and press **ENTER** to install Access Web Services and PBS Application Services. This is the default option.



Note: The following steps will change based on your choice.

7. Enter the license server details and press **ENTER**.

The license server details should have the port and hostname in the format `port@hostname`.

You can provide multiple license server details separated by a colon in Linux and semi-colon in Windows.

It is not mandatory to provide the license server at installation time. You will however be required to configure the license server information prior to logging into Access Web.

8. If you are installing PAS, enter a staging directory and press **ENTER**.

The staging directory is where user's job files will be staged prior to execution.

- 9.** Enter the Service User and press `ENTER`.

The default Service User is 'pbsworks' and the Access Web services are registered under this user.

- 10.** Enter the location where the Access Web binaries are to be installed.

You may choose to install in the default location.

- 11.** Enter the location where the Access Web configuration and logs files are to be installed.

You may choose to install in the default location.

- 12.** If Access Web is being installed, enter the HyperWorks Desktop location for visualizing results.

`<Hyperworks_INSTALL_DIR>/altair`

For example, `/opt/hw2020/altair`.



Note: You can also configure this path after the installation by editing `PA_HOME/config/resultservice/config/site_config.xml`.

- 13.** If Access Web is being installed, enter the Compose location for visualizing plot results.

`<COMPOSE_INSTALL_DIR>/altair/Compose2020`

For example, `/opt/compose2020/altair/Compose2020`.



Note: You can also configure this path after the installation by editing `PA_HOME/config/resultservice/config/site_config.xml`.

- 14.** Review the installation summary and press `ENTER`.

The installation starts. It may take a few minutes for the installation to complete.



Note: Access Web starts a watcher process which will monitor the status of Access Services. The watcher process automatically brings up any services that goes down abruptly.

4.3 Update Access Web Server Hostname

Update Access Web server hostname when you install Access Web on one system and PBS Professional and PAS together in another system.

 **Note:** Restart of PAS is required if you are performing the following instructions only to update Access Web server hostname.

 **Note:** Restart of PAS is not required if you performing the following instructions as part of install Access Web.

1. Login to the machine where PAS is installed as root or as a user with sudo permissions.
2. Source the Access Web configuration file to set up the environment variables `PA_HOME` and `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```
3. Edit the file `$PA_HOME/config/joboperation/application.properties`.

```
vi $PA_HOME/config/joboperation/application.properties
```
4. Update the `mq.hostname` value with Access Web server hostname.

```
mq.hostname=blrv01vm81
```
5. Edit the file `$PA_HOME/config/pas/conf/server.conf`.

```
vi $PA_HOME/config/pas/conf/server.conf
```
6. Update the `MQ.HOSTNAME` value with Access Web server hostname.

```
MQ.HOSTNAME=blrv01vm81
```
7. Restart PAS for these changes to take effect by entering the following command:

```
service pbsworks-pa restart
```

4.4 Modern Communication Module on Linux

The Modern Communication Module is a set of python libraries that are copied to the HPC execution hosts to improve file operations on running jobs.

Once Access Web is installed, the Modern Communication Module must be distributed to the HPC execution hosts. These libraries improve file operations for job operations on running jobs, such as:

- uploading and downloading files to the running directory.
- listing files from the running directory.
- custom actions on running jobs.
- viewing results visualization animation files from the running directory.
- starting remote sessions.

The Modern Communication Module replaces PBS technology for performing these same types of operations.

The Modern Communication Module can be distributed in two ways:

1. It can be copied to a shared file system that is accessible to the execution hosts.
2. It can be copied to the execution hosts by running an Access Web script.

See Also

[Setup Modern Communication Module on a Shared File System](#)

[Copy the Modern Communication Module to All Execution Hosts](#)

4.4.1 Setup Modern Communication Module on a Shared File System

Distribute the Modern Communication Module on a shared file system after completing the installation of Access Web.

Copy the Modern Communication Module located on the PAS Server to the shared file system. The Modern Communication Module is located at: `PA_EXEC/joboperations/binaries/momclientmodules`.

Before performing the following steps:

- ensure that the shared file system is available and accessible to all the users.
- create a directory on the shared file system to copy the Modern Communication Module. The permissions on this directory need to allow read and execute permissions for all users. For example, `/shared/filesystem/Access-MCM`.

 **Note:** All the execution nodes should have the same operating system.

1. Login to the machine where PAS is installed as the root user.
2. Source the Access Web configuration file to set up the environment variable `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```

3. Create a directory on the shared filesystem where the Modern Communication Module will be copied.

```
mkdir -m 755 -p /shared/filesystem/Access-MCM
```

4. Copy the directory `PA_EXEC/joboperation/binaries/momclientmodules` to the shared file system.

```
cp -rp $PA_EXEC/joboperation/binaries/momclientmodules /shared/filesystem/Access-MCM/
```

5. Depending on your Operating System (CentOS, SLES, or Ubuntu), unzip relevant python binary from `$PA_EXEC/shared/thirdparty/python_binaries/` to `/shared/filesystem/Access-MCM/momclientmodules`.



Note: You can use the CentOS python binary for RHEL Operating System.

6. Rename *python* directory to *python2*.
7. Give read and execute permissions to all users to the location where the Modern Communication Module was copied.

```
chmod 755 /shared/filesystem/Access-MCM/momclientmodules
```

8. Edit `PA_HOME/config/pas/conf/server.conf`

```
vi $PA_HOME/config/pas/conf/server.conf
```

9. Define the location of the Modern Communication Module by updating the `MODERN_COMMUNICATION_SHARED_LIBS` attribute.

```
MODERN_COMMUNICATION_SHARED_LIBS=/shared/filesystem/Access-MCM/momclientmodules
```

10. Restart the PAS by entering the command:

```
service pbsworks-pa restart
```

4.4.2 Copy the Modern Communication Module to All Execution Hosts

Distribute the Modern Communication Module to all execution hosts by running a script.

The script to distribute the Modern Communication Module to all of the PBS MoM hosts is located at `PA_EXEC/joboperation/scripts/distribute_modern_comm_modules.py`.

Before running this script, ensure the following prerequisites have been met:

- The Modern Communication Module distribution script must be run as the root user.
- The script must be run from the system where PAS is installed.
- The distribution script uses PBS Client commands. Hence the PBS Client must be installed on the PAS server.
- The distribution script asks for a location (a directory on the PAS Server) into which it will copy the Modern Communication Module before distributing it to the PBS MoMs. The permissions on this directory need to allow read and execute permissions for all users. This directory must be created before running the script. Once the script is run, the Modern Communication Module is copied to this directory on the PAS Server. The directory is then copied to each execution host and placed in the same location on each execution host.

- The distribution script asks for a user account. This user account will own the directory containing the Modern Communication Module on the PBS MoMs. This user must:
 - exist on the PAS server and all of the PBS MoMs
 - be able to SSH passwordlessly from the PAS Server into each MoM so that the Modern Communication Module can be securely copied to the PBS MoM.

Installation steps to distribute the Modern Communication Module:

1. Login to the machine where PAS is installed as the root user.
2. Source the Access Web configuration file to set up the environment variable `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```

3. Create a directory where the distribution script can copy the Modern Communication Module before distribution to the PBS MoMs:

```
mkdir -m 755 -p /access/mcm
```

4. Navigate to the directory `$PA_EXEC/joboperation/scripts`.

5. Execute the script to distribute the Modern Communication Module:

```
python distribute_modern_comm_modules.py
```

6. Enter the directory that meets the stated prerequisites.

This is where the script will copy the Modern Communication Module before distributing it to the PBS MoMs.

For example, `/access/mcm`

7. Enter a user that meets the stated prerequisites.

For example, `pbsworks`.

The following message is displayed:

```
Do you want to override if modules already exist (Y/N). [Default: N]?
```

8. Choose one of the following:

- Enter `N` or press `ENTER` (to accept the default value) to skip copying the Modern Communication Module to the PBS MoM when it already exists on the MoM.
- Enter `Y` to overwrite the modules. The distribution script will copy the modules even if it detects that Modern Communication Module already exists on the MoM.

The script will display the inputs provided.

9. Enter `Y` to continue with the inputs provided.

Messages similar to the below are displayed:

```
Transferring Client Modules to n2.lab.com...  
Successfully transferred to 'n2.lab.com'  
Transferring Client Modules to n1.lab.com...  
Successfully transferred to 'n1.lab.com'  
Updated PAS Configuration file successfully
```

10. Restart Access Web by entering the command:

```
service pbsworks-pa restart
```

4.5 Install Remote Sessions Components

Install components necessary to enable the remote visualization capabilities of Access Web.

A separate installer is required to install the Remote Sessions component. Download or obtain the installer binary using your usual Altair support channels.

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

1. Install the Remote Sessions component on the PAS Server:
 - adds a new interactive application definition GlxSpheres.
 - restarts PAS.
2. Install the Remote Sessions component on the PBS Server:
 - adds a custom resource called *ngpus*.
 - creates an interactive queue called "iworkq".
 - restarts the PBS Server.
3. Install the Remote Sessions component on all PBS MoMs on which you want to run interactive jobs.



Note: Step 1 and 2 may be performed at the same time when PAS is installed on the PBS Server.

After installing the Remote Sessions component view the value of the variable, `jobsub.monitor.host`, 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 while opening a remote session for the first time.

4.5.1 Install the Remote Sessions Component on the PBS and PAS Servers

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

Before you begin:

- Review the [prerequisites](#) for installation.



CAUTION: It is advisable that you run the installer when critical jobs are not running as both PBS and PAS are restarted during the installation process.

Installation must be done as root or as a user with sudo permissions.

On the PBS Server, this installation will:

- add a custom resource to PBS Professional called *ngpus*
- add an interactive queue called "iworkq"
- restart PBS Professional

On the PAS Server, this installation will:

- install the GlxSpheres application definition.
- restart PAS

The below steps must be ran on both the PBS Server and the PAS Server. When the PBS Server and PAS are installed on the same machine, then these steps only need to be run once.

1. Login to the machine where the PBS Server/PAS is installed.
2. Enter the command:

```
./AltairAccessWeb_RemoteSessionAgent_<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**.
Four options are displayed:
6. Enter **1** (Configure PBS and PAS Server) to configure the PBS Professional and PAS servers and press **ENTER**.
7. PBS/PAS 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.
8. Enter the number of GPUs that are available on the HPC complex and press **ENTER**.
If you have an HPC complex with 10 execution hosts and only two of those execution hosts have an associated GPU, 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, a **GPU resource** is configured, and **GlxSpheres** is installed.

Verifying the Existence of the Interactive Queue

Verify that a PBS Professional interactive queue has been created.

After running the Remote Sessions installer on the PBS 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 HPC complex and should reflect the number entered during installation. Other attributes used internally by Access Web 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 the Remote Sessions installer on the PBS Server, a new custom resource called *ngpus* is added to PBS. This resource is necessary to run interactive jobs. You can verify the existence of this custom resource by viewing the contents of the PBS 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.

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

4.5.2 Install the Remote Sessions Component on the PBS MoMs

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

Important: For Ubuntu platforms, see [Install the Remote Sessions Component on the Ubuntu MoMs](#) to install the Remote Sessions Component on the MoM.

Before you begin:

- Review the [Prerequisites for Installing Remote Sessions](#) for installation.
- Run the [Remote Sessions precheck diagnosis script](#) on the PBS MoM to check the status of GPU nodes.

Install necessary components on the PBS MoM to support interactive applications, including TurboVNC, VirtualGL, and the interactive proxy (guacd). The installer also set the value of a new custom resource called *ngpus* which is the number of GPUs available on the execution host. For the installer to set *ngpus*, the root user must be granted operator access, otherwise *ngpus* will have to be set manually after the installation.

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

Installation must be done as root or as a user with sudo permissions.

1. Login to the PBS Server.

2. Grant root operator access:

```
qmgr -c 'set server operators+=root@*'
```

If the root user is not granted operator access, then the custom resource *ngpus* will need to be set manually.

3. Login to the machine where the PBS Professional MoM is installed.

4. Enter the command:

```
./AltairAccessWeb_RemoteSessionAgent_<Version>_<BuildID>_<YYYYMMDD>_<Timestamp>.bin -i console
```

5. 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
```

6. Read the introduction and press ENTER.

7. Page through the license agreement by pressing ENTER until you are asked to accept its terms and conditions.

8. Accept the license agreement by entering Y and pressing ENTER.
Four options are displayed.

9. Enter 2 (Install Remote Session Agent) and press ENTER.

10. Enter the location where the binaries are to be installed and press ENTER.

You may choose to install in the default location.

11. 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.

12. Enter the number of GPUs available on the execution host and press `ENTER`.

13. Review the installation summary and press `ENTER`.

The installation starts. It may take a few minutes for the installation to complete.

14. Press `ENTER` to complete the installation process.

15. Restart the X Server.

 **Warning:** Restarting the X Server might affect any running graphical applications. Please make sure that there are no critical graphical applications running.

16. Choose one of the following options:

- a) If root was granted operator access, login to the PBS Server and remove the root user from the operators list:

```
qmgr -c 'set server operators-=root@*'
```

- b) Login to the PBS MoM as a user who has been granted operator access and manually set the custom resource `ngpus`:

```
qmgr -c 'set node <node> resources_available.ngpus = <ngpus>'
```

17. 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.

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

18. Verify that the interactive proxy (guacd) is installed and running by issuing the following command:

```
service guacd status
```

4.5.3 Install the Remote Sessions Component on the Ubuntu MoMs

Install binaries and configure the Ubuntu MoM to support interactive applications.

Before you begin:

- Review the [Prerequisites for Installing Remote Sessions](#) for installation.
- Run the Modern Communication Module distribution from server. Refer to [Modern Communication Module on Linux](#) for more information.

Install necessary components on the Ubuntu MoM to support interactive applications, including TurboVNC, VirtualGL, and the interactive proxy (guacd).



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

1. Login to Ubuntu machine as root.
2. Navigate to the directory `<MOM_CLIENT_MODULE>/remotesession/ubuntu/`
`<MOM_CLIENT_MODULE>` is the location where Modern Communication Module is distributed. For example, `/access/mcm/momclientmodules`.
3. Execute the command to install the agent:

```
./install.sh
```
4. Restart X server or restart the machine.
5. Start the guacd service using the command:

```
/etc/init.d/guacd start
```

Run below command on head node as root to configure the number of GPUs on the machine.
6. Execute the following command as root on the head node to configure the number of GPUs on the machine:

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

4.6 Open Ports

Open ports for communication with external locations.

It is recommended to configure a firewall on the Access Web server and block all Access Web ports from the outside world except:

- 4222
 - 4443
 - 4943
1. Login to the machine where Access Web is installed.
 2. Open the following ports:
 - Gateway port (defaults to 4443)
 - Remote Sessions Service Job Update port (defaults to 4943)
 3. Login to the PAS Server.
 4. Open the PAS Message Broker Service port (defaults to 4222).

4.7 Enable Job History

The HPC cluster where simulations will run must have job history enabled to run simulation jobs.

Skip this step if your site has not installed the Simulator component.

The Simulator component requires that job history be enabled on the PBS Server where simulation jobs are run:

1. Login to the PBS Server where simulation jobs will run as a PBS manager.
2. Execute the command:

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

Instructions for upgrading from a previous version of Access Web.

This chapter covers the following:

- [5.1 Prepare for an Upgrade](#) (p. 67)
- [5.2 Uninstall Remote Sessions](#) (p. 68)
- [5.3 Check the Status of SELinux](#) (p. 71)
- [5.4 Install the New Version of Access Web](#) (p. 72)
- [5.5 Install Remote Sessions Components](#) (p. 74)
- [5.6 Upgrade Access Web](#) (p. 78)
- [5.7 Modern Communication Module on Linux](#) (p. 79)
- [5.8 Install the Remote Sessions Component on the Ubuntu MoMs](#) (p. 82)
- [5.9 Enable Job History](#) (p. 83)

The Access Web installer itself does not support upgrades. If you are starting with an old version of Access Web, then all the sections and the steps must be completed exactly.

Only upgrades from Access Web 2020.1 and 2020.2 to Access Web 2020.3 are supported.

Access Web 2020.3 supports only PAS 2020.3. So, if you are upgrading Access Web, then you have to upgrade PAS.

5.1 Prepare for an Upgrade

Instructions to prepare for upgrading Access Web.

Before you begin

- Review the [prerequisites](#) for installation.

 **Important:** Do not uninstall the previous version of Access Web or PAS.

Create a backup of the Access Web installation registry file and application configuration file. The backup of the configuration file can be used to downgrade back to the currently installed version of Access Web.

1. Login to the machine where the previous version of Access Web is installed as root or as a user with sudo permissions.
2. Stop Access Web:

```
service pbsworks-pa stop
```
3. Create a backup of `/var/.com.zerog.registry.xml`.
4. Remove `/var/.com.zerog.registry.xml`.
5. Create a backup of the application configuration file:

```
cp -p /etc/pbsworks-pa.conf /etc/pbsworks-pa.conf.VERSION
```

Where *VERSION* is the currently installed version of Access Web.

5.2 Uninstall Remote Sessions

Unconfigure PBS Professional and PAS and uninstall the Remote Sessions component installed on the PBS MoM.

Uninstalling the Remote Sessions component requires running the Remote Sessions binary multiple times across several machines and must be performed in the following sequence:

1. Unconfigure the PBS and the PAS Server:
 - removes the application definition GlxSpheres which was installed automatically when the Remote Sessions component was installed on the PAS Server
 - deletes the interactive queue
 - removes the custom resource ngpus
2. Uninstall the Remote Sessions component on all PBS MoMs

 **Note:** Step 1 and 2 may be performed at the same time when PAS is installed on the PBS Server.

5.2.1 Unconfigure PBS and PAS

Unconfigure PBS and PAS before uninstalling the Remote Sessions component.

 **CAUTION:** It is advisable that you run the installer when critical jobs are not running as both PBS and PAS are restarted during the uninstallation process.

On the PBS Server, this uninstallation process will:

- delete the custom resource *ngpus*
- remove the interactive queue called "iworkq"
- restart PBS Professional

On the PAS Server, this installation will:

- remove the GlxSpheres application definition.
- restart PAS

The below steps must be run on both the PBS Server and the PAS Server. When the PBS Server and PAS are installed on the same machine, then these steps only need to be run once.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Stop Access Web:

```
service pbsworks-pa stop
```
3. Login to the machine where the PBS Server/PAS is installed as root or as a user with sudo permissions.
4. Navigate to the directory where the Remote Sessions installation binary is located.
5. Enter the command:

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

6. If you are uninstalling the Remote Sessions 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
```

7. Read the introduction and press ENTER.
8. Page through the license agreement by pressing ENTER until you are asked to accept its terms and conditions.
9. Accept the license agreement by entering Y and pressing ENTER.
Four options are displayed.
10. Enter 3 (Unconfigure PBS and PAS Server) to unconfigure PBS and PAS and press ENTER.
11. The PBS/PAS Server are 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.

12. Stop Access Web:

```
service pbsworks-pa stop
```

5.2.2 Uninstall the Remote Sessions Component from the PBS MoMs

Uninstall the Remote Sessions component from the PBS MoMs.



CAUTION: It is advisable that you run the installer when critical jobs are not running as PBS is restarted during the uninstallation process.

The below steps must be repeated on every PBS MoM where the Remote Sessions component has been installed.

1. Login to the PBS MoM machine where the Remote Sessions component is installed as root or as a user with sudo permissions.
2. Choose one of the following options:
 - On Ubuntu platforms, navigate to the directory <MOM_CLIENT_MODULE>/remotesession/ubuntu/.
 - On all other Linux platforms, navigate to the directory: /opt/altair/pbsworks/<Version>/remotesessionagent/_AltairAccessWeb_RemoteSessionAgent_<Version>_installation<MOM_CLIENT_MODULE> is the location where Modern Communication Module is distributed. For example, /access/mcm/momclientmodules.
3. Choose one of the following options:
 - On Ubuntu platforms, execute the uninstall script by entering the following command:

```
./uninstall.sh
```

- On all other Linux platforms, execute the uninstall script by entering the following command:

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

The command must contain spaces with escape characters.

4. Follow the instructions provided by the uninstaller.

5.3 Check the Status of SELinux

Check the status of SELinux and disable SELinux before installing Access Web.

SELinux must be disabled before installing Access Web.

1. Check the status of SELinux using the command:

```
sestatus
```

The message may be:

```
SELinux status: disabled  
or  
SELinux status: enabled
```

2. If the status of the SELinux is *enabled*, then follow the steps to disable:

- a) Edit the `/etc/selinux/config` file.
- b) Set the value of SELINUX to *disabled*.

```
SELINUX=disabled
```

- c) Reboot the system.

5.4 Install the New Version of Access Web

Install the latest version of Access Web when upgrading from a previous version.

- Review [system requirements](#) of Access Web.
- Review [prerequisites](#) of Access Web.
- Do not uninstall the previous version of Access Web or PAS.

Ensure that you have the following information before starting the installation:

- license server details
- an user account that will be the Service User
- HyperWorks location
- Compose location

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

Installation must be done as root or as a user with sudo permissions.

The Access Web 2020.3 installer provides an option for installing Access Web, PAS, or both. If you are installing both Access Web and PAS on the same machine, then you will only need to run through this installation process once. If you are installing them on a separate machine then you will have to run this installation process once to install Access Web and a second time to install PAS.

1. Enter the command:

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

2. Read the introduction and press `ENTER`.
3. Page through the license agreement by pressing `ENTER` until you are asked to accept its terms and conditions.
4. Accept the license agreement by entering `y` and pressing `ENTER`.
5. Choose one of the following options:
 - Enter `1` and press `ENTER` to install Access Web Services.
 - Enter `2` and press `ENTER` to install PBS Application Services.
 - Enter `3` and press `ENTER` to install Access Web Services and PBS Application Services. This is the default option.



Note: The following steps will change based on your choice.

6. Enter the license server details and press `ENTER`.

The license server details should have the port and hostname in the format `port@hostname`. You can provide multiple license server details separated by a colon in Linux and semi-colon in Windows.

It is not mandatory to provide the license server at installation time. You will however be required to configure the license server information prior to logging into Access Web.

7. If you are installing PAS, enter a staging directory and press `ENTER`.

The staging directory is where user's job files will be staged prior to execution.

8. Enter the Service User and press `ENTER`.

The default Service User is 'pbsworks' and the Access Web service is registered under this user.

9. Enter the location where the Access Web binaries are to be installed.

You may choose to install in the default location.

10. Enter the location where the Access Web configuration and logs files are to be installed.

You may choose to install in the default location.

11. If Access Web is being installed, enter the HyperWorks location for visualizing results.

`<Hyperworks_INSTALL_DIR>/altair`

For example, `/opt/hw2020/altair`



Note: You can also configure this path after the installation by editing `PA_HOME/config/resultservice/config/site_config.xml`

12. If Access Web is being installed, enter the Compose location for visualizing results.

`<COMPOSE_INSTALL_DIR>/altair/Compose2020`

For example, `/opt/compose2020/altair/Compose2020`



Note: You can also configure this path after the installation by editing `PA_HOME/config/resultservice/config/site_config.xml`.

13. Review the installation summary and press `ENTER`.

The installation starts. It may take a few minutes for the installation to complete.

5.5 Install Remote Sessions Components

Install components necessary to enable the remote visualization capabilities of Access Web.

A separate installer is required to install the Remote Sessions component. Download or obtain the installer binary using your usual Altair support channels.

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

1. Install the Remote Sessions component on the PAS Server:
 - adds a new interactive application definition GlxSpheres.
 - restarts PAS.
2. Install the Remote Sessions component on the PBS Server:
 - adds a custom resource called *ngpus*.
 - creates an interactive queue called "iworkq".
 - restarts the PBS Server.
3. Install the Remote Sessions component on all PBS MoMs on which you want to run interactive jobs.



Note: Step 1 and 2 may be performed at the same time when PAS is installed on the PBS Server.

After installing the Remote Sessions component view the value of the variable, `jobsub.monitor.host`, 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 while opening a remote session for the first time.

5.5.1 Install the Remote Sessions Component on the PBS and PAS Servers

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

Before you begin:

- Review the [prerequisites](#) for installation.



CAUTION: It is advisable that you run the installer when critical jobs are not running as both PBS and PAS are restarted during the installation process.

Installation must be done as root or as a user with sudo permissions.

On the PBS Server, this installation will:

- add a custom resource to PBS Professional called *ngpus*
- add an interactive queue called "iworkq"
- restart PBS Professional

On the PAS Server, this installation will:

- install the GlxSpheres application definition.
- restart PAS

The below steps must be ran on both the PBS Server and the PAS Server. When the PBS Server and PAS are installed on the same machine, then these steps only need to be run once.

1. Login to the machine where the PBS Server/PAS is installed.
2. Enter the command:

```
./AltairAccessWeb_RemoteSessionAgent_<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**.
Four options are displayed:
6. Enter **1** (Configure PBS and PAS Server) to configure the PBS Professional and PAS servers and press **ENTER**.
7. PBS/PAS 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.
8. Enter the number of GPUs that are available on the HPC complex and press **ENTER**.
If you have an HPC complex with 10 execution hosts and only two of those execution hosts have an associated GPU, 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, a [GPU resource](#) is configured, and [GlxSpheres](#) is installed.

5.5.2 Install the Remote Sessions Component on the PBS MoMs

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

 **Important:** For Ubuntu platforms, see [Install the Remote Sessions Component on the Ubuntu MoMs](#) to install the Remote Sessions Component on the MoM.

Before you begin:

- Review the [Prerequisites for Installing Remote Sessions](#) for installation.
- Run the [Remote Sessions precheck diagnosis script](#) on the PBS MoM to check the status of GPU nodes.

Install necessary components on the PBS MoM to support interactive applications, including TurboVNC, VirtualGL, and the interactive proxy (guacd). The installer also set the value of a new custom resource called *ngpus* which is the number of GPUs available on the execution host. For the installer to set *ngpus*, the root user must be granted operator access, otherwise *ngpus* will have to be set manually after the installation.



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

Installation must be done as root or as a user with sudo permissions.

1. Login to the PBS Server.
2. Grant root operator access:

```
qmgr -c 'set server operators+=root@*'
```

If the root user is not granted operator access, then the custom resource *ngpus* will need to be set manually.

3. Login to the machine where the PBS Professional MoM is installed.
4. Enter the command:

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

5. 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
```

6. Read the introduction and press ENTER.
7. Page through the license agreement by pressing ENTER until you are asked to accept its terms and conditions.
8. Accept the license agreement by entering Y and pressing ENTER.
Four options are displayed.
9. Enter 2 and press ENTER.
10. Enter the location where the binaries are to be installed and press ENTER.
You may choose to install in the default location.
11. 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.
12. Enter the number of GPUs available on the execution host and press ENTER.
13. Review the installation summary and press ENTER.
The installation starts. It may take a few minutes for the installation to complete.
14. Press ENTER to complete the installation process.
15. Restart the X Server.



Warning: Restarting the X Server might affect any running graphical applications. Please make sure that there are no critical graphical applications running.

16. Choose one of the following options:

- a) If root was granted operator access, login to the PBS Server and remove the root user from the operators list:

```
qmgr -c 'set server operators-=root@*'
```

- b) Login to the PBS Server as a user who has been granted operator access and manually set the custom resource *ngpus*:

```
qmgr -c 'set node <node> resources_available.ngpus = <ngpus>'
```

17. 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.

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

18. Verify that the interactive proxy (guacd) is installed and running by issuing the following command:

```
service guacd status
```

5.6 Upgrade Access Web

Run an upgrade script to copy artifacts from the previous version of Access Web to Access Web 2020.3. Only upgrades from Access Web 2020.1 and 2020.2 to Access Web 2020.3 are supported.

To extract and visualize plot and animation data using Access Web 2020.3, ensure to have Compose and Altair HyperWorks Desktop installed. For more information refer [Prerequisites for Installing Access Web](#).

Tip: Before installing Altair HyperWorks Desktop 2020 we recommend to clear all the older versions of Altair HyperWorks Desktop.

The upgrade script will perform the following:

- Migrate the previous version of application definitions, the site configuration file and the server configuration file to Access Web 2020.3.
- Migrate the user preferences and configuration related files from the previous version of Access Web's `PA_HOME` and `PA_EXEC` directories to those same directories of Access Web 2020.3.
- Automatically start Access Web 2020.3

If you have installed Access Web on a separate machine from PAS, then the following steps will have to be run on both machines.

1. Login to the machine where Access Web/PAS is installed
2. Stop the currently installed version of Access Web/PAS:

```
service pbsworks-pa stop
```

3. Source the Access Web configuration file to set up the environment variable `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```

4. Navigate to `$PA_EXEC/init/`.

5. Execute the `pa-upgrade.sh` script as follows:

```
./pa-upgrade.sh <PreviousVersion_PA_HOME> <PreviousVersion_PA_EXEC>
```

where `<PreviousVersion_PA_HOME>` is the Access Web 2020.1 or 2020.2 home directory and `<PreviousVersion_PA_EXEC>` is the Access Web 2020.1 or 2020.2 execution directory.

After upgrading, Access Web 2020.3 will be up and the following message will be displayed:

```
"Access Web upgraded successfully"
```

5.7 Modern Communication Module on Linux

The Modern Communication Module is a set of python libraries that are copied to the HPC execution hosts to improve file operations on running jobs.

Once Access Web is installed, the Modern Communication Module must be distributed to the HPC execution hosts. These libraries improve file operations for job operations on running jobs, such as:

- uploading and downloading files to the running directory.
- listing files from the running directory.
- custom actions on running jobs.
- viewing results visualization animation files from the running directory.
- starting remote sessions.

The Modern Communication Module replaces PBS technology for performing these same types of operations.

The Modern Communication Module can be distributed in two ways:

1. It can be copied to a shared file system that is accessible to the execution hosts.
2. It can be copied to the execution hosts by running an Access Web script.

See Also

[Setup Modern Communication Module on a Shared File System](#)

[Copy the Modern Communication Module to All Execution Hosts](#)

5.7.1 Setup Modern Communication Module on a Shared File System

Distribute the Modern Communication Module on a shared file system after completing the installation of Access Web.

Copy the Modern Communication Module located on the PAS Server to the shared file system. The Modern Communication Module is located at: `PA_EXEC/joboperations/binaries/momclientmodules`.

Before performing the following steps:

- ensure that the shared file system is available and accessible to all the users.
- create a directory on the shared file system to copy the Modern Communication Module. The permissions on this directory need to allow read and execute permissions for all users. For example, `/shared/filesystem/Access-MCM`.

 **Note:** All the execution nodes should have the same operating system.

1. Login to the machine where PAS is installed as the root user.
2. Source the Access Web configuration file to set up the environment variable `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```

3. Create a directory on the shared filesystem where the Modern Communication Module will be copied.

```
mkdir -m 755 -p /shared/filesystem/Access-MCM
```

4. Copy the directory `PA_EXEC/joboperation/binaries/momclientmodules` to the shared file system.

```
cp -rp $PA_EXEC/joboperation/binaries/momclientmodules /shared/filesystem/Access-MCM/
```

5. Depending on your Operating System (CentOS, SLES, or Ubuntu), unzip relevant python binary from `$PA_EXEC/shared/thirdparty/python_binaries/` to `/shared/filesystem/Access-MCM/momclientmodules`.



Note: You can use the CentOS python binary for RHEL Operating System.

6. Rename *python* directory to *python2*.
7. Give read and execute permissions to all users to the location where the Modern Communication Module was copied.

```
chmod 755 /shared/filesystem/Access-MCM/momclientmodules
```

8. Edit `PA_HOME/config/pas/conf/server.conf`

```
vi $PA_HOME/config/pas/conf/server.conf
```

9. Define the location of the Modern Communication Module by updating the `MODERN_COMMUNICATION_SHARED_LIBS` attribute.

```
MODERN_COMMUNICATION_SHARED_LIBS=/shared/filesystem/Access-MCM/momclientmodules
```

10. Restart the PAS by entering the command:

```
service pbsworks-pa restart
```

5.7.2 Copy the Modern Communication Module to All Execution Hosts

Distribute the Modern Communication Module to all execution hosts by running a script.

The script to distribute the Modern Communication Module to all of the PBS MoM hosts is located at `PA_EXEC/joboperation/scripts/distribute_modern_comm_modules.py`.

Before running this script, ensure the following prerequisites have been met:

- The Modern Communication Module distribution script must be run as the root user.
- The script must be run from the system where PAS is installed.
- The distribution script uses PBS Client commands. Hence the PBS Client must be installed on the PAS server.
- The distribution script asks for a location (a directory on the PAS Server) into which it will copy the Modern Communication Module before distributing it to the PBS MoMs. The permissions on this directory need to allow read and execute permissions for all users. This directory must be created before running the script. Once the script is run, the Modern Communication Module is copied to this directory on the PAS Server. The directory is then copied to each execution host and placed in the same location on each execution host.

- The distribution script asks for a user account. This user account will own the directory containing the Modern Communication Module on the PBS MoMs. This user must:
 - exist on the PAS server and all of the PBS MoMs
 - be able to SSH passwordlessly from the PAS Server into each MoM so that the Modern Communication Module can be securely copied to the PBS MoM.

Installation steps to distribute the Modern Communication Module:

1. Login to the machine where PAS is installed as the root user.
2. Source the Access Web configuration file to set up the environment variable `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```

3. Create a directory where the distribution script can copy the Modern Communication Module before distribution to the PBS MoMs:

```
mkdir -m 755 -p /access/mcm
```

4. Navigate to the directory `$PA_EXEC/joboperation/scripts`.

5. Execute the script to distribute the Modern Communication Module:

```
python distribute_modern_comm_modules.py
```

6. Enter the directory that meets the stated prerequisites.

This is where the script will copy the Modern Communication Module before distributing it to the PBS MoMs.

For example, `/access/mcm`

7. Enter a user that meets the stated prerequisites.

For example, `pbsworks`.

The following message is displayed:

```
Do you want to override if modules already exist (Y/N). [Default: N]?
```

8. Choose one of the following:

- Enter `N` or press `ENTER` (to accept the default value) to skip copying the Modern Communication Module to the PBS MoM when it already exists on the MoM.
- Enter `Y` to overwrite the modules. The distribution script will copy the modules even if it detects that Modern Communication Module already exists on the MoM.

The script will display the inputs provided.

9. Enter `Y` to continue with the inputs provided.

Messages similar to the below are displayed:

```
Transferring Client Modules to n2.lab.com...  
Successfully transferred to 'n2.lab.com'  
Transferring Client Modules to n1.lab.com...  
Successfully transferred to 'n1.lab.com'  
Updated PAS Configuration file successfully
```

10. Restart Access Web by entering the command:

```
service pbsworks-pa restart
```

5.8 Install the Remote Sessions Component on the Ubuntu MoMs

Install binaries and configure the Ubuntu MoM to support interactive applications.

Before you begin:

- Review the [Prerequisites for Installing Remote Sessions](#) for installation.
- Run the Modern Communication Module distribution from server. Refer to [Modern Communication Module on Linux](#) for more information.

Install necessary components on the Ubuntu MoM to support interactive applications, including TurboVNC, VirtualGL, and the interactive proxy (guacd).

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

1. Login to Ubuntu machine as root.
2. Navigate to the directory `<MOM_CLIENT_MODULE>/remotesession/ubuntu/`
`<MOM_CLIENT_MODULE>` is the location where Modern Communication Module is distributed. For example, `/access/mcm/momclientmodules`.
3. Execute the command to install the agent:

```
./install.sh
```
4. Restart X server or restart the machine.
5. Start the guacd service using the command:

```
/etc/init.d/guacd start
```

Run below command on head node as root to configure the number of GPUs on the machine.
6. Execute the following command as root on the head node to configure the number of GPUs on the machine:

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

5.9 Enable Job History

The HPC cluster where simulations will run must have job history enabled to run simulation jobs.

Skip this step if your site has not installed the Simulator component.

The Simulator component requires that job history be enabled on the PBS Server where simulation jobs are run:

1. Login to the PBS Server where simulation jobs will run as a PBS manager.
2. Execute the command:

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

Install Access Web on Windows

6

Load Access Web Docker image in Windows Docker, install PAS in Windows, install Remote Sessions agent, application definitions, update docker environment list, start docker container and start PAS service.

This chapter covers the following:

- [6.1 Enable IPV4 for All Network Adapters](#) (p. 86)
- [6.2 Disable User Access Control \(UAC\) in Windows](#) (p. 87)
- [6.3 Disable Network Level Authentication](#) (p. 88)
- [6.4 Install PAS On Windows](#) (p. 89)
- [6.5 Modern Communication Module on Windows](#) (p. 90)
- [6.6 Install Access Web Using a Docker Container](#) (p. 93)
- [6.7 Install Remote Sessions Agent on Windows](#) (p. 95)
- [6.8 Configure a Windows Graphical Node to Run a Single Job per User](#) (p. 96)
- [6.9 Enable Job History](#) (p. 97)

Before you begin:

- Ensure that the PBS Professional cluster for Windows is installed and running.
- Download the [Docker Desktop Binary](#) file.
- Docker is installed and running on the machine where you are going to install Access Web. Refer to [Install Docker Desktop for Windows](#) for more information.
- For the application to run smoothly, your windows Docker requires 8 CPU cores and 16 GB Memory.

Download or obtain the following files using your usual Altair support channels:

- Access Web Docker 2020.3 Tar File (`AltairAccessWeb_Docker_Container_<version>_<Build ID>_<YYYYMMDD>_<Timestamp>.tar`)
- PAS 2020.3 Installer (`AltairAccessWeb_PAS_<version>_<Build ID>_<YYYYMMDD>_<Timestamp>`)
- If you site is going to run interactive applications, then download the Remote Sessions Agent Installer (`AltairAccessWeb_RemoteSessionAgent_<version>_<Build ID>_<YYYYMMDD>_<Timestamp>`)
- Docker Environment List (`env.list`)
- Application Definitions repository
- Remote Sessions Application Definition Zip File (`windows_remotesession_appdef.zip`)

The following will be the infrastructure after you install Access Web and PAS on Windows:

- PAS running along with PBS Pro cluster on Windows machine.
- Access Web will be running in Docker.

 **Note:** It is mandatory to perform [Copy the Modern Communication Module to All Execution Hosts](#) after you [Install Access and Docker Setup](#).

 **Note:** The following are some of the Docker commands that will be useful:

- To check the Docker container ID use the following command:
`docker ps -q`
- Use the following command to copy a file from the container to the local machine:
`docker cp CONTAINER_ID:<source path> <local destination path>`
- Use the following command to copy the file from the local machine to the container:
`docker cp <local source path> CONTAINER_ID:<destination path>`

6.1 Enable IPV4 for All Network Adapters

Change all network adapters to use IPV4 for TCP communication rather than IPV6.

Before you begin:

- For more information about settings the Automatic Metric feature for IPV4 routes see <https://support.microsoft.com/en-us/help/299540/an-explanation-of-the-automatic-metric-feature-for-ipv4-routes>.
- Refer to [Configuring IPV6 in Windows for Advanced Users](#) for more information.

Skip this topic if IPV4 is set as the preferred protocol.

To disable IPV6 and set IPV4 as the preferred protocol, the following steps must be performed:

- Disable IPV6 for all adapters.
- Edit Registry to prefer IPV4 over IPV6.

1. Go to **Control Panel > Network and Internet > Network and Sharing Center**
2. Select **Change adapter settings**.



Note: The following steps must be performed for all the adapters in the **Change adapter settings**.

3. Right-click on an adapter and select **Properties**.
4. Disable the **Internet Protocol Version 6 (TCP/IPv6)** check box.
5. Enable the **Internet Protocol Version 4 (TCP/IPv4)** check box.
6. Select **Internet Protocol Version 4 (TCP/IPv6)** and click **Properties**.
7. Click **Advanced** in the **Internet Protocol Version 4 (TCP/IPv6) Properties** dialog box.
8. Disable the **Automatic metric** check box in the **Advanced TCP/IP Settings** dialog box. Once the check box is disabled, the **Interface Metric** box is enabled.
9. For **Interface metric**, enter an integer that is greater than 0.
If you are using Ethernet, enter 1. Otherwise, enter a higher number based on your preference.
10. Press **Windows + R** key to open the **Run Dialog box**.
11. Enter **regedit**.
12. Navigate to `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\tcpip6\Parameters\`.
13. Right-click **New > DWORD (32 bit) Value**
14. Enter the name as **DisabledComponents** and set its Data value to 20 (Hexadecimal).
15. Restart the machine.

6.2 Disable User Access Control (UAC) in Windows

Disable User Access Control for Access Web Windows setup to make sure the user is not blocked while executing any executables.

Skip this topic if the User Access Control is disabled.

1. Open **Control Panel**
2. Navigate to **User Accounts and Family Safety\User Accounts**
3. Click **Change User Account Control Settings**.
4. Change it to **Never Notify**.
5. Click **Ok**.
6. Press **Windows + R** key to open the **Run Dialog box**.
7. Enter **regedit**.
8. Navigate to `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\System\`.
9. Set the value of **EnableLUA DWORD** to 0.



Note: Create the **EnableLUA DWORD** key if it is not available.

10. Restart the machine.

6.3 Disable Network Level Authentication

Disable Network Level Authentication (NLA) on all Windows PBS MoMs.

Remote Sessions default security protocol is TLS for Windows. For this security type disable the Network Level Security on all the Windows PBS MoMs as a prerequisite before installing Remote Sessions.

 **Note:** If you want to change the default security protocol used by Remote Sessions refer to [Change the Windows RDP Security Connection](#).

1. Login to the PBS MoM machine as an administrator.
2. Open a PowerShell terminal.
3. Run the below command:

 **Note:** Replace `#MOM_HOSTNAME` with the hostname of the PBS MoM.

```
(Get-WmiObject -class Win32_TSGeneralSetting -Namespace root
\cimv2\terminalservices
-ComputerName $MOM_HOSTNAME -Filter "TerminalName='RDP-
tcp'").SetUserAuthenticationRequired(0)
```


6.4 Install PAS On Windows

Steps for installing PAS on a Windows platform.

Depending on the deployment option selected, PAS can be installed on the Windows machine where Access Web is installed or it can be installed on a Windows machine where the PBS Server is installed.

Download or obtain the PAS Windows Installer using your Altair PBS Works Support (pbssupport@altair.com).

These instructions will install PAS in `C:\Program Files\altair\pas\2020.3\`. You may install PAS in a non-default location. However, please note this while following the below instructions.

 **Note:** After installing PAS, verify the status of User Access Control (UAC) by running the `UAC_Check.ps1` script located at `C:\Program Files\altair\pas\2020.3\PAS\exec\scripts\`.

1. Login to the machine where PAS will be installed as an administrator.
2. Locate the PAS Windows Installer executable in Windows Explorer, right click and choose the **Run as administrator** option from the context menu.
3. Enter the installation location.
By default, the installation location is `C:\Program Files\altair\pas\2020.3\`.
4. Enter the staging directory.
By default, the staging directory is `C:\stage`.
5. Review the Pre-installation Summary and click **Install**.
On completion, the installer will provide the details of the installation directory, host and port. By default, PAS will be running on port 5243 and `https` protocol.
6. Navigate to `C:\Program Files\altair\pas\2020.3\PAS\exec\scripts`.
7. Execute the script `update_service_user.py` by providing the Service User name:

```
python update_service_user.py pbsadmin
```
8. Start PAS services:
 - a) Click **Start** and choose **Run**.
 - b) Type `services.msc` to open the Services Management Console.
 - c) Right-click the **AltairPASService** and click **Start**.

6.5 Modern Communication Module on Windows

The Modern Communication Module is a set of python libraries that are copied to the HPC execution hosts to improve file operations on running jobs.

Once Access Web is installed, the Modern Communication Module must be distributed to the HPC execution hosts. These libraries improve file operations for job operations on running jobs, such as:

- uploading and downloading files to the running directory.
- listing files from the running directory.
- custom actions on running jobs.
- viewing results visualization animation files from the running directory.
- starting remote sessions.

The Modern Communication Module replaces PBS technology for performing these same types of operations.

The Modern Communication Module can be distributed in two ways:

1. It can be copied to a shared file system that is accessible to the execution hosts.
2. It can be copied to all execution hosts.

See Also

[Setup Modern Communication Module on a Shared File System](#)

[Copy the Modern Communication Module to All Execution Hosts](#)

6.5.1 Setup Modern Communication Module on a Shared File System

Distribute the Modern Communication Module on a shared file system.

The Modern Communication Module replaces PBS technology for performing these same types of operations.

By default PAS is installed at `C:\Program Files\altair\pas\<version>\`. If you have installed PAS in a non-default location, then please mention that location while following the below instructions.

The Modern Communication module is located at: `PAS_EXEC\joboperation\binaries\momclientmodules`

Before performing the following steps:

- ensure that the shared file system is available and accessible to all the users.
- create a directory on the shared file system to copy the Modern Communication Module. The permissions on this directory need to allow read and execute permissions for all users. For example, `D:\shared\filesystem\Access-MCM`.

1. Login to the machine hosting PAS 2020.3 as an administrator.
2. Create a directory on the shared file system.
For example, `D:\shared\filesystem\Access-MCM`

3. Copy the directory `PAS_EXEC\joboperation\binaries\momclientmodules` to the shared file system.
For example, copy `PAS_EXEC\joboperation\binaries\momclientmodules` to `D:\shared\filesystem\Access-MCM`
4. On the shared file system, give full control permissions to Everyone for the `momclientmodules` directory:
 - a) Right click on `momclientmodules` and select **Properties**.
 - b) Click **Security** tab.
 - c) Click **Advanced**.
 - d) Click **Add** and click on **Select a Principal**.
 - e) Type in **Everyone** and click **Check Names**
 - f) Click **OK**
 - g) Select **Full Control** on **Permissions** section.
 - h) Click **OK**.
5. Login to the machine where PAS is installed.
6. Edit the file `PAS_HOME\config\pas\conf\server.conf`.
7. Define the location of the Modern Communication Module by updating the `MODERN_COMMUNICATION_SHARED_LIBS` attribute.
`MODERN_COMMUNICATION_SHARED_LIBS=D:\shared\filesystem\Access-MCM`
8. Restart PAS services:
 - a) Click **Start** and choose **Run**.
 - b) Type `services.msc` to open the Services Management Console.
 - c) Right-click the **AltairPASService** and click **Restart**.

6.5.2 Copy the Modern Communication Module to All Execution Hosts

Distribute the Modern Communication Module to all execution hosts.

The Modern Communication Module replaces PBS technology for performing these same types of operations.

By default PAS is installed at `C:\Program Files\altair\pas\<version>\`. If you have installed PAS in a non-default location, then please mention that location while following the below instructions.

The Modern Communication module is located at: `PAS_EXEC\joboperation\binaries\momclientmodules`

1. Login to the machine hosting PAS 2020.3 as an administrator.
2. Copy the directory `PAS_EXEC\joboperation\binaries\momclientmodules` from the machine where PAS is installed to `D:\Access-MCM` of the execution node.
3. On the execution host, give full control permissions to Everyone for the `momclientmodules` directory:
 - a) Right click on `momclientmodules` and select **Properties**.

- b) Click **Security** tab.
 - c) Click **Advanced**.
 - d) Click **Add** and click on **Select a Principal**.
 - e) Type in **Everyone** and click **Check Names**
 - f) Click **OK**
 - g) Select **Full Control** on **Permissions** section.
 - h) Click **OK**.
4. Repeat Step 1 to 3 for each PBS MoM.
5. Login to the machine where PAS is installed.
6. Edit the file `PAS_HOME\config\pas\conf\server.conf`.
7. Define the location of the Modern Communication Module by updating the `MODERN_COMMUNICATION_SHARED_LIBS` attribute.
- ```
MODERN_COMMUNICATION_SHARED_LIBS=D:\Access-MCM
```
8. Restart PAS services:
- a) Click **Start** and choose **Run**.
  - b) Type `services.msc` to open the Services Management Console.
  - c) Right-click the **AltairPASService** and click **Restart**.

#### See Also

[PBS Application Services Service Commands](#)

## 6.6 Install Access Web Using a Docker Container

Load the Access Web Docker image into Docker and update the Docker environment list.

The `env.list` file must be updated with:

### **ALTAIR\_LICENSE\_PATH**

Specify the Altair license server details in the format `port@ip address` or `port@hostname`.

### **HOSTNAME**

IP Address/Hostname of the Windows Machine where Remote Sessions Agent is Installed.

### **HW\_DESKTOP\_LOCATION**

Specify the HyperWorks Desktop and Compose installation path.

### **HOST\_ENTRIES**

Specify the IP addresses of the PBS Server and PBS MOM.

### **TIME\_ZONE**

Time zone of the machine where PBS Server is running.

Download or obtain the Access Web Docker 2020.3 Tar file and Docker environment list (`env.list`) using your usual Altair PBS Works Support ([pbssupport@altair.com](mailto:pbssupport@altair.com)).

1. Load the Access Web Docker image into Docker using the following command:

```
docker load -i TARFILE
```

Where *TARFILE* is the name of the Access Web tar file.

2. Update the license path, hostname, HyperWorks installation location, host entries, and time zone in the Docker environment list (`env.list`).

For example, the modified `env.list` will be as follows:

```
ALTAIR_LICENSE_PATH=6200@10.130.3.175
HOSTNAME=10.75.20.123
HW_DESKTOP_LOCATION=10.75.32.34:/apps/rvs
HOST_ENTRIES="10.75.22.95 blrpc686, 192.168.33.23 23centos7"
TIME_ZONE=/usr/share/zoneinfo/Asia/Kolkata
```



**Note:** In Docker environment list (`env.list`), Compose and Altair HyperWorks Desktop exists in the following path `HW_DESKTOP_LOCATION`.

3. Start the Access Web Docker container using the following command:

```
docker run -itd --env-file ./env.list --entrypoint /tmp/scripts/access_setup.sh ^
--name windows_access --privileged -p 4443:4443 -p 4222:4222 -p 4943:4943 ^
-p 4743:4743 windows_docker:latest bash
```

4. Login to the Access Web Docker container using the following command:

```
docker exec -it windows_access bash
```

5. Stop Access Web using the following command:

```
service pbsworks-pa stop
```

6. Navigate to `PA_HOME/config/resultservice/config`.

7. Edit `site_config.xml`.

8. Locate the following line:

```
<AIFImpersonation enabled="true">
```

**9.** Change @enabled="true" to @enabled="false".

**10.** Start Access Web using the following command:

```
service pbsworks-pa start
```

**11.** Login to the machine where PAS will be installed as an administrator.

**12.** Start PAS services:

- a) Click **Start** and choose **Run**.
- b) Type `services.msc` to open the Services Management Console.
- c) Right-click the **AltairPASService** and click **Start**.

**13.** Login to Access Web as the Service User and add a server cluster.

- PAS will be running on port 5243 and `https` protocol.
- If PBS MOM is also active in same machine as PAS, then make sure you do not start remote session from the same user through which you started the docker and PAS service.

### See Also

[Access Web Service Commands](#)

## 6.7 Install Remote Sessions Agent on Windows

Install the Remote Sessions component on Windows.

Download or obtain the Remote Sessions Windows Installer using Altair PBS Works Support ([pbssupport@altair.com](mailto:pbssupport@altair.com)).

Install the Remote Sessions Windows installer on all PBS MoMs.

1. Locate the Remote Sessions installer executable in Windows Explorer, right click and choose the **Run as administrator** option from the context menu.
2. Enter the installation location.  
By default, the installation location for binaries and configuration is `C:\altair\pbsworks\2020.3\remotesessionagent`.
3. Review the Pre-installation Summary and click **Install**.
4. Once the installation is complete check that the Remote Sessions service is running:
  - a) Click **Start** and choose **Run**.
  - b) Type `services.msc` to open the Services Management Console.
  - c) Locate the **RemoteSessionAgentService**.  
The status should be "Started".
  - d) If the service is not running then, right-click the **RemoteSessionAgentService** and click **Start**.

### See Also

[Remote Sessions Service Commands](#)

## 6.8 Configure a Windows Graphical Node to Run a Single Job per User

To prevent a user from running multiple Remote Sessions on the same Windows graphics node, configure the graphics node at the PBS Professional level to limit the number of running jobs on the node to one per user.

Users cannot open multiple Remote Sessions on the same Windows graphical node because RDP does not allow more than one session per user per node.

Perform the below steps to configure PBS Professional to run a single session per user per graphics node.

 **Note:** Multiple sessions can be run on the same node for different users.

Repeat these steps for each Windows graphics node.

1. Login to the PBS Server as PBS Manager.
2. Open the command prompt.
3. Enter the command:

```
qmgr -c "set node <vnode name> max_user_run=1"
```



## 6.9 Enable Job History

The HPC cluster where simulations will run must have job history enabled to run simulation jobs.

Skip this step if your site has not installed the Simulator component.

The Simulator component requires that job history be enabled on the PBS Server where simulation jobs are run:

1. Login to the PBS Server where simulation jobs will run as a PBS manager.
2. Execute the command:

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

# Upgrade Access Web on Windows

Instructions for upgrading from a previous version of Access Web.

This chapter covers the following:

- [7.1 Prepare for an Upgrade on Windows](#) (p. 99)
- [7.2 Prepare for PAS Upgrade on Windows](#) (p. 100)
- [7.3 Enable IPV4 for All Network Adapters](#) (p. 101)
- [7.4 Verify User Access Control \(UAC\) in Windows](#) (p. 102)
- [7.5 Disable Network Level Authentication](#) (p. 103)
- [7.6 Backup Access Web Configuration Files](#) (p. 104)
- [7.7 Install PAS On Windows](#) (p. 105)
- [7.8 Post Configuration of PAS](#) (p. 106)
- [7.9 Modern Communication Module on Windows](#) (p. 107)
- [7.10 Install Access Web Using a Docker Container](#) (p. 110)
- [7.11 Post Configuration of Access Web Upgrade](#) (p. 112)
- [7.12 Install Remote Sessions Agent on Windows](#) (p. 113)
- [7.13 Configure a Windows Graphical Node to Run a Single Job per User](#) (p. 114)
- [7.14 Enable Job History](#) (p. 115)

The Access Web installer does not support upgrades. All sections of this chapter must be completed to perform an upgrade.

Only upgrades from Access Web 2020.1 or 2020.2 to Access Web 2020.3 are supported.

Access Web 2020.3 supports only PAS 2020.3. So if you are upgrading Access Web, then you have to upgrade PAS.

## 7.1 Prepare for an Upgrade on Windows

Instructions to prepare for upgrading Access Web on Windows.

Download or obtain the following files using your Altair PBS Works Support ([pbssupport@altair.com](mailto:pbssupport@altair.com)):

- Access Web Docker 2020.3 Tar File (AltairAccessWeb\_Docker\_Container\_<Version>\_<Build ID>\_<YYYYMMDD>\_<Timestamp>.tar)
- PAS 2020.3 Installer (AltairAccessWeb\_PAS\_<Version>\_<Build ID>\_<YYYYMMDD>\_<Timestamp>.exe)
- If you site is going to run interactive applications, then download the Remote Sessions Agent Installer (AltairAccessWeb\_RemoteSessionAgent\_<Version>\_<Build ID>\_<YYYYMMDD>\_<Timestamp>.exe)
- Docker Environment List (env.list)
- Remote Sessions Application Definition Zip File (windows\_remotesession\_appdef.zip)
- Windows Backup Script (prepare\_backup.sh)
- Windows 2020.3 Upgrade Container Zip File (container\_upgrade.zip)



**Note:** The following are some of the Docker commands that will be useful:

- To check the Docker container ID use the following command:  
`docker ps -q`
- Use the following command to copy a file from the container to the local machine:  
`docker cp CONTAINER_ID:<source path> <local destination path>`
- Use the following command to copy the file from the local machine to the container:  
`docker cp <local source path> CONTAINER_ID:<destination path>`

## 7.2 Prepare for PAS Upgrade on Windows

Instructions to prepare PAS for an upgrade on Windows.

1. Login to the machine where PAS is installed as an administrator.
2. Stop PAS services:
  - a) Click **Start** and choose **Run**.
  - b) Type `services.msc` to open the Services Management Console.
  - c) Right-click **AltairPASService** and click **Stop**.
3. Remove the registry file `.com.zerog.registry.xml` located at

`C:\Program Files\Zero G Registry\`



**Note:** If you do not want to remove the registry file, then uninstall PAS. Before uninstalling PAS take a backup of the home directory from the location `PAS_HOME`.



**Note:** If you remove the registry file, then you have to install PAS 2020.3 in a different location.

## 7.3 Enable IPV4 for All Network Adapters

Change all network adapters to use IPV4 for TCP communication rather than IPV6.

For more information about settings the Automatic Metric feature for IPV4 routes see <https://support.microsoft.com/en-us/help/299540/an-explanation-of-the-automatic-metric-feature-for-ipv4-routes>.

1. Go to **Control Panel > Network and Internet > Network and Sharing Center**
2. Select **Change adapter settings**.



**Note:** The following steps must be performed for all the adapters in the **Change adapter settings**.

3. Right-click on an adapter and select **Properties**.
4. Disable the **Internet Protocol Version 6 (TCP/IPv6)** check box.
5. Enable the **Internet Protocol Version 4 (TCP/IPv4)** check box.
6. Select **Internet Protocol Version 4 (TCP/IPv6)** and click **Properties**.
7. Click **Advanced** in the **Internet Protocol Version 4 (TCP/IPv6) Properties** dialog box.
8. Disable the **Automatic metric** check box in the **Advanced TCP/IP Settings** dialog box.  
Once the check box is disabled, the **Interface Metric** box is enabled.
9. For **Interface metric**, enter an integer that is greater than 0.  
If you are using Ethernet, enter 1. Otherwise, enter a higher number based on your preference.
10. Press **Windows + R** key to open the **Run Dialog box**.
11. Enter **regedit**.
12. Navigate to `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\tcpip6\Parameters\`.
13. Right-click **New > DWORD (32 bit) Value**
14. Enter the name as **DisabledComponents** and set its Data value to 20 (Hexadecimal).

## 7.4 Verify User Access Control (UAC) in Windows

Verify if User Access Control is disabled for Access Web Windows setup to make sure the user is not blocked while executing any executables.

 **Note:** If previous version of PAS is not uninstalled, then run the `UAC_Check.ps1` script located at `C:\Program Files\altair\pas\2020.3\PAS\exec\scripts\` to verify the status of UAC.

1. Open **Control Panel**
2. Navigate to **User Accounts and Family Safety\User Accounts**
3. Click **Change User Account Control Settings**.
4. Change it to **Never Notify**.
5. Click **Ok**.
6. Press **Windows + R** key to open the **Run Dialog box**.
7. Enter **regedit**.
8. Navigate to `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\System\`.
9. Verify that the value of **EnableLUA DWORD** is set to 0.

 **Note:** Create the **EnableLUA DWORD** key if it is not available and set its value to 0. You have to restart the machine after these changes.

## 7.5 Disable Network Level Authentication

Disable Network Level Authentication (NLA) on all Windows PBS MoMs.

Remote Sessions default security protocol is TLS for Windows. For this security type disable the Network Level Security on all the Windows PBS MoMs as a prerequisite before installing Remote Sessions.

 **Note:** If you want to change the default security protocol used by Remote Sessions refer to [Change the Windows RDP Security Connection](#).

1. Login to the PBS MoM machine as an administrator.
2. Open a PowerShell terminal.
3. Run the below command:

 **Note:** Replace `#MOM_HOSTNAME` with the hostname of the PBS MoM.

```
(Get-WmiObject -class Win32_TSGeneralSetting -Namespace root
\cimv2\terminalservices
-ComputerName $MOM_HOSTNAME -Filter "TerminalName='RDP-
tcp'").SetUserAuthenticationRequired(0)
```

## 7.6 Backup Access Web Configuration Files

Instructions to take a backup of Access Web configuration files.

Download or obtain the following files using Altair PBS Works Support ([pbssupport@altair.com](mailto:pbssupport@altair.com)):

- Windows Backup Script (`prepare_backup.sh`)

The script will create a zip file with the name *upgrade\_**\$TIMESTAMP*.zip which contains the Access Web `PA_HOME` folder and database dump.

1. Login to the Windows machine where Access Web is installed.
2. Copy the Windows Backup Script (`prepare_backup.sh`) to the Docker container using the following command:

```
docker cp prepare_backup.sh windows_access:/tmp
```

3. Login to the Access Web Docker container using the following command:

```
docker exec -it windows_access bash
```

4. Stop Access Web using the following command:

```
service pbsworks-pa stop
```

5. Make the script executable:

```
chmod +x prepare_backup.sh
```

6. Execute the script to back up the Access Web `PA_HOME` folder to a zip file.

```
./prepare_backup.sh /tmp/
```

An example of the upgrade zip file is *upgrade\_1569014147849.zip*.

7. Copy the upgrade zip file to host Windows machine:

```
docker cp windows_access:/tmp/upgrade_1569014147849.zip <Destination Path>
```

8. Backup the Docker container using the following command:

```
docker save -o windows_docker_<CURRENT_VERSION>.tar windows_docker
```

9. Stop the Docker container:

```
docker stop windows_access
```

10. Remove the Docker container:

```
docker rm -f windows_access
```

11. Remove the existing Docker image:

```
docker rmi -f windows_docker
```



## 7.7 Install PAS On Windows

Steps for installing PAS on a Windows platform.

Depending on the deployment option selected, PAS can be installed on the Windows machine where Access Web is installed or it can be installed on a Windows machine where the PBS Server is installed.

Download or obtain the PAS Windows Installer using your Altair PBS Works Support ([pbssupport@altair.com](mailto:pbssupport@altair.com)).

These instructions will install PAS in `C:\Program Files\altair\pas\2020.3\`. You may install PAS in a non-default location. However, please note this while following the below instructions.

 **Note:** After installing PAS, verify the status of User Access Control (UAC) by running the `UAC_Check.ps1` script located at `C:\Program Files\altair\pas\2020.3\PAS\exec\scripts\`.

1. Login to the machine where PAS will be installed as an administrator.
2. Locate the PAS Windows Installer executable in Windows Explorer, right click and choose the **Run as administrator** option from the context menu.
3. Enter the installation location.  
By default, the installation location is `C:\Program Files\altair\pas\2020.3\`.
4. Enter the staging directory.  
By default, the staging directory is `C:\stage`.
5. Review the Pre-installation Summary and click **Install**.  
On completion, the installer will provide the details of the installation directory, host and port. By default, PAS will be running on port 5243 and `https` protocol.
6. Navigate to `C:\Program Files\altair\pas\2020.3\PAS\exec\scripts`.
7. Execute the script `update_service_user.py` by providing the Service User name:  

```
python update_service_user.py pbsadmin
```
8. Start PAS services:
  - a) Click **Start** and choose **Run**.
  - b) Type `services.msc` to open the Services Management Console.
  - c) Right-click the **AltairPASService** and click **Start**.

## 7.8 Post Configuration of PAS

Instructions for updating application definitions, site configuration file (site-config.xml) and AMS from the previous version of PAS.

You need to have the following files before beginning the post-installation configuration:

- Backup of previous version (2020.1 or 2020.2) Home directory.
- PAS 2020.3 should be installed.

You must migrate your existing application definitions, site configuration file, server configuration file, and AMS files that were backed up during the pre-installation process.

You may need to merge the old and new `server.conf` and `application.properties` file:

- Before copying the backup of the server configuration file to the new `PAS_HOME\config\pas\conf\` directory, review and compare the new version of the server configuration file to the backup. Additional parameters may have been added to the new server configuration file or default values for configuration parameters may have changed.
- Before copying the backup of the application properties file to the new `PAS_HOME\config\joboperation\` directory, review and compare the new version of the application properties file to the backup. Additional parameters may have been added to the new application properties file or default values for configuration parameters may have changed.

By default PAS is installed at `C:\Program Files\altair\pas\2020.3\`. If you have installed PAS in a non-default location, then please mention that location while following the below instructions.

1. Login to the machine where PAS is installed as an administrator.
2. Stop PAS services:
  - a) Click **Start** and choose **Run**.
  - b) Type `services.msc` to open the Services Management Console.
  - c) Right-click the **AltairPASService** and click **Stop**.
3. Copy the application definitions and site-config.xml from previous version to 2020.3 location.
4. Copy the profiles located at `PAS_HOME\home\data\pas\targets\localhost\` from previous version to 2020.3 location.
5. Copy the following AMS files from previous version to 2020.3 location:
  - `accessActions.xml` located at `PAS_HOME\home\data\ams\policies\access\`
  - `accessPolicy.xml` located at `PAS_HOME\home\data\ams\policies\access\`
  - `AA_Groups.xml` located at `PAS_HOME\home\data\ams\local-datastore\`
  - `AA_Users.xml` located at `PAS_HOME\home\data\ams\local-datastore\`
6. Merge the 2020.3 `server.conf` file with the previous version of `server.conf` located at `PAS_HOME\config\pas\conf\`.
7. Merge the 2020.3 `application.properties` file with the previous version of `application.properties` located at `PAS_HOME\config\joboperation\`.

## 7.9 Modern Communication Module on Windows

The Modern Communication Module is a set of python libraries that are copied to the HPC execution hosts to improve file operations on running jobs.

Once Access Web is installed, the Modern Communication Module must be distributed to the HPC execution hosts. These libraries improve file operations for job operations on running jobs, such as:

- uploading and downloading files to the running directory.
- listing files from the running directory.
- custom actions on running jobs.
- viewing results visualization animation files from the running directory.
- starting remote sessions.

The Modern Communication Module replaces PBS technology for performing these same types of operations.

The Modern Communication Module can be distributed in two ways:

1. It can be copied to a shared file system that is accessible to the execution hosts.
2. It can be copied to all execution hosts.

### See Also

[Setup Modern Communication Module on a Shared File System](#)

[Copy the Modern Communication Module to All Execution Hosts](#)

### 7.9.1 Setup Modern Communication Module on a Shared File System

Distribute the Modern Communication Module on a shared file system.

The Modern Communication Module replaces PBS technology for performing these same types of operations.

By default PAS is installed at `C:\Program Files\altair\pas\<version>\`. If you have installed PAS in a non-default location, then please mention that location while following the below instructions.

The Modern Communication module is located at: `PAS_EXEC\joboperation\binaries\momclientmodules`

Before performing the following steps:

- ensure that the shared file system is available and accessible to all the users.
- create a directory on the shared file system to copy the Modern Communication Module. The permissions on this directory need to allow read and execute permissions for all users. For example, `D:\shared\filesystem\Access-MCM`.

1. Login to the machine hosting PAS 2020.3 as an administrator.
2. Create a directory on the shared file system.  
For example, `D:\shared\filesystem\Access-MCM`

3. Copy the directory `PAS_EXEC\joboperation\binaries\momclientmodules` to the shared file system.  
For example, copy `PAS_EXEC\joboperation\binaries\momclientmodules` to `D:\shared\filesystem\Access-MCM`
4. On the shared file system, give full control permissions to Everyone for the `momclientmodules` directory:
  - a) Right click on `momclientmodules` and select **Properties**.
  - b) Click **Security** tab.
  - c) Click **Advanced**.
  - d) Click **Add** and click on **Select a Principal**.
  - e) Type in **Everyone** and click **Check Names**
  - f) Click **OK**
  - g) Select **Full Control** on **Permissions** section.
  - h) Click **OK**.
5. Login to the machine where PAS is installed.
6. Edit the file `PAS_HOME\config\pas\conf\server.conf`.
7. Define the location of the Modern Communication Module by updating the `MODERN_COMMUNICATION_SHARED_LIBS` attribute.  
`MODERN_COMMUNICATION_SHARED_LIBS=D:\shared\filesystem\Access-MCM`
8. Restart PAS services:
  - a) Click **Start** and choose **Run**.
  - b) Type `services.msc` to open the Services Management Console.
  - c) Right-click the **AltairPASService** and click **Restart**.

## 7.9.2 Copy the Modern Communication Module to All Execution Hosts

Distribute the Modern Communication Module to all execution hosts.

The Modern Communication Module replaces PBS technology for performing these same types of operations.

By default PAS is installed at `C:\Program Files\altair\pas\<version>\`. If you have installed PAS in a non-default location, then please mention that location while following the below instructions.

The Modern Communication module is located at: `PAS_EXEC\joboperation\binaries\momclientmodules`

1. Login to the machine hosting PAS 2020.3 as an administrator.
2. Copy the directory `PAS_EXEC\joboperation\binaries\momclientmodules` from the machine where PAS is installed to `D:\Access-MCM` of the execution node.
3. On the execution host, give full control permissions to Everyone for the `momclientmodules` directory:
  - a) Right click on `momclientmodules` and select **Properties**.

- b) Click **Security** tab.
  - c) Click **Advanced**.
  - d) Click **Add** and click on **Select a Principal**.
  - e) Type in **Everyone** and click **Check Names**
  - f) Click **OK**
  - g) Select **Full Control** on **Permissions** section.
  - h) Click **OK**.
4. Repeat Step 1 to 3 for each PBS MoM.
5. Login to the machine where PAS is installed.
6. Edit the file `PAS_HOME\config\pas\conf\server.conf`.
7. Define the location of the Modern Communication Module by updating the `MODERN_COMMUNICATION_SHARED_LIBS` attribute.
- ```
MODERN_COMMUNICATION_SHARED_LIBS=D:\Access-MCM
```
8. Restart PAS services:
- a) Click **Start** and choose **Run**.
 - b) Type `services.msc` to open the Services Management Console.
 - c) Right-click the **AltairPASService** and click **Restart**.

See Also

[PBS Application Services Service Commands](#)

7.10 Install Access Web Using a Docker Container

Load the Access Web Docker image into Docker and update the Docker environment list.

The `env.list` file must be updated with:

ALTAIR_LICENSE_PATH

Specify the Altair license server details in the format `port@ip address` or `port@hostname`.

HOSTNAME

IP Address/Hostname of the Windows Machine where Remote Sessions Agent is Installed.

HW_DESKTOP_LOCATION

Specify the HyperWorks Desktop and Compose installation path.

HOST_ENTRIES

Specify the IP addresses of the PBS Server and PBS MOM.

TIME_ZONE

Time zone of the machine where PBS Server is running.

Download or obtain the Access Web Docker 2020.3 Tar file and Docker environment list (`env.list`) using your usual Altair PBS Works Support (pbssupport@altair.com).

1. Load the Access Web Docker image into Docker using the following command:

```
docker load -i TARFILE
```

Where *TARFILE* is the name of the Access Web tar file.

2. Update the license path, hostname, HyperWorks installation location, host entries, and time zone in the Docker environment list (`env.list`).

For example, the modified `env.list` will be as follows:

```
ALTAIR_LICENSE_PATH=6200@10.130.3.175
HOSTNAME=10.75.20.123
HW_DESKTOP_LOCATION=10.75.32.34:/apps/rvs
HOST_ENTRIES="10.75.22.95 blrpc686, 192.168.33.23 23centos7"
TIME_ZONE=/usr/share/zoneinfo/Asia/Kolkata
```



Note: In Docker environment list (`env.list`), Compose and Altair HyperWorks Desktop exists in the following path `HW_DESKTOP_LOCATION`.

3. Start the Access Web Docker container using the following command:

```
docker run -itd --env-file ./env.list --entrypoint /tmp/scripts/access_setup.sh ^
--name windows_access --privileged -p 4443:4443 -p 4222:4222 -p 4943:4943 ^
-p 4743:4743 windows_docker:latest bash
```

4. Login to the Access Web Docker container using the following command:

```
docker exec -it windows_access bash
```

5. Stop Access Web using the following command:

```
service pbsworks-pa stop
```

6. Navigate to `PA_HOME/config/resultservice/config`.

7. Edit `site_config.xml`.

8. Locate the following line:

```
<AIFImpersonation enabled="true">
```

9. Change @enabled="true" to @enabled="false".

10. Start Access Web using the following command:

```
service pbsworks-pa start
```

11. Login to the machine where PAS will be installed as an administrator.

12. Start PAS services:

- a) Click **Start** and choose **Run**.
- b) Type `services.msc` to open the Services Management Console.
- c) Right-click the **AltairPASService** and click **Start**.

13. Login to Access Web as the Service User and add a server cluster.

- PAS will be running on port 5243 and `https` protocol.
- If PBS MOM is also active in same machine as PAS, then make sure you do not start remote session from the same user through which you started the docker and PAS service.

See Also

[Access Web Service Commands](#)

7.11 Post Configuration of Access Web Upgrade

Instructions for updating the previous version of Access Web configuration files.

Before beginning the post-installation configuration of Access Web after upgrading, ensure you have the following:

- Access Web 2020.3 should be installed in the Docker container.
- The `upgrade_$(TIMESTAMP).zip` that is created after running the `prepare_backup.sh` script.
- Windows 2020.3 Upgrade Container Zip File (`container_upgrade.zip`).

1. Login to the Access Web Docker container using the following command:

```
docker exec -it windows_access bash
```

2. Copy `upgrade_$(TIMESTAMP).zip` to the Docker container using the following command:

```
docker cp upgrade_$(TIMESTAMP).zip windows_access:/tmp
```

3. Copy `container_upgrade.zip` to the Docker container using the following command:

```
docker cp container_upgrade.zip windows_access:/tmp
```

4. Login to the Access Web Docker container using the following command:

```
docker exec -it windows_access bash
```

5. Stop Access Web using the following command:

```
service pbsworks-pa stop
```

6. Source the Access Web configuration file using the following command:

```
source /etc/pbsworks-pa.conf
```

7. Clean the Access Web instance using the following command:

```
$PA_EXEC/init/pbsworks-pa @clean
```

8. Unzip the container zip file to Access Web `PA_EXEC` folder using the following command:

```
cd $PA_EXEC  
unzip /tmp/container_upgrade.zip
```

9. Change the permissions on the upgrade scripts to read/write/execute for all users.

```
chmod 777 $PA_EXEC/ams/scripts/upgrade.sh ^  
$PA_EXEC/shared/scripts/upgrade.sh ^  
$PA_EXEC/displaymanager/scripts/upgrade.sh
```

10. Unzip the `upgrade_$(TIMESTAMP).zip` file using the following command:

```
cd /tmp  
unzip upgrade_$(TIMESTAMP).zip
```

11. Run the upgrade script using the following command:

```
$PA_EXEC/init/pa-upgrade.sh /tmp/upgrade_$(TIMESTAMP)/home ^  
/tmp/upgrade_$(TIMESTAMP)/exec
```


7.12 Install Remote Sessions Agent on Windows

Install the Remote Sessions component on Windows.

Download or obtain the Remote Sessions Windows Installer using Altair PBS Works Support (pbssupport@altair.com).

Install the Remote Sessions Windows installer on all PBS MoMs.

1. Locate the Remote Sessions installer executable in Windows Explorer, right click and choose the **Run as administrator** option from the context menu.
2. Enter the installation location.
By default, the installation location for binaries and configuration is `C:\altair\pbsworks\2020.3\remotesessionagent`.
3. Review the Pre-installation Summary and click **Install**.
4. Once the installation is complete check that the Remote Sessions service is running:
 - a) Click **Start** and choose **Run**.
 - b) Type `services.msc` to open the Services Management Console.
 - c) Locate the **RemoteSessionAgentService**.
The status should be "Started".
 - d) If the service is not running then, right-click the **RemoteSessionAgentService** and click **Start**.

See Also

[Remote Sessions Service Commands](#)

7.13 Configure a Windows Graphical Node to Run a Single Job per User

To prevent a user from running multiple Remote Sessions on the same Windows graphics node, configure the graphics node at the PBS Professional level to limit the number of running jobs on the node to one per user.

Users cannot open multiple Remote Sessions on the same Windows graphical node because RDP does not allow more than one session per user per node.

Perform the below steps to configure PBS Professional to run a single session per user per graphics node.

 **Note:** Multiple sessions can be run on the same node for different users.

Repeat these steps for each Windows graphics node.

1. Login to the PBS Server as PBS Manager.
2. Open the command prompt.
3. Enter the command:

```
qmgr -c "set node <vnode name> max_user_run=1"
```

7.14 Enable Job History

The HPC cluster where simulations will run must have job history enabled to run simulation jobs.

Skip this step if your site has not installed the Simulator component.

The Simulator component requires that job history be enabled on the PBS Server where simulation jobs are run:

1. Login to the PBS Server where simulation jobs will run as a PBS manager.
2. Execute the command:

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

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

This chapter covers the following:

- [8.1 Application Definitions](#) (p. 117)
- [8.2 Configure the License Server](#) (p. 122)
- [8.3 Configure Results Visualization Service](#) (p. 123)

Before you start the Access Web service, you must copy over default application definitions provided by Altair and a corresponding PAS site configuration file.

8.1 Application Definitions

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

To run a solver or application through Access Web requires an application definition. 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:

`PA_HOME/data/pas/targets/localhost/repository/applications.`

For sites that are installing Access Web for the first time, default application definitions and a site configuration file are provided to get you up and running quickly. Obtain them through your usual Altair PBS Works Support (pbssupport@altair.com).

For sites that are using legacy products such as Compute Manager, legacy application definitions can be ported so that they can be used by Access Web.

8.1.1 Copy 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 Altair PBS Works Support (pbssupport@altair.com).

1. Login to the machine where PAS is installed as root or as a user with sudo permissions.
2. Copy any default application definitions required for your site to the location: `PA_HOME/data/pas/targets/localhost/repository/applications`
3. Copy the default `site-config.xml` file to `PA_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. Remove `time_stamp.txt` from `PA_HOME/data/pas/`

8.1.2 Onboard an Application Definition

Port an application definition from a legacy version of PBS Works so that it can be used by Access Web. Access Web allows onboarding the legacy application definitions in a very easy way and it can be done at any time.



Note: The `site-config.xml` file must be updated manually after you onboard the legacy application definitions or you can copy over a site configuration file from a previous installation of Access or Compute Manager.

Recommended techniques for onboarding legacy application definitions:

Test Legacy Application Definitions

Submit jobs to an HPC cluster and verify that Access Web can render and submit the job properly.

Upgrade Application Definitions to Use Access Web Features

Access Web allows you to enhance your application definition by making some modification for using the following features of Access Web:

Submit a Job using a Right-Click Context Menu

Access Web includes a feature that allows a job to be submitted to an HPC cluster by right-clicking a job input file and choosing a solver. This eliminates the need to submit a job using a job submission form. Below are changes that must be made to the application definition to enable this feature:

PRIMARY_FILE and QUEUE Arguments in Application Definition

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.

Update a Solver's Application Definition to Link it to a Specific File Extension

Update a solver's application definition to link it to a specific file extension. Access Web links a job input file to a specific application or solver via the file's extension. For example, the solver Optistruct is a structural analysis solver and can process input files with a .fem extension. The association between the file extension and the solver is done through the application definition and must be set up so that Access Web can determine which solvers are available for a file extension.

Extracting Include Files from a Master File

Another feature available with Access is the ability to extract the names of include files from a master file and automatically populate a job submission form argument of type FILE_MULTI with the list of include files. A special script called the Master File Analyzer script is required to read the master file and identify the include files.

This feature must be enabled in the application definition to dynamically identify the include files. The default application definitions with Master File Analyzer capabilities are provided to get you up and running quickly. Obtain them through your usual Altair support channels.

Refer to the tutorial *Extracting Include Files from a Master File in Diving Into Application Definitions* to convert or write application definitions that support the Master File Analyzer script.

Integrate Right Click Context Menu of Access Web

Enrich your legacy application definition so that a job can be submitted by right-clicking a job input file and selecting a solver.

1. Edit the solver's application input file `app-inp-application.xml`
2. Link the file extension to the solver by adding the following XML:

```
<ApplicationExtension>file_extension</ApplicationExtension>
```

The below example links a file with the extension of `.fem` to the Optistruct solver.

```
<ApplicationId>Optistruct</ApplicationId>
<ApplicationName>Optistruct</ApplicationName>
<ApplicationExtension>.fem</ApplicationExtension>
```

3. Save the application input file.
4. Update the site configuration file `site-config.xml` with the appropriate application information such as versions and policies:

```
<Applications>
  <Application id="Optistruct">
    <ApplicationVersions>
      <ApplicationVersion>
        <Option>11.0</Option>
        <Executable>/opt/hyperworks/11.0/altair/scripts/optistruct</
Executable>
      <ApplicationVersion>
        <Option>12.0</Option>
        <Executable>/opt/hyperworks/12.0/altair/scripts/optistruct</
Executable>
      <ApplicationVersion>
        <Option>13.1</Option>
        <Executable>/opt/hyperworks/13.1/altair/scripts/optistruct</
Executable>
    </ApplicationVersions>
  </Application>
</Applications>
```

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

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

7. Change the value of `serverName` to the name of the server provided when adding the server cluster to Access Web.

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

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

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

9. 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"
```

10. 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"
```

11. 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"
```

12. Add additional applications by repeating previous step 9-11 making sure that when you add the next application to the JSON mapping file you separate the applications using a comma.

```
"applications":
[
  {
    "applicationName": "ShellScript",
```



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

13. Save the file.

14. Copy your legacy application definitions to the PAS repository.

15. Restart PAS by issuing the command:

```
service pbsworks-pa restart
```

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

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

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

16. Right-click on a job input file that has the file extension that was just added to the application definition.

17. Verify that the correct solver and job profiles are being displayed in the context menu.

Master File Analyzer

The Master File Analyzer identifies the list of include files from the input or master file that is required to submit a job.

This feature must be enabled in the application definition to dynamically identify the include files. The default application definitions with Master File Analyzer capabilities are provided to get you up and running quickly. Obtain them through your usual Altair support channels.

You can refer to *Diving Into Application Definitions* guide and the samples provided to convert or write application definitions to support Master File Analyzer.

8.2 Configure the License Server

Configure the license server when it was not provided during the installation of Access Web.

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

 **Note:** Multiple license servers can be configured in the license configuration using the delimiter ":" in Linux and ";" in Windows.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
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
```

 **Note:** If you have a different license server for HyperWorks and Compose for RVS, then add the license information in the `pbsworks.license.server`.

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

```
service pbsworks-pa restart
```

8.3 Configure Results Visualization Service

This section provides relevant information for the administrator in configuring the Results Visualization Service (RVS).

8.3.1 Configure HyperWorks Location

Configure the Altair HyperWorks Desktop location to enable the results visualization capabilities for animation.

Follow these steps when the HyperWorks location was not specified while installing Access Web 2020.3.

1. Edit the file at `PA_HOME/config/resultservice/config/site_config.xml`.
2. Change the value of the `location` to the location of HyperWorks.

```
<HYPERWORKS_INSTALL_DIR>/altair  
  
<Products>  
  <Product id="ALTAIR HYPERWORKS" defaultVersion="13.0">  
    <Version id="13.0" location="/opt/hw2020/altair" />  
  </Product>  
</Products>
```

3. Restart Access Web using the following command:

```
service pbsworks-pa restart
```

8.3.2 Configure Compose Location

Configure the Compose location to enable the results visualization capabilities for plot.

Follow these steps when the Compose location was not specified while installing Access Web 2020.3

1. Edit the file at `PA_HOME/config/resultservice/config/site_config.xml`.
2. Change the value of the `location` to the location of Compose.

```
<COMPOSE_INSTALL_DIR>/altair/Compose2020  
  
<Products>  
  <Product id="COMPOSE" defaultVersion="2020">  
    <Version id="2020" location="/opt/compose2020/altair/Compose2020" />  
  </Product>  
</Products>
```

3. Restart Access Web using the following command:

```
service pbsworks-pa restart
```

8.3.3 Configure Environment Variables Set for Compose

Configure the Compose environment variables to enable the results visualization capabilities for plot.

Set the environment variables for the following parameters: `ALTAIR_HOME`, `HW_ROOTDIR`, `HW_UNITY_ROOTDIR`, `PATH`, and `LD_LIBRARY`.

1. Edit the file `/opt/altair/pbsworks/2020.3/access/exec/resultservice/scripts/setenv.sh`.

2. Update the Compose installation location path: <COMPOSE_INSTALL_DIR>/altair/Compose2020/.

```
#!/bin/sh
export ALTAIR_HOME=/opt/2020/compose/altair/Compose2020/.altair
export HW_ROOTDIR=/opt/2020/compose/altair/Compose2020/.altair
export HW_UNITY_ROOTDIR=/opt/2020/compose/altair/Compose2020/.altair/hwx
export HW_PLATFORM=linux64
export PLATFORM=linux64
export ALTAIR_PROD_ARCH=linux64
export PATH=$PATH:/opt/2020/compose/altair/Compose2020/.altair/hwx/bin/linux64:/opt/2020/compose/altair/Compose2020/.altair/hw/bin/linux64
export LD_LIBRARY_PATH=/opt/2020/compose/altair/Compose2020/.altair/hwx/bin/linux64:/opt/2020/compose/altair/Compose2020/.altair/hw/bin/linux64
export HW_EDITION=business
```

8.3.4 Configure HyperWorks Licenses

Install the HyperWorks Desktop feature, HWHyperViewTrans and Compose in Altair License Server.

These feature licenses must be available via a Altair License Server 14.5.1 or newer license server to enable the visualization of the supported result files. To configure, point RVS to the HyperWorks installed license server, refer [Configure the License Server](#).

The HyperWorks Desktop and Compose installation should not be in /root or any user's home directory and in a location where all users have read and write permission.



Tip:

- Install HyperWorks Desktop by following the Linux installation instructions in the HyperWorks 2020 Installation Guide.

Licensing System of HyperWorks Units

RVS uses the Altair patented licensing system of HyperWorks Units (HWU).

Animation requests checkout 6 HWUs and plot requests checkout 10 HWUs. Units are leveled for the same user but stacked for different users. Licenses are checked out only during the results extraction. As soon as the results are extracted, units are immediately returned to the licensing pool. The client side rendering of plot and animation results are covered by Altair Access licensing and does not require any extra units.

8.3.5 Configure Data Directory

Configure the RVS data directory for storing the RVS data such as result files, temporary files and cache data.

1. Open the file at PA_HOME/config/resultservice/config/site_config.xml
2. Configure the folders to store your RVS data in the following line:

```
<HWE_RM_DATA_LOC><folder_name>/HWE_RM_DATA_LOC>
```



Note: By default, the RVS data is stored in the temp folder.

3. Restart Access Web using the command, `service pbsworks-pa restart`.

8.3.6 Kill Compose Process Ids

After upgrade or installation, kill any Compose Process ids of your previous version of Access Web.

Follow the given steps:

1. To check if there any of the Compose processes that are running, use the command:

```
ps -ef | grep composeserv
```

The list of Compose process ids is displayed.

2. To kill a process id, specify the `process id` in the following command:

```
kill -9 <process id>
```

8.3.7 Allow Pop-up Windows

In the supported web browsers, allow the pop-up windows to view the auto-refresh loading messages for a running job.

Follow the steps given to enable pop-up windows in Google Chrome.

1. Open the supported browser, Google Chrome.
2. Click  located in the top-right corner of the web page.
3. Choose **Settings**. Click **Advanced** and choose **Site Settings**.
4. Click **Pop-ups and redirects** and change the permissions as follows: Slide the option to **Allowed**. This will allow pop-up windows for all the sites you access.
5. Click **Add** under **Allow** section.
6. On the **Add a site** window, add the Site address. This will allow pop-up windows for the sites you add.

Login to Access Web as the Service User to add servers.

This chapter covers the following:

- [9.1 Log into Access Web as the Service User](#) (p. 127)
- [9.2 Add a Server Cluster](#) (p. 128)

9.1 Log into Access Web as the Service User

Login to Access Web as the Service User to add servers.

1. Open a supported web browser.
2. Enter the URL `https://<hostname>:4443/pbsworks` in the address bar.
where `<hostname>` is the IP address or hostname of the machine where Access Web is installed.
The Access Web login screen is displayed.
3. Enter the Service User credentials.
4. Click **Log In**.

If Access Web is not installed with PAS, then you must [add a server cluster](#).

9.2 Add a Server Cluster

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

A server cluster is a PAS Server that is connected to an HPC complex. Before you can submit a job, a server cluster must be added. Only users that have been assigned a Manager role can add a server cluster. The Service User entered during the installation of Access Web is automatically assigned a Manager role.

When Access Web is installed on the same machine as PAS, a default local server is automatically added, eliminating the need for the Service User to add a server. Users can begin submitting jobs immediately. Access to the local filesystem is also configured through the default server. By default, users have access to the Job File Stage Area directory (default is `/stage`) that is defined at installation. Edit the default server to configure access to additional directories such as user home directories, for example `/home`.

Configure the default home location of users when you register a PAS server. Environment variables can be used to define the user's default home location like `$HOME` representing the PAS home directory and `$USER_HOME` or `%U` representing username. Access Web will display the contents of the user's home directory path when the user logs into Access Web.

The following are examples for setting the user's home directory:

In Linux : `/stage`, `/home`, `/stage/$USER`, `/home/$USER/project`

In Windows: `C:/stage`, `C:/Users`, `C:/%HOMEPATH%`, `C:/%HOMEPATH%/project`



Note: The user's credentials should be available in the PAS server when you define the home location path with the user (`$USER_HOME` or `%U`).

An **Autocreate Directory** option is provided while adding a server cluster and it is set to true. This will create the root directory specified if it is not available in PAS.

1. Choose one of the following options:

- If no servers have been configured, click the **Configure one or more servers** link.
- Click and then click **Add**.

The Add Server Cluster screen is displayed.

Add Server Cluster
All fields are required

Server Name

URL

User Name

Password

Root Dir

Default Root Dir ☒ Autocreate Directory

Figure 8: Add Server Cluster

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

The URL is in the format `https://<hostname>:5243/pas` where `<hostname>` is the hostname of the machine where the PAS Server is installed.

 **Note:** It is recommended to add a server 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.).

- For **User Name** and **Password**, enter your login credentials.
The user account and password must be available on the PAS Server.
- For **Root Dir**, enter the pathname where user job input and result files are stored.

Ex: `/home`, `/users`, `/stage`, `/stage/$USER`, `/home/$USER/project`, `C:/stage`, `C:/Users`, `C:/%HOMEPATH%`, `C:/%HOMEPATH%/project`

 **Note:** Add parent directory of all Users home during server registration to make home button work.

- Click if you want to add another **Root Dir** and enter the pathname.

Add Server Cluster
All fields are required

Server Name

URL

User Name

Password

Root Dir
 ×

Default Root Dir ☒ Autocreate Directory

Figure 9: Multiple Root Directory Entry

7. Select the default root directory to be displayed from the **Default Root Dir** drop-down menu.

Add Server Cluster
All fields are required

Server Name

URL

User Name

Password

Root Dir
 ×
 ×

Default Root Dir ☒ Autocreate Directory

Figure 10: Default Root Directory

8. Optional: Click **Autocreate Directory** checkbox if you do not want the root directory to be created.



Tip: By default, auto create directory option is set to true to create the root directory specified if it is not available in PAS.

9. Click **Add**.
If the server cluster is added successfully, then a notification is displayed.



Note: A notification is displayed to all users logged into Access Web when a server cluster gets added, edited, deleted, if it goes down or if it is unreachable.

10. Repeat steps 2 through 9 to add additional server clusters.

11. Click **Done**.

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

Manage Servers Add

Available Not Available

Name	Uri	Last Seen On	Last Modified	Details	
cluster	https://172.16.80.18:5243/pas	8/25/2020, 3:50:45 PM	8/25/2020, 3:50:17 PM	Available	
hpccluster	https://localhost:5243/pas	8/25/2020, 3:50:45 PM	8/25/2020, 3:31:16 AM	Available	

Figure 11: Server Clusters List

The green color next to the server cluster indicates that it is available to use. The red color indicates that the server is not available.

The **Details** column provides the reason when a server cluster is not available. Mouse hover the **Details** column of a server cluster to view the error message.

Manage Services Add

Available Not Available

Name	Uri	Last Seen On	Last Modified	Details	
cluster	https://172.16.18.80:5243/pas	11/29/2019, 5:29:10 AM	11/29/2019, 5:23:59 AM	I/O error on GET request for "https://172.16.18.80:5243/pas/restservice/jobs/select": Connect to 172.16.18.80:5243 [172.16.18.80] failed: connect timed out; nested exception is org.apache.http.conn.ConnectTimeoutException: Connect to 172.16.18.80:5243 [172.16.18.80] failed: connect timed out	
hpccluster	https://localhost:5243/pas	11/29/2019, 5:27:40 AM			

Figure 12: Server Cluster Details

See Also
[Troubleshoot PBS Application Services](#)

Downgrade Access Web on Linux

10

Instructions for downgrading Access Web 2020.3 to a previous version.

Perform these steps to downgrade Access Web and PAS (single and different machine setup) 2020.3 to 2020.1 or 2020.2.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Stop Access Web 2020.3 using the following command:

```
service pbsworks-pa stop
```

3. Create a backup of `/etc/pbsworks-pa.conf` as `/etc/pbsworks-pa.conf.2020.3`
 4. Rename `/etc/pbsworks-pa.conf.CurrentlyInstalledVersion` to `/etc/pbsworks-pa.conf`
 5. Copy `PreviousVersion_PA_EXEC/init/pbsworks-pa` script to `/etc/init.d/`
You are successfully downgraded to previous version of Access Web.
 6. Start Access Web using the following command:
- ```
/etc/init.d/pbsworks-pa start
```
7. 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 Access Web is installed.  
The Access Web login screen is displayed.
  8. Enter your username and password.
  9. Click **Log In**.

# Downgrade Access Web on Windows

Instructions for downgrading Access Web 2020.3 to a previous version on Windows.

This chapter covers the following:

- [11.1 Downgrade PAS On Windows](#) (p. 134)
- [11.2 Copy the Modern Communication Module to All Execution Hosts](#) (p. 135)
- [11.3 Downgrade Access Web in Docker](#) (p. 136)
- [11.4 Downgrade Remote Sessions Agent](#) (p. 137)

## 11.1 Downgrade PAS On Windows

Instructions for downgrading PAS 2020.3 to a previous version.

By default PAS is installed in `C:\Program Files\altair\pas\<version>\`. You may install PAS in a non-default location. However, please note this while following the below instructions.

1. Stop PAS services:
  - a) Click **Start** and choose **Run**.
  - b) Type `services.msc` to open the Services Management Console.
  - c) Right-click the **AltairPASService** and click **Stop**.
2. Uninstall PAS 2020.3.
  - a) Navigate to **Start > Control Panel > Programs and Features**.
  - b) Scroll down until you find the **AltairAccessWeb\_PAS** application.
  - c) Right-click the **AltairAccessWeb\_PAS** application, and then click **Uninstall/Change**.
3. If you have uninstalled the previous version of PAS, then perform the following:
  - a) Install the previous version of PAS.
  - b) Replace `PAS_HOME` with the previous version of `PAS_HOME`.
4. If you have not uninstalled the previous version of PAS, then perform the following:
  - a) Navigate to the previous version of installation:  
`PAS_EXEC\scripts\`
  - b) Register previous version of PAS service using the command:  
`AltairAccessWeb_PAS_Service.bat install AltairPASService`
5. Start PAS services:
  - a) Click **Start** and choose **Run**.
  - b) Type `services.msc` to open the Services Management Console.
  - c) Right-click the **AltairPASService** and click **Start**.

## 11.2 Copy the Modern Communication Module to All Execution Hosts

Distribute the Modern Communication Module to all execution hosts.

The Modern Communication Module replaces PBS technology for performing these same types of operations.

By default PAS is installed at `C:\Program Files\altair\pas\<version>\`. If you have installed PAS in a non-default location, then please mention that location while following the below instructions.

The Modern Communication module is located at: `PAS_EXEC\joboperation\binaries\momclientmodules`

1. Login to the machine hosting PAS 2020.3 as an administrator.
2. Copy the directory `PAS_EXEC\joboperation\binaries\momclientmodules` from the machine where PAS is installed to `D:\Access-MCM` of the execution node.
3. On the execution host, give full control permissions to Everyone for the `momclientmodules` directory:
  - a) Right click on `momclientmodules` and select **Properties**.
  - b) Click **Security** tab.
  - c) Click **Advanced**.
  - d) Click **Add** and click on **Select a Principal**.
  - e) Type in **Everyone** and click **Check Names**
  - f) Click **OK**
  - g) Select **Full Control** on **Permissions** section.
  - h) Click **OK**.
4. Repeat Step 1 to 3 for each PBS MoM.
5. Login to the machine where PAS is installed.
6. Edit the file `PAS_HOME\config\pas\conf\server.conf`.
7. Define the location of the Modern Communication Module by updating the `MODERN_COMMUNICATION_SHARED_LIBS` attribute.  
`MODERN_COMMUNICATION_SHARED_LIBS=D:\Access-MCM`
8. Restart PAS services:
  - a) Click **Start** and choose **Run**.
  - b) Type `services.msc` to open the Services Management Console.
  - c) Right-click the **AltairPASService** and click **Restart**.

### See Also

[PBS Application Services Service Commands](#)

## 11.3 Downgrade Access Web in Docker

Instructions for downgrading Access Web 2020.3 to a previous version in Docker.

You need to have the following files before beginning the downgrade:

- Windows Access Web 2020.1 Docker Tar (`windows_docker_2020_1.tar`) and 2020.2 Docker Tar (`windows_docker_2020_2.tar`) backup that was taken at the time of upgrade
- The `env.list` file of 2020.1 and 2020.2.

1. Login to the machine as an administrator where Access Web 2020.3 is installed.

2. Stop the Docker container:

```
docker stop windows_access
```

3. Remove the Docker container:

```
docker rm -f windows_access
```

4. Remove the existing Docker image:

```
docker rmi -f windows_docker
```

5. Load the previous version of Access Web Docker Tar

(`windows_docker_<previous_version>.tar`) backup that was taken at the time of upgrade:

```
docker load -i windows_docker_<Version>.tar
```

6. Verify the license path, hostname, HyperWorks installation location, host entries, and time zone in the previous version Docker environment list (`env.list`).



**Note:** The 2019.3 Docker environment list (`env.list`) will not contain service user.

7. Start the Access Web Docker container using the following command:

```
docker run -itd --env-file .\env.list --entrypoint /tmp/scripts/access_setup.sh ^
--name windows_access --privileged -p 4443:4443 -p 4222:4222 -p 4943:4943 ^
-p 4743:4743 windows_docker:latest bash
```

8. Login to the Access Web previous version Docker container using the following command:

```
docker exec -it windows_access bash
```

9. Start Access Web using the following command:

```
service pbsworks-pa start
```

10. Login to the Access Web portal and verify that the PAS server is registered.

- The Service User should have logged in to Access Web after starting or restarting Access Web and before registering the PAS service.
- PAS installed in Windows will be running on port 5243 and `https` protocol.
- If PBS MOM is also active in same machine as PAS, then make sure you do not start remote session from the same user through which you started the docker and PAS service.



## 11.4 Downgrade Remote Sessions Agent

Instructions for downgrading Remote Sessions 2020.3 to a previous version.

You need to have the following file before beginning the downgrade:

- Remote Sessions Agent 2020.1 or 2020.2 installer.

You have to perform the following steps in all the PBS MoM's.

1. Login in to PBS MoM machine where Remote Sessions Agent is installed.
2. Stop Remote Sessions Agent service.
3. Uninstall Remote Sessions Agent.
  - a) Navigate to **Start > Control Panel > Programs and Features**.
  - b) Scroll down until you find the **AltairAccessWeb\_RemoteSessionAgent\_2020.3** application.
  - c) Right-click the **AltairAccessWeb\_RemoteSessionAgent\_2020.3** application, and then click **Uninstall/Change**.
4. Locate the previous version of Remote Sessions installer executable in Windows Explorer, right click and choose the **Run as administrator** option from the context menu.
5. Enter the installation location.

By default, the installation location for binaries and configuration is `C:\altair\pbsworks\<Version>\remotesessionagent`.
6. Review the Pre-installation Summary and click **Install**.
7. Once the installation is complete check that the Remote Sessions service is running:
  - a) Click **Start** and choose **Run**.
  - b) Type `services.msc` to open the Services Management Console.
  - c) Locate the **DMAgent Service**.

The status should be "Started".
  - d) If the service is not running then, right-click the **DMAgent Service** and click **Start**.

# Uninstall Access Web and its Components on Linux

# 12

Instructions for uninstalling previous version of Access Web and Remote Sessions component.

This chapter covers the following:

- [12.1 Uninstall Access Web](#) (p. 139)
- [12.2 Uninstall Remote Sessions](#) (p. 140)

## 12.1 Uninstall Access Web

Remove a previous version of Access Web.

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

 **Note:** Uninstalling Access Web will not remove `PA_HOME`.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Navigate to the installation directory.

The default installation directory is `/opt/altair/pbsworks/2020.3/access/Altair_Access_installation/`

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

```
./Change_Altair_Access_Installation -i console
```

The command must contain spaces with escape characters.

4. Follow the instructions provided by the uninstaller.

## 12.2 Uninstall Remote Sessions

Unconfigure PBS Professional and PAS and uninstall the Remote Sessions component installed on the PBS MoM.

Uninstalling the Remote Sessions component requires running the Remote Sessions binary multiple times across several machines and must be performed in the following sequence:

1. Unconfigure the PBS and the PAS Server:
  - removes the application definition GlxSpheres which was installed automatically when the Remote Sessions component was installed on the PAS Server
  - deletes the interactive queue
  - removes the custom resource ngpus
2. Uninstall the Remote Sessions component on all PBS MoMs

 **Note:** Step 1 and 2 may be performed at the same time when PAS is installed on the PBS Server.

### 12.2.1 Unconfigure PBS and PAS

Unconfigure PBS and PAS before uninstalling the Remote Sessions component.

 **CAUTION:** It is advisable that you run the installer when critical jobs are not running as both PBS and PAS are restarted during the uninstallation process.

On the PBS Server, this uninstallation process will:

- delete the custom resource *ngpus*
- remove the interactive queue called "iworkq"
- restart PBS Professional

On the PAS Server, this installation will:

- remove the GlxSpheres application definition.
- restart PAS

The below steps must be run on both the PBS Server and the PAS Server. When the PBS Server and PAS are installed on the same machine, then these steps only need to be run once.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Stop Access Web:

```
service pbsworks-pa stop
```
3. Login to the machine where the PBS Server/PAS is installed as root or as a user with sudo permissions.
4. Navigate to the directory where the Remote Sessions installation binary is located.
5. Enter the command:

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

6. If you are uninstalling the Remote Sessions 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
```

7. Read the introduction and press ENTER.
8. Page through the license agreement by pressing ENTER until you are asked to accept its terms and conditions.
9. Accept the license agreement by entering Y and pressing ENTER.  
Four options are displayed.
10. Enter 3 (Unconfigure PBS and PAS Server) to unconfigure PBS and PAS and press ENTER.
11. The PBS/PAS Server are 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.

12. Stop Access Web:

```
service pbsworks-pa stop
```

## 12.2.2 Uninstall the Remote Sessions Component from the PBS MoMs

Uninstall the Remote Sessions component from the PBS MoMs.



**CAUTION:** It is advisable that you run the installer when critical jobs are not running as PBS is restarted during the uninstallation process.

The below steps must be repeated on every PBS MoM where the Remote Sessions component has been installed.

1. Login to the PBS MoM machine where the Remote Sessions component is installed as root or as a user with sudo permissions.
2. Choose one of the following options:
  - On Ubuntu platforms, navigate to the directory <MOM\_CLIENT\_MODULE>/remotesession/ubuntu/.
  - On all other Linux platforms, navigate to the directory: /opt/altair/pbsworks/<Version>/remotesessionagent/\_AltairAccessWeb\_RemoteSessionAgent\_<Version>\_installation

<MOM\_CLIENT\_MODULE> is the location where Modern Communication Module is distributed. For example, /access/mcm/momclientmodules.
3. Choose one of the following options:
  - On Ubuntu platforms, execute the uninstall script by entering the following command:

```
./uninstall.sh
```

- On all other Linux platforms, execute the uninstall script by entering the following command:

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

The command must contain spaces with escape characters.

4. Follow the instructions provided by the uninstaller.

# Uninstall Access Web and its Components on Windows

Instructions for uninstalling Access Web, PAS and Remote Sessions component.

This chapter covers the following:

- [13.1 Uninstall Access Web on Windows](#) (p. 144)
- [13.2 Uninstall PAS on Windows](#) (p. 145)
- [13.3 Uninstall Agents on Windows](#) (p. 146)

## 13.1 Uninstall Access Web on Windows

Instructions for uninstalling Access Web on Windows.

1. Login to the Windows machine as an administrator where Access Web is installed.
2. Open Windows command line terminal and enter the command:
3. Check the Docker container ID using the following command:

```
docker ps -q
```

4. Stop the Docker container:

```
docker stop CONTAINER_ID
```

5. Remove the Docker container:

```
docker rm -f CONTAINER_ID
```

6. Remove the 2020.3 Docker image.



## 13.2 Uninstall PAS on Windows

Instructions for uninstalling PAS on Windows.

1. Stop PAS services:
  - a) Click **Start** and choose **Run**.
  - b) Type `services.msc` to open the Services Management Console.
  - c) Right-click the **AltairPASService** and click **Stop**.
2. Navigate to **Start > Control Panel > Programs and Features**.
3. Scroll down until you find the **AltairAccessWeb\_PAS** application.
4. Right-click the **AltairAccessWeb\_PAS** application, and then click **Uninstall/Change**.

## 13.3 Uninstall Agents on Windows

Instructions for uninstalling Remote Sessions Agent on Windows.

You have to perform the following steps in all the PBS MoM's.

1. Login in to PBS MoM machine where Remote Sessions Agent is installed.
2. Stop Remote Sessions Agent service.
  - a) Click **Start** and choose **Run**.
  - b) Type `services.msc` to open the Services Management Console.
  - c) Right-click the **RemoteSessionAgentService** and click **Stop**.
3. Remove `momclientmodules` folder from the configured directory
4. Navigate to **Start > Control Panel > Programs and Features**.
5. Scroll down until you find the **AltairAccessWeb\_RemoteSessionAgent\_2020.3** application.
6. Right-click the **AltairAccessWeb\_RemoteSessionAgent\_2020.3** application, and then click **Uninstall/Change**.

# Access Web Service Commands on Linux

# 14

Commands for starting, stopping, restarting and checking the status of Access Web on Linux.

This chapter covers the following:

- [14.1 Start Access Web](#) (p. 148)
- [14.2 Stop Access Web](#) (p. 149)
- [14.3 Restart Access Web](#) (p. 150)
- [14.4 Determine the Status of all Access Web Services](#) (p. 151)

The commands should be executed by the root or as a user with sudo permissions as defined in `/etc/pbsworks-pa.conf`.

## 14.1 Start Access Web

Start all Access Web services.

Access Web starts a watcher process which will monitor the status of Access Services. The watcher process automatically brings up any services that goes down abruptly.

Starting Access Web must be done as root or as a user with sudo permissions.

1. Login to the machine where Access Web is installed.
2. Enter the following command to start Access Web:

```
service pbsworks-pa start
```

## 14.2 Stop Access Web

Stop all Access Web services.

Stopping Access Web must be done as root or as a user with sudo permissions.

1. Login to the machine where Access Web is installed.
2. Enter the following command to stop Access Web:

```
service pbsworks-pa stop
```

## 14.3 Restart Access Web

Restart all Access Web services.

Restarting Access Web must be done as root or as a user with sudo permissions.

1. Login to the machine where Access Web is installed.
2. Enter the following command to restart Access Web:

```
service pbsworks-pa restart
```

## 14.4 Determine the Status of all Access Web Services

Determine whether a Access Web service is up or down.

1. Login to the machine where Access Web is installed.
2. Enter the following command to display the status of each Access Web service:

```
service pbsworks-pa status
```

Messages similar to the following are displayed:

```
PBSWORKS_EXEC =>/opt/altair/pbsworks/2020.3/access/exec
PBSWORKS_HOME =>/var/spool/pbsworks/2020.3/access/home
PAS_REPO: => /var/spool/pbsworks/2020.3/access/home//data/pas/

api_gateway_service is Running (13328) [OK]
database_service is Running (Database) [OK]
message_broker_service is Running (Messaging service) [OK]
ams_service is Running (13811) [OK]
pa_service is Running (13887) [OK]
executor_service is Running (13964) [OK]
displaymanager_service is Running (14042) [OK]
resultmanager_service is Running (14121) [OK]
pas_message_broker_service is Running (Nats Service!) [OK]
resultservice_service is Running (14405) [OK]
pas_service is Running (14654) [OK]
```

# Access Web Service Commands on Windows

15

Commands for starting, stopping, restarting and checking the status of Access Web on Windows.

This chapter covers the following:

- [15.1 Access Web Service Commands](#) (p. 153)
- [15.2 PBS Application Services Service Commands](#) (p. 154)
- [15.3 Remote Sessions Service Commands](#) (p. 155)



## 15.1 Access Web Service Commands

Access Web service commands on Windows.

### 15.1.1 Start Access Web on Windows

Start Access Web services.

1. Login to the Access Web Docker container using the following command:

```
docker exec -it windows_access bash
```

2. Start Access Web using the following command:

```
service pbsworks-pa start
```

### 15.1.2 Stop Access Web on Windows

Stop Access Web services.

1. Login to the Access Web Docker container using the following command:

```
docker exec -it windows_access bash
```

2. Stop Access Web using the following command:

```
service pbsworks-pa stop
```

### 15.1.3 Restart Access Web on Windows

Restart Access Web services.

1. Login to the Access Web Docker container using the following command:

```
docker exec -it windows_access bash
```

2. Restart Access Web using the following command:

```
service pbsworks-pa restart
```

### 15.1.4 Status of Access Web on Windows

Status of Access Web services.

1. Login to the Access Web Docker container using the following command:

```
docker exec -it windows_access bash
```

2. Check the status of Access Web using the following command:

```
service pbsworks-pa status
```

## 15.2 PBS Application Services Service Commands

PAS service commands on Windows.

### 15.2.1 Start PAS Service

Start PAS services.

1. Click **Start** and choose **Run**.
2. Type `services.msc` to open the Services Management Console.
3. Right-click **AltairPASService**.
4. Click **Start**.

Once the service is started, the status of the service will be displayed as **Started**.

### 15.2.2 Stop PAS Service

Stop PAS services.

1. Click **Start** and choose **Run**.
2. Type `services.msc` to open the Services Management Console.
3. Right-click **AltairPASService**.
4. Click **Stop**.

Once the service is stopped, the status of the service will be displayed as **Stopped**.

### 15.2.3 Restart PAS Service

Restart PAS services.

1. Click **Start** and choose **Run**.
2. Type `services.msc` to open the Services Management Console.
3. Right-click **AltairPASService**.
4. Click **Restart**.

Once the service is restarted, the status of the service will be displayed as **Restarted**.

## 15.3 Remote Sessions Service Commands

Remote Sessions service commands on Windows.

### 15.3.1 Start Remote Sessions Service

Start Remote Sessions services.

1. Click **Start** and choose **Run**.
2. Type `services.msc` to open the Services Management Console.
3. Right-click **RemoteSessionAgentService**.
4. Click **Start**.

Once the service is started, the status of the service will be displayed as **Started**.

### 15.3.2 Stop Remote Sessions Service

Stop Remote Sessions services.

1. Click **Start** and choose **Run**.
2. Type `services.msc` to open the Services Management Console.
3. Right-click **RemoteSessionAgentService**.
4. Click **Stop**.

Once the service is stopped, the status of the service will be displayed as **Stopped**.

### 15.3.3 Restart Remote Sessions Service

Restart Remote Sessions services.

1. Click **Start** and choose **Run**.
2. Type `services.msc` to open the Services Management Console.
3. Right-click **RemoteSessionAgentService**.
4. Click **Restart**.

Once the service is restarted, the status of the service will be displayed as **Restarted**.

Add, update, or delete HPC clusters.

This chapter covers the following:

- [16.1 Add a Server Cluster](#) (p. 157)
- [16.2 Edit a Server Cluster](#) (p. 161)
- [16.3 Delete a Server Cluster](#) (p. 163)

## 16.1 Add a Server Cluster

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

A server cluster is a PAS Server that is connected to an HPC complex. Before you can submit a job, a server cluster must be added. Only users that have been assigned a Manager role can add a server cluster. The Service User entered during the installation of Access Web is automatically assigned a Manager role.

When Access Web is installed on the same machine as PAS, a default local server is automatically added, eliminating the need for the Service User to add a server. Users can begin submitting jobs immediately. Access to the local filesystem is also configured through the default server. By default, users have access to the Job File Stage Area directory (default is `/stage`) that is defined at installation. Edit the default server to configure access to additional directories such as user home directories, for example `/home`.

Configure the default home location of users when you register a PAS server. Environment variables can be used to define the user's default home location like `$HOME` representing the PAS home directory and `$USER_HOME` or `%U` representing username. Access Web will display the contents of the user's home directory path when the user logs into Access Web.

The following are examples for setting the user's home directory:

In Linux : `/stage`, `/home`, `/stage/$USER`, `/home/$USER/project`

In Windows: `C:/stage`, `C:/Users`, `C:/%HOMEPATH%`, `C:/%HOMEPATH%/project`



**Note:** The user's credentials should be available in the PAS server when you define the home location path with the user (`$USER_HOME` or `%U`).

An **Autocreate Directory** option is provided while adding a server cluster and it is set to true. This will create the root directory specified if it is not available in PAS.

1. Choose one of the following options:

- If no servers have been configured, click the **Configure one or more servers** link.
- Click and then click **Add**.

The Add Server Cluster screen is displayed.

**Add Server Cluster**  
All fields are required

Server Name

URL

User Name

Password

Root Dir

Default Root Dir  ☒ Autocreate Directory

Figure 13: Add Server 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 `https://<hostname>:5243/pas` where `<hostname>` is the hostname of the machine where the PAS Server is installed.

 **Note:** It is recommended to add a server 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 account and password must be available on the PAS Server.
5. For **Root Dir**, enter the pathname where user job input and result files are stored.

Ex: `/home`, `/users`, `/stage`, `/stage/$USER`, `/home/$USER/project`, `C:/stage`, `C:/Users`, `C:/%HOMEPATH%`, `C:/%HOMEPATH%/project`

 **Note:** Add parent directory of all Users home during server registration to make home button work.

6. Click  if you want to add another **Root Dir** and enter the pathname.

**Add Server Cluster**  
All fields are required

Server Name

URL

User Name

Password

Root Dir   
 ×

Default Root Dir  ☒ Autocreate Directory

Figure 14: Multiple Root Directory Entry

7. Select the default root directory to be displayed from the **Default Root Dir** drop-down menu.

**Add Server Cluster**  
All fields are required

Server Name

URL

User Name

Password

Root Dir   
 ×  
 ×

Default Root Dir  ☒ Autocreate Directory

Figure 15: Default Root Directory

8. Optional: Click **Autocreate Directory** checkbox if you do not want the root directory to be created.



**Tip:** By default, auto create directory option is set to true to create the root directory specified if it is not available in PAS.

9. Click **Add**.  
If the server cluster is added successfully, then a notification is displayed.



**Note:** A notification is displayed to all users logged into Access Web when a server cluster gets added, edited, deleted, if it goes down or if it is unreachable.

10. Repeat steps 2 through 9 to add additional server clusters.

11. Click **Done**.

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

Manage Servers

Available

Not Available

| Name                  | Url                           | Last Seen On          | Last Modified         | Details   |  |
|-----------------------|-------------------------------|-----------------------|-----------------------|-----------|--|
| <div>cluster</div>    | https://172.16.80.18:5243/pas | 8/25/2020, 3:50:45 PM | 8/25/2020, 3:50:17 PM | Available |  |
| <div>hpccluster</div> | https://localhost:5243/pas    | 8/25/2020, 3:50:45 PM | 8/25/2020, 3:31:16 AM | Available |  |

Figure 16: Server Clusters List

The green color next to the server cluster indicates that it is available to use. The red color indicates that the server is not available.

The **Details** column provides the reason when a server cluster is not available. Mouse hover the **Details** column of a server cluster to view the error message.

Manage Services

Available

Not Available

| Name                  | Uri                           | Last Seen On           | Last Modified          | Details                                                                                                                                                                                             |  |
|-----------------------|-------------------------------|------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <div>cluster</div>    | https://172.16.18.80:5243/pas | 11/29/2019, 5:29:10 AM | 11/29/2019, 5:23:59 AM | I/O error on GET request for "https://172.16.18.80:5243/"; nested exception is org.apache.http.conn.ConnectTimeoutException: Connect to 172.16.18.80:5243 [/172.16.18.80] failed: connect timed out |  |
| <div>hpccluster</div> | https://localhost:5243/pas    | 11/29/2019, 5:27:40 AM |                        |                                                                                                                                                                                                     |  |

Figure 17: Server Cluster Details

**See Also**  
[Troubleshoot PBS Application Services](#)



## 16.2 Edit a Server Cluster

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

 **Note:** Only a user that has been assigned a Manager role can edit a server cluster.

**1.** Click .

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

Manage Servers Add

■ Available ■ Not Available

| Name                                             | Url                           | Last Seen On          | Last Modified         | Details   |  |
|--------------------------------------------------|-------------------------------|-----------------------|-----------------------|-----------|--|
| <span style="color: green;">■</span> cluster     | https://172.16.80.18:5243/pas | 8/25/2020, 3:50:45 PM | 8/25/2020, 3:50:17 PM | Available |  |
| <span style="color: green;">■</span> hpcccluster | https://localhost:5243/pas    | 8/25/2020, 3:50:45 PM | 8/25/2020, 3:31:16 AM | Available |  |

Figure 18: Manage Servers

**2.** Right-click the cluster that you want to edit.

**3.** Click **Edit** from the context menu.

Manage Servers Add

■ Available ■ Not Available

| Name                                             | Url                           | Last Seen On          | Last Modified         | Details   |  |
|--------------------------------------------------|-------------------------------|-----------------------|-----------------------|-----------|--|
| <span style="color: green;">■</span> cluster     | https://172.16.80.18:5243/pas | 8/25/2020, 4:26:50 PM | 8/25/2020, 3:50:17 PM | Available |  |
| <span style="color: green;">■</span> hpcccluster | https://localhost:5243/pas    | 4:26:50 PM            | 8/25/2020, 3:31:16 AM | Available |  |

Figure 19: Cluster Edit Option

The Edit Server Cluster screen is displayed.

**Edit Server Cluster**  
All fields are required

Server Name

URL

User Name

Password

Root Dir

Default Root Dir  ☒ Autocreate Directory

Figure 20: Edit Server Cluster

**4.** Update the server cluster information.

**5.** Click **Save**.



**Note:** A notification is displayed to all users logged into Access Web when a server cluster gets added, edited, deleted, if it goes down or if it is unreachable.

6. Click **Done**.

## 16.3 Delete a Server Cluster

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

 **Note:** Only a user that has been assigned a Manager role can delete a server cluster.

1. Click .

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

Manage Servers Add

■ Available ■ Not Available

| Name          | Url                           | Last Seen On          | Last Modified         | Details   |  |
|---------------|-------------------------------|-----------------------|-----------------------|-----------|--|
| ■ cluster     | https://172.16.80.18:5243/pas | 8/25/2020, 3:50:45 PM | 8/25/2020, 3:50:17 PM | Available |  |
| ■ hpcccluster | https://localhost:5243/pas    | 8/25/2020, 3:50:45 PM | 8/25/2020, 3:31:16 AM | Available |  |

Figure 21: Manage Servers

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

Manage Servers Add

■ Available ■ Not Available

| Name          | Url                           | Last Seen On          | Last Modified         | Details   |  |
|---------------|-------------------------------|-----------------------|-----------------------|-----------|--|
| ■ cluster     | https://172.16.80.18:5243/pas | 8/25/2020, 4:21:40 PM | 8/25/2020, 3:50:17 PM | Available |  |
| ■ hpcccluster | https://localhost:5243/pas    |                       | 8/25/2020, 3:31:16 AM | Available |  |

Figure 22: 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 Access Web when a server cluster gets added, edited, deleted, if it goes down or if it is unreachable.

5. Click **Done**.

Advanced configurations for Access Web and its services.

This chapter covers the following:

- [17.1 Configure Single Sign-On](#) (p. 165)
- [17.2 Configure the Access Web Component](#) (p. 170)
- [17.3 Configure PBS Application Services](#) (p. 213)
- [17.4 Configure the Remote Sessions Component](#) (p. 221)
- [17.5 Configure Results Visualization Service](#) (p. 236)

## 17.1 Configure Single Sign-On

Configure Single Sign-On (SSO) with Active Directory Federation Server (AD FS) 2.0 using Security Assertion Markup Language (SAML) protocol.

Configuring Single Sign-On will enable clients who are logged into a domain to access the application without providing credentials a second time.

### 17.1.1 Prerequisite for Single Sign-On

Mandatory requirements for Single Sign-On.

The following are the general prerequisites for installation:

- Active Directory Federation Server (AD FS) 2.0 should be installed and configured on Windows Server machine.
- Access server should be able to reach AD FS server using its Fully Qualified Domain Name (FQDN).
- Access server machine should be configured against AD for identity provider (System Security Services Daemon in Linux).

### 17.1.2 Configure Single Sign-On on Linux

Configure Access Web to allow clients who are logged into a domain to access the application without providing credentials a second time.

 **Note:** By default SSO is disabled.

The following steps must be done as root or as a user with sudo permissions.

1. Using a browser, navigate to the following URL to download the Identity Provider (IDP) metadata file:

```
https://<adfserver>/FederationMetadata/2007-06/FederationMetadata.xml
```

Where *adfserver* is the AD FS server FQDN.

The metadata file begins to download.

2. Login to the machine where Access Web is installed.
3. Source the Access Web configuration file to set up the environment variables `PA_HOME` and `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```
4. Copy the downloaded metadata XML file to the location `$PA_HOME/config/sp/metadata/idp.xml`.
5. Edit the file `$PA_HOME/config/ams/jaas-config/AA_jaas.config` to configure the Java Authentication and Authorization Service (JAAS) module.

```
vi $PA_HOME/config/ams/jaas-config/AA_jaas.config
```
6. Add the below line under LoginModule.

```
com.altair.jaas.module.PasswordLessLoginModule Sufficient;
```

The `AA_jaas.config` file after adding the line will be as shown below:

```
LoginModule {
 com.altair.jaas.module.PasswordLessLoginModule Sufficient;
 com.altair.jaas.module.SSHUnixLoginModule Required
 host="localhost"
 port="22"
 cache_ttl="60"
 debug=false;
};
```

7. Edit the file `PA_HOME/config/sp/securityContext.xml` to configure the user-facing Access server domain name or IP address.

```
vi $PA_HOME/config/sp/securityContext.xml
```

8. Update `entityBaseURL` with the domain name or IP address in `metadataGeneratorFilter` configuration.

For example,

```
<property name="entityBaseURL" value="https://localhost:4443/pbsworks/sp/auth"/>
```

9. Update `serverName` with your domain name or IP address in `contextProvider` configuration.

For example,

```
<property name="serverName" value="localhost"/>
```

10. Edit the file `PA_HOME/config/pa/configuration.json` to enable SSO.

11. Enable SSO by changing the value of the `enableSSO` key to true.

```
enableSSO = true
```

12. Start Access Web using the following command:

```
service pbsworks-pa start
```

### 17.1.3 Configure Single Sign-On on Windows

Configure Access Web to allow clients who are logged into a domain to access the application without providing credentials a second time.

 **Note:** By default SSO is disabled.

The following steps must be done as root or as a user with sudo permissions.

1. Using a browser, navigate to the following URL to download the Identity Provider (IDP) metadata file:

```
https://<adfserver>/FederationMetadata/2007-06/FederationMetadata.xml
```

Where `adfserver` is the AD FS server FQDN.

The metadata file begins to download.

2. Login to the machine where the Access Web is installed.
3. Copy the downloaded XML file to the location `PAS_HOME/config/sp/metadata/idp.xml`.
4. Edit the file `PAS_HOME/config/ams/jaas-config/AA_jaas.config` to configure the Java Authentication and Authorization Service (JAAS) module.

5. Add the below line under LoginModule.

```
com.altair.jaas.module.PasswordLessLoginModule Sufficient;
```

The AA\_jaas.config file after adding the line will be as shown below:

```
LoginModule {
 com.altair.jaas.module.PasswordLessLoginModule Sufficient;
 com.altair.jaas.module.ProcessRunnerWindowsLoginModule required

 process_runner_path="C:/Program Files/altair/pas/2020.3/PAS/home/data/
 ams/native/win64/ProcessRunner.exe";
};
```

6. Edit the file PAS\_HOME/config/sp/securityContext.xml to configure the user-facing Access server domain name or IP address.

7. Update entityBaseURL with the domain name or IP address in metadataGeneratorFilter configuration.

For example,

```
<property name="entityBaseURL" value="https://localhost:4443/pbsworks/sp/auth"/>
```

8. Update serverName with your domain name or IP address in contextProvider configuration.

For example,

```
<property name="serverName" value="localhost"/>
```

9. Start PAS services:

- a) Click **Start** and choose **Run**.
- b) Type services.msc to open the Services Management Console.
- c) Right-click the **AltairPASService** and click **Stop**.

10. Login to the Access Web Docker container using the following command:

```
docker exec -it windows_access bash
```

11. Edit the file PA\_HOME/config/pa/configuration.json to enable SSO.

12. Enable SSO by changing the value of the enableSSO key to true.

```
enableSSO = true
```

## 17.1.4 Configure AD FS as an Identity Provider

Configure AD FS as an identity provider using the service provider metadata.

The workflow to configure AD FS as an identity provider is as follows:

- Get the metadata.xml from Access Server.
- Import the data into AD FS.
- Add rules.
- Change to SHA-1.



**Note:** These are general steps for configuring the AD FS as an identify provider. Steps may vary depending upon your site's version of Windows.

1. Using a browser, navigate to the following URL:

`https://<accessserver>:4443/pbsworks/sp/auth/saml/metadata`

where *accessserver* is the FQDN or IP Address of the machine where Access Web is installed..

2. Save the content of the metadata file as `metadata.xml`.
3. Upload the `metadata.xml` to the AD FS server.
4. Open AD FS 2.0 Management snap-in from **Start > Administrative Tools > ADFS 2.0 Management > Add Relying Party Trust**.
5. Select **Import data about the relying party from a file** and upload the metadata XML file. The wizard may complain that some content of metadata is not supported. You can safely ignore this warning.
6. On the **Ready to Add Trust** ensure that tab endpoints contains multiple endpoint values. If not, verify that your metadata was generated with HTTPS protocol URLs.
7. Verify that **Open the Edit Claim Rules dialog** is checked.
8. Select **Add Rule**, choose **Send LDAP Attributes as Claims** and click **Next**.
9. Update the following information:
  - Enter *NameID* for Claim rule name.
  - Choose *Active Directory* for Attribute store.
  - Choose *SAM-Account-Name* as LDAP Attribute.
  - Enter *Name ID* as Outgoing claim type.
10. Double-click the provider and select **Advanced** tab.
11. Change *Secure hash algorithm* to SHA-1.

## 17.1.5 Verify Single Sign-On on Linux or Windows

Verify if Single Sign-On is enabled on Linux or on Windows.

1. Open a supported web browser.
2. Enter the URL `https://<hostname>:4443/pbsworks` in the address bar.  
where *<hostname>* is the IP address or hostname of the machine where Access Web is installed.  
The Access Web server will redirect to authenticate against the AD FS server.
3. Enter your credentials.  
The credentials will be authenticated and the Access Web user interface is displayed.

## 17.1.6 Disable Single Sign-On

### Disable Single Sign-On on Linux

Disable Single Sign-On so that users are forced to enter their credentials when logging into Access Web. The following steps must be done as root or as a user with sudo permissions.

1. Login to the machine where the Access Web is installed.



2. Edit the file `PA_HOME/config/pa/configuration.json` to disable SSO.
3. Disable SSO by changing the value of the *enableSSO* key to false.  
`enableSSO = false`
4. Refresh the browser.

## Disable Single Sign-On on Windows

Disable Single Sign-On so that users are forced to enter their credentials when logging into Access Web. The following steps must be done as root or as a user with sudo permissions.

1. Login to the Access Web Docker container using the following command:  
`docker exec -it windows_access bash`
2. Edit the file `PA_HOME/config/pa/configuration.json` to disable SSO.
3. Disable SSO by changing the value of the *enableSSO* key to false.  
`enableSSO = false`
4. Refresh the browser.

## 17.2 Configure the Access Web Component

Configurations required for Access Web component.

### 17.2.1 Change Port Numbers

Change the default port numbers used by Access Web.

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

The Access Web installer has auto-port detection logic in place and ports will be picked up by each service within the specified range. Refer to [Ports Used by Access Web](#).

To allocate specific port to each of the service, then follow the steps mentioned in below topics:

#### Change the Gateway Port Number

Change the port that the Gateway service listens on.

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

For information on default port and port range, refer to [Ports Used by Access Web](#).

The gateway port number has to be updated in the files:

- `nginx.conf`
- `rm_servers.xml`
- `dmrest.properties`

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/api_gateway/nginx.conf`
3. Update the value of `listen` of server:

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

4. Edit the file `PA_HOME/config/resultmanager/rm_servers.xml`
5. Update the value in `<PAServerURL>`.

```
<PAServerURL>https://localhost:4443</PAServerURL>
```

6. Edit the file `PA_HOME/config/displaymanager/dmrest.properties`
7. Update value of `pbsaccess.api_gateway.service.host`.

```
pbsaccess.api_gateway.service.host=https://localhost:4443/
```

8. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Web Server Port Number

Change the port that the Access Web server listens on.

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

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

- server.xml
- nginx.conf
- dmrest.properties
- dmrest.properties.template

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/pa/tomcat/conf/server.xml`
3. Search for the Connector port and update with the new port number.

```
<Connector port="4543" protocol="HTTP/1.1" address="127.0.0.1"
 scheme="https" compression="on" compressionMinSize="2048"
 noCompressionUserAgents="gozilla, traviata"
 compressableMimeType="text/html,text/xml,text/javascript,text/
css,application/javascript,text/plain,application/json"
 useSendfile="false" secure="true" SSLEnabled="true"
 clientAuth="false" sslEnabledProtocols="TLSv1,TLSv1.1,TLSv1.2"
 keystoreFile="${PBSWORKS_HOME}/config/shared/access.keystore"
 keystorePass="k86BCuq3mLrCqUGZVj3n9DupJ2ePqv" keyAlias="pbsworks"
 ciphers="TLS_RSA_WITH_AES_128_CBC_SHA,SSL_RSA_WITH_RC4_128_SHA"/>
```

4. Edit the file `PA_HOME/config/api_gateway/nginx.conf`
5. Update the port number of `server localhost`.

```
env STORAGE_SERVICE_PORT=4543;

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

6. Edit the file `PA_HOME/config/displaymanager/dmrest.properties`.
7. Update the port number of `pbsaccess.storage.service.host`.  
`pbsaccess.storage.service.host=https://localhost:4543/storage`
8. Edit the file `PA_HOME/config/displaymanager/dmrest.properties.template`.
9. Update the port number of `pbsaccess.storage.service.host`.  
`pbsaccess.storage.service.host=https://localhost:4543/storage`
10. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Postgres Port Number

Change the port that Postgres listen on.

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

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`

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_EXEC/database/scripts/configure.sh`.
3. Update the port number of `PG_PORT`.

```
PG_PORT=4643;
```

4. Edit the file Navigate to `PA_HOME/config/shared/app.properties`.

5. Update the port number of `spring.datasource.url`.

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

6. Navigate to `PA_EXEC/init/`
7. Run the command:

```
./reconfigure-pa.sh
```

## Change the Message Broker Port Number

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

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

The Message Broker port number has to be updated in the files:

- `message-app.properties`
- `env`
- `activemq.xml`.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/shared/message-app.properties`.
3. Update the port number of `pbsworks.messaging.broker.url`.

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

4. Edit the file `PA_EXEC/shared/thirdparty/apache/activemq/bin/env`.

5. Update the port number of `ACTIVEMQ_QUEUEMANAGERURL`.

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

6. Edit the file `PA_EXEC/shared/thirdparty/apache/activemq/conf/activemq.xml`.
7. Update the port number of `uri`.

```
<transportConnector name="openwire"
uri="tcp://127.0.0.1:4743?
maximumConnections=1000&wireFormat.maxFrameSize=104857600>
```

8. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Remote Sessions Proxy Port Number

Change the port that the Remote Sessions Proxy (GUACD) listens on.

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

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

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

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `/etc/guacamole/guacd.conf`.
3. Update the port number of `bind_port`.

```
bind_port = 5443
```

4. Edit the file `PA_HOME/config/displaymanager/guacamole.properties`.
5. Update the port number of `guacd-port`.

```
guacd-port: 5443
```

6. Edit the file `PA_HOME/config/displaymanager/guacamole.properties.template`.
7. Update the port number of `guacd-port`.

```
guacd-port: 5443
```

8. Start Access Web by entering the command:

```
service pbsworks-pa start
```

9. Restart the Interactive Proxy by entering the command:

```
/etc/init.d/guacd start
```

## Change the Remote Sessions Web Server Port Number

Change the port that the Remote Sessions Web Server listens on.

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

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

- `server.xml`

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

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/displaymanager/tomcat/conf/server.xml`.
3. Search for the Connector port and update the new port number.

```
<Connector port="4843" protocol="HTTP/1.1" address="127.0.0.1"
 scheme="https" compression="on" compressionMinSize="2048"
 noCompressionUserAgents="gozilla, traviata"
 compressableMimeType="text/html,text/xml,text/javascript,text/
css,application/javascript,text/plain,application/json"
 useSendfile="false" secure="true" SSLEnabled="true"
 clientAuth="false"
 sslEnabledProtocols="TLSv1,TLSv1.1,TLSv1.2"
 keystoreFile="{$PBSWORKS_HOME}/config/shared/access.keystore"
 keystorePass="k86BCuq3mLrCqUGZVj3n9DupJ2ePqv" keyAlias="pbsworks"
 ciphers="TLS_RSA_WITH_AES_128_CBC_SHA,SSL_RSA_WITH_RC4_128_SHA"/>
```

4. Edit the file `PA_HOME/config/api_gateway/nginx.conf`.

5. Update the port number of `server localhost`.

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

6. Edit the file `PA_HOME/config/displaymanager/guacamole.properties`.

7. Update the port number in `dm-host`.

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

8. Edit the file `PA_HOME/config/displaymanager/guacamole.properties.template`.

9. Update the port number in `dm-host`.

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

10. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Remote Sessions Job Update Port Number

Change the port that the Remote Sessions Job Update listens on.

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

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

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/displaymanager/dmrest.properties`.

3. Update the port number of `jobsub.monitor.port`.

```
jobsub.monitor.port=4943
```

4. Edit the file `PA_HOME/config/displaymanager/dmrest.properties.template`

5. Update the port number of `jobsub.monitor.port`.

```
jobsub.monitor.port=4943
```

6. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Result Manager Services Port Number

Change the port that the Result Manager Services listens on.

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

The Result Manager Services port number has to be updated in the files `server.xml` and `nginx.conf`.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/resultmanager/tomcat/conf/server.xml`.
3. Search for the Connector port and update the new port number.

```
<Connector port="5043" maxThreads="200" address="127.0.0.1" scheme="https"
 compression="on" compressionMinSize="2048" noCompressionUserAgents="gozilla,
 traviata"
 compressableMimeType="text/html,text/xml,text/javascript,text/
 css,application/javascript,text/plain,application/json"
 useSendfile="false" secure="true" SSLEnabled="true" clientAuth="false"
 sslProtocols="TLSv1, TLSv1.1, TLSv1.2"
 keystoreFile="{PBSWORKS_HOME}/config/shared/access.keystore"
 keystorePass="k86BCuq3mLrCqUGZVj3n9DupJ2ePqv" keyAlias="pbsworks"
 ciphers="TLS_RSA_WITH_AES_128_CBC_SHA,SSL_RSA_WITH_RC4_128_SHA"/>
```

4. Edit the file `Navigate to PA_HOME/config/api_gateway/nginx.conf`.
5. Update the port number of `server localhost`.

```
upstream resultmanager {
 server localhost:5043;
}
```

6. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Result Core Services Port Number

Change the port that the Result Core Services listens on.

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

The Result Core Services port number has to be updated in the files `server.xml`, `rm.servers.xml` and `resultmanager.conf`.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/resultservice/tomcat/conf/server.xml`.
3. Search for the Connector port and update the new port number.

```
<Connector port="5143" maxThreads="200" address="127.0.0.1" scheme="https"
 compression="on" compressionMinSize="2048" noCompressionUserAgents="gozilla,
 traviata"
 compressableMimeType="text/html,text/xml,text/javascript,text/
 css,application/javascript,text/plain,application/json"
 useSendfile="false" secure="true" SSLEnabled="true" clientAuth="false"
 sslProtocols="TLSv1, TLSv1.1, TLSv1.2"
 keystoreFile="${PBSWORKS_HOME}/config/shared/access.keystore"
 keystorePass="k86BCuq3mLrCqUGZVj3n9DupJ2ePqv" keyAlias="pbsworks"
 ciphers="TLS_RSA_WITH_AES_128_CBC_SHA,SSL_RSA_WITH_RC4_128_SHA"/>
```

4. Edit the file `PA_HOME/config/resultmanager/rm.servers.xml`.

5. Update the port number in `RVSServerURL`.

```
<RVSServerURL>https://localhost:5143</RVSServerURL>
```

6. Edit the file `PA_HOME/config/api_gateway/default.d/resultmanager.conf`

7. Update the port number in `proxy_pass`:

```
proxy_pass https://localhost:5143/resultservice;
```

8. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the PBS Application Services Port Number

Change the port that the PAS listens on.

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

The PAS port number has to be updated in the files `server.xml` and `nginx.conf`.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/pas/tomcat/conf/server.xml`.
3. Search for the Connector port and update the new port number.

```
<Connector port="5243" protocol="HTTP/1.1" maxThreads="200"
 scheme="https" compression="on" compressionMinSize="2048"
 noCompressionUserAgents="gozilla, traviata"
 relaxedPathChars="[]|{}^\`"<>"
 relaxedQueryChars="[]|{}^\`"<>"
 compressableMimeType="text/html,text/xml,text/javascript,text/
 css,application/javascript,text/plain,application/json"
 useSendfile="false" secure="true" SSLEnabled="true"
 clientAuth="false"
 sslEnabledProtocols="TLSv1,TLSv1.1,TLSv1.2"
 keystoreFile="${PBSWORKS_HOME}/config/shared/access.keystore"
 keystorePass="k86BCuq3mLrCqUGZVj3n9DupJ2ePqv" keyAlias="pbsworks"
 ciphers="TLS_RSA_WITH_AES_128_CBC_SHA,SSL_RSA_WITH_RC4_128_SHA"/>
```

4. Edit the file `PA_HOME/config/api_gateway/nginx.conf`.

5. Update the port number of `env PAS_SERVICE_PORT`.

```
env PAS_SERVICE_PORT=5243;
```

6. Start Access Web by entering the command:

```
service pbsworks-pa start
```



## Change the PAS Messaging Port Number

Change the port that the PAS messaging service listens on.

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

The PAS messaging service port number has to be updated in the files `nats-server.conf`, `server.conf` and `application.properties`.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/shared/nats-server.conf`.
3. Update the port number of `port`.

```
port: 4222
```

4. Edit the file `PA_HOME/config/pas/conf/server.conf`.
5. Update the port number of `MQ_PORT`.

```
#message broker port
MQ_PORT=4222
```

6. Edit the file `PA_HOME/config/joboperation/application.properties`.
7. Update the port number of `mq.port`.

```
mq.port=4222
```

8. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Job Profile Services Port Number

Change the port that the Job Profile Services listens on.

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

The job profile services port number has to be updated in the files `server.xml` and `nginx.conf`.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/jobprofiles/tomcat/conf/server.xml`.
3. Search for the Connector port and update the new port number.

```
<Connector port="5343" maxThreads="200" scheme="https"
 compression="on" compressionMinSize="2048" noCompressionUserAgents="gozilla,
 traviata"
 compressableMimeType="text/html,text/xml,text/javascript,text/
 css,application/javascript,text/plain,application/json"
 useSendfile="false" secure="true" SSLEnabled="true" clientAuth="false"
 sslProtocols="TLSv1, TLSv1.1, TLSv1.2"
 keystoreFile="{PA_HOME}/config/shared/access.keystore"
 keystorePass="k86BCuq3mLrCqUGZVj3n9DupJ2ePqv" keyAlias="pbsworks"
 ciphers="TLS_RSA_WITH_AES_128_CBC_SHA,SSL_RSA_WITH_RC4_128_SHA"/>
```

4. Edit the file `PA_HOME/config/api_gateway/nginx.conf`.
5. Update the port number of `server localhost`.

```
upstream jobprofiles {
 server localhost:5343;
}
```

6. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the AMS Port Number

Change the port that the Access Management Services listens on.

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

The AMS port number has to be updated in the files:

- server.xml
- app.properties
- nginx.conf
- ServiceRegistry.json.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/ams/tomcat/conf/server.xml`.
3. Search for the Connector port and update the new port number.

```
<Connector port="5543" protocol="HTTP/1.1" address="127.0.0.1"
 scheme="https" compression="on" compressionMinSize="2048"
 noCompressionUserAgents="gozilla, traviata"
 compressableMimeType="text/html,text/xml,text/javascript,text/
css,application/javascript,text/plain,application/json"
 useSendfile="false" secure="true" SSLEnabled="true"
 clientAuth="false" sslEnabledProtocols="TLSv1,TLSv1.1,TLSv1.2"
 keystoreFile="${PBSWORKS_HOME}/config/shared/access.keystore"
 keystorePass="k86BCuq3mLrCqUGZVj3n9DupJ2ePqv" keyAlias="pbsworks"
 ciphers="TLS_RSA_WITH_AES_128_CBC_SHA,SSL_RSA_WITH_RC4_128_SHA"/>
```

4. Edit the file `PA_HOME/config/shared/app.properties`.

5. Update the port number of `pbsworks.ams.url`.

```
pbsworks.ams.url = https://localhost:5543/AAService
```

6. Edit the file `PA_HOME/config/api_gateway/nginx.conf`.

7. Update the port number of `server localhost`.

```
upstream amsservice {
 server localhost:5543;
}
```

8. Edit the file `PA_HOME/config/shared/token_handler_config/token_injector/ServiceRegistry.json`.

9. Update the port number in `service`.

```
{"service":[{"name":"ams","host":"localhost","port":"5543",
 "service_name":"AAService","scheme":"https"}]}
```

10. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Mobile Notification Service Port Number

Change the port that the mobile notification service listens on.

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

The mobile notification service port number has to be updated in the files `server.xml` and `nginx.conf`.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/mobile_notification_service/tomcat/conf/server.xml`.
3. Search for the Connector port and update the new port number.

```
<Connector port="5643" protocol="HTTP/1.1" address="127.0.0.1"
 scheme="https" compression="on" compressionMinSize="2048"
 noCompressionUserAgents="gozilla, traviata"
 compressableMimeType="text/html,text/xml,text/javascript,text/
css,application/javascript,text/plain,application/json"
 useSendfile="false" secure="true" SSLEnabled="true"
 clientAuth="false"
 sslEnabledProtocols="TLSv1,TLSv1.1,TLSv1.2"
 keystoreFile="${PBSWORKS_HOME}/config/shared/access.keystore"
 keystorePass="k86BCuq3mLrCqUGZVj3n9DupJ2ePqv" keyAlias="pbsworks"
 ciphers="TLS_RSA_WITH_AES_128_CBC_SHA,SSL_RSA_WITH_RC4_128_SHA"/>
```

4. Edit the file `PA_HOME/config/api_gateway/nginx.conf`.
5. Update the port number of server localhost.

```
upstream mobile_notification_service {
 server localhost:5643;
}
```

6. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the VNC Router Port Number

Change the port that the VNC router listens on.

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

The VNC router port number has to be updated in the file `nginx.conf` and `routing-service.properties`.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/remotesession_edgeserver/nginx.conf`.
3. Update the port number of proxy\_pass localhost.

```
stream {
 server {
 listen 5643;
 proxy_pass localhost:5743;
 }
}
```

4. Edit the file `PA_HOME/config/vnc_router/routing-service.properties`.

5. Update the port number of `router.service.port`.

```
router.service.port=5743
```

6. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Edge Gateway Port Number for Desktop

Change the port number of edge gateway proxy which is used for Desktop Remote Sessions.

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

The edge gateway port number has to be updated in the files `configuration.json` and `nginx.conf`.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/pa/configuration.json`.

3. Update the port number of `vncGatewayPort`.

```
"vncGatewayPort":5843
```

4. Edit the file `PA_HOME/config/remotesession_edgeserver/nginx.conf`.

5. Update the port number of `listen`.

```
stream {
 server {
 listen 5843;
 proxy_pass localhost:5743;
 }
}
```

6. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Edge Gateway Port Number for Web

Change the port number of Remote Sessions edge proxy for web-based connection when edge proxy is installed on a different machine.

You must stop Access Web before changing the port number. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on default port and port range, refer to [Ports Used by Access Web](#).

The edge gateway port number has to be updated in the files `proxy_loadbalancing.properties` and `nginx.conf`.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/displaymanager/proxy_loadbalancing.properties`.

3. Update the port number of `port`.

```
port:5943
```

4. Edit the file `PA_HOME/config/remotesession_edgeserver/nginx.conf`.

5. Update the port number of `listen`.

```
server {
 listen 5943 ssl;
 server_name localhost;
```

6. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## 17.2.2 Change Memory used by the Services

Change the default memory value used by the services in Access Web.

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

To change the default memory value used by the service, follow the steps mentioned in below topics:

### Change the Gateway Service Memory Value

Change the memory value of gateway service.

You must stop Access Web before changing the Java heap size. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on memory usage and its value, refer to [Memory Usage by Service](#).

 **Note:** You can add the following line in the configuration file if the memory value is not found:

```
jvm_options "-Xmx512m";
```

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/api_gateway/nginx.conf`.
3. Update the value of `jvm_options`:

```
jvm_options "-Xmx512m";
```

4. Start Access Web by entering the command:

```
service pbsworks-pa start
```

### Change the Access Web Server Service Memory Value

Change the memory value of Access Web server service.

You must stop Access Web before changing the Java heap size. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on memory usage and its value, refer to [Memory Usage by Service](#).

 **Note:** You can add the following line in the configuration file if the memory value is not found:

```
JAVA_OPTS="-Xmx512M"
```

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_EXEC/pa/scripts/setenv.sh`.
3. Update the value of `JAVA_OPTS`:

```
JAVA_OPTS="-Xmx512M"
```

4. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Message Broker (ActiveMQ) Service Memory Value

Change the memory value of message broker (ActiveMQ) service.

You must stop Access Web before changing the Java heap size. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on memory usage and its value, refer to [Memory Usage by Service](#).

 **Note:** You can add the following line in the configuration file if the memory value is not found:

```
ACTIVEMQ_OPTS_MEMORY="-Xms64M -Xmx512M"
```

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_EXEC/shared/thirdparty/apache/activemq/bin/env`.
3. Update the value of `ACTIVEMQ_OPTS_MEMORY`:

```
ACTIVEMQ_OPTS_MEMORY="-Xms64M -Xmx512M"
```

4. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Remote Sessions Webserver Service Memory Value

Change the memory value of remote session webserver service.

You must stop Access Web before changing the Java heap size. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on memory usage and its value, refer to [Memory Usage by Service](#).

 **Note:** You can add the following line in the configuration file if the memory value is not found:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_EXEC/displaymanager/scripts/setenv.sh`.
3. Update the value of `JAVA_OPTS`:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

4. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Result Manager Services Memory Value

Change the memory value of result manager services.

You must stop Access Web before changing the Java heap size. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on memory usage and its value, refer to [Memory Usage by Service](#).

 **Note:** You can add the following line in the configuration file if the memory value is not found:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_EXEC/resultmanager/scripts/setenv.sh`.
3. Update the value of `JAVA_OPTS`:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

4. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Result Core Services Memory Value

Change the memory value of result core services.

You must stop Access Web before changing the Java heap size. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on memory usage and its value, refer to [Memory Usage by Service](#).

 **Note:** You can add the following line in the configuration file if the memory value is not found:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_EXEC/resultservice/scripts/setenv.sh`.
3. Update the value of `JAVA_OPTS`:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

4. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Job Profile Services Memory Value

Change the memory value of job profile services.

You must stop Access Web before changing the Java heap size. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on memory usage and its value, refer to [Memory Usage by Service](#).

 **Note:** You can add the following line in the configuration file if the memory value is not found:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_EXEC/jobprofiles/scripts/setenv.sh`.

3. Update the value of `JAVA_OPTS`:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

4. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the AMS Services Memory Value

Change the memory value of AMS services.

You must stop Access Web before changing the Java heap size. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on memory usage and its value, refer to [Memory Usage by Service](#).

 **Note:** You can add the following line in the configuration file if the memory value is not found:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_EXEC/ams/scripts/setenv.sh`

3. Update the value of `JAVA_OPTS`:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

4. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Mobile Notification Services Memory Value

Change the memory value of mobile notification services.

You must stop Access Web before changing the Java heap size. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on memory usage and its value, refer to [Memory Usage by Service](#).

 **Note:** You can add the following line in the configuration file if the memory value is not found:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_EXEC/mobile_notification_service/scripts/setenv.sh`.



3. Update the value of `JAVA_OPTS`:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

4. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the Executor Services Memory Value

Change the memory value of executor services.

You must stop Access Web before changing the Java heap size. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on memory usage and its value, refer to [Memory Usage by Service](#).

 **Note:** You can add the following line in the configuration file if the memory value is not found:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_EXEC/executor/scripts/setenv.sh`.
3. Add the following line:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

4. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## Change the VNC Router Services Memory Value

Change the memory value of VNC router services.

You must stop Access Web before changing the Java heap size. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#). For information on memory usage and its value, refer to [Memory Usage by Service](#).

 **Note:** You can add the following line in the configuration file if the memory value is not found:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_EXEC/vnc_router/scripts/setenv.sh`.
3. Add the following line:

```
JAVA_OPTS="$JAVA_OPTS -Xmx512M"
```

4. Start Access Web by entering the command:

```
service pbsworks-pa start
```

## 17.2.3 Set 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)

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Navigate to `PA_HOME/config/pa/`
3. Edit the file `configuration.json`.
4. Change the value of the `doubleClickDelay`.

## 17.2.4 Change the Database Password

Change the database password to encrypted text.

If the Postgres database password is changed (via `passwd`, `yppasswd`, etc.), then Access Web will need to be updated with the new password.

The Postgres database password is stored in the `app.properties` file. The location of the file for a typical installation of Access Web is: `PA_HOME/config/shared/`

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Navigate to `PA_EXEC/shared/thirdparty/postgresql/bin/`
3. Execute the following command:

```
./psql -p <DB_PORT> -d pbsworks -U <DB_USER>
```

`DB_PORT` is database port, and `DB_USER` is database username.

For example,

```
./psql -p 4643 -d pbsworks -U pbsworks
```

4. Enter the existing password. The default password is `postgres`.
5. Enter `\password` in Postgres prompt.
6. Enter the new password.
7. Navigate to `PA_EXEC/init/`
8. Execute the following command:

```
./pa-encrypt.sh
```

9. Enter the new password given in [step 6](#).

This command will output the password in its encrypted format.

10. Navigate to `PA_HOME/config/shared/`
11. Edit the `app.properties` file and update the value of `spring.datasource.password` to the encrypted format of the new password.
12. Restart Access Web by entering the command:

```
service pbsworks-pa restart
```

## 17.2.5 Configure 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 default text viewer by double-clicking the files. 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.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
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.

## 17.2.6 Configure 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 after clicking on the Jobs tab are Job ID, Job Name, Job State, Creation Time and User Name. You can add or remove the `defaultGridColumnns` property value in the `jobpropertiesmap.json` file.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Navigate to `PA_HOME/config/pa/`
3. Open the `jobpropertiesmap.json` file.
4. Update the `defaultGridColumnns` value.

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

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

## 17.2.7 Change the File Opening behavior of a Remote Sessions 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 Access Web 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 Access Web will copy the file to execution node job directory and remote application will open with the copied file from job directory.

If your site does not have a cross-mounted file system that is accessible to both the PBS MoMs and the PBS Server, then you have two options for job submission:

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

When submitting an interactive job via Access Web, the Run from job directory field must be unchecked. You will need to do this every time you submit a job.

## 17.2.8 Configure Notifications for a Job State Change

Configure email notifications for a job state change.

Users of Access Web can configure email notifications when a job's state changes, including who will receive the email notification, and when the email will be sent. Currently, Access Web supports sending email notifications for the following job state changes:

- job is aborted
- job begins execution
- job finishes execution

However, the email will not be sent unless the application associated with the job has been configured accordingly. This is done through the application definition.

Each Access Web user must set their email preferences through the Access Web application.

1. Click .
2. Select **Preferences**.  
Access Web Preferences is displayed.

← Back

Preferences

Theme

Profile

Notifications

Files

Job Submission

Pagination

Tail Frequency

Persistence

RVS

Remote Session

Diagnosis

Theme

Theme name

Font Size

White

12px

Figure 23: Preferences

3. Double-click the **Email** field to enter additional email ID and press `Enter`.  
You can enter multiple email IDs separated by semi-colon (;).

4. Click **Job Submission** in the left menu.  
The Job Submission panel is displayed.

← Back

Preferences

Theme

Profile

Notifications

Files

Job Submission

Pagination

Tail Frequency

Persistence

RVS

Remote Session

Diagnosis

Job Submission

Notify when job state changes to

☐ Aborted

☐ Begins Execution

☐ Ends Execution

Close submission Form

☐ Close submission Form after submission?

Figure 24: Job Submission



**Note:** Click ← Back to go back to the previous page.

5. Check any or all of the options in the **Notify when job state changes to** list to indicate when the email will be sent.

6. The application definition must be modified to support the email notification. This is accomplished by modifying the application definition submittime script, `presubmit.py`, with the following lines of code:

```
import re

''' Mail Options '''

if userInputs['MAIL_USERS'.replace(';','(',')')]:
 job.attr_mail_list = userInputs['MAIL_USERS']

if userInputs['MAIL_POINTS']:
 mail_points = userInputs['MAIL_POINTS']

 if re.match(r"[abe]", mail_points):
 job.attr_mail_options = mail_points
```

This code captures the mail preferences entered through Access Web, and sets the job's mail options, so that PBS Professional knows to send an email when a particular job state is reached.

## 17.2.9 Disable to View all Jobs

Restrict users to only be able to view their own jobs.

By default, users can view all jobs.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Navigate to `PA_HOME/config/pa/`
3. Edit the `configuration.json` file.
4. Change the value of `restrictOthersJobs` to `true`.

## 17.2.10 Add a Generic Action for a PAS server

Perform a generic action on a job.

Generic actions are simple python scripts that run on a PAS server irrespective of the job or application.

A JSON file is used to define generic actions. You have to specify the PAS server name and the generic actions that has to be performed on that server. For a typical installation of Access Web, the generic action JSON file is `genericactions.json` and it is located at `PA_HOME/config/pa/`

 **Note:** Refer to <https://jsonlint.com/> to validate the JSON file and refer to <https://jsonformatter.org/> to format the code.

## Define a Generic Action

Define a generic action JSON file.

Here is an example of a generic action for a cluster denoted by "hpccluster":

```
{
 "hpccluster": [{
 "Name": "qstat",
 "DisplayName": "Qstat of Job",
 "Description": "Qstat of Job",
 "ScriptLocation": "/stage/GenericActions/qstat.py",
 "Arguments": {
 "jobid": {
 "type": "string",
 "DisplayName": "Job ID"
 },
 "required": ["jobid"]
 }
 }]
}
```

The following JSON elements provide a way of identifying and describing the generic action:

**Name**

An internal name of the generic action.

**DisplayName**

Name of the generic action that will be displayed to the user.

**Description**

Description of the generic action.

**ScriptLocation**

Location of the execution script.

**Arguments**

Defines arguments (input fields) that a user will enter prior to executing the generic action. The following elements define an argument:

**type**

Defines the type of the argument

**DisplayName**

Name of the argument that will be displayed

**required**

Indicates a required field

## Define a Generic Action Execution Script

Define a generic action execution script file.

A job can be selected from the Job Monitoring page of Access Web, and an action can be executed. This generic action allows a command and command options to be entered. Access Web will then run the command.

### Example of Generic Action for a Single Cluster

Below is an example of a generic action for the server "hpccluster", stored in a JSON file called genericactions.json.

```
{
 "hpccluster": [{
```

```
"Name": "qstat",
"DisplayName": "Qstat of Job",
"Description": "Qstat of Job",
"ScriptLocation": "/stage/GenericActions/qstat.py",
"Arguments": {
 "jobid": {
 "type": "string",
 "DisplayName": "Job ID"
 },
 "required": ["jobid"]
},
},
{
 "Name": "Tracejob",
 "DisplayName": "Tracejob of Job",
 "Description": "Tracejob of Job",
 "ScriptLocation": "/stage/GenericActions/tracejob.py",
 "Arguments": {
 "jobid": {
 "type": "string",
 "DisplayName": "Job ID"
 },
 "required": ["jobid"]
 },
},
{
 "Name": "Distributed Tracejob",
 "DisplayName": "Distributed Tracejob of Job",
 "Description": "Distributed Tracejob of Job",
 "ScriptLocation": "/stage/GenericActions/dtj.py",
 "Arguments": {
 "jobid": {
 "type": "string",
 "DisplayName": "Job ID"
 },
 "required": ["jobid"]
 },
},
{
 "Name": "Node Status",
 "DisplayName": "Node status of cluster",
 "Description": "Node status of cluster",
 "ScriptLocation": "/stage/GenericActions/nodestatus.py",
 "Arguments": {
 "jobid": {
 "type": "string",
 "DisplayName": "Job ID"
 },
 "required": []
 },
},
]
}
```

### Example of Generic Action for a Multiple Cluster

Below is an example of a generic action for the server "hpccluster-1" and "hpccluster-2", stored in a JSON file called `genericactions.json`.

```
{
 "hpccluster-1": [{
 "Name": "qstat",
 "DisplayName": "Qstat of Job",
```



```
"Description": "Qstat of Job",
"ScriptLocation": "/stage/GenericActions/qstat.py",
"Arguments": {
 "jobid": {
 "type": "string",
 "DisplayName": "Job ID"
 },
 "required": ["jobid"]
},
{
 "Name": "Tracejob",
 "DisplayName": "Tracejob of Job",
 "Description": "Tracejob of Job",
 "ScriptLocation": "/stage/GenericActions/tracejob.py",
 "Arguments": {
 "jobid": {
 "type": "string",
 "DisplayName": "Job ID"
 },
 "required": ["jobid"]
 }
},
{
 "Name": "Distributed Tracejob",
 "DisplayName": "Distributed Tracejob of Job",
 "Description": "Distributed Tracejob of Job",
 "ScriptLocation": "/stage/GenericActions/dtj.py",
 "Arguments": {
 "jobid": {
 "type": "string",
 "DisplayName": "Job ID"
 },
 "required": ["jobid"]
 }
},
{
 "Name": "Node Status",
 "DisplayName": "Node status of cluster",
 "Description": "Node status of cluster",
 "ScriptLocation": "/stage/GenericActions/nodestatus.py",
 "Arguments": {
 "jobid": {
 "type": "string",
 "DisplayName": "Job ID"
 },
 "required": []
 }
}
],
{
 "hpccluster-2": [{
 "Name": "Queue Hold",
 "DisplayName": "Queue hold a job",
 "Description": "Queue hold a job",
 "ScriptLocation": "/stage/GenericActions/qhold.py",
 "Arguments": {
 "jobid": {
 "type": "string",
 "DisplayName": "Job ID"
 },
 "required": ["jobid"]
 }
 }
]
```

```
}
},
{
 "Name": "Queue Release",
 "DisplayName": "Queue release a job",
 "Description": "Queue release a job",
 "ScriptLocation": "/stage/GenericActions/qrls.py",
 "Arguments": {
 "jobid": {
 "type": "string",
 "DisplayName": "Job ID"
 },
 "required": ["jobid"]
 }
},
{
 "Name": "Suspend a job ",
 "DisplayName": "Suspend a job",
 "Description": "Suspend a job",
 "ScriptLocation": "/stage/GenericActions/qsig.py",
 "Arguments": {
 "jobid": {
 "type": "string",
 "DisplayName": "Job ID"
 },
 "required": ["jobid"]
 }
},
{
 "Name": "Delete jobs ",
 "DisplayName": "Delete job(s)",
 "Description": "Delete job(s)",
 "ScriptLocation": "/stage/GenericActions/qdel.py",
 "Arguments": {
 "jobid": {
 "type": "string",
 "DisplayName": "Job ID"
 },
 "required": ["jobid"]
 }
}
]
```

## Execution Script

The generic action script is a python script that is responsible for executing the generic action, using the information entered by the user (defined by the generic action JSON file). You can directly edit this script, taking full advantage of Python to add further inspection and complexity to the execution of the generic action. In this example, the python script will create a subprocess to execute the command entered by the user.

```
import subprocess, sys, os

def execcmd(cmd):
 try:
 p = subprocess.Popen(cmd, shell=True, stdout=subprocess.PIPE,
stderr=subprocess.STDOUT)
 data = ""
 for line in p.stdout.readlines():
 data = data + line
 except:
```

```

errTtype = sys.exc_type
try:
 errName = errTtype.__name__
except AttributeError:
 errName = errType
data = "Error: " + str(errName) + " --- " + str(sys.exc_value)
return data
cmd = "/opt/pbs/bin/qstat -fx " + sys.argv[2]
print (cmd)
print execcmd(cmd)
sys.stdout.flush()

```

## 17.2.11 Map a File Extensions to an Icon

Map icons to a file extension in the Access Web application.

Access Web displays customized file types and icons when viewing remote files.

<input type="checkbox"/>	▲Name	Created On	Owner	File Size	Type	⚙
<input type="checkbox"/>	Images	9/3/2020, 2:34:15 AM	pbsworks	--	Folder	
<input type="checkbox"/>	Inputs	9/3/2020, 4:52:47 AM	pbsworks	--	Folder	
<input type="checkbox"/>	Optistruct_Files	8/25/2020, 4:23:41 AM	pbsworks	--	Folder	
<input type="checkbox"/>	Optistruct_Master_File	9/3/2020, 10:52:27 PM	pbsworks	--	Folder	
<input type="checkbox"/>	Radioss_Files	8/25/2020, 4:34:27 AM	pbsworks	--	Folder	
<input type="checkbox"/>	ShellScript_Files	8/25/2020, 4:17:01 AM	pbsworks	--	Folder	
<input type="checkbox"/>	sleep_1598292540543	8/25/2020, 5:17:44 AM	pbsworks	--	Folder	
<input type="checkbox"/>	 AltairAccessWebReleaseNotes2019.4.pdf	8/25/2020, 4:18:01 AM	pbsworks	196.93 KB	File	
<input type="checkbox"/>	 Inputs.zip	9/3/2020, 4:35:11 AM	pbsworks	33.92 MB	File	
<input type="checkbox"/>	 Master_file.fem	9/3/2020, 4:37:46 AM	pbsworks	29 Bytes	File	
<input type="checkbox"/>	 Master_file_archive_1599068750459.zip	9/3/2020, 4:49:34 AM	pbsworks	1.01 MB	File	
<input type="checkbox"/>	 mbdsystemlvlopt.fem	9/3/2020, 4:37:48 AM	pbsworks	5.22 MB	File	
<input type="checkbox"/>	 model_1.png	8/25/2020, 4:18:01 AM	pbsworks	137.28 KB	File	
<input type="checkbox"/>	 model_2.png	8/25/2020, 4:18:01 AM	pbsworks	92.97 KB	File	
<input type="checkbox"/>	 rod.h3d	8/25/2020, 4:18:01 AM	pbsworks	6.21 MB	File	
<input type="checkbox"/>	 sleep.py	8/25/2020, 5:12:36 AM	pbsworks	28 Bytes	File	

«
( 1 )
»

Page 1 of 1
Go

Figure 25: File Icon Mapping

The file icons are mapped to a file extension in the JSON file, `fileextensions.json` and the location of this file is at `PA_HOME/config/pa/`

The file icon image file must be placed at the location `PA_HOME/config/pa/fileicons/`

Below is an example of a file extension and icon that has been mapped in `fileextensions.json` located at `PA_HOME/config/pa/`:

```

{
 "fileextension":
 [
 {
 "name": "pdf",
 "displayText": "Acrobat",
 "icon": "icon_pdf.png"
 },
],

```

```
{
 {
 "name": "zip",
 "displayText": "Archive",
 "icon": "icon_zip.png"
 }
 {
 "name": "h3d",
 "displayText": "H3D",
 "icon": "hvpctrl-32.gif"
 }
}
```

The XML attributes of the file extension mapping file is as follows:

*name*

The file extension.

*displayText*

Access Web will display this as the files type.

*icon*

Icon image file located at `PA_HOME/config/pa/fileicons/`

## 17.2.12 Set Maximum Page Size for Files

Set the maximum file size (in bytes) for displaying a file in a single page.

The default is 5000 bytes.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Navigate to `PA_HOME/config/pa/`
3. Open the `configuration.json` file and change the value of the `filechunksize`.

```
"filechunksize": 5000
```

## 17.2.13 Install and Configure SSL Certificate

Install and configure SSL certificate on the server to secure communication.

If you do not have a valid domain certificate for your site, you need to create a Certificate Signing Request (CSR) and order your certificate.

1. You should have received a `your_domain_name.pem` file from Certificate Authority which contains both your primary certificate and the intermediate certificate. If you have that `.pem` file, you can skip to Step 4.
2. Download the intermediate (`Intermediate.crt`) and your primary certificate (`your_domain_name.crt`) files.
3. Copy these files, along with the `.key` file you generated when creating the CSR, to the directory on the server where the certificate and key files are kept.
4. Concatenate the primary certificate file (`your_domain_name.crt`) and the intermediate certificate file (`Intermediate.crt`) into a single `.pem` file by running the following command:

```
cat your_domain_name.crt Intermediate.crt >> bundle.crt
```

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

6. Open the `nginx.conf` file and update the following line:

```
server
{
 ssl on;
 ssl_certificate /etc/ssl/your_domain_name.pem; (or bundle.crt)
 ssl_certificate_key /etc/ssl/your_domain_name.key;
}
```

- `ssl_certificate` should be your primary certificate combined with the intermediate certificate (`your_domain_name.crt`).
- `ssl_certificate_key` should be the `.key` file generated when you created the CSR.

7. Restart Access Web by entering the following command:

```
service pbsworks-pa restart
```

## 17.2.14 Enable Mobile Notification Service

Enable mobile notification service in Access Web so that the job status notification is displayed in Access Mobile.

You must stop Access Web before enabling mobile notification service. For more information about stopping Access Web, see [Access Web Service Commands on Linux](#).

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Navigate to `PA_HOME/config/shared/`
3. Open the `deployment.ini` file.
4. Add the following line under `pa_deploy_options` section:

```
option=("mobile_notification_service")
```

5. Start Access Web using the following command:

```
service pbsworks-pa start
```

## 17.2.15 Customize Login Page

Customize Access Web login page with custom branding information.

Customize the Access Web login page with your company's logo, as well as a custom message that is displayed below the login prompt.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Add the branding logo at `PA_HOME/config/pa/branding/`
3. Edit `PA_HOME/config/pa/configuration.json`
4. Update the path of the branding logo in `appLogo`.

For example:

```
"appLogo": "/config/pa/branding/company-logo.png"
```

5. Update the description of the branding information in `appDescription`

For example:

```
"appDescription": "ALTAIR PBSWORKS HPC PORTAL"
```

6. Refresh your Access Web browser to reflect the login screen with branding logo and description.  
For example, Access Web with branding logo and description will be displayed as follows:

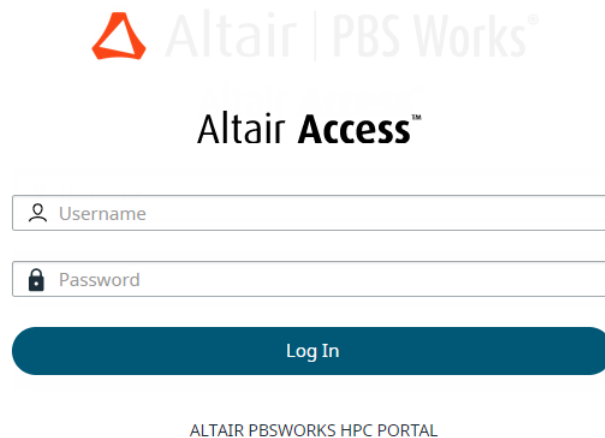


Figure 26: Access Web Login Page with Branding Logo and Description

## 17.2.16 Switch to Use the Locally Installed Webhelp

Configure Access Web to point to the locally installed webhelp when there is no internet connectivity and the internet version of the webhelp is not reachable.

Download or obtain the Access Web help using your Altair PBS Works Support ([pbssupport@altair.com](mailto:pbssupport@altair.com)).

Access Web will now fetch and display the latest version of the User Guide (WebHelp) from Altair Connect. As a fall back, the application can also be configured to use a local copy of the help.

Perform these steps to configure and view the local copy of the help.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Copy the Access Web help zip file to `PA_HOME/data/pa/`
3. Unzip the Access Web help zip file.
4. Edit the `PA_HOME/config/pa/configuration.json` file.
5. Update the `helpurl` path to the local webhelp folder path.



**Note:** By default, the `helpurl` path mentioned is the Altair Connect path.

6. Change the Altair Connect default path to the local webhelp folder path as follows:

```
"helpurl": "/data/pa/webhelp/index.htm"
```

7. Refresh the Access Web browser.

## 17.2.17 Shared File System Support

Support for sites that have deployed a shared file system on their HPC cluster.

Organizations may deploy a shared file system on their HPC cluster such that the file system is shared between the PBS Server and the PBS execution nodes, eliminating the need to stage in and stage out job files. Applications that run on the HPC cluster and need access to the shared file system will require a change to their corresponding application definition to set the following environment variables in the submittime script (`presubmit.py`) and a change to the runtime script (`start.py`):

### `ACCESS_INPUT_FILES`

Environment variable used by Access to establish the job's input files.

### `ACCESS_OUTPUT_FILES`

Environment variable used by Access to establish the job output directory.

### `ACCESS_RUNNING_FILES`

Environment variable used by Access to establish the job running directory.

For example, a site may have `/shared` mounted on a share file system that is shared between the PBS Server and the PBS execution nodes. The user `tsmith` moves job files to the directory `/stage/tsmith/opti_test1` and submits an Optistruct job. For Access to support the use of the shared file system by the job, the application definition associated with the Optistruct solver must be updated to set these three environment variables in the `presubmit.py` script.

For more information about the specific changes that need to be made to the application definition see the recipe *How to Support a Shared File System in Diving Into Application Definitions*.

This feature is completely backward compatible. If your site is not using a shared file system, then your current application definitions do not require any changes.

## 17.2.18 Change the Maximum File Upload Size

Change the default file upload size based on site's requirements.

Before you begin

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

The default maximum file upload size is 4Gb. The user will not be able to upload a file size bigger than the value set in the maximum file size.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
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 Access Web using the following command:

```
service pbsworks-pa start
```

## 17.2.19 Configure to Handle Large File Uploads

Configure to handle large file uploads by enabling the modern file upload parameter.

Before you begin:

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

By default, the conventional file upload feature is enabled which will restrict the file upload to 4GB.

By enabling the modern file upload parameter there will be no upload restriction based on file size and the files will be uploaded in chunks.

You need to have administrative privileges to make the changes.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Navigate to `PA_HOME/config/pa/`
3. Open the `configuration.json` file.
4. Change the `enableModernFileUpload` value to `true` to enable modern file upload.

```
"enableModernFileUpload": false
```



**Note:** By default, the `enableModernFileUpload` value is set to `false`.

5. Start Access Web using the following command:

```
service pbsworks-pa start
```

## 17.2.20 Configure Number of Files Displayed in Running Directory

Set the maximum number of files displayed in running directory.

The parameter `max.files.list.count` located in `PA_HOME/config/joboperation/application.properties` file defines the maximum number of files to list in the running directory.

By default, its value is set to -1 indicating that there is no limit to the number of files that can be listed from the running directory. Update the value of `max-files.list-count` to change this default.

1. Login to the machine where PAS is installed as root or as a user with sudo permissions.
2. Source the Access Web configuration file to set up the environment variables `PA_HOME` and `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```

3. Edit the file `PA_HOME/config/joboperation/application.properties`



```
vi $PA_HOME/config/joboperation/application.properties
```

**4. Update the value of *max-files.list-count*.**

```
#Maximum number of Files that can listed in a directory.
For NO LIMIT on number of files assign any NEGATIVE INTEGER.
max.files.list.count=-1
```

**5. Restart PAS using the following command:**

```
service pbsworks-pa restart
```

## 17.2.21 Remote Sessions Support for HyperWorks Graphical Applications

Access Web now supports HyperWorks 2019.

With Access 2019.4 onwards, HyperWorks 2019.1 is supported for Remote Sessions. As HyperWorks 2019.1 uses OpenCL based APIs, Access 2020.3 has been updated to be compatible with application's using OpenCL. Previous versions of Access Web are not compatible with interactive applications using OpenCL calls, including HyperWorks 2019.1, and may result in the interactive application crashing.

Default interactive application definitions that are provided by Altair (HyperMesh, HyperView, etc.) have been updated to pass an +ocl flag to VirtualGL (a fix implemented by VirtualGL for the OpenCL crash issue). Please review the default HyperMesh application definition provided for Access Web 2020.3 for examples on how to set this flag. In particular, view the files:

- HyperMesh/runtime/VGLApplicationManager.py
- HyperMesh/runtime/xstartup.turbovnc

It is expected that sites that are running interactive applications to selectively add this flag for any interactive applications which use OpenCL.

These changes to the application definitions are specific to those interactive applications that are run on Linux graphical nodes and are not required for those that are run on a Windows graphical node.

## 17.2.22 Support for PBS Peering Based Setup

Access Web supports PBS Peering Scheduling by displaying the job that is moved from one complex to the other.

Peer scheduling allows separate PBS complexes to automatically run jobs from each other's queues. When Complex A pulls a job from Complex B, Complex A is the "pulling" complex and Complex B is the "furnishing" complex. These jobs can be monitored through Access Web through either the pulling complex or the furnishing complex using the Services filter that is available on the Job Monitoring page.

Ensure that the following prerequisites are met to support PBS Peering Scheduling:

- PBS should be configured for Peer Scheduling. For more information see *Peer Scheduling* in the *PBS Professional Administrator's Guide*.
- PAS must be installed on both the pulling and the furnishing HPC complex.

- Modern Communication Module should be setup on all execution nodes.
- Add a server cluster to Access Web for both the "pulling" complex and the "furnishing" complex.

In the following example, a ShellScript job is submitted to *troycompute* server. The *troycompute* server is the furnishing complex. The ShellScript job is pulled by the *syspc02compute* server and this server is the pulling complex. The job can be monitored through either the pulling or the furnishing server.

Using the **Job Monitoring** page, view those jobs that are submitted to the furnishing server (filter the jobs by enabling the *troycompute* Service) . The ShellScript job is listed.

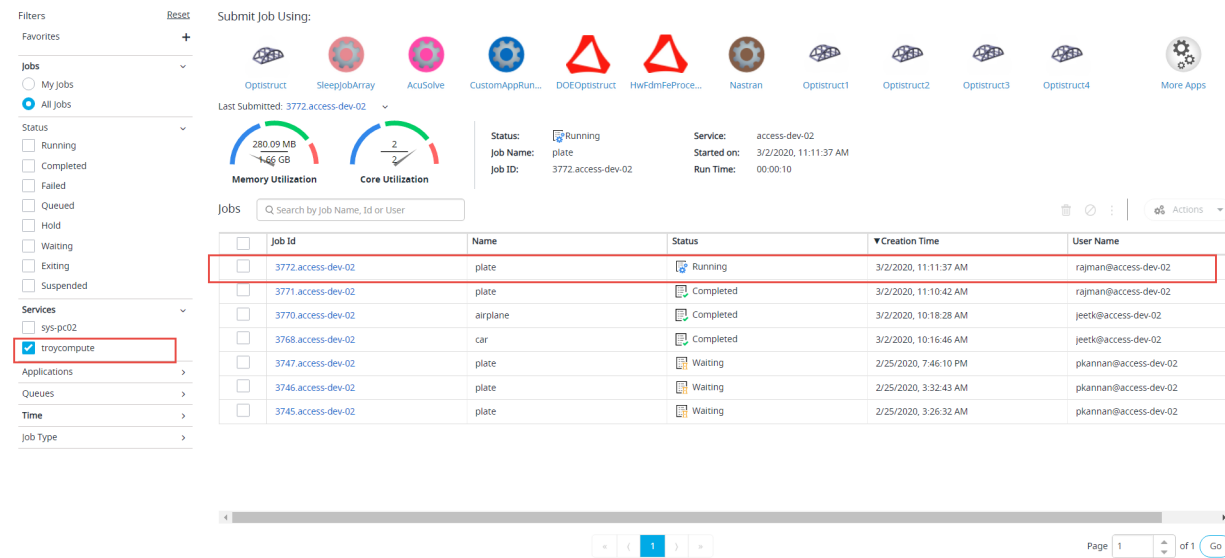


Figure 27: Jobs in troycompute Server

Using the **Job Monitoring** page, view those jobs that are submitted to the pulling server (filter the jobs by enabling the *syspc02compute* Service) . The ShellScript job is listed.

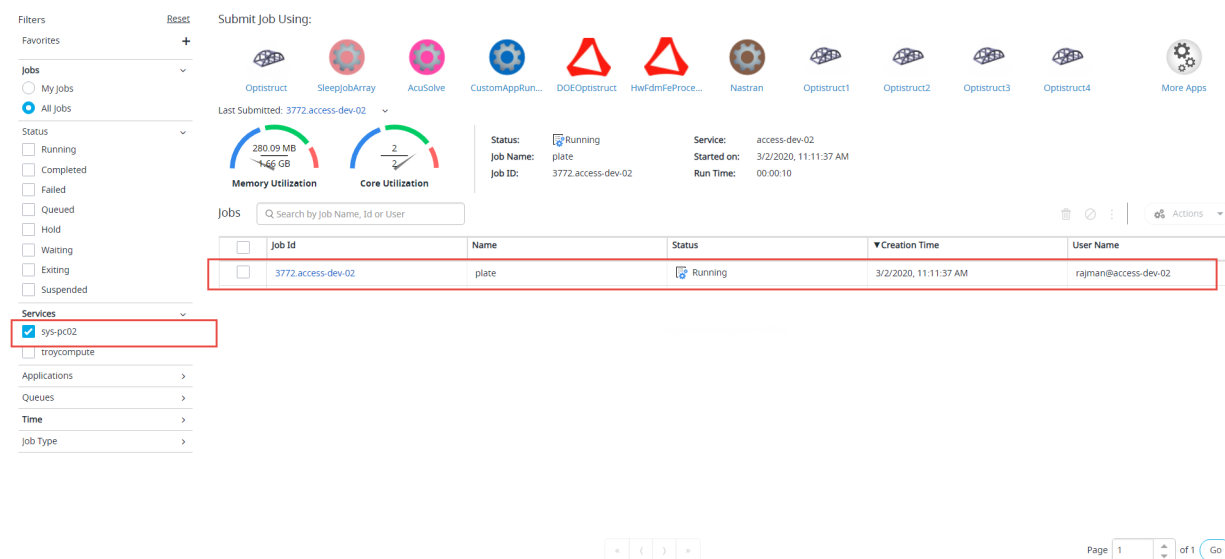


Figure 28: Jobs in syspc02compute Server

## 17.2.23 Enable and Disable the Modern Communication Module

Disable or enable the Modern Communication Module based on the needs of your site.

### Disable the Modern Communication Module

Disable the Modern Communication Module and revert to PBS technology for performing file operations for running jobs.

 **Note:** Disabling the Modern Communication Module may degrade the performance of file operations on running jobs.

These steps assume that Access Web and PAS are installed on the same machine.

1. Login to Access Web as a user who has been assigned a Manager role.
2. Delete all server clusters.
3. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
4. Stop Access Web by entering the following command:  

```
service pbsworks-pa stop
```
5. Edit the `PA_HOME/config/pas/conf/server.conf` file.
6. Change the value of `MODERN_COMMUNICATION_ENABLED` to *false*.  

```
MODERN_COMMUNICATION_ENABLED=false
```
7. Navigate to `PA_HOME/config/api_gateway`.
8. Copy `template_pyspawn.conf` to `template.conf`.
9. Start Access Web by entering the following command:  

```
service pbsworks-pa start
```
10. Login to Access Web as a user who has been assigned a Manager role.
11. Re-register all server clusters.

### Enable the Modern Communication Module

Enable the Modern Communication Module, after it has been disabled, to improve file operation performance for running jobs.

The Modern Communication Module must be copied to a location accessible to the PBS execution hosts before it can be enabled. If this was not done when Access Web was installed or upgraded then see the below topics for instructions:

- [Modern Communication Module on Linux](#)
- [Modern Communication Module on Windows](#)

These steps assume that Access Web and PAS are installed on the same machine.

1. Login to Access Web as a user who has been assigned a Manager role.

2. Delete all Server Clusters.
3. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
4. Stop Access Web by entering the following command:  

```
service pbsworks-pa stop
```
5. Edit the `PA_HOME/config/pas/conf/server.conf` file.
6. Change the value of `MODERN_COMMUNICATION_ENABLED` to `true`.  

```
MODERN_COMMUNICATION_ENABLED=true
```
7. Navigate to `PA_HOME/config/api_gateway`.
8. Copy `template_joboperation.conf` to `template.conf`.
9. Start Access Web by entering the following command:  

```
service pbsworks-pa start
```
10. Login to Access Web as a user who has been assigned a Manager role.
11. Re-register all server clusters.

## 17.2.24 Enable Multi-Factor Authentication

Enable Duo multi-factor authentication to strengthen access security by requiring two methods to verify your identity.

You must have already implemented DUo multi-factor authentication at your site.

- Your site must have signed up for a Duo account.
- Login to the Duo Admin Panel and protect a Web SDK application.
- Get your Web SDK application's integration key, secret key and API hostname.

For more information see <https://duo.com/docs/duoweb>.

Duo Security is a vendor of cloud-based multi-factor authentication services. Duo's multi-factor authentication system can be integrated with Access Web.

Multi-factor authentication adds a second layer of security to your site. Verifying your identity using a second factor (like your phone or other mobile device) prevents anyone but you from logging in, even if they know your password.

The following steps must be done as root or as a user with sudo permissions.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Stop Access Web using the following command:  

```
service pbsworks-pa stop
```
3. Source the Access Web configuration file to set up the environment variables `PA_HOME` and `PA_EXEC`:  

```
source /etc/pbsworks-pa.conf
```
4. Edit the file `PA_HOME/config/shared/auth-config/auth_details.json`.
5. Enable multi-factor authentication by changing the value of the `enable_multi_factor` key to `true`.

```
"multifactor": {
 "enable_multi_factor": "true",
```

6. Replace `%INTEGRATION_KEY%`, `%SECRET_KEY%`, and `%APPLICATION_KEY%` with the appropriate values obtained when you chose to protect a new application using the DUO Admin Panel.

 **Note:** Your `APPLICATION_KEY` is a string that you generate and keep secret from Duo. It should be at least 40 characters long and should contain only AlphaNumeric characters.

```
"integration_key": "%INTEGRATION_KEY%",
"secret_key": "%SECRET_KEY%",
"application_key": "%APPLICATION_KEY%",
```

7. Edit the file `PA_HOME/data/api_gateway/duo/index.html`.
8. Update `host` attribute value in HTML file with your API hostname obtained from DUO Admin Panel.

```
Duo.init({
 'host': ' api-XXXXXXX.duosecurity.com',
 'sig_request': getUrlParameter('sig_request'),
 'post_action': '/duo/auth/validate'
});
```

9. Start Access Web using the following command:

```
service pbsworks-pa start
```

## 17.2.25 Change the Locale

Change the locale to view user interface labels, buttons, tooltips, etc. in a different language.

Currently, the following languages are supported:

- English (`en_US`)
- French (`fr_FR`)
- Chinese (`zh_CH`)
- Japanese (`ja_JP`)

The default locale set in `PA_HOME/config/pa/configuration.json` file is English.

 **Note:** You can add your language bundle at `PA_HOME/data/pa/locale/` and update the `PA_HOME/config/pa/configuration.json` file.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Source the Access Web configuration file to set up the environment variables `PA_HOME` and `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```

3. Edit the file `PA_HOME/config/pa/configuration.json`.

```
vi $PA_HOME/config/pa/configuration.json

"locale": {
 "default": "en_US",
 "availableLocales": {
 "en_US": "/data/pa/locale/en_US.json",
 "fr_FR": "/data/pa/locale/fr_FR.json",
 "zh_CN": "/data/pa/locale/zh_CN.json"
```

```
 "ja_JP": "/data/pa/locale/ja_JP.json"
 },
},
```

4. Choose one of the following options:
  - To set the locale to English, set the value of the parameter default to "en\_US".
  - To set the locale to French, set the value of the parameter default to "fr\_FR".
  - To set the locale to Chinese, set the value of the parameter default to "zh\_CN".
  - To set the locale to Japanese, set the value of the parameter default to "ja\_JP".
5. Refresh the browser to reflect the changes.

## 17.2.26 Add Site Specific Web Pages

Add site specific pages to share with all the users in Access Web by providing a URL link.

Some sites want to provide access to web sites via Access Web. These web sites may provide site-specific information that user's of Access Web require. For example, an internal web page describing the solver's available at each HPC complex.

 **Note:** The Site Specific Pages will not be displayed if your site is configured with security header "x-frame-options": SAMEORIGIN.

Links to these site-specific web pages can be configured and once configured are available as a context menu accessible through a Pages tab that is added to the Access Web user interface.

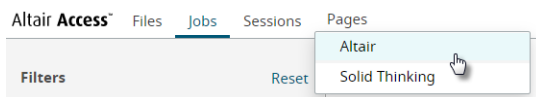


Figure 29: Pages Tab Context Menu

To configure the web pages, edit the file `configuration.json` and add JSON to describe the following parameters:

*id*

The ID of an internal web page.

*name*

The name of the web page that is displayed in the context menu accessible from the Pages tab.

*url*

The URL of the web page. The URL should be in the format *https://<web page url link>*.

 **Note:** The URL link will not work using *http* protocol.

For example, to make the Altair and solidThinking web pages accessible through Access Web, provide the following JSON:

```
"pages": [
 {
```

```
[
 {
 "id" : "altair",
 "name": "Altair",
 "url" : "https://www.altair.com/"
 },
 {
 "id" : "solidthinking",
 "name": "Solid Thinking",
 "url" : "https://solidthinking.com/"
 }
]
```

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Source the Access Web configuration file to set up the environment variables `PA_HOME` and `PA_EXEC`:

3. Edit `PA_HOME/config/pa/configuration.json`  
`vi $PA_HOME/config/pa/configuration.json`

4. Add the JSON required to add the web page links between the below brackets:

```
"pages": [
]
```

5. Refresh the browser to reflect the changes.

## 17.2.27 Configure Access Web Idle Session Timeout

Configure Access Web session timeout value to automatically logout a user when the session is idle.

The user is automatically logged out of Access Web session when the session is idle based on a configurable session timeout and token timeout value. The default session timeout value is 5 hours (300 minutes) and the token timeout value is 3 hours (180 minutes). Change these values per your site's requirements.

 **Note:** The session timeout value should always be greater than the token timeout value.

The Session Timeout specifies the number of minutes that an interactive session can remain idle before the user gets logged out of the application automatically.

The Token Timeout specifies the number of minutes in which the access token is refreshed. When the session is idle then the token is not refreshed and the user is automatically logged out.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Source the Access Web configuration file to set up the environment variables `PA_HOME` and `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```

3. Edit the file `PA_HOME/config/ams/AA_Service.properties`.  
`vi $PA_HOME/config/ams/AA_Service.properties`
4. Update the `java.sessionTimeout` value in minutes.

```
java.sessionTimeout=300
```

 **Note:** The minimum session timeout value that can be set is 30 minutes.

5. Edit the file `PA_HOME/config/api_gateway/nginx.conf`.

```
vi $PA_HOME/config/api_gateway/nginx.conf
```

6. Update the `ACCESS_TOKEN_TIMEOUT` value in minutes.

```
env ACCESS_TOKEN_TIMEOUT=180;
```



**Note:** The token timeout value should always be less than session timeout value. The minimum token timeout value that can be set is 20 minutes.

7. Edit the file `PA_EXEC/shared/scripts/start.sh`.

```
vi $PA_EXEC/shared/scripts/start.sh
```

8. Update the `ACCESS_TOKEN_TIMEOUT` in minutes with the same value that is set in `PA_HOME/config/api_gateway/nginx.conf`

```
env ACCESS_TOKEN_TIMEOUT=180;
```

9. Restart Access Web using the following command:

```
service pbsworks-pa restart
```

## 17.2.28 Import Active Directory Users and Roles into Access Web

Export Active Directory roles, users, and user/role mappings to a CSV file and use the file's contents to import the information into Access Web.

User a PowerShell script to export a site's Active Directory (AD) user and role data to a CSV file. The CSV file's contents are imported into Access Web using a Python script automatically, eliminating the need for an administrator to manually enter users and roles.

### Export Active Directory Users and Roles to a CSV File

Export Active Directory users, roles and their mappings to a CSV file.

The export utility is a PowerShell script.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Source the Access Web configuration file to set up the environment variables `PA_HOME` and `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```

3. Navigate to the directory `PA_EXEC/ams/scripts/`

```
cd $PA_EXEC/ams/scripts/
```

4. Copy the export script `ad_user_export.ps1` to your Active Directory machine.
5. Run the export script on PowerShell:

```
ad_user_export.ps1
```

This will generate `AD_Users_Roles_Data.csv` file in the current working directory.

6. Transfer the generated `AD_Users_Roles_Data.csv` file to Access Web machine.



The next step is to import the CSV file (AD\_Users\_Roles\_Data.csv) into Access Web, refer to [Import Active Directory Users and Roles into Access Web](#).

## Import Active Directory Users and Roles into Access Web

Import a CSV file containing Active Directory users, roles and user/role mappings into Access Web.

Before importing the AD users and roles, they must be exported to a CSV file. Refer to [Export Active Directory Users and Roles to a CSV File](#).

The import utility is a Python script which is compatible with Python 2.7.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Source the Access Web configuration file to set up the environment variables PA\_HOME and PA\_EXEC:

```
source /etc/pbsworks-pa.conf
```

3. Navigate to the directory PA\_EXEC/ams/scripts/

```
cd $PA_EXEC/ams/scripts/
```

4. Execute the following command to import the CSV file:

```
python user_role_import.py --server_url=<accessurl> --csv_file=<csvfilelocation>
```



**Note:** Execute the command `python user_role_import.py -h` for help.

An example of importing the active directory from Access Web:

```
python user_role_import.py --server_url=https://localhost:4443 /
--csv_file=AD_Users_Roles_Data.csv
```

## 17.2.29 Enable Product Promotions from Access Web

Promote related products such as Access Desktop and Access Mobile from the About Access Web menu.

By default, the promotion screens are disabled in Access Web. Administrators can enable the promotion screens, so that the promotion screen will be displayed in the user interface.

For example, if both Access Mobile and Access Desktop are enabled, then the promotion of these products is displayed under About Access Web.

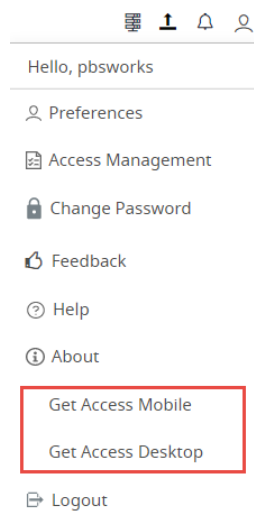


Figure 30: About Access Web Menu

If you click on **Get Access Mobile**, then the following promotion screen is displayed:

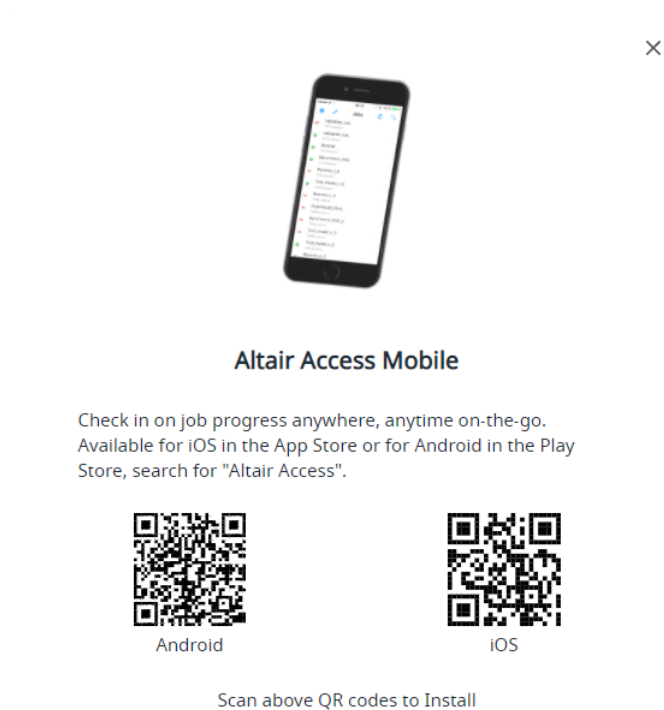


Figure 31: Access Mobile Promotion Screen

If you click on **Get Access Desktop**, then the following promotion screen is displayed:

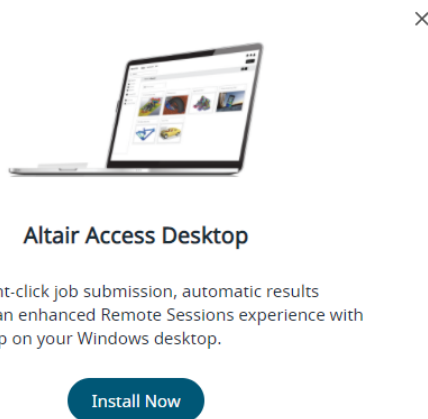


Figure 32: Access Desktop Promotion Screen

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.

2. Source the Access Web configuration file to set up the environment variables `PA_HOME` and `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```

3. Edit the file `PA_HOME/config/pa/configurations.json`

```
vi $PA_HOME/config/pa/configurations.json
```

```
"promotions": [
 {
 "name": "Get Access Mobile",
 "config": "/config/pa/promotions/mobile/accessmobile.json",
 "enable": false
 },
 {
 "name": "Get Access Desktop",
 "config": "/config/pa/promotions/desktop/accessdesktop.json",
 "enable": false
 }
]
```

4. Choose the following:

- To enable the Access Mobile promotion screen, set the value of *enable* to true.
- To enable the Access Desktop promotion screen, set the value of *enable* to true.



**Note:** You can also set the value of *enable* to true for both Access Mobile and Access Desktop.

5. Refresh the browser to reflect the changes.

To allow Access Web users to install Access Desktop from its promotion screen requires additional configuration. Refer to [Configure a Location to Distribute Access Desktop](#)

## 17.2.30 Configure a Location to Distribute Access Desktop

Allow a user to download a preconfigured Access Desktop zip file package from the Access Web user interface.

Before you begin, the preconfigured Access Desktop zip file package has to be generated and placed in Access Web. Refer to *Install Access Desktop for Deployment Option 4* topic in *Access Desktop 2020.3 Desktop Administrator's Guide* for information about creating Access Desktop zip file package.

The Access Desktop zip file package contains Access Desktop executable file and a configuration zip file. The configuration zip file contains preconfigured clusters registered through HTTPS and SSH, application definitions and job profiles. Once you install Access Desktop, the clusters are registered automatically.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Copy the preconfigured Access Desktop zip file package using `scp`, `WinSCP` or some other kind of copy mechanism to the location `$PA_HOME/config/pa/promotions/desktop`.

3. Source the Access Web configuration file to set up the environment variables `PA_HOME` and `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```

4. Edit the file `$PA_HOME/config/pa/promotions/desktop/accessdesktop.json`

```
vi $PA_HOME/config/pa/promotions/desktop/accessdesktop.json
```

5. Update the value of `downloadUrl` to point to the executable or binary that was copied in step 2. For example, the default zip file package name provided is as follows:

```
"downloadUrl": "/pbsworks/config/pa/promotions/desktop/AltairAccessDesktop.zip",
```

6. Refresh the browser to reflect the changes.

## 17.3 Configure PBS Application Services

Information about configuration files, verification of your PAS installation, post-installation configuration and tasks.

### 17.3.1 PAS Configuration Files

Configuration files that are installed with PAS.

#### Application Definitions

Application definitions are a feature of PAS and are used to submit jobs using the power and flexibility of PAS. Application definitions are stored in the PAS application directory. The default location of this directory is:

```
PA_HOME/data/pas/targets/localhost/repository/applications/
```

#### Site Configuration File

A default site configuration file, `site-config.xml`, is installed in the PAS configuration directory. The location of this file for a typical installation of PAS is: `PA_HOME/data/pas/targets/localhost/repository/`

This file is a central repository for site specific information that can be used across all application definitions. The default site configuration file installed with PAS is basically a template. Initially, you may use the default site configuration file as is, but as you become accustomed to working with application definitions, you may choose to modify the site configuration file per your site's needs. A tutorial and several recipes are available within *Diving Into Application Definitions* showing several ways that the site configuration file can be used with an application definition. For an overview of the site configuration file see Sitewide Settings on page 57.

#### Server Configuration File

A server configuration file, `server.conf`, is also installed in the PAS configuration directory. This file contains all configurable parameters available with PAS. The location of this file for a typical installation of PAS is: `PA_HOME/config/pas/conf`

### 17.3.2 Configure System Zip Utility

Configure PAS to use the system compression utility.

By default, PAS uses zip 3.0 utility to compress the file.

## Configure System Zip Utility to Compress by Updating Python Script

Enable the system zip utility to compress the files by updating the Python Script.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the `PA_EXEC/pas/scripts/FileCompress.py` file.
3. Before `zipcmd = [zip_full_path_normalized] + ['-rq'] + [compressionSpeed]` line, add the following: `zip_full_path_normalized = '/usr/bin/zip'`

The `/usr/bin/zip` is the path where the system zip utility is located.



**Note:** If you do not specify the system zip utility path, then PAS zip utility will be used to compress the files.

## Configure System Zip Utility to Compress without Updating Python Script

Enable the system zip utility to compress the files without updating the python script.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Navigate to `PA_EXEC/pas/bin/Linux-x86_64`.
3. Rename the existing zip utility to `zip_backup`.
4. Create a soft link to link to the system installed zip utility:

```
ln -s /usr/bin/zip zip
```

The `/usr/bin/zip` mentioned, is the path where the system zip utility is located.



**Note:** Restore the permission of the changed zip utility.

### 17.3.3 Configure System Unzip Utility

Configure PAS to use the system uncompression utility.

By default, PAS uses unzip 6.0 utility to uncompress the file.

## Configure System Unzip Utility to Uncompress by Updating Python Script

Enable the system unzip utility to uncompress the files by updating the Python Script.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the `PA_EXEC/pas/scripts/FileUncompress.py` file.

3. Before `files_list_cmd = [unzip_full_path_normalized] + ['-lqq'] + [archive]` line, add the following: `unzip_full_path_normalized = '/usr/bin/unzip'`

The `/usr/bin/unzip` is the path where the system unzip utility is located.



**Note:** If you do not specify the system unzip utility path, then PAS unzip utility will be used to uncompress the files.

## Configure System Unzip Utility to Uncompress without Updating Python Script

Enable the system unzip utility to uncompress the files without updating the python script.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Navigate to `PA_EXEC/pas/bin/Linux-x86_64`
3. Rename the existing unzip utility to `unzip_backup`.
4. Create a soft link to link to the system installed unzip utility:

```
ln -s /usr/bin/unzip unzip
```

The `/usr/bin/unzip` mentioned, is the path where the system unzip utility is located.



**Note:** Restore the permission of the changed unzip utility.

## 17.3.4 Configurable Parameters

Parameters that can be modified to configure the behavior of PAS.

PAS stores its configuration data in a file called `PA_HOME/config/pas/conf/server.conf`.

All parameters are stored in `key=value` pairs. Spaces and tabs are preserved (as spaces) and providing quotes around values is optional. As spaces are preserved, do not use `key = value` (notice the space surrounding the `=`) unless spaces are intentional. Empty lines beginning with a comment symbol (i.e., `#`) are ignored.

## Standard Configuration Parameters

A description of the standard parameters for configuration of the PAS Server.

### LOGGING\_CONFIG\_FILE\_RELATIVE

The PAS logging configuration file (Log4J) which is used to configure logging levels. Since the PAS uses Log4J as its logging and tracing API, you can access additional information on Log4J via the Apache Log4J website at <http://logging.apache.org/log4j>

Default value is `server-log.xml`.

#### *ADMIN\_USER*

The PAS administration account (for example, pbsadmin) that has complete control over the PAS Server. This account is required for any remote PAS administration tasks.

On Linux, the administration account can be a non-privileged user account that has been granted manager status for PBS Professional, and can be changed after installation.

Default value is pbsadmin.

#### *LOGIN\_MODULE\_NAME*

The PAS authentication module. PAS uses the Java Authentication and Authorization Service (JAAS) as its authentication abstraction layer.

Default value is UnixLogin.

#### *STAGE\_ROOT*

The PAS file staging location.

Default value is /stage.

This directory must exist prior to the installation of PAS. The staging directory is where the necessary files are transferred after job submission (via a client for example, PBS Portals or Access Web), but prior to the portal submitting the job to PAS for transfer to PBS Professional for execution. When PBS Professional selects the job for execution, the files are staged in to the execution host from the staging directory. Upon job completion, any files the job wants to retain are staged-out by PBS Professional to the staging directory, and the client retrieves them from there when it is ready to do so. Customer written portals may choose to do the same, but are not required to do so.

The value of STAGE\_ROOT can be set to point to the user's home directory by using the variable \$USER\_HOME (for example: \$USER\_HOME/stage) after installation.

#### *FILE\_TRANSFER\_PROTOCOL*

The PAS file transfer mechanism. Default value is http.

#### *FILE\_EXPIRATION\_TIME*

The PAS stage area file expiration time. That is, the age in days after which data is removed from the staging directory (as defined by the STAGE\_ROOT parameter) and its subdirectories with the exception of the profiles directory. Files in the profiles directory are never removed by PAS.

The default value is -1.

#### *ZIP\_COMPRESSION\_SPEED*

Compression speed value for the zip compression utility. The value of -0 is the fastest with no compression (Store), the value of -9 is the slowest with maximum compression. Default value is -1.

#### *MAX\_LIST\_FILES\_COUNT*

The number of files to be returned by the FileList API. Allows sites to impose limits on how many files are returned to improve the response time of Access Web remote file operations.

Default value is 1000.

#### *BUFFER\_SIZE*

Maximum buffer size for file operations in bytes. Default value is 65536.



#### *JSCH\_REQUEST\_TIMEOUT*

The JSCH request timeout value. The default value is 30000.

#### *MAX\_EXECUTION\_TIME*

Maximum process execution time in minutes. The default value is 5 minutes.

#### *MODERN\_COMMUNICATION\_ENABLED*

A modern communication infrastructure for faster running job operations. Enabling this will use modern communication layer for faster running job operations. Default value is True.

For more information about modern communication, refer to [Enable and Disable the Modern Communication Module](#).

#### *MODERN\_COMMUNICATION\_SHARED\_LIBS*

Location of python modules needed for modern communication for Job operations. This directory should be present on all MOMs.

For more information about modern communication, refer to [Enable and Disable the Modern Communication Module](#).

#### *MQ\_PROTOCOL*

Message broker protocol used for modern communication. The default message broker protocol used is PAS.

#### *MQ\_HOSTNAME*

Message broker server hostname used for modern communication.

#### *MQ\_PORT*

Message borker port number used for modern communication. The default port number is 4222.

For more information about modern communication port, refer to [Change the PAS Messaging Port Number](#).

#### *REPLACE\_UNSUPPORTED\_XML\_CHARACTERS*

Replace unsupported XML charactes with "\_" in qstat command output. By default the value of this is set to false indicating that the unsupported XML characters are not checked in the Qstat output. This improves the performance of the Qstat output.

## **Advanced Configuration Parameters**

Optional parameters available for advanced configurations of the PAS Server.

#### *PYTHON\_PATH*

The PAS Python binary. PAS requires that each PBS execution host provide a standard Python binary. The full path to your systems Python binary can be changed here.

Default path is `$PBS_EXEC/bin/pbs_python`.

The PBS Professional daemon `pbs_mom` will look for a binary called `pbs_python` in `PBS_EXEC/bin`. If using custom actions or any other operations that involve the `pbs_mom` accessing this `pbs_python` (aka python binary) there may be problems if the python libraries are not located in the standard locations relative to `PBS_EXEC/bin/pbs_python`. If Python is installed elsewhere a link to (Linux)the actual python binary must exist as `PBS_EXEC/bin/pbs_python`.

#### *PBS\_DATA\_REFRESH\_TIME*

Time interval in minutes to fetch PBS related data like qmgr, queues etc.

Default value is 15.

#### *SSH\_LOGGER\_ENABLE*

SSH Log enabling. Default value is False.

#### *STAGE\_ROOT\_TEMP\_DIR*

Temporary folder for zip/download API.

Default stage root temporary directory path is /tmp. The default path can be changed to \$STAGE\_ROOT/tmp.

#### *JSON\_SCHEMA\_VALIDATION*

JSON Schema Validation. Default value is False.

## 17.3.5 Configure JVM Performance

Configure the Java Virtual Machine (JVM) heap size of PAS.

Currently, the default JVM heap size is 1024 MB. If OutOfMemory errors or warnings are reported in the PAS log file, this value should be increased. It can be increased in multiples of 256 MB.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the script `PA_EXEC/pas/scripts/setenv.sh`.
3. Modify the JVM argument `-Xmx1024m`:

```
JAVA_OPTS="$JAVA_OPTS -Xmx1024m -XX:PermSize=128m -XX:MaxPermSize=128m"
```

4. Restart Access Web by entering the following command:

```
service pbsworks-pa restart
```

## 17.3.6 Restrict the Display of Custom Resource

Restrict the display of PBS custom resources in Access Web.

PBS custom resources are now displayed on the Job Listing grid in Job Monitoring page. The custom resources are not included in the default job attributes that are displayed for the job, but can be added via the **Job Select Columns** list.

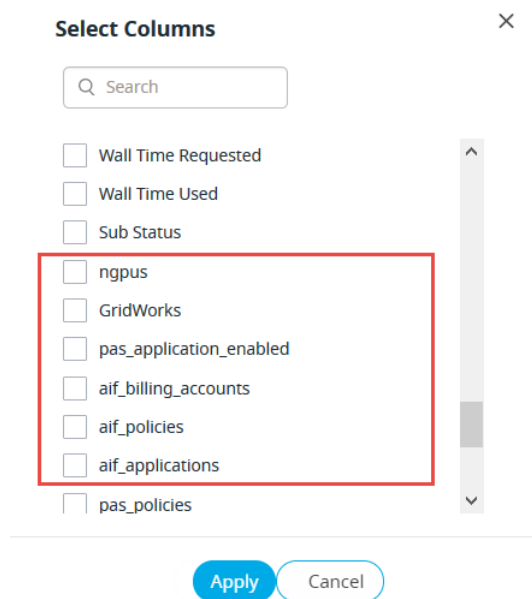


Figure 33: Job Attributes and Custom Resources

If your site would like to restrict displaying a custom resource in the Job Select Columns list, then follow these steps:

1. Login to the machine where PAS is installed as root or as a user with sudo permissions.
2. Source the Access Web configuration file to set up the environment variable `PA_HOME`.

```
source /etc/pbsworks-pa.conf
```

3. Edit `$PA_HOME/config/pas/conf/server.conf`.

4. Locate the line:

```
QMGR_CUSTOM_RESOURCES_LIST=*
```



**Note:** By default, the value of `QMGR_CUSTOM_RESOURCES_LIST` is set to `*` indicating that all custom resource are displayed in the **Job Select Columns** list.

5. Update the value of `QMGR_CUSTOM_RESOURCES_LIST` to a comma-separated list of custom resources that should be displayed in the **Job Select Columns** list.  
For example, to display only the custom resources `pas_application_enabled` and `GridWorks`, set the value of `QMGR_CUSTOM_RESOURCES_LIST` as follows:

```
QMGR_CUSTOM_RESOURCES_LIST=pas_application_enabled, GridWorks
```

6. Restart Access Web by entering the following command:

```
service pbsworks-pa restart
```

Now, the **Job Select Columns** list is restricted to only display the custom resources `pas_application_enabled` and `GridWorks`.

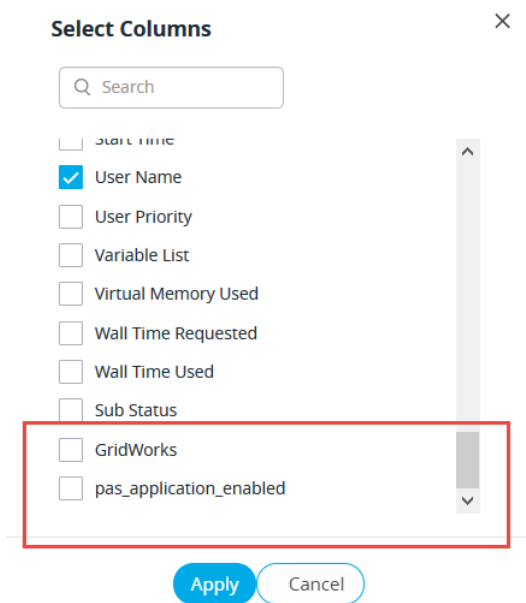


Figure 34: Custom Resources - Restricted

## 17.3.7 Change the Location of the PAS Repository

Change the default location of the PAS repository where application definitions and the site configuration file are stored.

The default location of the PAS repository is: `$PA_HOME/data/pas/`.

The environment variables `$PA_HOME` and `$PA_EXEC` can be used to specify the new location.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Stop Access Web using the following command:

```
service pbsworks-pa stop
```

3. Edit the file `/etc/pbsworks-pa.conf`.

```
vi /etc/pbsworks-pa.conf
```

4. Update the `PAS_REPO` variable with the custom directory location.

```
PAS_REPO=$PA_HOME/data/pas/
```



**Note:** Ensure that the custom directory location is available.

5. Copy all the folders and file from `$PA_HOME/data/pas/` to the custom directory location.
6. Start Access Web using the following command:

```
service pbsworks-pa start
```

## 17.4 Configure the Remote Sessions Component

Configurations when you install remote session component.

### 17.4.1 Verify that Interactive Applications are Configured for the Desktop Manager

Verify that all interactive application definitions are configured for the Desktop Manager that is installed on the graphic PBS MoM.

By default, the GlxSpheres application definition, that is installed when the PAS server is configured for Remote Sessions, is configured to use the GNOME Desktop Manager. If you install a different Desktop Manager, then you will have to edit all of the interactive application definitions to reconfigure them to use a different Desktop Manager.

1. Login to the PAS Server as root or a user with sudo permissions.
2. Navigate to `PA_HOME/data/pas/targets/localhost/repository/applications`.

For each interactive application definition:

3. Navigate to the `runtime` directory .
4. Edit the file `xstartup.turbovnc`.
5. If the Desktop Manager that is installed on the PBS MoM is GNOME:
  - a) Verify that the `DESKTOP` variable is set to GNOME:

```
#DESKTOP=${DESKTOP:-NONE}
#DESKTOP=${DESKTOP:-MATE}
#DESKTOP=${DESKTOP:-KDE}
DESKTOP=${DESKTOP:-GNOME}
```

6. If the Desktop Manager that is installed on the PBS MoM is MATE:
  - a) Verify that the `DESKTOP` variable is set to MATE:

```
#DESKTOP=${DESKTOP:-NONE}
DESKTOP=${DESKTOP:-MATE}
#DESKTOP=${DESKTOP:-KDE}
#DESKTOP=${DESKTOP:-GNOME}
```

7. If the Desktop Manager that is installed on the PBS MoM is KDE:
  - a) Verify that the `DESKTOP` variable is set to KDE:

```
#DESKTOP=${DESKTOP:-NONE}
#DESKTOP=${DESKTOP:-MATE}
DESKTOP=${DESKTOP:-KDE}
#DESKTOP=${DESKTOP:-GNOME}
```

8. If the Desktop Manager that is installed on the PBS MoM is something other than GNOME, MATE, or KDE:

- a) Add a line to represent the Desktop Manager:

```
#DESKTOP=${DESKTOP:-NONE}
#DESKTOP=${DESKTOP:-MATE}
#DESKTOP=${DESKTOP:-KDE}
#DESKTOP=${DESKTOP:-GNOME}
DESKTOP=${DESKTOP:-DESKTOP_MGR}
```

Where *DESKTOP\_MGR* is an acronym for the installed Desktop Manager.

b) Add a line to start a Desktop Manager session:

```
MATE) exec ${VGLRUN} -display ${DISPLAY_VGL} +wm /bin/mate-session ;;
KDE) exec ${VGLRUN} -display ${DISPLAY_VGL} +wm /bin/startkde ;;
DESKTOP_MGR) exec ${VGLRUN} -display ${DISPLAY_VGL} +wm /
bin/DESKTOP_MGR_BIN ;;
```

Where *DESKTOP\_MGR* is an acronym for the installed Desktop Manager  
and *DESKTOP\_MGR\_BIN* is the executable for the Desktop Manager.

9. Restart PAS/Access or remote timestamp.txt.:

```
service pbsworks-pa restart
```

The Desktop Manager should now display. If the Desktop Manager does not display, then there may be graphic card compatibility issues.

## 17.4.2 Change the Maximum Wait Time for a Session to Start

Change the configured wait time for an interactive application session to start.

The default maximum wait time configured is 25 seconds for an interactive application session to start. The following message is displayed if the session does not start within the configured time:

```
Opening session is taking longer than expected, you can choose to wait for some more
time or kill session.
```

Configure the maximum wait time by updating the `maxWait` value in `configuration.json` file.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/pa/configuration.json`
3. Update the value of `maxWait` in milliseconds.

```
"maxWait": 25000
```

4. Refresh the Access Web browser.

## 17.4.3 Display Custom Message for Delayed Start of Interactive Session

Change the default message that is displayed when an interactive session takes a long time to start to a custom site specific message.

By default, interactive sessions are given 25 seconds to start before the following message is displayed:

```
Opening session is taking longer than expected, you can choose to wait for some more
time or kill session.
```

This message can be changed to provide a site-specific message explaining the cause for the delay. For example, in some cloud setup node is provisioned when a job comes to queue. The process of provisioning the node and to start a job might take time. In this case, administrator can provide custom message explaining the delay.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Open the file `PA_HOME/config/pa/configuration.json` to check the default locale file that is set.

```
"locale": {
 "default": "en_US",
 "availableLocales": {
 "en_US": "/data/pa/locale/en_US.json",
 "fr_FR": "/data/pa/locale/fr_FR.json",
 "zh_CN": "/data/pa/locale/zh_CN.json"
 }
},
```

3. Open the default locale file from `PA_HOME/data/pa/locale/` .  
If English (en\_US) is set as the default locale, then open the file `PA_HOME/data/pa/locale/en_US.json`.
4. Replace the text within the quotes after the colon with the custom message:  

```
"Opening session is taking longer than expected, you can choose to wait for
some more time or kill session": "Opening session is taking longer than expected,
you can choose to wait for some more time or kill session"
```
5. Refresh the browser to reflect the changes.

## 17.4.4 Change the Session Timeout for Interactive Applications

Change the remote session timeout when it is getting closed or killed because of inactivity over the client connection.

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

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/displaymanager/dmrest.properties`
3. Update the value of `jobaction.expiry_time` in seconds.

```
#session expiry time(seconds)
jobaction.expiry_time=1800
```

4. Restart Access Web using the following command:

```
service pbsworks-pa restart
```

## 17.4.5 Update the Remote Sessions Service when there is a Job Submission Host Change

Update the remote session service when the hostname or IP address of the job submission host changes.

Interactive jobs connect to the remote session service to provide job status updates. When the hostname or IP address of the machine where Access Web is installed changes, the remote session 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 Access Web is installed as root or as a user with sudo permissions.
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.

```
#Enables handling asynchronous job updates.
jobsub.monitor.host=dm-05
jobsub.monitor.port=4909
```

5. Restart Access Web using the following command:

```
service pbsworks-pa restart
```

## 17.4.6 Configure GPU Limits when the Number of GPUs Change

Reconfigure the remote session 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.)

### Modify 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 remote session 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.

## Modify 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 remote session 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. Login to the machine hosting the PBS Server as root or a user with sudo permissions.
2. 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.

3. 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.

## 17.4.7 Configure to use Single Remote Sessions proxy

Install remote session proxy on a server and modify the Guacd setting.

### Install the Remote Sessions Proxy on a Server

Install the remote session proxy on a central server where all the graphic nodes are reachable.

Before you begin:

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

By default, remote session proxy is installed at the PBS MoM. If you do not want to use the default remote session proxy, then install the remote session proxy on a central server where all the graphic nodes are reachable. and update the `PA_HOME/config/displaymanager/guacamole.properties` file.

Installation must be done as root or as a user with sudo permissions.

1. Login to the machine where Access Web is installed.
2. Enter the command:

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

3. If you are installing the Remote Sessions 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.  
Four options are displayed.
7. Enter 4 and press ENTER.
8. Enter the location where the binaries are to be installed and press ENTER.  
You may choose to install in the default location.
9. 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.
10. 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
```

Update the Guacamole properties in `PA_HOME/config/displaymanager/guacamole.properties` file.

### See Also

[Configure Guacd Settings to use Single Remote Sessions Proxy](#)

## Configure Guacd Settings to use Single Remote Sessions Proxy

Change the configuration of Guacd, to use the single remote session proxy for all the sessions.

By default, Guacd is installed while installing remote session agent on the graphic node (PBS MoM). For the VNC based session, the Guacamole service will connect to the Guacd installed on the graphics node.

Follow the steps to configure the settings to use the common Guacd for all the session including the VNC based sessions.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/displaymanager/guacamole.properties`.
3. Change the value of the `guacd-distributed-environment` to `false`.

```
guacd-distributed-environment: true
```



**Note:** By default, the `guacd-distributed-environment` value is set to `true` indicating that the remote session proxy will use Guacd installed in graphic node (PBS MoM) where VNC server is running.

4. Update the remote session proxy by changing the value of the `guacd-hostname` and `guacd-port`.

```
guacd-hostname: $ALTAIR_DM_MONITOR_HOST$
guacd-port: 5443
```

5. Restart Access Web by entering the command:

```
service pbsworks-pa restart
```

6. Restart the Interactive Proxy by entering the command:

```
/etc/init.d/guacd start
```

## 17.4.8 Configure to use Distributed Remote Sessions Proxy

Uninstall remote session proxy from the server and update the Guacd settings.

### Uninstall the Remote Sessions Proxy from the Server

Uninstall the previous version of remote session component to remove remote session proxy from the server.



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

If it is a distributed deployment, then login to the machine hosting Access Web and uninstall Remote Sessions Component to remove the proxy.

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

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Navigate to the `/opt/altair/pbsworks/2020.3/remotesessionagent/_AltairRemoteSessionAgent_Installer_<Version>_installation` directory.
3. Execute the uninstall script by entering the following command:  

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

The command must contain spaces with escape characters.
4. Follow the instructions provided by the uninstaller.

### See Also

[Configure Guacd Settings to use Distributed Remote Sessions Proxy](#)

## Configure Guacd Settings to use Distributed Remote Sessions Proxy

Change the configuration of Guacd, to use the distributed remote session proxy for all the sessions.

By default, Guacd is installed while installing remote session agent on the graphic node (PBS MoM). For the VNC based session, the Guacamole service will connect to the Guacd installed on the graphics node.

Follow the steps to configure the settings to use the distributed Guacd for all the session including the VNC based sessions.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Edit the file `PA_HOME/config/displaymanager/guacamole.properties`.
3. Change the value of the `guacd-distributed-environment` to `true`.

```
guacd-distributed-environment: true
```

 **Note:** By default, the `guacd-distributed-environment` value is set to `true` indicating that the interactive proxy will use Guacd installed in graphic node (PBS MoM) where VNC server is running.

4. Check that the `guacd-hostname` and `guacd-port` is as mentioned below:

```
guacd-hostname: $ALTAIR_DM_MONITOR_HOST$
guacd-port: 5443
```

5. Restart Access Web by entering the command:

```
service pbsworks-pa restart
```

6. Restart the Interactive Proxy by entering the command:

```
/etc/init.d/guacd start
```

## 17.4.9 Remote Sessions Handoff to Desktop Viewer

Access Remote Sessions from native desktop viewer.

Start a Remote Session from Access Web and then switch the session to a native desktop viewer. Some of the benefits of switching the session to the native desktop viewer are better session performance, control over the image quality and compression level of the session.

To hand off the Remote Sessions, click  in Access Web. This automatically displays the Remote Sessions in Access Desktop which must be installed on the local machine.

The Remote Sessions handoff will work in the following scenarios:

Table 2: Remote Sessions Handoff Scenarios

Client OS	Graphical Node OS	
	Windows	Linux
Windows	Access Desktop must be installed on the Windows client. Automatically hands-off Remote Sessions to Access Desktop. Credential are required for connecting.	Access Desktop must be installed on the Windows client. Automatically hands-off Remote Sessions to Access Desktop.
Mac	RDP is used to connect to the GPU node. Credentials are required for connecting.	Not supported.
Linux	RDP is used to connect to the GPU node. Credentials are required for connecting.	Not supported.

### Proxy Settings

By default, native desktop client connects directly to graphics nodes.

Enable the proxy, for VNC graphics node connection.



**Note:** Proxy is not required for connecting to windows graphics node.

## 17.4.10 Configure Edge Gateway

Configure the edge gateway to enable the proxy for communication from the user desktop native client to the graphics node.

Enable the edge gateway by setting the *isGatewayEnabled* value to true and by adding the gateway information *vnc\_router* and *remotesession\_edgeserver*.

 **Note:** By default, edge gateway is disabled in Access Web.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Stop Access Web using the following command:

```
service pbsworks-pa stop
```

3. Source the Access Web configuration file to set up the environment variables *PA\_HOME* and *PA\_EXEC*:

```
source /etc/pbsworks-pa.conf
```

4. Run the following command:

```
sed -i "s|PBSWORKS_EXEC|${PA_EXEC}|g" "$PA_HOME/config/remotesession_edgeserver/nginx.conf"
```

5. Run the following command:

```
sed -i "s|PBSWORKS_HOME|${PA_HOME}|g" "$PA_HOME/config/remotesession_edgeserver/nginx.conf"
```

6. Edit the file *PA\_HOME/config/pa/configuration.json*.

```
vi $PA_HOME/config/pa/configuration.json
```

7. Enable the edge gateway by changing the value of the *isGatewayEnabled* key to true.

```
"isGatewayEnabled":true
```

 **Note:** By default, the value of the *isGatewayEnabled* key is set to false.

8. Edit the file *PA\_HOME/config/shared/deployment.ini*.

```
vi $PA_HOME/config/shared/deployment.ini
```

9. Add the *vnc\_router* and *remotesession\_edgeserver* as an *option* under *pa\_deploy\_options* section:

```
'option=("vnc_router")'
'option=("remotesession_edgeserver")'
```

10. Start Access Web using the following command:

```
service pbsworks-pa start
```

## 17.4.11 Configure Edge Gateway Proxy on a Separate Server

Install and configure edge gateway proxy on a different server to improve the scalability and performance of Remote Sessions.

 **Note:** Remote Sessions edge gateway proxy is always deployed in Linux machine.

The guacamole service is installed with the Access Server. By configuring edge gateway proxy on a different server, the guacamole service can be externalized. This will improve the scalability and the performance of Remote Sessions.

Update the access portal with the edge gateway proxy to an external service.

## Secure the Configured SSL Certificate

Secure the configured SSL certificate on the server to secure communication.

If you do not have a valid domain certificate for your site, you need to create a Certificate Signing Request (CSR) and order your certificate.

SSL certificate is a must to configure the edge gateway proxy. Generate the SSL Certificate with the domain name of the machine where remote session edge proxy is getting installed.

1. You should have received a `your_domain_name.pem` file from Certificate Authority which contains both your primary certificate and the intermediate certificate. If you have that `.pem` file, you can skip to Step 4.
2. Download the intermediate (`Intermediate.crt`) and your primary certificate (`your_domain_name.crt`) files.
3. Copy these files, along with the `.key` file you generated when creating the CSR, to the directory on the server where the certificate and key files are kept.
4. Concatenate the primary certificate file (`your_domain_name.crt`) and the intermediate certificate file (`Intermediate.crt`) into a single `.pem` file by running the following command:

```
cat your_domain_name.crt Intermediate.crt >> bundle.crt
```

## Install Remote Sessions Edge Proxy

Install and configure the Remote Sessions Edge Proxy edge proxy.

SSL certificate is a must to configure the edge gateway proxy. Refer to [Secure the Configured SSL Certificate](#) to generate the SSL certificate for edge gateway proxy.

1. Install the Access Web on separate Linux machine.



**Note:** Do not start the Access Web service.

2. Source the Access Web configuration file to set up the environment variables `PA_HOME` and `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```

3. Edit the file `PA_HOME/config/shared/deployment.ini`.

```
vi $PA_HOME/config/shared/deployment.ini
```

4. Replace the contents of `deployment.ini` with the following:

```
pa_deploy_options=(
 'option=("displaymanager") '
 'option=("remotesession_edgeserver") '
 'option=("vnc_router") '
```

```
)
resultservice_deploy_options=()
pas_deploy_options=()
```

5. Run the following command:

```
$PA_EXEC/init/pbsworks-pa @clean
```

6. Run the following command:

```
$PA_EXEC/init/pbsworks-pa @configure
```

7. Edit the file `PA_HOME/config/displaymanager/guacamole.properties`.

```
vi $PA_HOME/config/displaymanager/guacamole.properties
```

8. Update `dm-host` with the installed Access Web URL.

```
dm-host: https://localhost:4443/pbsworks/api/displaymanager
```

9. Edit the file `PA_HOME/config/remotesession_edgeserver/nginx.conf`.

```
vi $PA_HOME/config/remotesession_edgeserver/nginx.conf
```

10. Update the SSL certificate information which was generated in the following line:

```
ssl_certificate certs/nginx.crt;
ssl_certificate_key certs/nginx.key;
```

- `ssl_certificate` should be your primary certificate combined with the intermediate certificate (`your_domain_name.crt`).
- `ssl_certificate_key` should be the `.key` file generated when you created the CSR.

11. Update the URL1 and URL2 to the HTTP URL from which Access Web portal will be accessed.

```
($http_origin ~ (URL1|URL2))
```



**Note:** The URL1 and URL2 are the URL that is used in the supported browser to access the Access Web portal.

For example,

```
($http_origin ~ (https://access-dev-01.prog.altair.com:4443|
https://10.10.10.10:4443))
```

12. Remove `displaymanager.xml` from the location `PA_HOME/config/displaymanager/tomcat/conf/Catalina/localhost`

```
rm $PA_HOME/config/displaymanager/tomcat/conf/Catalina/localhost/displaymanager.xml
```

13. Start Access Web using the following command:

```
service pbsworks-pa start
```

## Configure Access Web to Connect to an Edge Proxy

Update Access Web configuration to connect to an external edge proxy.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Source the Access Web configuration file to set up the environment variables `PA_HOME` and `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```

3. Edit the file `PA_HOME/config/displaymanager/proxy_loadbalancing.properties`.

```
vi $PA_HOME/config/displaymanager/proxy_loadbalancing.properties
```



4. Update the *hostname* value with the hostname of an external edge proxy or the DNS load balancer.

```
hostname=localhost
```

5. Update the *port* value with the port to access the external edge proxy or the DNS load balancer.

```
port=5943
```



**Note:** The default port used for edge proxy is 5943.

6. Change the value of *usedefault* to false to connect to the above configured edge proxy hostname and port.

```
usedefault=true
```

7. Restart Access Web using the following command:

```
service pbsworks-pa restart
```

## 17.4.12 Configure a Windows Graphical Node to Run a Single Job per User

To prevent a user from running multiple Remote Sessions on the same Windows graphics node, configure the graphics node at the PBS Professional level to limit the number of running jobs on the node to one per user.

Users cannot open multiple Remote Sessions on the same Windows graphical node because RDP does not allow more than one session per user per node.

Perform the below steps to configure PBS Professional to run a single session per user per graphics node.



**Note:** Multiple sessions can be run on the same node for different users.

Repeat these steps for each Windows graphics node.

1. Login to the PBS Server as PBS Manager.
2. Open the command prompt.
3. Enter the command:

```
qmgr -c "set node <vnode name> max_user_run=1"
```

## 17.4.13 Enable Remote Sessions Statistics Panel

Enable Remote Sessions statistics panel to view the remote session throughput and frames per seconds in the user interface.

By default, the Remote Sessions statistics panel is disabled.

Use the Remote Sessions statistics panel to help diagnosis performance issues.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.

2. Source the Access Web configuration file to set up the environment variables `PA_HOME` and `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```

3. Edit the file `PA_HOME/config/pa/configuration.json`.

```
vi $PA_HOME/config/pa/configuration.json
```

4. Update the value of `showStatisticsInfo` to true.

```
showStatisticsInfo=true
```

5. Refresh the browser to reflect the changes.

The session statistics info button is displayed in the session inline view.

Figure 35: Remote Sessions Statistics Info Button



6. Click .  
Remote Sessions Statistics information is displayed.

Figure 36: Remote Sessions Statistics



## 17.4.14 Change the Windows RDP Security Connection

Change the security mode for Windows RDP session.

RDP sessions support different authentication methods for security. By default, TLS security mode is used as the default authentication method for RDP session for Windows.

Supported security modes are:

- ANY
- Remote Desktop (RDP)
- Transport Layer Security (TLS)
- Network Layer Authentication (NLA)

Follow the steps to change the security mode.

1. Login to the Access Web Docker container using the following command:

```
docker exec -it windows_access bash
```

2. Source the Access Web configuration file to set up the environment variables `PA_HOME` and `PA_EXEC`:

```
source /etc/pbsworks-pa.conf
```

3. Edit the file `PA_HOME/config/displaymanager/rdpconnection.properties`.

```
vi $PA_HOME/config/displaymanager/rdpconnection.properties
```

4. Update the value of `security` to one of the supported security modes.
  - `tls`
  - `rdp`

- nla

```
security=tls
```

**5. Restart Access Web using the following command:**

```
service pbsworks-pa restart
```

## 17.5 Configure Results Visualization Service

This sections provides relevant information for the administrator in configuring the Results Visualization Service (RVS).

### 17.5.1 Activate Solver Files Readers

You can activate solver file readers such as Abaqus, CFX, Fluent, and STAR-CCM+ that are not supported by default.

Solver log file readers are already present in the standard installation of HyperWorks, but they are not activated by default. Enable them by activating a HyperWorks plotting preference file.

**Tip:** If the configuration fails for any of the specified data files, then place the external reader line of code below the text column line of code. For example: The code looks like this when it is changed:

```
*RegisterExternalColumnReader({external_readers_dir + "/hgtextcolumn.exe"})
*RegisterExternalReader({external_readers_dir + "/"
hg<solverfilereadername>.exe"}, "", "", ascii)
```

### Activate the Abaqus Reader

Activate the Abaqus reader so that Abaqus data files can be read by HyperWorks.

1. Edit the file at <HyperWorks\_INSTALL\_DIR>/hw/prefinc/preferences\_common\_plot.mvw

2. Locate the following line of code:

```
*RegisterExternalColumnReader({external_readers_dir + "/hgtextcolumn.exe"})
```

3. Add the following line of code directly before the code referenced in the previous step to activate the Abaqus reader:

```
*RegisterExternalReader({external_readers_dir + "/hgabaqus.exe"}, "", "", ascii)
```

The code looks like this when you are done.

```
*RegisterExternalReader({external_readers_dir + "/hgabaqus.exe"}, "", "", ascii)
*RegisterExternalColumnReader({external_readers_dir + "/hgtextcolumn.exe"})
```

### Activate the CFX Reader

Activate the CFX reader so that CFX data files can be processed by HyperWorks.

1. Edit the file at <HyperWorks\_INSTALL\_DIR>/hw/prefinc/preferences\_common\_plot.mvw

2. Locate the following line of code:

```
*RegisterExternalColumnReader({external_readers_dir + "/hgtextcolumn.exe"})
```

3. Add the following line of code directly before the code referenced in the previous step to activate the CFX reader:

```
*RegisterExternalReader({external_readers_dir + "/hgCFX.exe"}, "", "", ascii)
```

The code looks like this when you are done.

```
*RegisterExternalReader({external_readers_dir + "/hgCFX.exe"}, "", "", ascii)
*RegisterExternalColumnReader({external_readers_dir + "/hgtextcolumn.exe"})
```

## Activate the Fluent Reader

Activate the Fluent reader so that Fluent data files can be processed by HyperWorks.

1. Edit the file at <HyperWorks\_INSTALL\_DIR>/hw/prefinc/preferences\_common\_plot.mvw
2. Locate the following line of code:

```
*RegisterExternalColumnReader({external_readers_dir + "/hgtextcolumn.exe"})
```

3. Add the following line of code directly before the code referenced in the previous step to activate the Fluent reader:

```
*RegisterExternalReader({external_readers_dir + "/hgfluent.exe"}, "", "", ascii)
```

The code looks like this when you are done.

```
*RegisterExternalReader({external_readers_dir + "/hgfluent.exe"}, "", "", ascii)
*RegisterExternalColumnReader({external_readers_dir + "/hgtextcolumn.exe"})
```

## Activate the STAR-CCM+ Reader

Activate the STAR-CCM reader so that STAR-CCM data files can be processed by HyperWorks.

1. Edit the file at HW\_EXEC/hw/prefinc/preferences\_common\_plot.mvw
  2. Locate the following line of code:
- ```
*RegisterExternalColumnReader({external_readers_dir + "/hgtextcolumn.exe"})
```
3. Add the following line of code directly before the code referenced in the previous step to activate the STAR-CCM reader:

```
*RegisterExternalReader({external_readers_dir + "/hgStarCCM.exe"}, "", "", ascii)
```

The code looks like this when you are done.

```
*RegisterExternalReader({external_readers_dir + "/hgStarCCM.exe"}, "", "", ascii)
*RegisterExternalColumnReader({external_readers_dir + "/hgtextcolumn.exe"})
```

4. Copy the hgstarccm executable from the user download area to <HyperWorks_INSTALL_DIR>/io/abf_readers/bin/linux64

17.5.2 Supported Result File Types

The result file types supported by RVS for visualizing plot and animation.

Table 3: Supported Result File Types

| Solver Name | Results File Format |
|----------------------|--|
| RadioSS Bulk | *.op2, *.h3d, *.res, *.pch, *.gz |
| RadioSS Block | *A00#, *.T##, *.gz |
| Optistruct | *.op2, *.h3d, *.res, *.pch, *.hgdata |
| MotionSolve | *.mrf, *.plt, *.h3d, *.maf |
| Abaqus | *.odb, *.dat, *.out |
| ADAMS | *.req, *.res, *.nam, *.rsp, *.shl, *.sta |
| Ansys | *.rst, *.rth, |
| CFX | *.out |
| Fluent | *.out, output.*, *.trn, *.txt* |
| Ls-Dyna | d3plot, *dynain, *.fz, *.dyn, Intfor, Ptf, ABSTAT, BINOUT, BNDOUT, DBFSI, DEFORC, ELOUT, GLSTAT, GECOUT, JNTFORC, MATSUM, NCFORC, NODFOR, NODOUT, RBDOUT, RCFORC, RWFOC, SBTOUT, SECFORC, SLEOUT, SPHOUT, SWFORC |
| NanoFluidX | nFX |
| UltraFluidX | uFX |
| HyperXtrude | *.h3d, *.out |
| FEMZIP | *.fz, *d3plot* |
| HW ASCII | *.hwascii |
| MADYMO | *.fai, *.kn3 |
| Marc | *.t16 |
| Nastran | *.op2, *.pch |
| NIKE3D | *n3plot |
| Pamcrash | *.DSY, *.erfh5, *.THP, *.fz, *.h3d |

| Solver Name | Results File Format |
|---------------------|-----------------------------------|
| Permas | *A# # |
| Other Ascii formats | *.xgr, *.dat, *.col, *.csv, *.rvp |

17.5.3 RVS Cache Data

Enable data caching for RVS. The fetched result file data is stored as a RVS cache data in the configured RVS server.

Set RVS Data Cleanup

To improve the performance of visualizing the result files you can configure the RVS data cleanup for the RVS cache data.

To configure the RVS data files refer to [Configure Data Directory](#).

Scheduling data cleanup avoids overlaing the database and server's disk space. You can configure the RVS data cleanup criteria settings in `site_config.xml` file. The recurring cleanup can be configured in these formats: Daily, Weekly or Monthly.

 **Note:** By default, the RVS data cleanup is set for Weekly Sun 1:00 AM.

If you wish to setup the cleanup criteria on a daily basis, you need to specify the time as `DAILY 21:45` which represents everyday at 9:45 PM.

If you wish to setup the cleanup criteria weekly, you need to specify the days and the time. Here are a few examples:

`WEEKLY SUN 14:30` represents every Sunday in a week at 2:30 PM.

`WEEKLY MON-FRI 1:00` represents the range of days in a week. Every Monday to Friday at 1 AM.

`WEEKLY MON,WED 3:00` represents the days Monday and Wednesday in a week at 3 AM.

If you wish to setup the cleanup criteria monthly, you would need to specify the days and time. Here are a few examples:

`MONTHLY 15 15:30` represents the every 15th day in a month at 3:30 PM.

`MONTHLY 10-20 1:30` represents every 10th day to 20th day in a month at 1:30 AM.

`MONTHLY 1, 11, 21 8:00` represents every 1st day, 11th day and 21st day in a month at 8 AM.

Schedule RVS Data Cleanup

You can configure the recurring RVS data cleanup criteria settings in `site_config.xml` file.

Follow the steps given here:

1. Open the file at `PA_HOME/config/resultservice/config/site_config.xml`
2. Set the value of cleanup time `<CleanupTime>` indicate when the cleanup should occur.
The below example will set the cleanup daily at 1AM.

```
<CleanupTime>DAILY 01:00</CleanupTime>
```

3. Enter the cleanup time in 24 hours format.
4. Choose one of the cleanup criteria to cleanup the untouched RVS data.
 - Specify the value of cleanup criteria `<noOfDays>`. The RVS data that is not accessed for the specified number of days is considered for the cleanup.

```
<Criterion id="LAST_ACCESSED_TIME_BASED" noOfDays="30"  
class="com.altair.hwe.publish.resultsmanager.defaultimpl.LastAccessed  
TimeBasedCriterion"/>
```

- Specify the value of cleanup criteria `<noOfDays>`. The RVS data that is not modified for the specified number of days is considered for the cleanup.

```
<Criterion id="LAST_MODIFIED_TIME_BASED" noOfDays="100"  
class="com.altair.hwe.publish.resultsmanager.defaultimpl.LastModified  
TimeBasedCriterion"/>  
</CleanupCriteria>
```

5. Replace the criterion id with the framework element value to configure the RVS data cleanup.

```
<Criterion id="FRAMEWORK_CACHE_CLEANUP_CRITERIA">
```

The following snippet is set with Daily cleanup time and the chosen cleanup criteria is, the last modified time to clean the RVS data.

```
<CleanupTime>DAILY 01:00</CleanupTime>  
    <CleanupCriteria>  
        <Criterion id="LAST_ACCESSED_TIME_BASED" noOfDays="30"  
class="com.altair.hwe.publish.resultsmanager.defaultimpl.LastAccessed  
TimeBasedCriterion"/>  
        <Criterion id="FRAMEWORK_CACHE_CLEANUP_CRITERIA"  
noOfDays="100"  
class="com.altair.hwe.publish.resultsmanager.defaultimpl.LastModified  
TimeBasedCriterion"/>  
    </CleanupCriteria>  
  
    <FrameworkCacheCleanupCriteria>FRAMEWORK_CACHE_CLEANUP_CRITERIA</  
FrameworkCacheCleanupCriteria>
```

6. Save the file and restart Access Web using the command, `service pbsworks-pa restart`.

17.5.4 Configure RVS Parameters

Main parameters related to RVS in Access Web.

Result Service Configuration

Result service configurations are defined in the `site_config.xml` file located at `PA_HOME/config/resultservice/config/site_config.xml`. RVS has to be restarted after any changes to the `site_config.xml`

Configurations in `site_config.xml`

TOC Size

The maximum TOC size-limit in bytes.

Default value is 2097152 (In bytes) (i.e. 2MB).

Configure the maximum TOC size using the parameter `<SizeLimit toc="2097152">`.

If the TOC of the result file exceeds the size limit value, RVS will make multiple calls to retrieve the remaining data. To avoid this, increase the TOC size limit value to optimize data extraction time.

Rename the result file after increasing the TOC size limit. This will ensure that RVS fetches the TOC data based on your settings instead of using cached data.

AIF Impersonation

The result file computation and license checkout are processed for the user.

Default value is set to true.

If the value is changed to False, then the RVS result file computation and license check out are processed using the concern administrator's credentials.

Configure the RVS impersonation using `<AIFImpersonation enabled="true">`

Cache enabled

Enable or disable data caching for the RVS data extraction requests. To improve performance, repeated RVS file requests are fetched from the cache. This will speed up the RVS performance.

Default value is set to true.

If set to false, result data is fetched from the database for every query. This reduces the speed of the application due to extra data transfer.

Configure the RVS data caching using `<Cache enabled="true">`.

Session defaultTimeout

The maximum amount of time the server should wait for a response from another application before disconnecting.

Default value is 6000 milliseconds (i.e., 6 seconds).

Configure the session default timeout using `<Session defaultTimeout="6000">`.

Operation defaultTimeout

Is the maximum amount of time the server should wait before closing an old connection and creating a new connection.

Default value is 6000 milliseconds (i.e., 6 seconds).

Configure the operation default timeout using `<Operation defaultTimeout="6000">`.

Configuration in resultmanager.conf

The browser timeout value for RVS is configured in the resultmanager.conf file located at: PA_HOME/config/api_gateway/default.d/resultmanager.conf

Browser Timeout

The amount of time the browser should wait for a response from a request.

A browser timeout message is displayed if the server does not provide a response before this time limit is reached.



Note: The timeout value doesn't interrupt any of the RVS background operations.

Default value is 600 seconds (i.e., 10 minutes).

Configure the browser timeout for RVS requests in the line `<proxy_read_timeout 600sec>` and enter the timeout value in seconds.

Parameters for Compose

The default value of the parameters are stored and listed in the following file *plugin_def.xml*. This file is located at PA_HOME/config/resultservice/plugins/compose_application/plugin_def.xml

Parameters in plugin_def.xml

Socket timeout for Compose

It is the maximum amount of time that the Compose server should wait to setup a connection with RVS.

Default value is 900000 milliseconds.

Configure the socket timeout for Compose in the line `<Application id="COMPOSE_APPLICATION">` and enter the `<socketTimeout="900000">` value.

Connection timeout for Compose

It is the maximum amount of time that the Compose server should wait to respond for the data query from RVS.

Default value is 900000 milliseconds.

Configure the connection timeout for Compose in the line `<Application id="COMPOSE_APPLICATION">` and enter the `<connectionTimeout="900000">` value.

Request timeout for PBS datasource

It is the maximum amount of time that the RVS server will wait for a request from PAS.

Default value is 6000 milliseconds.

Configure the request timeout for PAS in the line `<DataSourceHandler id="PBS_DATA_SOURCE_HANDLER">` and enter the `<requestTimeout="900000">` value.

Connection timeout for PBS datasource

It is the maximum amount of time that the PAS server should wait to respond for the data query from RVS.

Default value is 6000 milliseconds.

Configure the connection timeout for PAS in the line `<DataSourceHandler id="PBS_DATA_SOURCE_HANDLER">` and enter the `<connectionTimeout="900000">` value.

A predefined set of instructions 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:

- [18.1 Application Definition Components](#) (p. 244)
- [18.2 Sample Application Definition ShellScript](#) (p. 246)
- [18.3 Display an Icon for an Application](#) (p. 247)
- [18.4 Define a Category for an Application Definition](#) (p. 249)
- [18.5 Administration of Application Definitions](#) (p. 250)
- [18.6 Sitewide Settings](#) (p. 252)
- [18.7 Interactive Application Definitions](#) (p. 256)

To run a solver or application through Access Web requires an application definition. 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:

```
PA_HOME/data/pas/targets/localhost/repository/applications.
```

For sites that are installing Access Web for the first time, default application definitions and a site configuration file are provided to get you up and running quickly. Obtain them through your usual Altair PBS Works Support (pbssupport@altair.com).

For sites that are using legacy products such as Compute Manager, legacy application definitions can be ported so that they can be used by Access Web.

18.1 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.

Application definitions are stored in the PAS application directory. The default location of this directory is: `PA_HOME/data/pas/targets/localhost/repository/applications/`.

Diving Into Application Definitions explains what an application definition is and how to use an application definition. If you are installing PAS for the first time and are not familiar with application definitions, then *Diving Into Application Definitions* is a good place to start. A set of tutorials is provided starting with how to create the simplest of application definitions and progressing to more advanced topics. Recipes are also available demonstrating advanced techniques. For more comprehensive information about application definitions and their associated files see *Diving Into Application Definitions*.

18.1.1 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.

18.1.2 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 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.

18.1.3 Application Runtime Scripts

The application runtime scripts are what 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*.

18.1.4 Site Configuration File

A default site configuration file, `site-config.xml`, is installed in the PAS configuration directory.

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.

The location of this file for a typical installation of PAS is:

```
PA_HOME/data/pas/targets/localhost/repository/
```

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*.

The `site-config.xml` file must be updated manually if you add an application definition. Access Web does not create a backup the `site-config.xml` file. If you delete the `site-config.xml` file, then you must create it manually. Before making changes to the site configuration file, it is recommended to back it up.

18.2 Sample Application Definition ShellScript

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

ShellScript 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. ShellScript 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. ShellScript'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.

18.3 Display an Icon for an Application

Provide a custom icon to represent an application or solver in the Access Web user interface.

By default, Access Web generates a unique generic icon for each of the application for visual distinction. The generic icon is displayed in the Access Web user interface when displaying the list of available applications/solvers for submitting a job. To display a custom icon, place the icon in a special application definition directory.

A directory called `avatar` must be created in the application definition directory and the custom icon must be placed in this directory.

The custom icon should meet the following criteria:

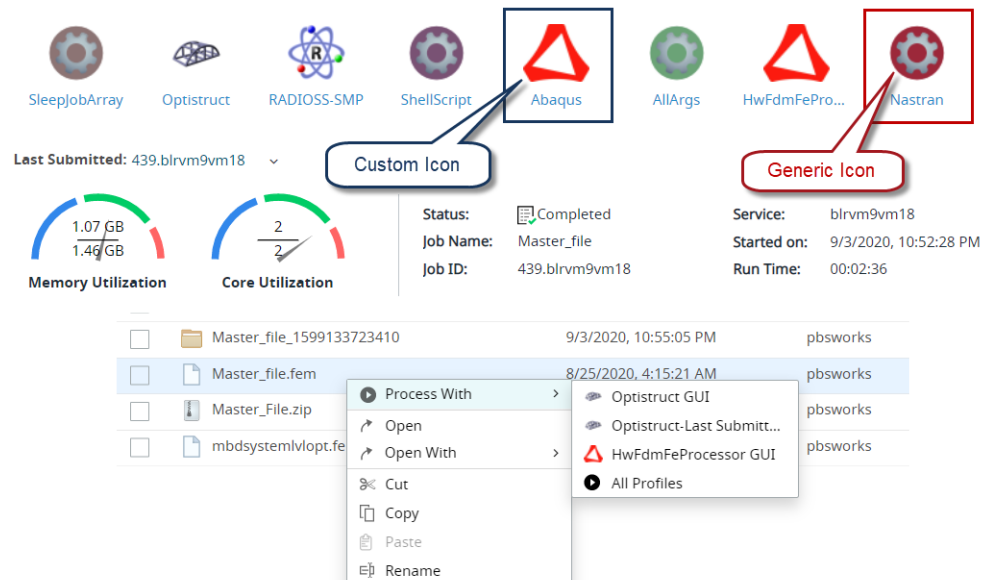
- supported icon formats are JPG, JPEG and PNG.
- the name of the custom icon must be `application.jpg`, `application.jpeg`, or `application.png`.
- minimum size of the icon should be 48x48 pixels.

The custom icon placed in the `avatar` directory gets converted to the following application icon set:

- `ApplicationName-16.png`
- `ApplicationName-24.png`
- `ApplicationName-48.png`
- `ApplicationName.ico`

The custom icon will be resized dynamically and it will be displayed in the application list menu and in the context menu.

Figure 37: Application Icon in Job List and Context Menu



To maintain backward compatibility, application definitions with the following XML elements `<ApplicationIconSmall>` (icon size 16x16) and `<ApplicationIconMedium>` (icon size 48x48) for the context menu and application list are still valid.

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Navigate to the required application directory to place the application icon.
3. Create an *avatar* directory.
4. Copy the custom icon to the `avatar` directory.
5. Repeat steps 2 through 4 for all applications.
6. Restart Access Web by entering the following command:

```
service pbsworks-pa restart
```


18.4 Define a Category for an Application Definition

Define a category in the application definition input file so that the application listed can be filtered based on the category.

The XML element <TAGS> defines the category under which an application is listed within the Access Web UI.

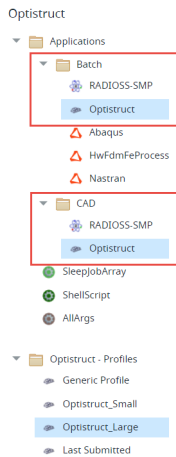


Figure 38: Application Definition Category

Applications can be filtered in the UI by selecting a category.

For example, add a category to the Optistruct application using the XML element <TAGS>:

```
<TAGS>
  <TAG>ApplicationType:Batch</TAG>
  <TAG>ApplicationType:CAD</TAG>
</TAGS>
```

This tag indicates that the Optistruct application will be listed under the ApplicationType. The Batch and CAD will be the subcategory of ApplicationType. The category tags can be defined in other application definition input files so that the categories can be used to filter the application list.

18.5 Administration of Application Definitions

PAS has a central location for storing application definitions -

`PA_HOME/data/pas/targets/localhost/repository/applications.`

All application definition components are stored in this directory.

18.5.1 Add a New Application Definition

Adding an application definition to the applications directory, followed by a restart of Access Web, will expose your application definition to the user.

A default application definition called ShellScript is available after installing Access.

Follow these steps to add an application definition:

1. Login to the machine hosting the PAS Server as root or as a user with sudo permissions.
2. Navigate to `PA_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. Navigate to `PA_HOME/data/pas/targets/localhost/repository/.`



Note: It is recommended to back up the site configuration file before making any changes to it.

9. Update the application definition information in `site-config.xml`.
10. Restart Access Web by entering the following command:

```
service pbsworks-pa restart
```

18.5.2 Application Definition Validation

When Access Web starts, it performs a validation of the existing application definitions. If application definitions fail to meet key criteria, error messages are displayed in the PAS log file indicating why the application definition was invalid.

If an application is not displayed in the Access Web user interface after adding a new application definition or making changes to an existing one and restarting Access Web, then most likely there were validation problems with the application definition or the site configuration file.

View the PAS log for any error messages and edit the application definition or site configuration file to take any required corrective action. An invalid application definition will not prevent the PAS Server from starting up.

18.5.3 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 Access Web.

Update 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 as root or as a user with sudo permissions.
2. Navigate to the applications directory located at:

```
PA_HOME/data/pas/targets/localhost/respository/applications.
```

3. Edit and make any modifications necessary to the application definition files.
4. Restart Access Web by entering the following command:

```
service pbsworks-pa restart
```

Remove 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 Access Web to remove your application definition from PAS. Follow these steps to remove an application definition:

1. Login to the machine hosting the PAS Server as root or as a user with sudo permissions.
2. Navigate to the applications directory located at:

```
PA_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. Remove references to the application definition from the `site-config.xml` file located at:

```
PA_HOME/data/pas/targets/localhost/repository/.
```

5. Restart Access Web by entering the following command:

```
service pbsworks-pa restart
```

18.6 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 `PA_HOME/data/pas/targets/localhost/repository`.

18.6.1 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.

The `site-config.xml` file must be updated manually if you add an application definition. Access Web does not create a backup of `site-config.xml` file. If you delete the `site-config.xml` file, then you must create it manually. Before making changes to the site configuration file, it is recommended to back it up.

18.6.2 Site Configuration File Backup

Upon server start-up, PAS will validate the content of the site configuration file and the content of application definitions. Any validation errors are written to the PAS log file.

If an application is not displayed in the Access Web user interface after adding a new application definition or making changes to an existing one and restarting PAS, then most likely there were validation problems with the application definition or the site configuration file.

View the PAS log for any error messages and edit the application definition or site configuration file to take any required corrective action.

As of Access 2020.3, the site configuration file is no longer backed up during its validation process.

18.6.3 Initial Site Configuration File after Installation of PAS

After installation of PAS the site configuration file will contain references to ShellScript, 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="ShellScript">
      <ApplicationVersions/>
    </Application>
  </Applications>
  <JobProjects id="BILLING_ACCOUNT"/>
  <Policies/>
</SiteConfiguration>
```

18.6.4 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="ShellScript">
      <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>
```

18.6.5 Use 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*.

18.6.6 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.

18.7 Interactive Application Definitions

Interactive application definition mandatory and special arguments.

An interactive application runs a 3D and graphics-intensive application on a graphical node.

18.7.1 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`.

18.7.2 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>
```

 **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 Access Web.

```
<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`.

18.7.3 Add 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 Remote Sessions components of Access Web.

1. Navigate to `PA_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 `PA_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 the Access Web for these changes to take effect by entering the following command:

```
service pbsworks-pa restart
```

The new application will be available in Access Web after restart.

Create roles and add users to these roles to grant and restrict access to the various features of Access Web.

This chapter covers the following:

- [19.1 Manage Roles](#) (p. 262)
- [19.2 Manage Users](#) (p. 265)

Access Web roles and privileges are defined by clicking  > **Access Management** located in the upper right-hand of the web page once you have logged into Access Web. This option is only displayed for users who have been assigned the role of Manager.

19.1 Manage Roles

Add a role, change a role's privileges or delete a role.

19.1.1 Default Roles and Resources

Overview of the default Access Web roles.

Access Web Roles

By default, the only role available in Access Web is Manager. This role cannot be deleted and their assigned privileges cannot be changed, however additional users can be added to these roles to provide manager access.

Manager

A Manager has the highest level of access privilege. Managers can add, edit, or remove clusters, can view and act upon jobs and files, and can grant and restrict access to the various features of Access Web. By default, the Service User entered during the installation of Access Web is assigned to the Manager role and cannot be removed from this role.

Privileges

By default, the following privilege levels are available:

Portal Admin

This privilege allows full access to manage clusters and access management.

Application User

This privilege restricts application access for jobs, sessions and to the resources.

Resources

By default, the following resource levels are available:

Applications

This privilege allows access to the applications and its respective profiles available in Access Web. It limits the users to access applications for job submission, create job profiles, use the application for remote session and perform custom action.

19.1.2 Add a New Role

Create a custom role for your site.

Review the [default roles and privileges](#) before adding a new role.

1. Click  > **Access Management**.
2. Click **Roles** from the Access Management menu located on the left-hand side of the web page.
3. Click **Add Role**.

A role is created with a default role name and undefined privileges.

4. Click  located to the right of the name of the role.
 - a) For Role Name, enter a name that describes the role.
 - b) Click **OK**.
5. Choose **Portal Admin** privilege if you want to provide full permission.
By default, only **Application User** privilege is provided to the new Role.
6. Click **+** at the top next to the **Assigned Resources**.
The **Available Resources** menu is displayed.
7. Choose the resources to give to this role by clicking the check-box located to the right of the resources.
Resources are not mutually exclusive, so you may assign more than one.
8. Click **Ok** in the **Available Resources** menu.
9. Click **Save**.
The new role is displayed in the Roles list.

19.1.3 Change the Resources of a Role

Add or remove access resources for a role.

Review the [default roles and privileges](#) before adding a new role.

1. Click  > **Access Management**.
2. Click **Roles** from the Access Management menu located on the left-hand side of the web page.
3. Click the name of the role.
The **Assigned Resources** menu is displayed.
4. Click **+** at the top next to the **Assigned Resources**.
The **Available Resources** menu is displayed.
5. Enable the checkbox next to the Resource to assign the resource to the role.
6. Click **Ok** in the **Available Resources** menu.
7. Click **Save**.

19.1.4 Change the Name of a Role

Rename a role.

1. Click  > **Access Management**.
2. Click **Roles** from the Access Management menu located on the left-hand side of the web page.
3. Click the name of the role.
4. Click  located to the right of the name of the role.
 - a) For Role Name, enter a new role name.

b) Click **Ok**.

5. Click **Save**.

19.1.5 Delete a Role

Delete a role that is no longer needed.

1. Click  > **Access Management**.
2. Click **Roles** from the Access Management menu located on the left-hand side of the web page.
3. Select a role by enabling the checkbox next to the role's name.



Tip: Select multiple roles so that they can be deleted in a single click.

4. Click .
5. Click **Yes**.

19.2 Manage Users

Add a user, assign or remove a role from a user, revoke access to a cluster, or delete a user.

19.2.1 Add a User

Add a user so that the user can access the features of Access Web.

1. Click  > **Access Management**.
2. Click **Users** from the Access Management menu located on the left-hand side of the web page.
3. Click **Add User**.
 - a) For First Name, enter the first name of the user.
 - b) For Last Name, enter the last name of the user.
 - c) For User Name, enter the user's username.
 - d) Click **Save**.

19.2.2 Assign a Role to a User

Assign a role to the user to establish user privileges.

1. Click  > **Access Management**.
2. Click **Users** from the Access Management menu located on the left-hand side of the web page.
3. Select a user by enabling the checkbox next to the user's name.

 **Tip:** Select multiple users when you want to assign the same roles to multiple users.

4. Click **Assign Roles**.
5. Enable the checkbox next to the Role Name to assign the role to the user.

 **Tip:** More than one role can be assigned to the user.

6. Click **OK**.

19.2.3 Remove a Role from a User

Remove a role from a user to limit access to certain features.

1. Click  > **Access Management**.
2. Click **Users** from the Access Management menu located on the left-hand side of the web page.
3. Click the name of the user.

The roles assigned to the user are displayed.

4. Click  to delete the role.
5. Click **Save**.

19.2.4 Change the User Name

Change the first or last name of a user.

1. Click  > **Access Management**.
2. Click **Users** from the Access Management menu located on the left-hand side of the web page.
3. Click the name of the user.
The roles assigned to the user is displayed.
4. Change the first or last name of the user.
5. Click **Save**.

19.2.5 Delete a User

Delete a user when the user no longer needs access to Access Web.

1. Click  > **Access Management**.
2. Click **Users** from the Access Management menu located on the left-hand side of the web page.
3. Select a user by enabling the checkbox next to the user's name.

 **Tip:** Select multiple users so that they can be deleted in a single click.

4. Click .
5. Click **Yes**.

Troubleshooting tips and tricks.

This chapter covers the following:

- [20.1 Use the Diagnosis Script to Troubleshoot Issues](#) (p. 268)
- [20.2 Troubleshoot Access Web](#) (p. 270)
- [20.3 Troubleshoot PBS Application Services](#) (p. 271)
- [20.4 Troubleshoot Remote Sessions Components](#) (p. 281)
- [20.5 Troubleshoot Results Visualization Service](#) (p. 301)
- [20.6 Logging](#) (p. 309)

20.1 Use the Diagnosis Script to Troubleshoot Issues

Use the diagnosis script to gather logs and system data to help troubleshoot issues with Access Web. The diagnosis script must be run as root or as a user with sudo permissions using the `sudo` command. The diagnosis script will create a zip archive that can be shared with Altair support team for troubleshooting issues.



Note: If PAS is installed on a separate machine, run the diagnosis script on the PAS server as well.

The zip archive contains the Access Web configuration folder, logs folder and system information as mentioned below:

Table 4: *pa-diagnosis* Zip Archive Contents

Folder or File Name	Description
config folder	Access Web configuration folders
logs folder	Access Web components logs folders
cpuinfo	CPU information
diskinfo	Disk information
meminfo	Memory information
os	Operating System information
pbsworks-pa.conf	Access Web configuration file
process	Process information running from <code>PA_EXEC</code> location.
remotesession-diagnosis	Remote Sessions diagnosis information
selinuxstatus	SE Linux status information
topoutput	The top command is used to show the Linux processes. It provides a dynamic real-time view of the running system. It shows the summary information of the system and the list of processes or threads which are currently managed by the Linux Kernel.
VERSION	Access Web Version and Build information

1. Login to the machine where you have installed Access Web or PAS server.
2. Navigate to `PA_EXEC/init/`
3. Run the following command:

```
./pa-diagnosis.py
```

A zip archive is created in `/tmp` called `pbsworks-pa-diagnosis_DATETIMESTAMP.zip` where *DATETIMESTAMP* is the file creation timestamp in the format `YYYYMMDD-HHMMSS`.

20.2 Troubleshoot Access Web

Troubleshooting information and steps for Access Web.

20.2.1 Unable to View the Job Files for a Running Job

Condition

After submitting a job, I am unable to view the job files for the running job and the following message is displayed `Could not perform operation. Job might not be running.`

The screenshot shows the Altair Access Web interface for a running job. The top bar includes 'JOB ID: 1158.altair' and buttons for 'Terminate' and 'Custom Actions'. Below this, there's a 'Jobs' tab and 'v17' sub-tab. The 'Running Folder' section shows the path '/home/christophe/pbs.1158.altair.x8z' and an 'Upload File' button. A table with columns 'Name', 'Created On', 'Owner', and 'File Size' is present, but it's empty. The 'Job Summary' section shows the job is 'Running' with details like 'Job Name: v17', 'Job ID: 1158.altair', 'Service: altair', 'Started on: 14/04/2020 à 15:15:42', and 'Run Time: 00:00:26'. A message box at the bottom right displays the error: 'Could not perform operation. Job might not be running.'

The following error is displayed in the PAS server log:

```
ERROR com.altair.pas.joboperations.messagebroker.NATSServices - No Response  
message received from mom. Could not perform operation.Job might not be running.
```

Cause

If the Access Web Server is not reachable or resolvable from PBS execution hosts, then the job directory will not be visible and no file listing will be seen from the jobs running directory.

Remedy

Verify that the Access Web Server is reachable and its hostname resolvable from the HPC complex execution hosts. Additionally, verify that all ports used for external communication are opened.

See Also

[Update Access Web Server Hostname](#)

[Open Ports](#)

20.3 Troubleshoot PBS Application Services

Troubleshooting information and steps for PAS.

20.3.1 PAS Status Page

Use the PAS status page to get information about PAS such as JVM data, memory and disk usage data, and PBS information.

A status page is available through the following URL to monitor the status of PAS:

<https://HOSTNAME:5243/pas/pasStatus>

Where *HOSTNAME* is the hostname of the machine where the PAS Server is installed.

PAS Status at time: 6:23:29 PM

JVM Platform OS Name (system property os.name)	Linux - OK
JVM Platform OS Version (system property os.version)	3.10.0-693.el7.x86_64 - OK
JVM Platform Architecture (system property os.arch)	amd64 - OK
JVM Data Model (system property sun.arch.data.model)	64 - OK
Java Version	1.8.0_92 - OK
Python	OK
Dependent shared objects	OK
Available heap memory in MB	186 MB - OK
Memory used by AIF server in MB	101 MB - OK
PAS_EXEC directory disk space.	OK
PAS_HOME directory disk space.	OK
PBS status	PBS server is Running - OK
PBS Version	18.2 - OK
PBS execution speed	OK

Figure 39: PAS Status Page

Green indicates that the system is functioning properly. Red indicates an issue that should be investigated.

For the PBS execution speed, PAS retrieves the PBS version by executing `get_PBS_version.py` located in `PA_EXEC/pas/scripts`. If the response takes more than 5 seconds, the execution speed is considered slow and will be displayed in red.

20.3.2 PAS Log File Contains OutOfMemory Errors

Condition

There are `OutOfMemoryErrors` in the PAS Server log.

Cause

Usually, this error is thrown when the Java Virtual Machine cannot allocate an object because it is out of memory.

Remedy

Adjust the Java Virtual Machine (JVM) heap size of PAS.

Out of memory errors can indicate a underlying problem, therefore it is recommended to report these errors to the Altair support team.

See Also

[Configure JVM Performance](#)

20.3.3 PBS Professional Features are Not Working after Upgrade

Condition

I have upgraded PBS Professional to the newest version and now the new features are not working.

Cause

Whenever PAS starts, it saves PBS configuration information in memory. After PBS Professional is upgraded, the new configuration information is not available to PAS.

Remedy

After installing a new version of PBS Professional, you must restart PAS.

1. Login to the PAS Server.
2. Restart PAS.

20.3.4 Verify the Installation of PBS Application Services

Verify PAS installation and server status.

1. Open any of the supported browsers.
2. Enter URL (`https://<HOSTNAME>:<PORT>/pas`)

Where *HOSTNAME* is the hostname of the machine where PAS is installed and *PORT* is the port that PAS listens on.



Note: The default port is 5243.

The browser will display the PAS information.
Messages similar to the following are displayed:

PBSWorks Application Services

Version: 2020.3.0

Build: 20200817

[REST Services](#)

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20.3.5 Server is Down or Home Directory Listing Failed

Condition

PAS server is down or the get user home directory script fails.

Cause

If User Access Control (UAC) is enabled, then it may not execute any executables.

Remedy

Verify the status of UAC by executing the script.

1. Login to the PAS Server.
2. Source the Access Web configuration file to set up the environment variables PA_HOME and PA_EXEC:

```
source /etc/pbsworks-pa.conf
```
3. Execute the UAC_Check.ps1 script located at C:\Program Files\altair\pas\2020.3\PAS\exec\scripts\

```
.\UAC_Check.ps1
```

The UAC status will be displayed:

```
UAC Enabled: False
```

If UAC enabled is true, then disable UAC by performing the steps mentioned in [Disable User Access Control \(UAC\) in Windows](#)

20.3.6 Troubleshoot PAS Job Submission Issues

Information about troubleshooting PAS job submission issues.

Change the Logging Level to Troubleshoot Job Submission Issues

Change the PAS logging level to get fine-grained information that is more useful to debug a job submission issue.

 **Note:** To gather debugging information for other functional areas of PAS, see [Logging Behavior](#).

To troubleshoot errors during job submission and job monitoring, relevant information must be collected:

- user input provided for the job submission
- submission environment
- status (success or failure) of all the dependencies
- steps which happen during the job submission
- job submission attributes generated by the PAS Server for the workload manager (PBS)

Follow these steps to gather relevant data:

1. Check the PAS server log `PA_HOME/logs/pas/pas-server.log` for errors.
2. Check the Tomcat log file `PA_HOME/logs/pas/catalina.out` for network or security errors.
3. Check the system logs.

 **Note:** For advanced debugging, contact the Altair support team.

If you cannot determine the cause of the issue after checking the PAS Server log files, the Tomcat log files and the system logs, change the PAS logging level to get fine-grained information that is more useful to debug a job submission issue.

4. Navigate to `PA_HOME/config/pas/conf/`.
5. Add the following lines to the `server-log.xml` file to get detailed logging information about user inputs and to see how long it takes to execute a submission request:

```
<category name="com.altair.gw.aif.rest.RESTJobsPortImpl">  
  <priority value="debug" />  
</category>
```

6. Add the following lines to the `server-log.xml` file to get detailed logging information about the process of creating PBS job attributes from user inputs as well as information about the application definition:

```
<category name=" com.altair.gw.aif.rest.util.PASNextGenJobUtils">  
  <priority value="debug" />  
</category>
```

PAS supports multiple adapters to communicate with the workload manager.

7. If the SSH adapter is enabled for the communication with the PBS cluster, add the following XML to the `server-log.xml` file to troubleshoot job submission:

```
<category name=" com.altair.gw.aif.ssh.implementation. SSHImplementation">
  <priority value="debug" />
</category>
```

8. Edit the PAS job script `PA_EXEC/pas/scripts/job.py`.
9. Enable debug logging by setting `DEBUG` to `true`.

```
DEBUG=TRUE
```

This provides information about the job process arguments and the job environment at the moment of job execution. This information is available in the job output file.

10. Restart Access Web by entering the following command:

```
service pbsworks-pa restart
```

11. Resubmit the job.
12. Check the log files described in steps 1 through 3.
13. Check the job output file for information about the job process arguments and the job environment.

If this troubleshooting steps do not provide enough information to debug the issue, then [submit a job script directly to PBS](#).

Troubleshoot Job Submission Issues by Submitting a Job Directly to PBS

Debug job submission issues by submitting the job script directly to PBS.

Submit a job directly to PBS to determine if the problem is a PBS issue or a PAS issue.

1. Edit the file `PA_HOME/config/pas/conf/server.conf`.
2. Enable debug mode for the PAS Server by setting `DEBUG` to `true`.

```
DEBUG=TRUE
```

3. Restart Access Web by entering the command:

```
service pbsworks-pa restart
```

The PAS Server will save the job script to a file in `PA_HOME/data/pas/system/temp`

4. Use the job script file to submit a job directly to PBS Professional.
If the job runs successfully with no errors, then the problem is originating from PAS.

Job Fails With "Bad UID for job execution" Error

Condition

Our site has installed PAS on a separate machine from the one hosting the PBS Professional Server. When a user submits a job, the job fails with a "Bad UID for job execution" exception.

Cause

This error is displayed when jobs are submitted by root. If the failed job was not submitted by root, then the PBS Professional *flatuid* may be set to False.

Remedy

The PBS Professional *flatuid* attribute must be set to True. This attribute specifies whether, for each user, the username at the submission host must be the same as the one at the Server host. The username at the Server host must always be the same as the username at the execution host. When *flatuid* is set to True, the Server assumes that UserA@host1 is the same as UserA@host2. Therefore, if *flatuid* is True, UserA@host2 can operate on UserA@host1's job.

1. Login to the PBS Server as root or a user with sudo permissions.
2. At the command line, enter the command:

```
qmgr
```

3. Enter the command:

```
print server
```

4. If the attribute *flatuid* is equal to False or is not set (you do not see it in the output from the print server command), then set the value to True by issuing the command:

```
set server flatuid = True
```

20.3.7 Troubleshoot Issues During the Installation of PAS

Error messages, explanation, and a resolution for the error that may occur during the installation of PAS.

Stage Directory is Blank

Condition

During the installation of PAS, I get a Staging Directory is blank warning message.

Cause

Staging Directory path is not provided during installation.

Remedy

The staging directory is where the necessary files are transferred after job submission, but prior to the portal submitting the job to PAS for transfer to PBS Professional for execution. This staging directory must exist for the installation to complete successfully. Please enter a pathname to an existing directory which will be designated as the PAS staging directory.

PAS Service was unable to start

Condition

During the installation of PAS, I get a PAS Service was unable to start error message.

Cause

This may be due to port required by PAS is unavailable or busy.

Remedy

An error occurred while starting PAS. Review the PAS log file for errors and contact system support.

PAS Log File Contains OutOfMemory Errors

Condition

There are `OutOfMemoryErrors` in the PAS Server log.

Cause

Usually, this error is thrown when the Java Virtual Machine cannot allocate an object because it is out of memory.

Remedy

Adjust the Java Virtual Machine (JVM) heap size of PAS.

Out of memory errors can indicate a underlying problem, therefore it is recommended to report these errors to the Altair support team.

See Also

[Configure JVM Performance](#)

Job Fails With "Bad UID for job execution" Error

Condition

Our site has installed PAS on a separate machine from the one hosting the PBS Professional Server. When a user submits a job, the job fails with a "Bad UID for job execution" exception.

Cause

This error is displayed when jobs are submitted by root. If the failed job was not submitted by root, then the PBS Professional `flatuid` may be set to False.

Remedy

The PBS Professional `flatuid` attribute must be set to True. This attribute specifies whether, for each user, the username at the submission host must be the same as the one at the Server host. The username at the Server host must always be the same as the username at the execution host. When

flatuid is set to True, the Server assumes that UserA@host1 is the same as UserA@host2. Therefore, if *flatuid* is True, UserA@host2 can operate on UserA@host1's job.

1. Login to the PBS Server as root or a user with sudo permissions.
2. At the command line, enter the command:

```
qmgr
```

3. Enter the command:

```
print server
```

4. If the attribute *flatuid* is equal to False or is not set (you do not see it in the output from the print server command), then set the value to True by issuing the command:

```
set server flatuid = True
```

Job Fails With Unknown Resource Error

Condition

Our site has installed PAS on a separate machine from the one hosting the PBS Professional Server. When a user submits a job, the job fails with a `Unknown resource Resource_List.xxxxxx` exception.

Cause

The resource needed for running the job is not configured in PBS Professional.

Remedy

Resources required by PAS have not been defined to PBS Professional. Add the required PAS resources to the PBS Professional resource definition file.

1. Login to the PBS Server as root or a user with sudo permissions.
2. Edit the PBS resource definition file `PBS_HOME/server_priv/resourcedef`.
3. Add these resource definitions to the `resourcedef` file:

```
# *** BEGINNING OF AIF STATIC RESOURCES SECTION.DO NOT EDIT BY HAND ***
pas_billing_accounts type=string_array
pas_policies type=string_array
pas_applications type=string_array
pas_applications_enabled type=string_array flag=h
pas_platform type=string_array flag=h
pas_candidate_hosts type=string_array
pas_operating_system type=string_array flag=h
pas_cpu_arch type=string_array flag=h
aif_billing_accounts type=string_array
aif_policies type=string_array
aif_applications type=string_array
aif_applications_enabled type=string_array flag=h
aif_platform type=string_array flag=h
aif_candidate_hosts type=string_array
aif_operating_system type=string_array flag=h
aif_cpu_arch type=string_array flag=h
# *****END OF AIF STATIC RESOURCES SECTION *****
# *** BEGINNING OF DM STATIC RESOURCES SECTION.DO NOT EDIT BY HAND ***
ngpus type=long flag=nh
# ***** END OF DM STAT
```

4. Save the file.

5. Restart the PBS Professional server.
6. At the command line, enter the command:

```
qmgr
```

7. Enter the command:

```
print server
```

8. If the attribute `flatuid` is equal to `False` or is not set (you do not see it in the output from the `print server` command), then set the value to `True` by issuing the command:

```
set server flatuid = True
```

PBS Professional Features are Not Working after Upgrade

Condition

I have upgraded PBS Professional to the newest version and now the new features are not working.

Cause

Whenever PAS starts, it saves PBS configuration information in memory. After PBS Professional is upgraded, the new configuration information is not available to PAS.

Remedy

After installing a new version of PBS Professional, you must restart PAS.

1. Login to the PAS Server.
2. Restart PAS.

20.3.8 Troubleshoot Issues of Unsupported XML Characters in Qstat Output

Condition

The job details are not being displayed and the following error is being displayed in the PAS Server log file:

```
ERROR altair.gw.aif.cli.implementation.BasicCommandsImpl (BasicCommandsImpl.java:215)
- qstat output contains unsupported xml characters: An invalid XML character
(Unicode: 0x13) was found in the element content of the document.
*****
Try by setting "REPLACE_UNSUPPORTED_XML_CHARACTERS" in server.conf to "true".
*****
```

Cause

The job details are fetched from the PBS Server using a `qstat` command. This string data is then converted to XML by Access Web. Occasionally, certain string data returned from the `qstat` command breaks the XML parsing. When this occurs, the job/jobs are not displayed or updated in Access Web.

Configure PAS server configuration file so that the unsupported characters are replaced with `"_"` and this will ensure that the parsing of the XML does not break.

Remedy

1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
2. Stop Access Web server using the following command:

```
service pbsworks-pa stop
```

3. Source the Access Web configuration file to set up the environment variables PA_HOME and PA_EXEC:

```
source /etc/pbsworks-pa.conf
```

4. Edit the file PA_HOME/config/pas/conf/server.conf

```
vi $PA_HOME/config/pas/conf/server.conf
```

5. Update the <REPLACE_UNSUPPORTED_XML_CHARACTERS> xml element value to true.

```
REPLACE_UNSUPPORTED_XML_CHARACTERS=false
```

6. Start Access Web server using the following command:

```
service pbsworks-pa start
```


20.4 Troubleshoot Remote Sessions Components

Troubleshoot problems related to Remote Sessions and interactive applications.

20.4.1 Remote Sessions Precheck Diagnosis Script

A script that captures Remote Sessions information to help troubleshoot issues in PBS MoM.

Name

`remotesession-precheck.py`

Description

Capture information about GPU Nodes and X Server in PBS MoM before installing Remote Sessions. This information will be useful to troubleshooting issues.

Running the Script

This command must be executed as root.

This diagnosis script must be run on all the PBS MoM.

Python 2.4 or later is required to run the script.

Script Location

Download or obtain the Remote Sessions precheck diagnosis script folder (`remotesession_precheck`) using your usual Altair support channels.

The Remote Sessions precheck diagnosis script folder will have to be copied to all the PBS MoM to troubleshoot those machines.

Run the `remotesession-precheck.py` script that is available in the `remotesession_precheck` folder.

Output on the Machine Hosting the PBS MoM

After running the diagnosis script on the machine hosting the PBS MoM, messages similar to the below are displayed. Information that is of interest in this output:

Script Location

Provides the path of the script location.

Script Location: `/tmp/remotesession-utilityscript-master/remotesession_precheck`

Log Location

Location of the log file is provided for troubleshooting. A separate directory is created each time when the script is run and the logs are stored in that directory.

Log Location: `/tmp/remotesession-utilityscript-master/remotesession_precheck/scratch/scratch_20190628140246`

GPU Hardware

Print the configured GPU hardware if available.

GPU Hardware:

```
- output: 01:00.0 VGA compatible controller: NVIDIA Corporation GK106GL
[Quadro K4000] (rev a1)
05:00.0 VGA compatible controller: NVIDIA Corporation GF106GL [Quadro 2000] (rev
a1)
```

X Server Status

Provides the status of X Server.

```
X Server status: Running
```

Libraries Installed

Lists the libraries installed for VirtualGL and TurboVNC to run. If any of the libraries are missing, then that has to be installed.

- Dependency Library Check:

- VirtualGL:

```
- output:          linux-vdso.so.1 (0x00007ffec4fa5000)
libGL.so.1 => /usr/lib64/libGL.so.1 (0x00007f110dd3d000)
libX11.so.6 => /usr/lib64/libX11.so.6 (0x00007f110d9fe000)
libGLU.so.1 => /usr/lib64/libGLU.so.1 (0x00007f110d790000)
libm.so.6 => /lib64/libm.so.6 (0x00007f110d493000)
libc.so.6 => /lib64/libc.so.6 (0x00007f110d0ef000)
libdl.so.2 => /lib64/libdl.so.2 (0x00007f110ceeb000)
libGLX.so.0 => /usr/lib64/libGLX.so.0 (0x00007f110ccb0000)
libGLdispatch.so.0 => /usr/lib64/libGLdispatch.so.0 (0x00007f110c9ec000)
libxcb.so.1 => /usr/lib64/libxcb.so.1 (0x00007f110c7cc000)
libstdc++.so.6 => /usr/lib64/libstdc++.so.6 (0x00007f110c443000)
libgcc_s.so.1 => /lib64/libgcc_s.so.1 (0x00007f110c22b000)
/lib64/ld-linux-x86-64.so.2 (0x0000555797423000)
libXext.so.6 => /usr/lib64/libXext.so.6 (0x00007f110c019000)
libXau.so.6 => /usr/lib64/libXau.so.6 (0x00007f110be15000)
```

- TurboVNC:

```
- output:          linux-vdso.so.1 (0x00007ffe90db5000)
libm.so.6 => /lib64/libm.so.6 (0x00007fdee0ab9000)
libpthread.so.0 => /lib64/libpthread.so.0 (0x00007fdee089b000)
libpam.so.0 => /lib64/libpam.so.0 (0x00007fdee068c000)
libc.so.6 => /lib64/libc.so.6 (0x00007fdee02e9000)
/lib64/ld-linux-x86-64.so.2 (0x0000556334b3c000)
libaudit.so.1 => /usr/lib64/libaudit.so.1 (0x00007fdee00c5000)
libdl.so.2 => /lib64/libdl.so.2 (0x00007fdedfec1000)
```

Hardware Accelerator

Status about OpenGL installation and rendering information are provided.

- Hardware Accelerator:

```
OpenGL vendor string: NVIDIA Corporation
OpenGL renderer string: Quadro K4000/PCIe/SSE2
OpenGL core profile version string: 4.3.0 NVIDIA 390.67
OpenGL core profile shading language version string: 4.30 NVIDIA via Cg compiler
OpenGL core profile extensions:
OpenGL version string: 4.6.0 NVIDIA 390.67
OpenGL shading language version string: 4.60 NVIDIA
OpenGL extensions:
```

```
direct rendering: Yes
```

359 GLXFBConfigs:

```
visual  x  bf lv rg d st colorbuffer ax dp st accumbuffer ms cav drw
id dep cl sp sz l  ci b ro  r  g  b  a F bf th cl  r  g  b  a ns be at typ
-----
0x135 24 tc  0  24  0 r  y  .  8  8  8  0  .  4 24  8 16 16 16 16  0 0 None PXW
```

```
0x136 24 dc 0 24 0 r y . 8 8 8 0 . 4 24 8 16 16 16 16 0 0 None PXW
0x137 24 tc 0 32 0 r y . 8 8 8 8 . 4 24 8 16 16 16 16 0 0 None PXW
0x138 24 dc 0 32 0 r y . 8 8 8 8 . 4 24 8 16 16 16 16 0 0 None PXW
0x139 24 tc 0 24 0 r . . 8 8 8 0 . 4 24 8 16 16 16 16 0 0 None PXW
0x13a 24 dc 0 24 0 r . . 8 8 8 0 . 4 24 8 16 16 16 16 0 0 None PXW
0x13b 24 tc 0 32 0 r . . 8 8 8 8 . 4 24 8 16 16 16 16 0 0 None PXW
```

Desktop Manager Environment

Status about Desktop Manager environment is provided.

```
- Desktop Manager Environment installed:
  - output: /usr/share/xsessions/gnome-classic.desktop:Exec=env
    GNOME_SHELL_SESSION_MODE=classic gnome-session --session gnome-classic
  /usr/share/xsessions/gnome.desktop:Exec=gnome
  /usr/share/xsessions/icewm-session.desktop:Exec=icewm-session
  /usr/share/xsessions/icewm.desktop:Exec=icewm-session
  /usr/share/xsessions/sle-classic.desktop:Exec=env GNOME_SHELL_SESSION_MODE=classic
  SLE_CLASSIC_MODE=1 gnome-session --session gnome-classic
```

VNC Session

Starts VNC session, provides the information about the VNC session status, and the log file path. An interactive cause and suggestions is also displayed of the VNC session.

```
- Starting VNC session:
  - started VNC server. Please connect through vnc client:
Warning: BLRENTQA5:1 is taken because of /tmp/.X1-lock
Remove this file if there is no X server BLRENTQA5:1

Warning: BLRENTQA5:2 is taken because of /tmp/.X2-lock
Remove this file if there is no X server BLRENTQA5:2

Desktop 'TurboVNC: BLRENTQA5:3 (root)' started on display BLRENTQA5:3

Starting applications specified in
/tmp/remotesession-utilityscript-master/remotesession_precheck/xstartup.turbovnc
Log file is /tmp/remotesession-utilityscript-master/remotesession_precheck/
scratch/scratch_20190628140246/Xvnc.log

- VNC Display: 3
Are you able to access the VNC connection? Y/N: y
Are you able to See the desktop manager? Y/N: y
Are you able to see the Glxshpere app? Y/N: y
Stopping VNC session.
Congratulation! System look good for remote session.
```

Cause and Resolution

The script also checks if you are able to access VNC Connection, See Desktop Manager, and GlxSphere application.

Are you able to access the VNC connection? Y/N:

If you enter N, then the following suggestion is provided:

```
Are you able to access the VNC connection? Y/N: n
please check the network connection between the machine and the firewall
settings of the machine and run the script again after that.
```

Are you able to See the desktop manager? Y/N:

If you enter N, then the following suggestion is provided:

```
please check the Xvnc log for Desktop manager issue in:/tmp/
remotesession-utilityscript-master/remotesession_precheck/scratch/
scratch_20190628140433Xvnc.log.
If you want to change the Desktop manager. Please update it
on:/tmp/remotesession-utilityscript-master/remotesession_precheck/
xstartup.turbovnc
and run the script again.
```

Are you able to see the Glxshpere app? Y/N:

If you enter N, then the following suggestion is provided:

```
please check if, GPU driver is installed, X server is 3D Accelerated and
run the script again after that.
```

Complete Output of the Precheck Diagnosis Script

The complete display of the Precheck diagnosis script:

```
- Script Location: /tmp/remotesession-utilityscript-master/remotesession_precheck
- Log Location: /tmp/remotesession-utilityscript-master/remotesession_precheck/scratch/
scratch_20190628140246
- GPU Hardware:
  - output: 01:00.0 VGA compatible controller: NVIDIA Corporation GK106GL [Quadro
K4000] (rev a1)
05:00.0 VGA compatible controller: NVIDIA Corporation GF106GL [Quadro 2000] (rev a1)
- X Server status: Running
- Dependency Library Check:
  - VirtualGL:
    - output:      linux-vdso.so.1 (0x00007ffec4fa5000)
    libGL.so.1 => /usr/lib64/libGL.so.1 (0x00007f110dd3d000)
    libX11.so.6 => /usr/lib64/libX11.so.6 (0x00007f110d9fe000)
    libGLU.so.1 => /usr/lib64/libGLU.so.1 (0x00007f110d790000)
    libm.so.6 => /lib64/libm.so.6 (0x00007f110d493000)
    libc.so.6 => /lib64/libc.so.6 (0x00007f110d0ef000)
    libdl.so.2 => /lib64/libdl.so.2 (0x00007f110ceeb000)
    libGLX.so.0 => /usr/lib64/libGLX.so.0 (0x00007f110ccbb000)
    libGLdispatch.so.0 => /usr/lib64/libGLdispatch.so.0 (0x00007f110c9ec000)
    libxcb.so.1 => /usr/lib64/libxcb.so.1 (0x00007f110c7cc000)
    libstdc++.so.6 => /usr/lib64/libstdc++.so.6 (0x00007f110c443000)
    libgcc_s.so.1 => /lib64/libgcc_s.so.1 (0x00007f110c22b000)
    /lib64/ld-linux-x86-64.so.2 (0x0000555797423000)
    libXext.so.6 => /usr/lib64/libXext.so.6 (0x00007f110c019000)
    libXau.so.6 => /usr/lib64/libXau.so.6 (0x00007f110be15000)
  - TurboVNC:
    - output:      linux-vdso.so.1 (0x00007ffe90db5000)
    libm.so.6 => /lib64/libm.so.6 (0x00007fdee0ab9000)
    libpthread.so.0 => /lib64/libpthread.so.0 (0x00007fdee089b000)
    libpam.so.0 => /lib64/libpam.so.0 (0x00007fdee068c000)
    libc.so.6 => /lib64/libc.so.6 (0x00007fdee02e9000)
    /lib64/ld-linux-x86-64.so.2 (0x0000556334b3c000)
    libaudit.so.1 => /usr/lib64/libaudit.so.1 (0x00007fdee00c5000)
    libdl.so.2 => /lib64/libdl.so.2 (0x00007fdedfec1000)
- Hardware Accelerator:
  OpenGL vendor string: NVIDIA Corporation
```

```
OpenGL renderer string: Quadro K4000/PCIe/SSE2
OpenGL core profile version string: 4.3.0 NVIDIA 390.67
OpenGL core profile shading language version string: 4.30 NVIDIA via Cg compiler
OpenGL core profile extensions:
OpenGL version string: 4.6.0 NVIDIA 390.67
OpenGL shading language version string: 4.60 NVIDIA
OpenGL extensions:
```

```
    direct rendering: Yes
```

```
    359 GLXFBConfigs:
```

visual	x	bf	lv	rg	d	st	colorbuffer	ax	dp	st	accumbuffer	ms	cav	drw										
id	dep	cl	sp	sz	l	ci	b	ro	r	g	b	a	F	bf	th	cl	r	g	b	a	ns	b	eat	typ
0x135	24	tc	0	24	0	r	y	.	8	8	8	0	.	4	24	8	16	16	16	16	0	0	None	PXW
0x136	24	dc	0	24	0	r	y	.	8	8	8	0	.	4	24	8	16	16	16	16	0	0	None	PXW
0x137	24	tc	0	32	0	r	y	.	8	8	8	8	.	4	24	8	16	16	16	16	0	0	None	PXW
0x138	24	dc	0	32	0	r	y	.	8	8	8	8	.	4	24	8	16	16	16	16	0	0	None	PXW
0x139	24	tc	0	24	0	r	.	.	8	8	8	0	.	4	24	8	16	16	16	16	0	0	None	PXW
0x13a	24	dc	0	24	0	r	.	.	8	8	8	0	.	4	24	8	16	16	16	16	0	0	None	PXW
0x13b	24	tc	0	32	0	r	.	.	8	8	8	8	.	4	24	8	16	16	16	16	0	0	None	PXW

```
- Desktop Manager Environment installed:
```

```
    - output: /usr/share/xsessions/gnome-classic.desktop:Exec=env
      GNOME_SHELL_SESSION_MODE=classic gnome-session --session gnome-classic
/usr/share/xsessions/gnome.desktop:Exec=gnome
/usr/share/xsessions/icewm-session.desktop:Exec=icewm-session
/usr/share/xsessions/icewm.desktop:Exec=icewm-session
/usr/share/xsessions/sle-classic.desktop:Exec=env GNOME_SHELL_SESSION_MODE=classic
SLE_CLASSIC_MODE=1 gnome-session --session gnome-classic
```

```
- Starting VNC session:
```

```
    - started VNC server. Please connect through vnc client:
```

```
Warning: BLRENTQA5:1 is taken because of /tmp/.X1-lock
Remove this file if there is no X server BLRENTQA5:1
```

```
Warning: BLRENTQA5:2 is taken because of /tmp/.X2-lock
Remove this file if there is no X server BLRENTQA5:2
```

```
Desktop 'TurboVNC: BLRENTQA5:3 (root)' started on display BLRENTQA5:3
```

```
Starting applications specified in
```

```
/tmp/remotesession-utilityscript-master/remotesession_precheck/xstartup.turbovnc
Log file is /tmp/remotesession-utilityscript-master/remotesession_precheck/scratch/
scratch_20190628140246/Xvnc.log
```

```
    - VNC Display: 3
```

```
Are you able to access the VNC connection? Y/N: y
```

```
Are you able to See the desktop manager? Y/N: y
```

```
Are you able to see the Glxshpere app? Y/N: y
```

```
Stopping VNC session.
```

```
Congratulation! System look good for remote session.
```

20.4.2 Remote Sessions Diagnosis Script

A script that captures Remote Sessions information to help troubleshoot issues.

Name

`remotesession-diagnosis.py`

Description

Capture information that is useful when troubleshooting issues with Remote Sessions.

The output of the command can be shared with the Altair support team to help troubleshoot issues with Remote Sessions and interactive applications.

Running the Script

This command must be executed as root or as a user with sudo privileges using the `sudo` command.

As different Remote Sessions components are distributed across multiple machines, the diagnosis script must be run on any machine where those components have been installed:

- the PBS MoM
- the PBS Server
- the PAS Server
- the machine hosting Access Web

Python 2.4 or later is required to run the script.

Script Location

The script is located on the PAS Server or the Access Web server. It is located at:

`PA_EXEC/displaymanager/scripts/remotesession-diagnosis.py`

The script will have to be copied to the PBS Server and the PBS MoM to troubleshoot those machines.

Output on the Machine Hosting Access Web and the Remote Sessions Interactive Proxy

After running the diagnosis script on the machine hosting Access Web and the Interactive Proxy, messages similar to the below are displayed. Information that is of interest in this output:

guacd

Information about the Guacamole proxy daemon (`guacd`). Guacamole is an HTML5 web application that provides access to desktop environments using remote desktop protocols such as VNC or RDP. It is installed when the Interactive Proxy is installed on the Access Web server. The diagnosis script output displays whether Guacomole is installed and running, as well as the hostname and port that `guacd` is listening on.

pbsaccess

Information about the state of Access Web as well as the hostname and port that `guacd` is running on.

 **Note:** The below output is based on a distributed deployment where PAS is not installed on the Access Web server. If PAS is installed on the same machine as Access Web, additional information about whether the PAS Server is installed and running, as well as the interactive application definitions that are installed on the PAS Server is displayed.

```
- guacd
  - Guacd is installed - YES
  - Guacd is running - YES
  - Guacd configuration
    - bind_host = pbsworks-centos75.company.com
    - bind_port = 5443
- pbsaccess
  - PBSAccess is installed - YES
  - PBSAccess is running - YES
  - Guacd hostname matched - YES
  - Guacd port matched - YES
- PBSPPro
  - PBSPPro is installed - NO
  - PBSPPro is running - SKIPPING
  - PBSPPro iworkq configured: SKIPPING
  - PBSPPro GPU Resource configured: SKIPPING
- PAS
  - PAS is installed - NO
  - PAS is running - SKIPPING
- execution_node
  - DBUS_SESSION_BUS_ADDRESS :
  - RemoteSession agent: TurboVNC is installed - NO
  - RemoteSession agent: VirtualGL is installed - NO
  - RemoteSession agent: GPU hardware is configured: SKIPPING
```

Output on the Machine Hosting PAS

After running the diagnosis script on the machine hosting PAS, messages similar to the below are displayed. Information that is of interest in this output:

PAS

Information about whether the PAS Server is installed and running, as well as the interactive application definitions that are installed on the PAS Server.

 **Note:** The below output is based on a distributed deployment where PAS is installed stand-alone.

```
- guacd
  - Guacd is installed - NO
  - Guacd is running - SKIPPING
  - Guacd configuration - SKIPPING
- pbsaccess
  - PBSAccess is installed - NO
  - PBSAccess is running - SKIPPING
  - PBSAccess Remote Session guacd configuration is same: SKIPPING
- PBSPPro
  - PBSPPro is installed - NO
  - PBSPPro is running - SKIPPING
  - PBSPPro iworkq configured: SKIPPING
  - PBSPPro GPU Resource configured: SKIPPING
- PAS
  - PAS is installed - YES
```

```
- PAS is running - YES
- Interactive Appdef XML:
  - output: GlxSpheres
- Interactive Appdef JSON:
  - output: GlxSpheres
- execution_node
  - DBUS_SESSION_BUS_ADDRESS :
  - RemoteSession agent: TurboVNC is installed - NO
  - RemoteSession agent: VirtualGL is installed - NO
  - RemoteSession agent: GPU hardware is configured: SKIPPING
```

Output on the Machine Hosting the PBS Server

After running the diagnosis script on the machine hosting the PBS Server, messages similar to the below are displayed. Information that is of interest in this output:

PBSPro

Information about whether the PBS Server is installed and running, and whether the queue iworkq has been configured.

```
- guacd
  - Guacd is installed - NO
  - Guacd is running - SKIPPING
  - Guacd configuration - SKIPPING
- pbsaccess
  - PBSAccess is installed - NO
  - PBSAccess is running - SKIPPING
  - PBSAccess Remote Session guacd configuration is same: SKIPPING
- PBSPro
  - PBSPro is installed - YES
  - PBSPro is running - YES
  - PBSPro iworkq configured: YES
- PAS
  - PAS is installed - NO
  - PAS is running - SKIPPING
- execution_node
  - DBUS_SESSION_BUS_ADDRESS :
  - RemoteSession agent: TurboVNC is installed - NO
  - RemoteSession agent: VirtualGL is installed - NO
  - RemoteSession agent: GPU hardware is configured: SKIPPING
```

Output on the Machine Hosting the PBS MoM

After running the diagnosis script on the machine hosting the PBS MoM, messages similar to the below are displayed. Information that is of interest in this output:

PBSPro

Information about whether PBS Professional is installed.

execution_node

The below information is displayed if the Remote Sessions agent is installed on the execution node.

- Information about whether TurboVNC and VirtualGL are installed.
- Information about which Desktop Manager is installed.
- Information about the GPU hardware configuration (even if a graphics card is not present on the system).

This information is displayed whether PBS Professional is installed or not.

```
- guacd
  - Guacd is installed - NO
  - Guacd is running - SKIPPING
  - Guacd configuration - SKIPPING
- pbsaccess
  - PBSAccess is installed - NO
  - PBSAccess is running - SKIPPING
  - PBSAccess Remote Session guacd configuration is same: SKIPPING
- PBSPPro
  - PBSPPro is installed - YES
  - PBSPPro is running - NO
    - output: pbs_server is not running

pbs_sched is not running

pbs_comm is not running

  - PBSPPro iworkq configured: SKIPPING
  - PBSPPro GPU Resource configured: SKIPPING
- PAS
  - PAS is installed - NO
  - PAS is running - SKIPPING

- execution_node
  - DBUS_SESSION_BUS_ADDRESS :
  - RemoteSession agent: TurboVNC is installed - YES
  - RemoteSession agent: VirtualGL is installed - YES
  - RemoteSession agent: GPU hardware is configured: YES
    - output: OpenGL version string: 3.0 Mesa 17.2.3

  - RemoteSession agent: Direct Rendering: YES
    - output: 600 GLXFBConfigs:
visual  x  bf lv rg d st  colorbuffer  ax dp st accumbuffer  ms  cav  drw
id dep cl sp  sz l  ci b ro  r  g  b  a F bf th cl  r  g  b  a ns b eat  typ
-----
0x05d 24 tc 0 32 0 r . . 8 8 8 8 . 0 0 0 0 0 0 0 0 0 0 0 0 None PXW
0x05e 24 tc 0 32 0 r . . 8 8 8 8 . 0 0 0 16 16 16 16 0 0 Slow PXW
0x05f 24 tc 0 32 0 r y . 8 8 8 8 . 0 0 0 0 0 0 0 0 0 0 None PXW
0x060 24 tc 0 32 0 r y . 8 8 8 8 . 0 0 0 16 16 16 16 0 0 Slow PXW
0x061 24 tc 0 32 0 r y . 8 8 8 8 . 0 0 0 0 0 0 0 0 0 0 None PXW
0x062 24 tc 0 32 0 r y . 8 8 8 8 . 0 0 0 16 16 16 16 0 0 Slow PXW
0x063 24 tc 0 32 0 r . . 8 8 8 8 . 0 16 0 0 0 0 0 0 0 0 None PXW

  - Desktop Manager Environment installed:
    - output: gnome-classic.desktop, gnome-custom-session.desktop,
      gnome.desktop,
      mate.desktop
```

20.4.3 Use the Remote Sessions Diagnosis Script to Troubleshoot Issues

Use the Remote Sessions diagnosis script to gather information to help troubleshoot issues.

The diagnosis script must be run as root or as a user with sudo permissions using the `sudo` command.

The diagnosis script must be run on any machine where Remote Sessions components have been installed:

- the PBS MoM
- the PBS Server
- the PAS Server
- the machine hosting Access Web

The script will have to be copied from either the PAS Server or the Access Web server to the PBS Server and the PBS MoM using a command such as `scp`.

1. Login to the each of the above machines.
2. Choose one of the following options:

- On the Access Web or PAS servers:

```
python PA_EXEC/displaymanager/scripts/remotesession-diagnosis.py
```

- On the PBS Server or the PBS MoM:

```
python COPY_LOC/remotesession-diagnosis.py
```

Where `COPY_LOC` is the location where the script was copied.

The output of the command can be shared with the Altair support team to help troubleshoot issues with Remote Sessions and interactive applications.

20.4.4 Troubleshooting Remote Sessions

Use these steps to troubleshoot Remote Sessions when it is difficult to determine where the failure is occurring.

Remedy - Verify that the X Server is Running

1. Login to a PBS MoM where the Remote Sessions agent has been installed:
2. Verify that X Server is running as the display number 0.

```
ps -ef | grep X  
or  
ps -ef | grep Xorg
```

If X Server is running, messages similar to this should be displayed:

```
root 195463 0.0 0.0 253056 39852 ? Ssl Feb08 10:30 /usr/bin/X :0
```

The first parameter after `/usr/bin/X` is the display number prefixed by a colon.

3. If the X Server is not running, then start the X Server.
If the X Server start-up is failing, view the file `/var/log/Xorg.0.log` for errors and check the graphic card installation guides to verify that the X Server is configured properly for the graphic card.

Remedy - Verify the Connection to the VNC Server

If the X Server is running, then verify that the connection to the VNC server:

1. Install a VNC client on a user's laptop or desktop such as TigerVNC or TightVNC.
2. Login to a PBS MoM where the Remote Sessions agent has been installed:
3. Run the following command to start a virtual network computer (VNC):

```
/opt/TurboVNC/bin/vncserver -noauth
```

Messages similar to the below are displayed.

```
Desktop 'TurboVNC: pc02.mycompany.com:1' started on display pc02.mycompany.com:1  
Starting applications specified in /users/tsmith/.vnc/xstartup.turbovnc  
Log file is /users/tsmith/.vnc/pc02.mycompany.com:1.log
```

4. Using the VNC client, connect to the X server using the hostname and display number provided in the messages displayed after starting the VNC server:

```
Desktop 'TurboVNC: pc02.mycompany.com:1' started on display pc02.mycompany.com:1
```

If the virtual desktop is not displayed, forward the `.vnc` directory to the Altair support team for further investigation.

```
Starting applications specified in /users/tsmith/.vnc/xstartup.turbovnc
```

Remedy - Verify that VirtualGL is Configured and Functional

If the virtual desktop is displayed after connecting to the VNC server using the VNC client, run the following command in a terminal window in the remote desktop session:

```
/opt/VirtualGL/bin/vglsrun -d :0.0 -sp /opt/VirtualGL/bin/glxspheres64
```

If GLXSpheres starts, then VirtualGL is properly configured. If GLXSpheres does not start, then a detailed investigation is required by the support team.

See Also

[Display Session is Visible but Not the Interactive Application](#)

[A Single 3D Application is Not Working](#)

[Desktop Manager Is Not Displaying](#)

[Graphic Card Compatibility Issues](#)

[Interactive Application Job is in a Wait State](#)

20.4.5 Troubleshoot a Connection Error

Condition

After submitting an interactive job, the following error message is displayed:

```
Connection closed abruptly. Please refresh your browser.
```

Cause

The Remote Sessions interactive proxy (guacd) installed on the Access Web server cannot connect to the VNC server installed on the graphical execution host. This may be caused when:

- the graphics node is not reachable.
- a hostname resolution problem exists between the Access Web server and the graphical execution host.
- the VNC port number is blocked through the firewall on the graphical node.

General Troubleshooting Steps

1. Login to the Access Web server.

2. Check for errors in the `/var/log/messages` file.

Remedy - Verify that the Graphics Node is Reachable

1. Login to the Access Web server.
2. Verify that the graphics node is reachable.

```
ping GRAPHIC_NODE_IP
```

Where `GRAPHIC_NODE_IP` is the IP address of the graphics node.

3. If the graphics node cannot be pinged, then contact your network administrator to configure network access between the Access Web server and the graphics node.

Remedy - Verify Hostname Resolution between Access Web and the Graphical Node

1. Login to the Access Web server.
2. Verify that there is hostname resolution from the Access Web server and the graphical execution host.

```
ping GRAPHIC_NODE_HOSTNAME
```

Where `GRAPHIC_NODE_HOSTNAME` is the hostname of the graphics node.

3. If the hostname is not resolving, then configure it by updating DNS, `/etc/hosts`, or whatever your site uses for hostname resolution.

Remedy - Verify that the VNC Port Number is Not Blocked through the Firewall

1. Login to the graphical PBS MoM.
2. View the information in the `dm.info` file.

This file is located in the interactive application's job's execution directory on the graphic node. The below lines display the hostname and port on which the VNC server is listening.

```
host=ptlhpc1cn002.childrens.sea.kids  
port=5904
```



Note: The port should be within the 59xx range.

3. Login to the Access Web server.
4. Attempt to connect to the VNC server through the VNC server hostname and port:

```
telnet hostname port
```

5. If a connection cannot be established:
 - a) Login to the graphical PBS Mom.
 - b) Open the port through the firewall to allow access to the VNC server from the Access Web server.

20.4.6 Troubleshoot an Unable to Connect to Display Proxy Error

Condition

After submitting an interactive job, the following error message is displayed:

```
Unable to connect to Display Proxy.
```

Cause

The Access Web server is unable to connect to the Remote Sessions interactive proxy (guacd). This may be caused by:

- The Remote Sessions Interactive Proxy (guacd) is not running.
- The Remote Sessions Interactive Proxy has been configured to listen on the wrong port.
- The Remote Sessions Interactive Proxy has been configured to the listen on the wrong network interface.

Remedy - Verify that the Remote Sessions Interactive Proxy is Running

1. Login to the Access Web server as root or a user with sudo permissions.
2. Verify that the Remote Sessions Interactive Proxy is running:

```
/etc/init.d/guacd status
```

3. If the Remote Sessions Interactive Proxy is not running then start it:

```
/etc/init.d/guacd start
```

Remedy - Verify that the Interactive Proxy is Listening on the Correct Port and Network Interface

1. Login to the Access Web server as root or a user with sudo permissions.
2. Navigate to `PA_EXEC/displaymanager/scripts`.
3. Run the diagnosis script.

```
python remotesession-diagnosis.py
```

In the command output you should see messages similar to the below.

```
- pbsaccess
  - PBSAccess is installed - YES
  - PBSAccess is running - YES
  - Guacd hostname matched - YES
  - Guacd port matched - YES
```

4. If the Remote Sessions Interactive Proxy (guacd) hostname or port do not match:
 - a) Determine the hostname and port of the Remote Sessions Interactive Proxy by viewing the following output from the diagnosis script:

```
- guacd
  - Guacd is installed - YES
  - Guacd is running - YES
  - Guacd configuration
    - bind_host = access
    - bind_port = 5443
```

- b) [Change the Remote Sessions Proxy Port Number](#) to the `bind_host` and `bind_port` values.

20.4.7 Display Session is Visible but Not the Interactive Application

Condition

After submitting a job to start a remote session, the display session is visible but not the interactive application.

Cause

- The user does not have access to the 3D X Server.
- There are graphic card compatibility issues with the interactive application.

General Troubleshooting Steps

1. Login to the PBS MoM.
2. Check the `<jobname>.STDERR` and `<jobname>.STDOUT` for error messages.
These files are located in the interactive application's job execution directory on the graphic node where the job is running.

Remedy - User Does Not Have Access to the 3D X Server

Follow the steps to determine if the user has access to the X Server:

1. Login to the machine hosting the X Server as the user who is experiencing the issue.
2. Run the following command:

```
/opt/VirtualGL/bin/glxinfo -display :0 -c
```


The following message is displayed when the user does not have permission to access the 3D X Server:

```
"unable to open display :0"
```
3. If the user does not have permission to access the 3D X Server, then grant the appropriate access to the 3D X Server using these instructions: http://www.virtualgl.org/vgldoc/2_2_1/#hd005001.
4. Submit a job to start a remote session to verify that the user now has access to the X Server.
The interactive application should display. If the interactive application does not display then there may be graphic card compatibility issues with the interactive application.

See Also

[Graphic Card Compatibility Issues](#)

20.4.8 A Single 3D Application is Not Working

Condition

All 3D applications appear to be working properly, except for a single application.

Cause

- There may be application specific errors.

- The 3D application may not work in a VirtualGL environment.

Remedy - Check for Application Specific Errors When the Job is in a Running State

When the job is in a running state, check the log files to verify that there are not any application specific errors.

1. Login to the PBS MoM.
2. Check the `<jobname>.STDERR` and `<jobname>.STDOUT` files for errors.

These files are located in the interactive application's job's execution directory on the graphic node.

Remedy - Check for Application Specific Errors When the Job has Failed

Resubmit the job but enable the feature that copies back all job files to the job's output directory.

1. Login to Access Web.
2. Create a new remote session.
3. When the job submission form appears, enable **All Fields** at the top of the job submission form. All job submission fields are displayed.
4. Enable the **Copy back** checkbox.
5. Fill in the required fields for the interactive application.
6. Submit the job.
7. Once the job fails, view the following files in the job's Output tab to help diagnose the problem.
 - `dmtrace.log`
 - `<jobname>.STDERR`
 - `<jobname>.STDOUT`
 - `<jobname>.e<jobid>`
 - `<jobname>.o<jobid>`
 - `Xvnc.log`

Remedy - 3D Application Does Not Work in a VirtualGL Environment

Check with the 3D application software vendor to verify that the application works in a VirtualGL environment.

20.4.9 Desktop Manager Is Not Displaying

Condition

I have opened a Remote Sessions and the application is displayed, but I cannot see the Desktop Manager.



Note: GNOME 3 requires 3D acceleration, therefore a graphics card is required. However, other desktop managers such as KDE or MATE do not require 3D acceleration, therefore a graphics card is optional.

Cause

- The Desktop Manager is not installed.
- The interactive application is not configured for the installed Desktop Manager.
- A graphic card compatibility issue.

Remedy - General Troubleshooting Steps

1. Login to the PBS MoM.
2. Check the `xvnc.log` and the `dmtrace.log` files for errors.

These files are located in the interactive application's job's execution directory on the graphic node where the job is running.

Remedy - Verify that a Desktop Manager is Installed

Follow the below steps to determine if a Desktop Manager is installed on the PBS MoM:

1. Login to the PBS MoM where the interactive application is running as root or a user with sudo permissions.
2. Copy the remote session diagnosis script from either the PAS Server or the Access Web server. The script is located at `PA_EXEC/displaymanager/scripts/remotesession-diagnosis.py`
3. Run the diagnosis script.

```
python remotesession-diagnosis.py
```

At the bottom of the command output you should see messages similar to the below. This is the Desktop Manager that has been installed on the PBS MoM.

```
- Desktop Manager Environment installed:  
  - output: gnome-classic.desktop, gnome-custom-session.desktop,  
            gnome.desktop,mate.desktop
```

4. If a Desktop Manager has not been installed, then install a Desktop Manager such as GNOME, MATE, or KDE.

By default, the GlxSpheres application definition, that is installed when the PAS server is configured for Remote Sessions, is configured to use the GNOME Desktop Manager. If you install a different Desktop Manager, then you will have to edit all of the interactive application definitions to reconfigure them to use a different Desktop Manager.

See Also

[Graphic Card Compatibility Issues](#)

20.4.10 Graphic Card Compatibility Issues

Condition

Several conditions may be observed that may be caused by graphic card compatibility issues:

- After submitting a job to start a remote session, the display session is visible but the interactive application is not.
- The Desktop Manager is not visible after opening a Remote Sessions but the application is displayed.

Cause

- A supported graphic card is not installed.
- The wrong drivers have been installed for the graphics card.
- Full 3D acceleration is not enabled by the graphic card drivers.
- Pixel Buffer support is not enabled by the graphic card drivers.
- Direct rendering is not enabled for the graphics card.

Remedy

Use the drivers provided by the manufacturer of the graphics card. If the manufacturer of the 3D adapter provides proprietary drivers for Linux, it is recommended that these drivers be installed.

1. Login to the PBS MoM where the interactive application is running as root or a user with sudo permissions.
2. Copy the remote session diagnosis script from either the PAS Server or the Access Web server. The script is located at `PA_EXEC/displaymanager/scripts/remotesession-diagnosis.py`
3. Run the diagnosis script.

```
python remotesession-diagnosis.py
```

At the bottom of the command output you should see messages similar to the below.

```
- execution_node
  - DBUS_SESSION_BUS_ADDRESS :
  - RemoteSession agent: TurboVNC is installed - YES
  - RemoteSession agent: VirtualGL is installed - YES
  - RemoteSession agent: GPU hardware is configured: YES
    - output: OpenGL version string: 3.0 Mesa 17.2.3

  - RemoteSession agent: Direct Rendering: YES
    - output: 600 GLXFBConfigs:
      visual  x  bf lv rg d st colorbuffer ax dp st accumbuffer ms cav drw
      id dep cl sp  sz l  ci b ro  r  g  b  a F bf th cl  r  g  b  a ns b eat typ
      -----
0x05d 24 tc 0 32 0 r . . 8 8 8 8 . 0 0 0 0 0 0 0 0 0 0 0 0 None PXW
0x05e 24 tc 0 32 0 r . . 8 8 8 8 . 0 0 0 16 16 16 16 0 0 Slow PXW
0x05f 24 tc 0 32 0 r y . 8 8 8 8 . 0 0 0 0 0 0 0 0 0 0 None PXW
0x060 24 tc 0 32 0 r y . 8 8 8 8 . 0 0 0 16 16 16 16 0 0 Slow PXW
0x061 24 tc 0 32 0 r y . 8 8 8 8 . 0 0 0 0 0 0 0 0 0 0 None PXW
0x062 24 tc 0 32 0 r y . 8 8 8 8 . 0 0 0 16 16 16 16 0 0 Slow PXW
0x063 24 tc 0 32 0 r . . 8 8 8 8 . 0 16 0 0 0 0 0 0 0 0 None PXW

- Desktop Manager Environment installed:
  - output: gnome-classic.desktop, gnome-custom-session.desktop,
    gnome.desktop, mate.desktop
```

4. Verify that the graphics card is either NVIDIA or ATI(AMD).

```
- RemoteSession agent: GPU hardware is configured: YES
  - output: OpenGL version string: NVIDIA Corporation
```

It should not be Mesa or some other kind of graphics library software.

```
- RemoteSession agent: GPU hardware is configured: YES
  - output: OpenGL version string: 3.0 Mesa 17.2.3
```

This indicates that software rendering is being used to render the graphics, rather than using the graphics hardware. In this case, make sure that a NVIDIA or ATI(AMD) graphic card is installed,

the appropriate drivers are installed and verify that the graphics card vendor supports direct hardware rendering in your environment.

5. Verify that direct rendering is being used:

- RemoteSession agent: Direct Rendering: YES

Direct rendering means that all 3D rendering commands are handled by the client application, and the X server is not involved in the rendering. If indirect rendering is used, all rendering commands are sent to the server, and the server may use either software or hardware rendering. In terms of performance, direct hardware rendering is fastest. If indirect rendering is being used, it is an indication that the graphic card drivers are not installed or configured correctly.

6. Examine the output to ensure that at least one of the visuals is 24-bit or 32-bit TrueColor and has Pbuffer support (the latter is indicated by a "P" in the last column.)

359 GLXFBConfigs:																								
visual		x	bf	lv	rg	d	st	colorbuffer				ax	dp	st	accumbuffer				ms	cav	drw			
id	dep	cl	sp	sz	l	ci	b	r	g	b	a	F	bf	th	cl	r	g	b	a	ns	b	eat	typ	
0x135	24	tc	0	24	0	r	y	.	8	8	8	0	.	4	24	8	16	16	16	16	0	0	None	PXW
0x136	24	dc	0	24	0	r	y	.	8	8	8	0	.	4	24	8	16	16	16	16	0	0	None	PXW
0x137	24	tc	0	32	0	r	y	.	8	8	8	8	.	4	24	8	16	16	16	16	0	0	None	PXW
0x138	24	dc	0	32	0	r	y	.	8	8	8	8	.	4	24	8	16	16	16	16	0	0	None	PXW
0x139	24	tc	0	24	0	r	.	.	8	8	8	0	.	4	24	8	16	16	16	16	0	0	None	PXW
0x13a	24	dc	0	24	0	r	.	.	8	8	8	0	.	4	24	8	16	16	16	16	0	0	None	PXW
0x13b	24	tc	0	32	0	r	.	.	8	8	8	8	.	4	24	8	16	16	16	16	0	0	None	PXW
0x13c	24	dc	0	32	0	r	.	.	8	8	8	8	.	4	24	8	16	16	16	16	0	0	None	PXW
0x13d	24	tc	0	24	0	r	y	.	8	8	8	0	.	4	24	0	16	16	16	16	0	0	None	PXW
0x13e	24	dc	0	24	0	r	y	.	8	8	8	0	.	4	24	0	16	16	16	16	0	0	None	PXW
0x13f	24	tc	0	32	0	r	y	.	8	8	8	8	.	4	24	0	16	16	16	16	0	0	None	PXW
0x140	24	dc	0	32	0	r	y	.	8	8	8	8	.	4	24	0	16	16	16	16	0	0	None	PXW
0x141	24	tc	0	24	0	r	.	.	8	8	8	0	.	4	24	0	16	16	16	16	0	0	None	PXW

Figure 40: Pbuffer Support Check

If none of the visuals has Pbuffer support, then this is most likely because there is no 3D acceleration, which is most likely because the correct 3D drivers are not installed or are not configured correctly.

20.4.11 Interactive Application Job is in a Wait State

Condition

After submitting a job to start a remote session, the job has gone into a wait state.

Cause

There is an issue at the PBS Professional level, for example a file transfer issue.

Remedy

1. Login to the PBS Server as root or a user with sudo permissions.
2. Check the PBS Server logs for any errors related to the job.

20.4.12 Interactive Application Job is in a Queued State

Condition

After submitting a job to start a remote session, the job has gone into a queued state.

Cause

- GPU resources are currently not available to run the job.
- An insufficient amount of GPU resources are available to run the job.

Remedy

1. Login to the PBS Server as root or a user with sudo permissions.
2. Check the PBS Server logs for any errors related to the job.
3. Execute the command:

```
qstat -xf <jobid>
```

4. View the `comment` parameter at the end of the `qstat` command's output.

The following error indicates that there are not enough GPU resources available to run this job currently. The job remains in the queued state until GPU resources are free to run the job.

```
Not Running: Insufficient amount of resource: ngpus
```

The following error indicates that there is an insufficient amount of GPUs to run the job. For example, the job requests 2 GPUs and there is only a single GPU in the cluster or there are no execution nodes having a GPU resource.

```
Can Never Run: Insufficient amount of resource: ngpus
```

20.4.13 Interactive Application Job Fails

Condition

After submitting a job to start a remote session, the job fails.

Cause

Interactive jobs may fail because:

- there is an application specific error.
- there is an issue with the associated application definition, such pointing to the wrong application path.
- the Remote Sessions component is not installed on the PBS MoM.

Remedy

Resubmit the job but enable the feature that copies back all job files to the job's output directory.

1. Login to Access Web.
2. Create a new remote session.
3. When the job submission form appears, enable **All Fields** at the top of the job submission form. All job submission fields are displayed.

4. Enable the **Copy back** checkbox.
5. Fill in the required fields for the interactive application.
6. Submit the job.
7. Once the job fails, view the following files in the job's Output tab to help diagnose the problem.
 - dmtrace.log
 - <jobname>.STDERR
 - <jobname>.STDOUT
 - <jobname>.e<jobid>
 - <jobname>.o<jobid>
 - Xvnc.log

20.5 Troubleshoot Results Visualization Service

Troubleshooting information and steps for RVS.

The following section provides the information about troubleshooting information and steps for RVS.

20.5.1 Checklist for Troubleshooting

Access should be installed in a supported operating system. A supported web browser should be used to visualize results. RVS.

1. The RVS server should be installed on a supported operating system and web browsers to visualize the result files. For more information refer [Results Visualization System Requirements](#).



Note: Turn off pop-up blockers in your browser to view the progress of auto-refreshing plots.

2. On Linux platform, install these library packages for Compose.
 - a) For CentOS 8 and 8.1, install the library `libgomp` package using the command: `yum install libgomp`.
 - b) For SLES 12 and SLES 15, install the library `libgomp` using the command `zypper install libgomp` and the library `libXss` using the command `zypper install libXss`.
3. On Linux platform, install these library packages for Altair HyperWorks Desktop.
 - a) For CentOS 8 and 8.1, install the library `libgomp` package using the command: `yum install libgomp` and the library `libGLU` package using the command `yum install libGLU`.
 - b) For SLES 12 and SLES 15, install the library `libgomp` package using the command `zypper install libgomp`.
4. Ensure HyperWorks Desktop and Compose is installed in a location where all the Access Web users have read and write permissions.

These are recommended to install in the `Home` location, which enables read permission to all the Access Web users.
5. The Access Web user should have read access to results files. This indicates the user's read access to the PBS MOM's execution directory (the staging directory set during the installation) to view the running job result files.
6. To check if there any of the Compose processes that are running, use the command:

```
ps -ef | grep composeserv
```

The list of Compose process ids is displayed.
7. To kill a process id, specify the `process id` in the following command:

```
kill -9 <process id>
```

20.5.2 Common Issues

This section provides list of common issues occurs in RVS. The causes and the resolution steps are provided to resolve these common issues.

Unable to Use Results Visualization Service Features

Unable to view or perform any of the RVS options.

The causes could be:

- [RVS Options are Not Visible when a Result File is Right-Clicked](#)
- [RVS Services are Down Message is Displayed](#)

RVS Options are Not Visible when a Result File is Right-Clicked

RVS options are not available when attempting to view or create a plot or animation.

Condition

I am attempting to create or view a plot or animation by right-clicking a results file and the RVS options are not visible on the sub-menu.

Cause

The results file type may be unsupported or the result file type reader may need to be activated.

Remedy

Check that the file is a supported results file type.

- If the results file type is supported:
 1. Check if the result file type is associated to one of the following solvers: Abaqus, CFX, Fluent, or STAR-CCM+.
 2. If the result file type is associated to one of the above solvers, activate the solver file reader.
- If the result file type is not supported, then post-processing by RVS is not supported.

RVS Services are Down Message is Displayed

Unable to view or perform any of the RVS options.

Condition

The message, `Result Service services are down, please check log files.` appears as soon as you login to Access Web.

Cause

The RVS service may not have been started.

Remedy

1. Check if the RVS service is running using the command: `ps -ef | grep resultservice`.
2. If RVS is not started, try restarting Access Web using the command: `service pbsworks-pa restart`.

Cause

The RVS service is down due to an error condition.

Remedy

Check for errors in the RVS log files. To check the log files:

1. Navigate to: `PA_HOME/logs/resultservice/resultservice.log/resultservice.log`
2. If found none in the RVS Core logs, then navigate to the following file location: `PA_HOME/logs/resultservice/catalina.out` and check for the error messages.
3. Based on the errors or error messages found in the above file paths, Altair Support Contact will further resolve the issue.

Cause

It could be a port conflict with other services.

Remedy

1. Check for the port conflicts in the following path: `PA_HOME/logs/resultservice/catalina.out`.
2. Verify if RVS service is working on the default port. Refer to the list of ports used by Access Web Services and Components, [Ports Used by Access Web](#).

Compose License Error

Unable to post process the result files due to Compose license error.

Condition

Compose licenses are not available in the license server.

Cause

I receive the following error while plotting a result file: License for Compose is required for post processing of results and is not available in the License Server.

Remedy

Follow the given steps:

1. Login to Access Web server.
2. Navigate to RVS license configuration file location at `PA_HOME/config/license/app.properties`
3. Use the Altair license server hostname.
4. Ping the hostname of the license server to determine if it is pingable.

5. If the server responds to the ping, navigate to the license file location at: `/usr/local/altair/licensing14.5.1`
6. Verify the validity dates of Compose and HyperViewTrans licenses.

Cause

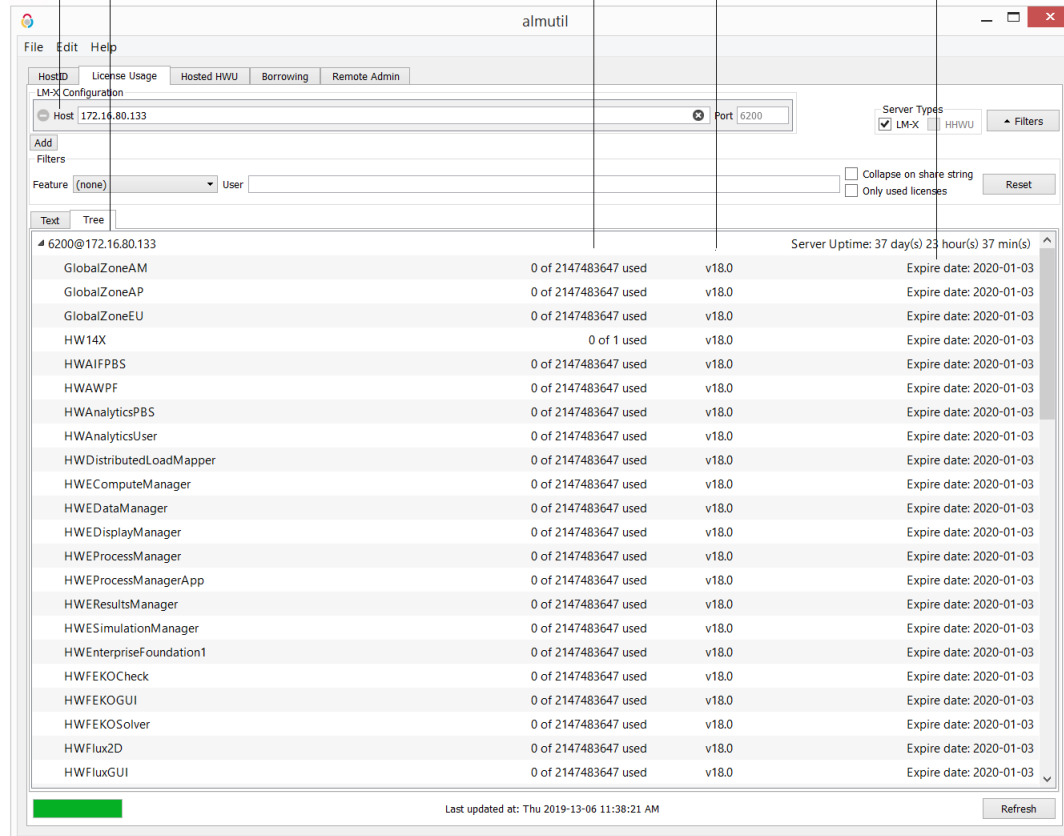
License for Compose is required indicates Compose feature is not available or insufficient licenses are available.

Remedy

Verify the details of licenses using Altair Utility:

1. Download The Altair License Utility Software from the following Altair Connect Weblink:<https://connect.altair.com/CP/downloads.html>.
2. On the Altair Connect page, click **Downloads** > **Software Downloads** > **PBS Works**.
3. On the **License Manager** tab, select the Altair License Manager software link for your operating system.
4. Download and install the software on your system. A shortcut, **Altair License Utility** is displayed.
5. Enter the Altair License server hostname.
The utility will provide the list of features with version, number of licenses used and unused, and expiry date of the feature.

Hostname	List of Features	No. of Licenses used	Version of the Feature	Expire Date of a Feature
----------	------------------	----------------------	------------------------	--------------------------



The screenshot shows the Altair License Utility (almutil) window. It displays a list of features and their license status. The window has a menu bar (File, Edit, Help) and a toolbar. Below the toolbar, there are tabs for HostID, License Usage, Hosted HWU, Borrowing, and Remote Admin. The License Usage tab is selected. It shows a table with columns for HostID, License Usage, Hosted HWU, Borrowing, Remote Admin, and a list of features. The features are listed in a table with columns for Feature, Version, No. of Licenses used, and Expire date. The features listed are GlobalZoneAM, GlobalZoneAP, GlobalZoneEU, HW14X, HWAIFPBS, HWAIFPF, HWAAnalyticsPBS, HWAAnalyticsUser, HWDistributedLoadMapper, HWEComputeManager, HWEDataManager, HWEDisplayManager, HWEProcessManager, HWEProcessManagerApp, HWEResultsManager, HWESimulationManager, HWEEnterpriseFoundation1, HWEKOCheck, HWEKOGUI, HWEKOSolver, HWEFlux2D, and HWEFluxGUI. All features show 0 of 2147483647 used licenses and an expire date of 2020-01-03. The window also shows a Server Uptime of 37 day(s) 23 hour(s) 37 min(s) and a Refresh button at the bottom right.

Feature	Version	No. of Licenses used	Expire date
GlobalZoneAM	v18.0	0 of 2147483647 used	2020-01-03
GlobalZoneAP	v18.0	0 of 2147483647 used	2020-01-03
GlobalZoneEU	v18.0	0 of 2147483647 used	2020-01-03
HW14X	v18.0	0 of 1 used	2020-01-03
HWAIFPBS	v18.0	0 of 2147483647 used	2020-01-03
HWAIFPF	v18.0	0 of 2147483647 used	2020-01-03
HWAAnalyticsPBS	v18.0	0 of 2147483647 used	2020-01-03
HWAAnalyticsUser	v18.0	0 of 2147483647 used	2020-01-03
HWDistributedLoadMapper	v18.0	0 of 2147483647 used	2020-01-03
HWEComputeManager	v18.0	0 of 2147483647 used	2020-01-03
HWEDataManager	v18.0	0 of 2147483647 used	2020-01-03
HWEDisplayManager	v18.0	0 of 2147483647 used	2020-01-03
HWEProcessManager	v18.0	0 of 2147483647 used	2020-01-03
HWEProcessManagerApp	v18.0	0 of 2147483647 used	2020-01-03
HWEResultsManager	v18.0	0 of 2147483647 used	2020-01-03
HWESimulationManager	v18.0	0 of 2147483647 used	2020-01-03
HWEEnterpriseFoundation1	v18.0	0 of 2147483647 used	2020-01-03
HWEKOCheck	v18.0	0 of 2147483647 used	2020-01-03
HWEKOGUI	v18.0	0 of 2147483647 used	2020-01-03
HWEKOSolver	v18.0	0 of 2147483647 used	2020-01-03
HWEFlux2D	v18.0	0 of 2147483647 used	2020-01-03
HWEFluxGUI	v18.0	0 of 2147483647 used	2020-01-03

Cause

If the error still persist even after the above checks, verify if there are any Compose process ids running. Kill the process id and try again.

Remedy

Follow the given steps:

1. To check if there any of the Compose processes that are running, use the command:

```
ps -ef | grep composeserv
```

The list of Compose process ids is displayed.

2. To kill a process id, specify the `process id` in the following command:

```
kill -9 <process id>
```

HVTrans License Error

Unable to post process the result files due to HyperViewTrans license error.

Condition

HWHyperViewTrans licenses are not available in the license server.

Cause

I receive the following error while viewing an animation result file: `License for HyperViewTrans is required for post processing of results and is not available in the License Server.`

Remedy

Follow the given steps:

1. Login to Access Web server.
2. Navigate to RVS license configuration file location at `PA_HOME/config/license/app.properties`
3. Use the Altair license server hostname.
4. Ping the hostname of the license server to determine if it is pingable.
5. If the server responds to the ping, navigate to the license file location at: `/usr/local/altair/licensing14.5.1`
6. Verify the validity dates of Compose and HyperViewTrans licenses.

Cause

`License for HVTrans is required` indicates HyperViewTrans feature is not available or insufficient licenses are available.

Remedy

Verify the details of HyperViewTrans feature and its licenses using Altair Utility:

1. Download The Altair License Utility Software from the following Altair Connect Weblink: <https://connect.altair.com/CP/downloads.html>.
2. On the Altair Connect page, click **Downloads** > **Software Downloads** > **PBS Works**.

3. On the **License Manager** tab, select the Altair License Manager software link for your operating system.
4. Download and install the software on your system. A shortcut, **Altair License Utility** is displayed.
5. Enter the Altair License server hostname.
The utility will provide the list of features with version, number of licenses used and unused, and expiry date of the feature.

The screenshot shows the Altair License Utility (almutil) window. The window has a menu bar (File, Edit, Help) and a toolbar. Below the toolbar, there are tabs: HostID, License Usage, Hosted HWU, Borrowing, and Remote Admin. The 'License Usage' tab is selected. In the 'HostID' section, the 'Host' is set to '172.16.80.133' and the 'Port' is '6200'. The 'Server Types' section shows 'LM-X' and 'HWU' with 'LM-X' selected. There are checkboxes for 'Collapse on share string' and 'Only used licenses'. A 'Reset' button is also present. The main area displays a table of features with columns: Hostname, List of Features, No. of Licenses used, Version of the Feature, and Expire Date of a Feature. The table shows a list of features under the hostname '6200@172.16.80.133'. The features include GlobalZoneAM, GlobalZoneAP, GlobalZoneEU, HW14X, HWAIFPBS, HWAJWPF, HWAAnalyticsPBS, HWAAnalyticsUser, HWDistributedLoadMapper, HWEComputeManager, HWEDataManager, HWEDisplayManager, HWEProcessManager, HWEProcessManagerApp, HWEResultsManager, HWESimulationManager, HWEEnterpriseFoundation1, HWEKOCHECK, HWEKOGUI, HWEKOSolver, HWEFlux2D, and HWEFluxGUI. Each feature row shows '0 of 2147483647 used', 'v18.0', and an 'Expire date: 2020-01-03'. At the bottom, there is a status bar indicating 'Last updated at: Thu 2019-13-06 11:38:21 AM' and a 'Refresh' button.

Hostname	List of Features	No. of Licenses used	Version of the Feature	Expire Date of a Feature
6200@172.16.80.133	GlobalZoneAM	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	GlobalZoneAP	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	GlobalZoneEU	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HW14X	0 of 1 used	v18.0	Expire date: 2020-01-03
	HWAIFPBS	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWAJWPF	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWAAnalyticsPBS	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWAAnalyticsUser	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWDistributedLoadMapper	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWEComputeManager	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWEDataManager	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWEDisplayManager	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWEProcessManager	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWEProcessManagerApp	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWEResultsManager	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWESimulationManager	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWEEnterpriseFoundation1	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWEKOCHECK	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWEKOGUI	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWEKOSolver	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWEFlux2D	0 of 2147483647 used	v18.0	Expire date: 2020-01-03
	HWEFluxGUI	0 of 2147483647 used	v18.0	Expire date: 2020-01-03

Cause

If the error still persist even after the above checks, verify if there are any Compose process ids running. Kill the running processes and try again.

Remedy

Follow the given steps:

1. To check if there are any of the Compose processes that are running, use the command:

```
ps -ef | grep composeserv
```

The list of Compose process ids is displayed.

2. To kill a process id, specify the process id in the following command:

```
kill -9 <process id>
```

Result File Reader is Unrecognized

Unable to post process the result files when you try to plot or animation.

Condition

The supported file type reader is not configured in HyperWorks.

Cause

I am trying to open a result file using RVS and I receive the following error: The result file reader is not configured in HyperWorks.

Remedy

Follow the givens steps:

1. Verify if your result file reader is configured.

For the Fluent file reader, the entry should be as following:

```
*RegisterExternalReader({external_readers_dir + "/hgfluent.exe"}, "", "", ascii
```

2. If not configured, then you need to configure the solver file reader.

See Also

[Activate Solver Files Readers](#)

[Supported Result File Types](#)

Unable to Extract TOC of a Result File

Condition

RVS is unable to post process the plot or animation result files.

Cause

Insufficient permissions to read the result file.

Remedy

Ensure Compose and HyperWorks Desktop is installed in a location where all the Access Web users have read and write permissions.

- Compose and HyperWorks Desktop are recommended to install in the `Home` location, which enables read and write permission to all the Access Web users.
- Navigate to `ALTAIR_HOME` and verify the permissions.
For example, the image displays Access Web users having executable permissions for the

HyperWorks Desktop application. `drwxr-xr-x. 5 root root 4096 May 6 10:27 hw2017.3`

Cause

The reason could be Compose is not accessible.

Remedy

Verify if Compose is installed properly.

- Verify if Compose is accessible by running the Compose script at: `<HyperWorks_INSTALL_DIR>/scriptsh/compose`.



Note: hwx: cannot connect to x server. Please ignore this message since this is referring to HyperMesh Desktop.

Cause

The reason could be that the shared library package is not installed.

Remedy

Verify if the library packages are installed properly for Compose and HyperWorks Desktop.

1. On Linux platform, install these library packages for Compose.
 - a) For CentOS 8 and 8.1, install the library `libgomp` package using the command: `yum install libgomp`.
 - b) For SLES 12 and SLES 15, install the library `libgomp` using the command `zypper install libgomp` and the library `libXss` using the command `zypper install libXss`.
2. On Linux platform, install these library packages for Altair HyperWorks Desktop.
 - a) For CentOS 8 and 8.1, install the library `libgomp` package using the command: `yum install libgomp` and the library `libGLU` package using the command `yum install libGLU`.
 - b) For SLES 12 and SLES 15, install the library `libgomp` package using the command `zypper install libgomp`.

See Also

[Checklist for Troubleshooting](#)

20.6 Logging

Information about defining PAS logging behavior and Log Files.

20.6.1 Logging Behavior

Information about defining PAS logging behavior.

PAS logging behavior is defined in the file `PA_HOME/config/pas/server-log.xml`.

The default logging level is set to "info" providing informational messages that highlight the progress of the application at a coarse-grained level.

PAS allows logging to be configured for certain functional aspects of PAS, such as file operations or job submission. These functional areas are defined by the `<category>` element. The existing categories in the `server-log.xml` are useful as a basic configuration, are more coarse-grained, and provide the default PAS logging.

To configure the level of logging, edit the `server-log.xml` file and set the `<priority value>` attribute of a particular `<category>` to one of the following values:

- `off` - has the highest possible rank and is intended to turn off logging.
- `fatal` - very severe error events that will presumably lead the application to abort.
- `error` - error events that might still allow the application to continue running.
- `warn` - potentially harmful situations.
- `info` - informational messages highlighting the progress of the application at a coarse-grained level.
- `debug` - fine-grained informational events that are most useful to debug an application.
- `trace` - finer-grained informational events than the `DEBUG`.
- `all` - the lowest possible rank and is intended to turn on all logging.

```
<category name="category">
  <priority value="<logging_level>" />
</category>
```

Remote File operations, Job submission, and Job Status

Configure logging behavior for remote file operations, job submission, and job status.

The logging for this category is relevant for the communication with the EIFL server.

1. Navigate to `PA_HOME/config/conf/`
2. Update `server-log.xml` with the following XML:

```
<category name=" com.altair.gw.aif.cli.implementation.BasicCommandsImpl">
  <priority value="debug" />
</category>
```

3. Update `server-log.xml` to get detailed troubleshooting information for the job status:

```
<category name="com.altair.gw.aif.pbs.ifl.implementations.PbsEiflWs">
  <priority value="debug" />
</category>
```

The following are examples of the type of messages that will be logged if debugging is enabled for the job status operation:

Table 5: Logging Messages for Communication with the EIFL Server

Event	Message
Before a web service API call to the EIFL server	"Success getting eifl server port <port>"
After an EIFL web service API call to the EIFL server	"Success returning from eifl.waitExit(), port is <port>"
For a job status request, before the web service API call to the EIFL server	"qstatJobs(): Success getting eifl server port <port>"
After an EIFL web service API call to the EIFL server	"qstatJobs(): Success returning from eifl.waitExit(), port is <port>"
For the get detailed job status operation, if an error occurs, the error code will be logged as returned by PBS	"PbsEiflWs.java getErrorCode(): pbs error code is <pbsErrorCodeStr>"

File Operations (local and remote)

Configure logging behavior for file operations (local and remote).

1. Navigate to `PA_HOME/config/conf/`
2. Update `server-log.xml` to change the *priority* value:

```
<category name="com.altair.gw.aif.fileop.implementation.FileOperations">
  <priority value="debug" />
</category>

<category name="com.altair.gw.aif.fileop.implementation.FileOperationsHelper">
  <priority value="debug" />
</category>
```

Job Submission

Configure logging behavior for job submission.

1. Navigate to `PA_HOME/config/conf/`

2. Update `server-log.xml` to get detailed logging information about user inputs and to see how long it takes to execute a submission request by adding the following XML:

```
<category name=" com.altair.gw.aif.rest. RESTJobsPortImpl">
  <priority value="debug" />
</category>
```

3. Update `server-log.xml` to get information about the process of creating PBS job attributes from user inputs and the application definition by adding the following XML:

```
<category name=" com.altair.gw.aif.rest.util.PASNextGenJobUtils">
  <priority value="debug" />
</category>
```

PAS supports multiple adapters to communicate with the workload manager.

4. If the SSH adapter is enabled for the communication with the PBS cluster, add the following XML to the `serverlog.xml` file to troubleshoot job submission:

```
<category name=" com.altair.gw.aif.ssh.implementation. SSHImplementation">
  <priority value="debug" />
</category>
```

The following are examples of the type of messages that will be logged if debugging is enabled for this class:

Table 6: Logging Messages for Job Submission

Event	Message
Before job submission, PAS will record the job name and the resources requested.	"PbsJobFactory.getPbsJob():job name = <job name>, resourceList to String: <job resources>"
Once the job is submitted, PAS will record the job id.	"JobSubmit success. Job id: <jobId>"
For job status requests, PAS will log any empty responses.	"HpcpPbsAdapter.jobList(): qstat is empty"

Job Submission and Status

Configure logging behavior for job submission and status.

1. Navigate to `PA_HOME/config/conf/`
2. Update `server-log.xml` with the following XML:

```
<category name="com.altair.gw.aif.pbs.ifl.responses.JobsStatus_Response">
  <priority value="debug" />
</category>

<category name=" com.altair.gw.aif.pbs.ifl.responses.PBSObjectStatus">
  <priority value="debug" />
```

```
</category>
```

Enabling a debugging level for the "PbsJobsPortImpl" class also provides the ability to determine the IP address of a client request for PAS job submission services.

For each job submission API call, a log record is created having the API name, requesting user name, and remote host. For example,

```
Entered getJobs(). User: <username>, client host: '<clientHost>'
```

Application Definitions

Configure logging behavior for application definitions.

1. Navigate to `PA_HOME/config/conf/`
2. Update `server-log.xml` to get detailed logging information about application definitions by adding the following XML:

```
<category name="com.altair.gw.aif.converter">  
  <priority value="debug" />  
</category>
```

Dynamic Application Refresh Script

Configure logging behavior for the dynamic application refresh script.

1. Navigate to `PA_HOME/config/conf/`
2. Update `server-log.xml` to get detailed logging information about dynamic application refresh script by adding the following XML:

```
<category name="com.altair.gw.aif.applications.utils.DynamicApplicationBuilder">  
  <priority value="debug" />  
</category>
```

During the Job Status Retrieval

Configure logging behavior to troubleshoot errors during the job status retrieval.

1. Navigate to `PA_HOME/config/conf/`
2. Update `server-log.xml` to get user information and the total time of the PAS server operation by adding the following XML:

```
<category name="com.altair.gw.aif.rest.RESTJobsPortImpl">  
  <priority value="debug" />  
</category>
```

3. To get job details information coming from the Workload Manager to PAS and details about response from PBS, add the following XML to the `server-log.xml` file:

```
<category name="com.altair.gw.aif.pbs.ifl.responses.JobsStatus_Response">  
  <priority value="debug" />  
</category>  
  
<category name="com.altair.gw.aif.pbs.ifl.responses.PBSObjectStatus">  
  <priority value="debug" />  
</category>
```



```
</category>
```

4. If the SSH adapter is enabled for the communication with the PBS cluster, add the following XML to the `server-log.xml` file to troubleshoot job submission:

```
<category name="com.altair.gw.aif.ssh.implementation.SSHImplementation">  
  <priority value="debug" />  
</category>
```

This will log the job status attributes as returned to the PAS Server from the script executed through the SSH channel.

File Operations Execution (Local and Remote) and File Download

Configure logging behavior to troubleshoot errors during the file operations execution (local and remote) and file download.

1. Navigate to `PA_HOME/config/conf/`
2. Update the `server-log.xml` to get more details on user information and the total time of the PAS server operation by adding the following XML:

```
<category name="com.altair.gw.aif.rest.RESTFilePortImpl">  
  <priority value="debug" />  
</category>
```

3. Update the `server-log.xml` file to get details about the local and remote file operation (parameters, current working directory, the operation result) at the PAS server level by adding the following XML:

```
<category name="com.altair.gw.aif.fileop.implementation.FileOperations">  
  <priority value="debug" />  
</category>
```

4. Update the `server-log.xml` file to get details about the local file operation by adding the following XML:

```
<category name="com.altair.gw.aif.fileop.implementation.FileOperationsHelper">  
  <priority value="debug" />  
</category>
```

5. Update the `server-log.xml` file to get details about the remote file operations by adding the following XML:

```
<category name="com.altair.gw.aif.process.ProcessWrapper">  
  <priority value="debug" />  
</category>
```

With this category we'll see more details related to user impersonation when we create the process as specific user.

6. If the SSH adapter is enabled for the communication with PBS cluster, it is possible to enable the logging of additional information related to the SSH tunnel. For the troubleshooting and debugging of remote file operations add the following XML to the `server-log.xml` file:

```
<category name="com.altair.gw.aif.fileop.implementation.cli.RemoteFileOpsTunnel-  
Based">  
  <priority value="debug" />  
</category>
```

It will show the command and parameters passed to the SSH tunnel and what is the result of the communication with the remote host coming back to the PAS Server.

7. Update the `server-log.xml` file to see more information about the file download by adding the following XML:

```
<category name=" com.altair.gw.aif.fileop.implementation. FileDownloadModel">  
  <priority value="debug" />  
</category>
```

Application Definition Related Errors

Configure logging behavior to troubleshoot application definition related errors.

1. Navigate to `PA_HOME/config/conf/`
2. Update the `server-log.xml` to get more details on user information and the total time of the PAS server operation by adding the following XML:

```
<category name="com.altair.gw.aif.rest. ApplicationDefinitionService">  
  <priority value="debug" />  
</category>
```

3. If any errors indicate the failure of communication with the file system, add the following XML to the `server-log.xml` file to log more details about application definition reading and writing from the file system:

```
<category name=" com.altair.gw.aif.applications.utils. ApplicationsRepository">  
  <priority value="debug" />  
</category>
```

Application definitions are cached for better performance. If any discrepancy between the application definition in the upstream products and the file system is observed, the cache debug logging should be enabled to make sure the PAS Server is providing the most current application definition.

4. Update the `server-log.xml` to get more information on cache debug logging by adding the following XML:

```
<category name=" com.altair.gw.aif.utils.generic. CacheManager">  
  <priority value="debug" />  
</category>
```

User Profile

Configure logging behavior to troubleshoot user profile errors.

1. Navigate to `PA_HOME/config/conf/`
2. Update the `server-log.xml` to get more details on user information and the total time of the PAS Server operation by adding the following XML:

```
<category name="com.altair.gw.aif.rest. ProfileService">  
  <priority value="debug" />  
</category>
```

Server Registration

Configure logging behavior to troubleshoot server registration errors.

1. Navigate to `PA_HOME/config/conf/`
2. Update the `server-log.xml` to get more details on user information and the total time of the PAS Server operation by adding the following XML:

```
<category name="com.altair.gw.aif.rest. ServerService">  
  <priority value="debug" />  
</category>
```

User Account

Configure logging behavior to troubleshoot user account related errors.

1. Navigate to `PA_HOME/config/conf/`
2. Update the `server-log.xml` to get more details on user information and the total time of the PAS Server operation by adding the following XML:

```
<category name="com.altair.gw.aif.rest. UserService">  
  <priority value="debug" />  
</category>
```

Session Errors

Configure logging behavior to troubleshoot session related errors.

1. Navigate to `PA_HOME/config/conf/`
2. Update the `server-log.xml` to get more details on user information and the total time of the PAS Server operation by adding the following XML:

```
<category name="com.altair.gw.aif.rest. SessionService">  
  <priority value="debug" />  
</category>
```

20.6.2 Locate RVS Log Files

The file path details to locate RVS core logs, web server logs, and integration logs are listed.

Locating RVS log files locations:

- a) RVS core logs: `PA_HOME/logs/resultservice/resultservicelog/resultservice.log`
- b) RVS web server logs: `PA_HOME/logs/resultservice/catalina.out`
- c) RVS integration logs: `PA_HOME/logs/resultmanager/resulmanager.log`

20.6.3 Log Files

Information about the log files.

PAS Log File

The PAS log file, `pas-server.log`, contains a record of server activities and is useful for identifying issues and problems. The location of the log file for a typical installation of PAS is: `PA_HOME/logs/pas/`

Other Log Files

The PAS installation log file is located in: `/opt/altair/pbsworks/pas/2020.3/_PAS
Services_installation/Logs`

The log files for the Apache Tomcat web server are located in: `PBSWORKS_EXEC/pas/bin/pas-server/
logs`