Altair Access Web 2019.4

Administrator's Guide











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Altair® PBS Works® v.2019.4

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Latest features available with Altair Access[™] Web.

Unity 2.0 Compliance

Access Web 2019.4 complies with Unity 2.0 standards and the Unity White Theme is implemented as the default theme. The layout of Files tab, Jobs tab, Sessions tab, and RVS related pages of Access Web 2019.4 are updated based on the new theme. The following components are also styled:

- Application Main Menu
- Menu Selection
- Breadcrumb
- · File and Folder Icons
- Models
- · Drop Down Menu
- · Check Box and Radio Button
- Tables

Switch from Oracle JDK to Amazon Corretto

Oracle Java Binaries are replaced with the Amazon Corretto 8 JDK.

Support for Recursive Include Files in the Master File Analyzer Script

The Master File Analyzer script has been modified to support recursive include files. Refer to *Extracting Include Files from a Master File* in *Diving Into Application Definitions 2019.4* for more information.

HyperWorks 2019 Support

Support for HyperWorks 2019.1 has been added for Remote Sessions. An issue exists when starting Remote Sessions for applications that use OpenCL calls which causes HyperWorks to crash. A modification of the associated application definition is necessary to resolve this issue.

For more information see Remote Sessions Support for HyperWorks Graphical Applications in Access Web 2019.4 Administrator's Guide.

PBS Custom Resources in Job Monitoring

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. System administrators can restrict the display of PBS custom resources.

Refer to Restrict the Display of Custom Resource in Access Web 2019.4 Administrator's Guide for more information.

Remote Visualization Resolution Improvements

Resolution for Remote Sessions can be adjusted to support HyperWorks 2019 font size issues. The resolution can be set from the Preferences panel or from the Session options. For more information see the *Access Web 2019.4 User Guide*.

Support for PBS Peering Scheduling

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 Server filter that is available on the Job Monitoring page.

For more information see *Support for PBS Peering Scheduling* in *Access Web 2019.4 Administrator's Guide*.



Use Access Web to submit jobs to a Workload Manager.

This chapter covers the following:

- 2.1 Document Conventions (p. 11)
- 2.2 System Requirements (p. 12)
- 2.3 Supported Product Configurations (p. 16)
- 2.4 Authentication and Authorization (p. 17)
- 2.5 PBS Works Licensing (p. 18)
- 2.6 Architecture (p. 19)

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 analyze 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

2.1 Document Conventions

Common typographical conventions for 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/2019.4/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/2019.4/access/exec
- on Windows Docker: /opt/altair/access/exec

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

PBS_HOME

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

PBS_EXEC

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

PAS HOME

The Windows PAS home directory which contains configuration, data, and logging files. Default location is: C:\Program Files\altair\pas\2019.4\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\2019.4\PAS\exec, however this can be overridden during the installation of PAS on Windows.



2.2 System Requirements

System requirements for all components of Access Web.

2.2.1 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 7.1 to 7.6
- Cent OS 7.1 to 7.6
- SLES 12 SP1 to 12 SP3
- Windows Server 2016

Hardware Requirements

The minimum hardware configuration required for Access Web is:

Hardware	Minimum Requirement	Recommended
CPU	2 CPU cores with a minimum speed of 2.5 GHz	4 CPU cores with a minimum speed of 2.5 GHz
Memory (Physical)	8 GB	16 GB
Disk Space	10 GB	500 GB

On Window platforms, for Access Web to run smoothly, the Docker requires 8 CPU cores and 16 GB of memory.



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

2.2.2 Supported Browsers

Supported Browsers

Access Web is supported on the following browsers:

Windows



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

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

2.2.3 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 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



2.2.4 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 plot and animation data Altair HyperWorks Desktop 2017.2 must be installed. Access Web and HyperWorks Desktop 2017.2 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.



Note: HyperWorks 2019.1 is not supported for Results Visualization Service.

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.



2.3 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: To visualize CAE results using RVS requires HyperWorks Desktop. RVS does not support HyperWorks 2019.1 at this time on either Linux or Windows platforms. However, HyperWorks 2019.1 solvers and graphical applications can be run via Access Web 2019.4.

Linux Support

The currently supported Access Web product configurations for Linux are:

Access Web	PBS Professional	HyperWorks
2019.4	19.2.5	14.0
	19.2.4	2017.2
	19.2.3	2019.1 (see note)
	19.2.2	
	19.1.1	
	18.2.4	
	18.2.3	
	18.2.2	
	18.1.1	

Windows Support

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

Access Web	PBS Professional	HyperWorks
2019.4	19.2.5	14.0
	19.1.1	2017.2
	18.2.3	2019.1 (see note)



2.4 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 service 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



2.5 PBS Works Licensing

Licensing model for Access Web.

Licenses must be installed and available via an Altair License Server version 14.0.1 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.



2.6 Architecture

2.6.1 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 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.

2.6.2 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:

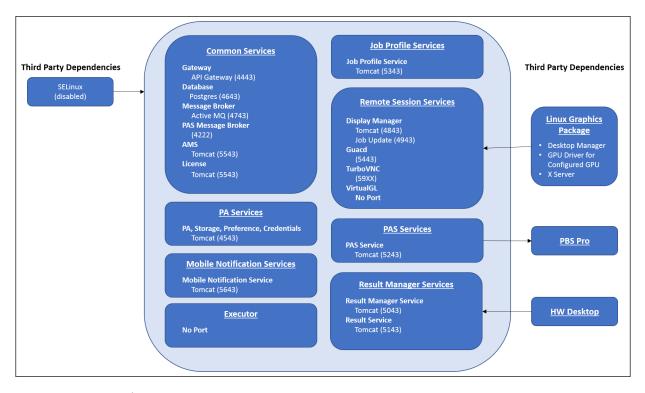


Figure 1: Basic Architecture Overview



2.6.3 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.

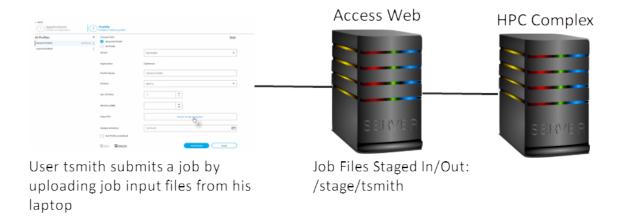


Figure 2: File Staging from User's Laptop or Workstation

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.



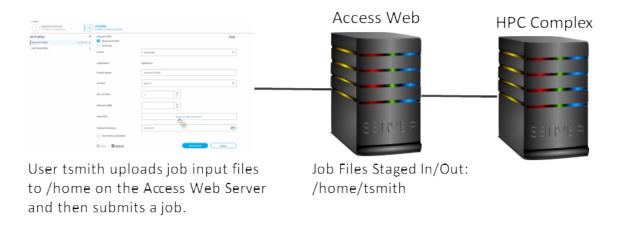


Figure 3: File Staging from User Directory on Access Web Machine

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.



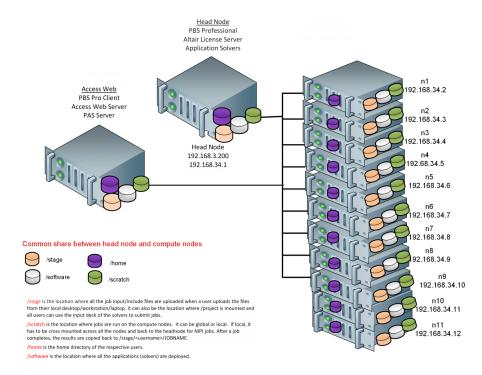


Figure 4: Shared Filesystem

See Also

Shared File System Support

2.6.4 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).

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

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. 28)
- 3.2 Deployment Option on Windows (p. 33)
- 3.3 Prerequisites for Installation (p. 35)
- 3.4 Service User (p. 39)

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 (when RVS features will be used at your site)

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

Server - A

9818/89

Server - A

Access Web / PAS Server

Access Web/PAS Installation

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

Remote Sessions Installation

GlxSpheres application definition installed

Server - B



PBS Serve

Remote Sessions Installation

- iworkq queue added
- Custom resources "ngpus" added

Server - C



PBS MoN

Remote Sessions Installation

- TurboVNC installed
- · VirtualGL installed
- · Interactive Proxy (guacd) installed
- Set resource_available.ngpus

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 service 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 napus.
 - 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 service 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

Server - A



Access Web Server

Access Web/PAS Installation

· Access Web services installed

Server - B



PBS / PAS Server

PAS Installation

- PAS services installed
- ShellScript application definition installed

Remote Sessions Installation

- GlxSpheres application definition installed
- iworkg queue added
- Custom resources "ngpus" added

Server - C



PBS MoM

Remote Sessions Installation

- TurboVNC installed
- VirtualGL installed
- Interactive Proxy (guacd) installed
- Set resource_available.ngpus

Figure 6: Deployment Option 2

Service Clusters

A service cluster is a PAS Server that is connected to an HPC complex. After installation, the Service User must add service clusters to Access Web so that users can submit jobs to an HPC complex. Access to the local filesystem is also configured through the service cluster. When adding a service 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 installation location (when RVS features will be used at your site)

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 Mol

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 14.0.1 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.



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.

Altair HyperWorks Desktop

Results Visualization Service is automatically installed with Access Web. To extract plot and animation data Altair HyperWorks Desktop 2017.2 must be installed. Access Web and HyperWorks Desktop 2017.2 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 platforms, the libXScrnSaver rpm package must be installed prior to installing HyperWorks Desktop.

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 <code>PasswordAuthentication</code> 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 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.

- 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)

- 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 service 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 were 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.



Install Access Web on Linux

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. 41)
- 4.2 Install Access Web (p. 42)
- 4.3 Modern Communication Module on Linux (p. 44)
- 4.4 Install Remote Sessions Components (p. 47)
- 4.5 Open Ports (p. 52)
- 4.6 Enable Job History (p. 53)

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:

sesstatus

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 so that non-interactive jobs can be submitted 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

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 2019.4 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 location for visualizing results.

For example, /opt/hw2017.2/altair/.



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.

14. Start Access Web manually by entering the following command:

service pbsworks-pa start



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 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

4.3.1 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.
- **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/job operations/binaries/momclientmodules to the shared file system.

cp -rp \$PA_EXEC/joboperations/binaries/momclientmodules /shared/filesystem/Access-MCM/

5. 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

6. Edit PA HOME/config/pas/conf/server.conf

vi \$PA 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=/shared/filesystem/Access-MCM/momclientmodules

8. Restart the PAS by entering the command:

service pbsworks-pa restart

4.3.2 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
```



4.4 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 will 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.

4.4.1 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 gueue called "iworkg"
- 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 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 GIxSpheres 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 <code>max_queued_res.ngpus</code> 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 <code>resouce_max.ngpus</code> and <code>resouce_min.ngpus</code>. 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 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 agpus 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.



4.4.2 Install the Remote Sessions Component on the PBS MoMs

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

Before you begin:

- Review the prerequisites 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, Virtual GL, 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.

- **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 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 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).



4.6 Enable Job History

The HPC cluster must have job history enabled for Access Web to display jobs.

- 1. Login to the PBS Server as a PBS manager.
- **2.** Execute the command:

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



Upgrade Access Web on Linux

Instructions for upgrading from a previous version of Access Web.

This chapter covers the following:

- 5.1 Prepare for an Upgrade (p. 55)
- 5.2 Uninstall Remote Sessions (p. 56)
- 5.3 Check the Status of SELinux (p. 59)
- 5.4 Install the New Version of Access Web (p. 60)
- 5.5 Install Remote Sessions Components (p. 62)
- 5.6 Upgrade Access Web (p. 66)
- 5.7 Modern Communication Module on Linux (p. 67)
- 5.8 Enable Job History (p. 70)

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 2019.2, 2019.3 and 2019.3.1 to Access Web 2019.4 are supported.

Access Web 2019.4 supports only PAS 2019.4. 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 PAS Server:
 - removes the application definition GlxSpheres which was installed automatically when the Remote Sessions component was installed on the PAS Server
- **2.** Unconfigure the PBS Server:
 - · deletes the interactive queue
 - removes the custom resource ngpus
- 3. Uninstall the Remote Sessions component on all PBS MoMs
- **4.** Uninstall the Remote Sessions Interactive Proxy. This is required if you are upgrading from 2019.2.



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 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 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 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
```

- **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 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.

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.** Stop Access Web:

```
service pbsworks-pa stop
```

3. Navigate to the directory:

```
/opt/altair/pbsworks/2019.4/remotesessionagent/
_AltairAccessWeb_RemoteSessionAgent_<Version>_installation
```

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

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



The command must contain spaces with escape characters.

5. Follow the instructions provided by the uninstaller.

5.2.3 Uninstall the Interactive Proxy from the Access Web Server

Remove Remote Sessions Interactive Proxy from Access Web server.



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

Uninstalling the Interactive Proxy from the Access Web Server is required only if you are upgrading from Access Web 2019.2.



Note: You can skip this topic if you are upgrading from Access Web 2019.3 or 2019.3.1.

If it is a distributed deployment, then login to the machine hosting Access Web and uninstall Remote Sessions Component to remove the proxy.

- 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.** Navigate to the /opt/altair/pbsworks/2019.4/remotesessionagent/ AltairAccessWeb RemoteSessionAgent <Version> installation directory.
- **4.** Execute the uninstall script by entering the following command:

./Change\ AltairAccessWeb RemoteSessionAgent <Version>\ Installation -i console

The command must contain spaces with escape characters.

5. 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:

sesstatus

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

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 2019.4 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. For example, /opt/hw2017.2/altair/.
 - Note: You can also configure this path after the installation by editing PA_HOME/config/resultservice/config/site_config.xml.
- **12.** Review the installation summary and press ENTER.

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



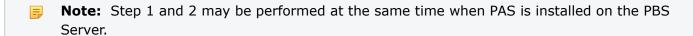
5.5 Install Remote Sessions Components

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 will 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.



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 gueue called "iworkg"
- 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 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 GIxSpheres 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.

Before you begin:

- Review the prerequisites 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, Virtual GL, 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.

- **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 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 <code>ngpus</code>:

```
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 2019.4.

Only upgrades from Access Web 2019.2, 2019.3 and 2019.3.1 to Access Web 2019.4 are supported.

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 2019.4.
- 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 2019.4.
- Automatically start Access Web 2019.4

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 2019.2, 2019.3, or 2019.3.1 home directory and <PreviousVersion_PA_EXEC> is the Access Web 2019.2, 2019.3, or 2019.3.1 execution directory.

After upgrading, Access Web 2019.4 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.
- **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/job operations/binaries/momclientmodules to the shared file system.

cp -rp \$PA_EXEC/joboperations/binaries/momclientmodules /shared/filesystem/Access-MCM/

5. 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

6. Edit PA HOME/config/pas/conf/server.conf

vi \$PA 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=/shared/filesystem/Access-MCM/momclientmodules

8. 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 Enable Job History

The HPC cluster must have job history enabled for Access Web to display jobs.

- 1. Login to the PBS Server as a PBS manager.
- **2.** Execute the command:

qmgr -c 'set server job_history_enable=True'



Install Access Web on Windows

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. 73)
- 6.2 Disable User Access Control (UAC) in Windows (p. 74)
- 6.3 Install PAS On Windows (p. 75)
- 6.4 Modern Communication Module on Windows (p. 76)
- 6.5 Install Access Web Using a Docker Container (p. 79)
- 6.6 Install Remote Sessions Agent on Windows (p. 81)
- 6.7 Enable Job History (p. 82)

Before you begin:

- 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.
- 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 2019.4 Tar File
 (AltairAccessWeb_Docker_Container_2019.3_494_20190923_195602.tar)
- PAS 2019.4 Installer (AltairAccessWeb PAS 2019.3 494 20190923 195602)
- If you site is going to run interactive applications, then download the Remote Sessions Agent Installer (AltairAccessWeb_RemoteSessionAgent_2019.3_494_20190923_195602)
- 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-foripv4-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.
- 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 you 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 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\2019.4\. You may install PAS in a non-default location. However, please note this while following the below instructions.

- 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\2019.4\.
- **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 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**.



6.4 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

6.4.1 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 2019.4 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\job operations\binaries\momclientmodules to the shared file system.
 - For example, copy PAS_EXEC\job operations\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 **Retart**.

6.4.2 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 2019.4 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 **Retart**.

See Also

PBS Application Services Service Commands



6.5 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 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 2019.4 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/hwdesktop

HOST_ENTRIES="10.75.22.95 blrpc686, 192.168.33.23 23centos7"

TIME_ZONE=/usr/share/zoneinfo/Asia/Kolkata
```

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 Access Web as the Service User and add a service 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



6.6 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 \2019.4\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 **DMAgent Service**.
 The status should be "Started".
 - d) If the service is not running then, right-click the **DMAgent Service** and click **Start**.

See Also

Remote Sessions Service Commands



6.7 Enable Job History

The HPC cluster must have job history enabled for Access Web to display jobs.

- 1. Login to the PBS Server 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. 84)
- 7.2 Prepare for PAS Upgrade on Windows (p. 85)
- 7.3 Enable IPV4 for All Network Adapters (p. 86)
- 7.4 Verify User Access Control (UAC) in Windows (p. 87)
- 7.5 Backup Access Web Configuration Files (p. 88)
- 7.6 Install PAS On Windows (p. 89)
- 7.7 Post Configuration of PAS (p. 90)
- 7.8 Modern Communication Module on Windows (p. 93)
- 7.9 Install Access Web Using a Docker Container (p. 96)
- 7.10 Post Configuration of Access Web Upgrade (p. 98)
- 7.11 Install Remote Sessions Agent on Windows (p. 99)
- 7.12 Enable Job History (p. 100)

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 2019.2, 2019.3 and 2019.3.1 to Access Web 2019.4 are supported.

Access Web 2019.4 supports only PAS 2019.4. 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):

- Access Web Docker 2019.4 Tar File (AltairAccessWeb_Docker_Container_<Version>_<Build ID> <YYYYMMDD> <Timestamp>.tar)
- PAS 2019.4 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 2019.4 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 2019.4 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.
- 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.

- 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 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):

• 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.** Check the Docker container ID using the following command:

```
docker ps -q
```

3. Copy the Windows Backup Script (prepare_backup.sh) to the Docker container using the following command:

```
docker cp prepare backup.sh CONTAINER ID:/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. Make the script executable:

```
chmod +x prepare backup.sh
```

7. 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.

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

```
docker cp CONTAINER ID:/tmp//upgrade 1569014147849.zip
```

9. Backup the Docker container using the following command:

```
docker save -o windows docker 2019 2.tar windows docker
```

10. Stop the Docker container:

```
docker stop CONTAINER ID
```

11. Remove the Docker container:

```
docker rm -f CONTAINER ID
```

12. Remove the existing Docker image:

```
docker rmi -f windows access
```



7.6 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\2019.4\. You may install PAS in a non-default location. However, please note this while following the below instructions.

- 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\2019.4\.
- **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 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**.



7.7 Post Configuration of PAS

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

Perform the post configuration after PAS upgrade:

- Post configuration after you upgrade from PAS 2019.2
- Post configuration after you upgrade from PAS 2019.3 or 2019.3.1

See Also

Copy PAS Files After Upgrading from PAS 2019.2 Copy PAS Files After Upgrading from PAS 2019.3 and 2019.3.1

7.7.1 Copy PAS Files After Upgrading from PAS 2019.2

Instructions for updating the application definition, site configuration file (site-config.xml) and AMS policies and roles and group from 2019.2 version of PAS.

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

- Application definitions, Profiles, and site-config.xml from PAS 2019.2 .
- The upgrade \$TIMESTAMP.zip that is created after running the prepare backup.sh script.
- PAS 2019.4 should be installed.

By default PAS is installed at C:\Program Files\altair\pas\2019.4\. 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 2019.2 application definitions to: PAS_HOME\data\pas\targets\localhost\repository \applications\
- **4.** Copy the 2019.2 profiles to: PAS HOME\data\pas\targets\localhost\
- 5. Copy the 2019.2 site-config.xml file to: PAS HOME\data\pas\targets\localhost\repository\
- **6.** Copy the upgrade \$TIMESTAMP.zip to C:\temp directory.
- **7.** Unzip the upgrade zip in the C:\temp directory.
- 8. Copy the AMS policies files from the unzipped upgrade file using the command:

```
cp upgrade_$TIMESTAMP\home\data\ams\policies\access\*
PAS HOME\data\ams\policies\access\
```

9. Copy the AMS roles and groups files from the unzipped upgrade file using the command:

```
cp upgrade_$TIMESTAMP\home\data\ams\local-datastore\*
PAS HOME\data\ams\local-datastore
```



7.7.2 Copy PAS Files After Upgrading from PAS 2019.3 and 2019.3.1

Instructions for updating the application definition, site configuration file (site-config.xml) and AMS from 2019.3 and 2019.3.1 version of PAS.

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

- Backup of previous version (2019.3 or 2019.3) Home directory.
- Backup of previous version (2019.3 or 2019.3.1) AMS files (AA_jaas.config, resources)
- PAS 2019.4 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.propertiesfile:

- 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\2019.4\. 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.** Create a backup of the PAS 2019.4 server configuration file.

This file is located at PAS HOME\config\pas\conf\server.conf.

Place the backup in a secure location that is not located in PA_HOME , as PA_HOME is going to be deleted.

4. Create a backup of the PAS 2019.4 application properties file.

This file is located at PAS HOME\config\joboperation\.

5. Remove the PAS HOME folder of 2019.4 PAS.

This folder is located at C:\Program Files\altair\pas\2019.3\PAS.

- **6.** Copy the previous version (2019.3 or 2019.3.1) home directory at 2019.4 PAS home directory location.
- 7. Merge the 2019.4 server.conf file taken as a backup in Step 2 with the existing server.conf located at PAS HOME\config\pas\conf\.
- **8.** Merge the 2019.4 application.properties file taken as a backup in Step 3 with the existing application.properties located at PAS HOME\config\joboperation\.



9. Copy the previous version (2019.3 or 2019.3.1) AMS files to PAS_HOME\config\ams\.



7.8 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

7.8.1 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 2019.4 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\job operations\binaries\momclientmodules to the shared file system.
 - For example, copy PAS_EXEC\job operations\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 **Retart**.

7.8.2 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 2019.4 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 **Retart**.

See Also

PBS Application Services Service Commands



7.9 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 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 2019.4 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/hwdesktop

HOST_ENTRIES="10.75.22.95 blrpc686, 192.168.33.23 23centos7"

TIME_ZONE=/usr/share/zoneinfo/Asia/Kolkata
```

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 Access Web as the Service User and add a service 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



7.10 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 2019.4 should be installed in the Docker container.
- The upgrade \$TIMESTAMP.zip that is created after running the prepare backup.sh script.
- Windows 2019.4 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. Check the Docker container ID using the following command:

```
docker ps -q
```

3. Copy upgrade \$TIMESTAMP.zip to the Docker container using the following command:

```
docker cp upgrade $TIMESTAMP.zip CONTAINER ID:/tmp
```

4. Copy container upgrade.zip to the Docker container using the following command:

```
docker cp container upgrade.zip CONTAINER ID:/tmp
```

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

```
docker exec -it windows access bash
```

6. Stop Access Web using the following command:

```
service pbsworks-pa stop
```

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

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

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

```
$PA EXEC/init/pbsworks-pa @clean
```

9. Unzip the container zip file to Access Web PA EXEC folder using the following command:

```
cd $PA_EXEC
unzip /tmp/container upgrade.zip
```

10. 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
```

11. Unzip the upgrade \$TIMESTAMP.zip file using the following command:

```
cd /tmp
unzip upgrade $TIMESTAMP.zip
```

12. Run the upgrade script using the following command:

```
$PA_EXEC/init/pa-upgrade.sh /tmp/upgrade_$TIMESTAMP/home ^
/tmp/upgrade $TIMESTAMP/execs
```

13. Start Access Web using the following command:

```
service pbsworks-pa start
```



7.11 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 \2019.4\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 **DMAgent Service**.
 - The status should be "Started".
 - d) If the service is not running then, right-click the **DMAgent Service** and click **Start**.

See Also

Remote Sessions Service Commands



7.12 Enable Job History

The HPC cluster must have job history enabled for Access Web to display jobs.

- 1. Login to the PBS Server as a PBS manager.
- **2.** Execute the command:

qmgr -c 'set server job_history_enable=True'



Post-Installation Configuration

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

This chapter covers the following:

- 8.1 Application Definitions (p. 102)
- 8.2 Configure the License Server (p. 107)
- 8.3 Configure Results Visualization Service (p. 108)

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.

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 rightclicking 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>
            <ApplicationVersion>
                <Option>12.0</Option>
                <Executable>/opt/hyperworks/12.0/altair/scripts/optistruct/
Executable>
            <ApplicationVersion>
        </ApplicationVersions>
</Application>
</Applications>
```

- 5. Edit the file PA HOME/config/pa/appmapping/applicationmapping.json
- **6.** Add the following JSON between the bracket []



7. Change the value of serverName to the name of the server provided when adding the service 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:

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:

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.



```
"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.

- 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
```

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 sections 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.

Follow these steps when the HyperWorks location was not specified while installing Access Web 2019.4.

- 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.

3. Restart Access Web using the following command:

```
service pbsworks-pa restart
```

8.3.2 Configure HyperWorks Licenses

Install the Hyperworks Desktop features, HWHyperMath and HWHyperViewTrans in a Altair License Server.

These feature licenses must be available via a Altair License Server 14.0 or newer license server to enable the visualization of the supported result files. To configure, point RVS to the HyperWorksinstalled license server. Refer Point RVS to the HyperWorks License Server.

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

Install "libXScrnSaver-1.2.2-6.1.el7.x86_64" package for HMathserv to run after installing the HyperWorks Desktop software.



Tip: Install HyperWorks Desktop by following the Linux installation instructions in the HyperWorks 2017 Installation Guide.

Point RVS to the HyperWorks License Server

Update the Altair license path to point to the HyperWorks license server.

Point RVS to the HyperWorks license server to keep the HyperWorks and Access Web licenses separate.

1. Open the file at PA EXEC/resultservice/scripts/setenv.sh.



2. Update the Altair license path to point to the HyperWorks license server in this format port@hostname.

export ALTAIR LICENSE PATH=port@hostname

This will enable the RVS capabilities of Access Web.

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.

8.3.3 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</pre>/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.

8.3.4 Kill HyperWorks HyperMath Process Ids

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

Follow the given steps:

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

```
ps -ef | grep hmathserv
```

The list of HMath process ids is displayed.

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

kill -9 cess id>



8.3.5 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.
- 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.



Add Service Clusters

Login to Access Web as the Service User to add service clusters.

This chapter covers the following:

- 9.1 Log into Access Web as the Service User (p. 112)
- 9.2 Add a Service Cluster (p. 113)

9.1 Log into Access Web as the Service User

Login to Access Web as the Service User to add service clusters.

- 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 service cluster.



9.2 Add a Service Cluster

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

A service cluster is a PAS Server that is connected to an HPC complex. Before you can submit a job, a service cluster must be added. Only users that have been assigned a Manager role can add service clusters. 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 service cluster is automatically added, eliminating the need for the Service User to add a service cluster. Users can begin submitting jobs immediately. Access to the local filesystem is also configured through the default service cluster. By default, users have access to the Job File Stage Area directory (default is /stage) that is defined at installation. Edit the default service cluster to configure access to additional directories such as user home directories, for example /home.

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

The Add Service Cluster screen is displayed.

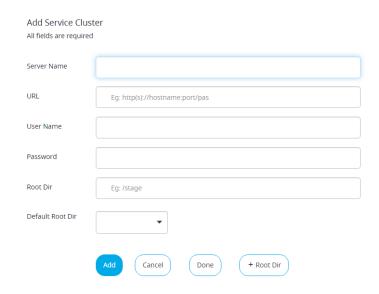


Figure 8: Add Service Cluster

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

The URL is in the format 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 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

6. Click of you want to add another **Root Dir** and enter the pathname.

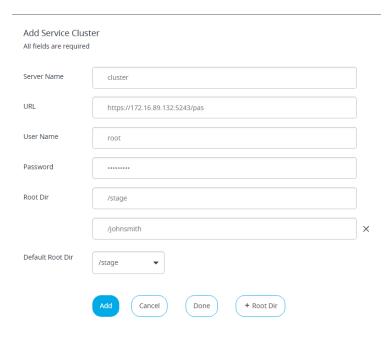


Figure 9: Multiple Root Directory Entry

7. Select the default root directory to be displayed from the **Default Root Dir** drop-down menu.



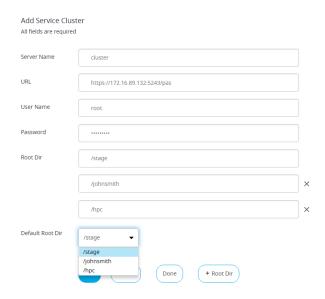


Figure 10: Default Root Directory

8. Click Add.

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



Note: A notification is displayed to all users logged into Access Web when a service cluster gets added, edited, deleted, if it goes down or if it is unreachable.

- 9. Repeat steps 2 through 8 to add additional service clusters.
- 10. Click Done.

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

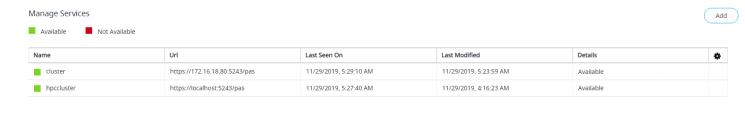


Figure 11: Service Clusters List

The green color next to the service cluster indicates that it is available to use. The red color indicates that the service cluster is not available.

The **Details** column provides the reason when a service cluster is not available. Mouse hover the **Details** column of a service cluster to view the error message.



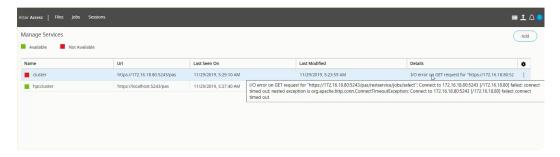


Figure 12: Service Cluster Details

See Also

Troubleshoot PBS Application Services



Downgrade Access Web on Linux

10

Instructions for downgrading Access Web 2019.4 to a previous version.

Perform these steps to downgrade Access Web and PAS (single and different machine setup) 2019.4 to 2019.3.1, 2019.3 or 2019.2.

- 1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
- **2.** Stop Access Web 2019.4 using the following command:
 - service pbsworks-pa stop
- 3. Create a backup of /etc/pbsworks-pa.conf as /etc/pbsworks-pa.conf.2019.4
- 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

11

Instructions for downgrading Access Web 2019.4 to a previous version on Windows.

This chapter covers the following:

- 11.1 Downgrade PAS On Windows (p. 119)
- 11.2 Copy the Modern Communication Module to All Execution Hosts (p. 120)
- 11.3 Downgrade Access Web in Docker (p. 121)
- 11.4 Downgrade Remote Sessions Agent (p. 123)

11.1 Downgrade PAS On Windows

Instructions for downgrading PAS 2019.4 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 2019.4.
 - 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.** Navigate to the previous version of installation:

PAS EXEC\scripts\

4. 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 2019.4 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 **Retart**.

See Also

PBS Application Services Service Commands



11.3 Downgrade Access Web in Docker

Instructions for downgrading Access Web 2019.4 to a previous version in Docker.

You need to have the following files before beginning the downgrade:

- Windows Access Web 2019.2 Docker Tar (windows_docker_2019_2.tar) or 2019.3 Docker Tar (windows_docker_2019_3.tar)backup that was taken at the time of upgrade
- The env.list file of 2019.2
- 1. Login to the machine as an administrator where Access Web 2019.4 is installed.
- 2. Open Windows command line terminal and enter the command:

```
docker exec -it windows access bash
```

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. Load the previous version of Access Web Docker Tar (windows_docker_2019_2.tar or windows_docker_2019_3.tar) backup that was taken at the time of upgrade:

```
docker load -i windows docker <Version>.tar
```

7. Verify the license path, hostname, HyperWorks installation location, host entries, time zone, and service user in the 2019.2 or 2019.3 Docker environment list (env.list).



Note: The 2019.3 Docker environment list (env.list) will not contain service user.

- 8. Start the Access Web Docker container:
 - a) If you are starting Access Web 2019.2 Docker, then use 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 ^
windows docker:latest bash
```

b) If you are starting Access Web 2019.3 Docker, then use 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
```

9. Login to the Access Web 2019.2 Docker container using the following command:

```
docker exec -it windows access bash
```

10. Start Access Web using the following command:

```
service pbsworks-pa start
```

- **11.** 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 2019.4 to a previous version.

You need to have the following file before beginning the downgrade:

Remote Sessions Agent 2019.3 or 2019.2 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_2019.4** application.
 - c) Right-click the AltairAccessWeb_RemoteSessionAgent_2019.4 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. 125)
- 12.2 Uninstall Remote Sessions (p. 126)

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.

- **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/2019.4/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 PAS Server:
 - removes the application definition GlxSpheres which was installed automatically when the Remote Sessions component was installed on the PAS Server
- **2.** Unconfigure the PBS Server:
 - · deletes the interactive queue
 - removes the custom resource ngpus
- 3. Uninstall the Remote Sessions component on all PBS MoMs
- **4.** Uninstall the Remote Sessions Interactive Proxy. This is required if you are upgrading from 2019.2.



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 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 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 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.

- **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 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.

12.2.2 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.** Stop Access Web:

```
service pbsworks-pa stop
```

3. Navigate to the directory:

```
/opt/altair/pbsworks/2019.4/remotesessionagent/
_AltairAccessWeb_RemoteSessionAgent_<Version>_installation
```

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

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



The command must contain spaces with escape characters.

5. Follow the instructions provided by the uninstaller.



Uninstall Access Web and its Components on Windows

13

Instructions for uninstalling Access Web, PAS and Remote Sessions component.

This chapter covers the following:

- 13.1 Uninstall Access Web on Windows (p. 130)
- 13.2 Uninstall PAS on Windows (p. 131)
- 13.3 Uninstall Agents on Windows (p. 132)

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 2019.3 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 **DMAgent Service** 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_2019.4 application.
- **6.** Right-click the **AltairAccessWeb_RemoteSessionAgent_2019.4** 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. 134)
- 14.2 Stop Access Web (p. 135)
- 14.3 Restart Access Web (p. 136)
- 14.4 Determine the Status of all Access Web Services (p. 137)

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/2019.4/access/exec
PBSWORKS HOME =>/var/spool/pbsworks/2019.4/access/home
PAS REPO: => /var/spool/pbsworks/2019.4/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)
pas message broker service is Running (Nats Service!)
                                                         [OK]
resultservice service is Running (14405)
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. 139)
- 15.2 PBS Application Services Service Commands (p. 140)
- 15.3 Remote Sessions Service Commands (p. 141)

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.

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 DMAgent Service.
- 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 DMAgent Service.
- 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 DMAgent Service.
- 4. Click Restart.

Once the service is restarted, the status of the service will be displayed as **Restarted**.



Manage Service Clusters

Add, edit, and delete service clusters.

This chapter covers the following:

- 16.1 Add a Service Cluster (p. 143)
- 16.2 Edit a Service Cluster (p. 147)
- 16.3 Delete a Service Cluster (p. 149)

Only a user that has been assigned a Manager role can add, edit, and remove service clusters. The Manage Services page will not be displayed for regular users.

16.1 Add a Service Cluster

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

A service cluster is a PAS Server that is connected to an HPC complex. Before you can submit a job, a service cluster must be added. Only users that have been assigned a Manager role can add service clusters. 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 service cluster is automatically added, eliminating the need for the Service User to add a service cluster. Users can begin submitting jobs immediately. Access to the local filesystem is also configured through the default service cluster. By default, users have access to the Job File Stage Area directory (default is /stage) that is defined at installation. Edit the default service cluster to configure access to additional directories such as user home directories, for example /home.

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

The Add Service Cluster screen is displayed.

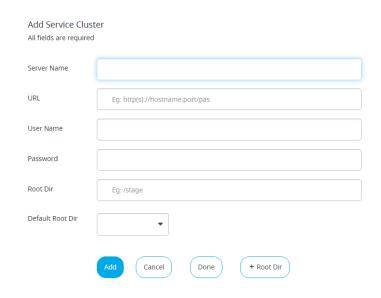


Figure 13: Add Service Cluster

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

The URL is in the format 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 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

6. Click of you want to add another **Root Dir** and enter the pathname.

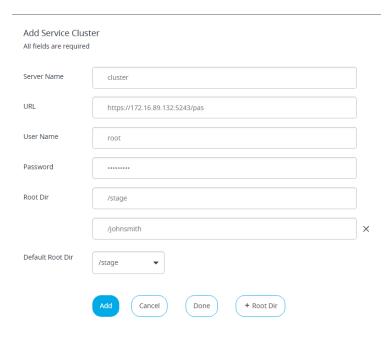


Figure 14: Multiple Root Directory Entry

7. Select the default root directory to be displayed from the **Default Root Dir** drop-down menu.



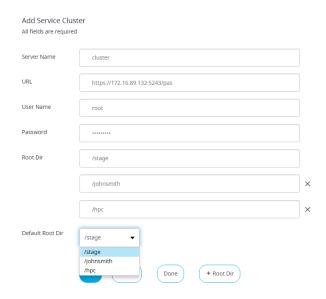


Figure 15: Default Root Directory

8. Click Add.

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



Note: A notification is displayed to all users logged into Access Web when a service cluster gets added, edited, deleted, if it goes down or if it is unreachable.

- 9. Repeat steps 2 through 8 to add additional service clusters.
- 10. Click Done.

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

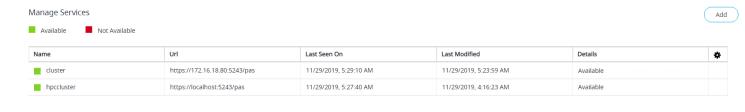


Figure 16: Service Clusters List

The green color next to the service cluster indicates that it is available to use. The red color indicates that the service cluster is not available.

The **Details** column provides the reason when a service cluster is not available. Mouse hover the **Details** column of a service cluster to view the error message.





Figure 17: Service Cluster Details

See Also

Troubleshoot PBS Application Services



16.2 Edit a Service Cluster

Update a service 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 service cluster.

1. Click ≡.

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

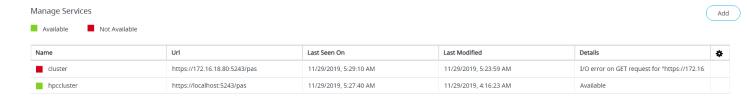


Figure 18: Manage Services

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

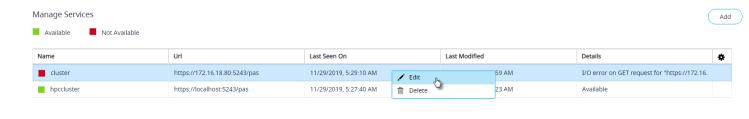


Figure 19: Cluster Edit Option

The Edit Service Cluster screen is displayed.



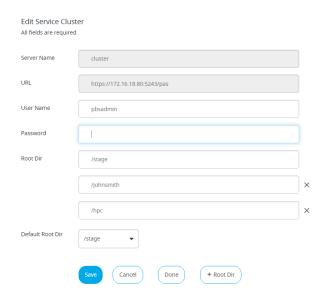


Figure 20: Edit Service Cluster

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

Note: A notification is displayed to all users logged into Access Web when a service cluster gets added, edited, deleted, if it goes down or if it is unreachable.

6. Click Done.



16.3 Delete a Service Cluster

Remove a service 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 service cluster.

1. Click ≡.

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

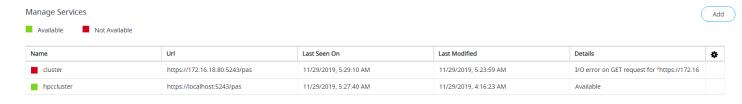


Figure 21: Manage Services

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

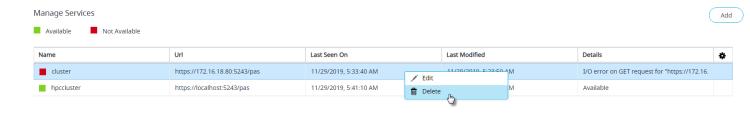


Figure 22: Server Cluster Delete

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 service cluster gets added, edited, deleted, if it goes down or if it is unreachable.

5. Click Done.



Advanced Configurations

Advanced configurations for Access Web and its services.

This chapter covers the following:

- 17.1 Configure the Access Web Component (p. 151)
- 17.2 Configure PBS Application Services (p. 183)
- 17.3 Configure the Remote Sessions Component (p. 191)
- 17.4 Configure Results Visualization Service (p. 199)

17.1 Configure the Access Web Component

Configurations required for Access Web component.

17.1.1 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.

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 for more information.

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.

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.

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.

- 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.



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:postgresgl://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.

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

```
pas. of no times day in grant of the contract of the contract
```

- **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.

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
- quacamole.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.

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.

- 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.

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.

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.

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.



```
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.

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.

- 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.

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.

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="${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 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.

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.

- 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.

- **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.

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.

- **4.** Edit the file PA_HOME/config/api_gateway/nginx.conf.
- **5.** Update the port number of server localhost.

6. Start Access Web by entering the command:

service pbsworks-pa start

17.1.2 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.

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.



=

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.

=

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.



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.

=

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.

5

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.



=

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.

=

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.



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.

=

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.

=

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

17.1.3 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 <code>doubleClickDelay</code>.

17.1.4 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
```

17.1.5 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.

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

17.1.6 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 <code>defaultGridColumns</code> property value in the <code>jobpropertiesmap.json</code> 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 defaultGridColumns value.

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

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

17.1.7 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.

17.1.8 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.



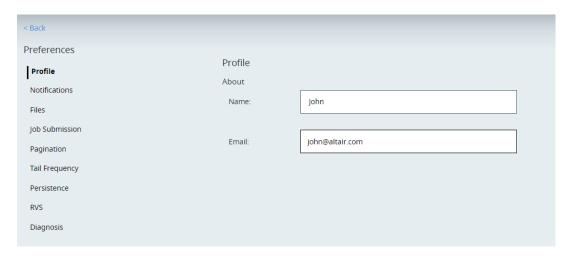


Figure 23: Preferences

- **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.

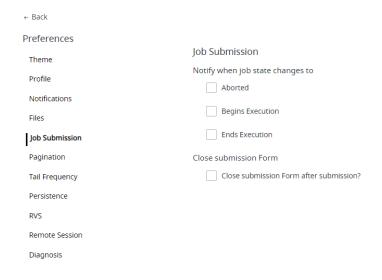
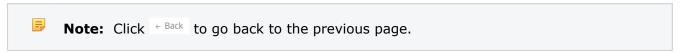


Figure 24: Job Submission



- **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.

17.1.9 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.

17.1.10 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/gdel.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.



17.1.11 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.

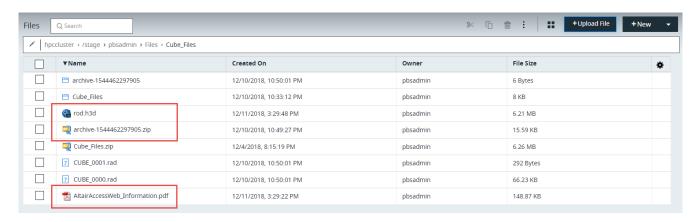


Figure 25: File Icon Mapping

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/:



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/

17.1.12 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
```

17.1.13 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
```

17.1.14 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.

- 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
```

17.1.15 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:



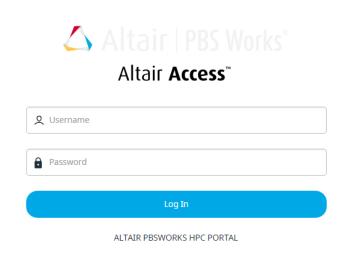


Figure 26: Access Web Login Page with Branding Logo and Description

17.1.16 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).

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.



17.1.17 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.

17.1.18 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.

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
```



17.1.19 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.

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 makes 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 <code>enableModernFileUpload</code> value to true to enable modern file upload.

"enableModernFileUpload": false



Note: By default, the <code>enableModernFileUpload</code> value is set to false.

5. Start Access Web using the following command:

service pbsworks-pa start

17.1.20 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 2019.4 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 2019.4 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.



17.1.21 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 the PBS Server of both the pulling and the furnishing HPC complex.
- Modern Communication Module should be setup on all execution nodes.
- Add a service 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.

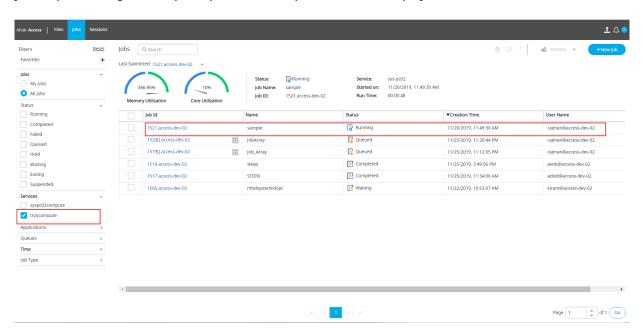


Figure 27: Jobs in troycompute Server

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.



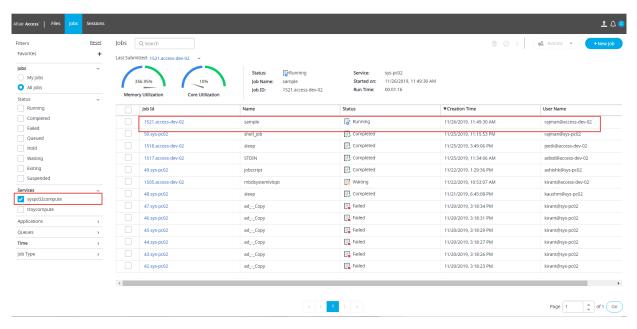


Figure 28: Jobs in syspc02compute Server

17.1.22 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 service 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 <code>MODERN_COMMUNICATION_ENABLED</code> 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 service 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
- Copy the Modern Communication Module to All Execution Hosts

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 Service 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 service clusters.



17.2 Configure PBS Application Services

Information about configuration files, verification of your PAS installation, post-installation configuration and tasks.

17.2.1 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

17.2.2 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.

17.2.3 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.

17.2.4 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 stagedin 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 Modern Communication Setup.

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 Modern Communication Setup.

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.

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.

17.2.5 Configure PBS Resources

Configure PBS resources in PAS.

You can install PAS on a separate machine from the PBS Professional Server as a failover server. The PBS Professional <code>flatuid</code> 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 <code>flatuid</code> is set to <code>True</code>, the Server assumes that <code>UserA@host1</code> is the same as <code>UserA@host2</code>. Therefore, if <code>flatuid</code> is <code>True</code>, <code>UserA@host2</code> can operate on <code>UserA@host1</code>'s job. Follow these steps to set <code>flatuid</code> to <code>True</code>. These steps must be performed either by root or a PBS manager.

- **1.** Login to the PBS Server.
- 2. At the command line, enter the command:

```
qmgr -c "print server"
```

3. 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:

```
qmgr -c "set server flatuid=true"
```

17.2.6 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
```



17.2.7 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.

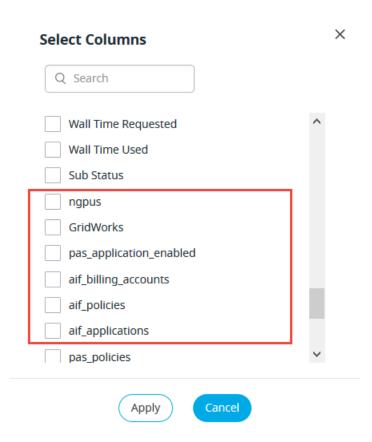


Figure 29: Job Attributes and Custom Resources

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=*
```



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.

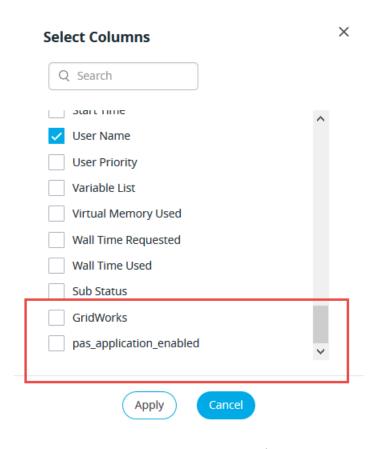


Figure 30: Custom Resources - Restricted

17.3 Configure the Remote Sessions Component

Configurations when you install remote session component.

17.3.1 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.

17.3.2 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.

17.3.3 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

17.3.4 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 <code>jobsub.monitor.host</code> 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

17.3.5 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 <code>max_queued_res.ngpus</code> 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.

- 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.

17.3.6 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.

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 quacd 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.

quacd-distributed-environment: true



Note: By default, the <code>guacd-distributed-environment</code> value is set to <code>true</code> 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: $ALTAIR_DM_MONITOR_HOST$
quacd-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/quacd start
```



17.3.7 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.
- **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 <code>guacd-distributed-environment</code> value is set to <code>true</code> indicating that the interactive proxy will use Guacd installed in graphic node (PBS MoM) where VNC server is running.

4. Check that the <code>guacd-hostname</code> and <code>guacd-port</code> 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 Configure Results Visualization Service

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

17.4.1 Activate Solver Files Readers

You can activate the result data files 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.

Activate the Abaqus Reader

Activate the Abaqus reader so that Abaqus data files can be read 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 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 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 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 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 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 HW_EXEC/io/abf_readers/bin/linux64

17.4.2 Supported Result File Types

The supported result file types supported by Access Web for visualizing Plot and Animation.

Table 2: Supported Result File Types for Plotting

Results File Format	Plot Data	Animation Data	Default TOC Type
Radioss Bulk			
*.op2	Yes	Yes	Animation
*.h3d	Yes	Yes	Animation
*.res	Yes	NA	Plot



Results File Format	Plot Data	Animation Data	Default TOC Type	
*.pch	Yes	NA	Plot	
*.gz	Yes	Yes	Animation	
Radioss Block	Radioss Block			
*A00#	Yes	Yes	Animation	
*.T##	Yes	NA	Plot	
*.gz	Yes	Yes	Animation	
Optistruct			,	
*.op2	Yes	Yes	Animation	
*.h3d	Yes	Yes	Animation	
*.res	Yes	NA	Plot	
*.pch	Yes	NA	Plot	
*.hgdata	Yes	NA	Plot	
MotionSolve			,	
*.mrf	Yes	NA	Plot	
*.plt	Yes	NA	Plot	
*.h3d	Yes	Yes	Animation	
*.maf	Yes	NA	Plot	
Abaqus				
*.odb	Yes	Yes	Animation	
*.dat	Yes	NA	Plot	
*.out	Yes	NA	Plot	
ADAMS				
*.req	Yes	NA	Plot	
*.res	Yes	NA	Plot	
*.nam	Yes	NA	Plot	



Results File Format	Plot Data	Animation Data	Default TOC Type	
*.rsp	Yes	NA	Plot	
*.shl	Yes	NA	Plot	
*.sta	Yes	NA	Plot	
Ansys	Ansys			
*.rst	Yes	Yes	Animation	
*.rth	Yes	Yes	Animation	
*.rth	Yes	Yes	Animation	
CFX				
*.out	Yes	NA	Plot	
Fluent				
*.out	Yes	NA	Plot	
output.*	Yes	NA	Plot	
*.trn	Yes	NA	Plot	
.txt	Yes	NA	Plot	
Ls-Dyna				
d3plot	Yes	Yes	Animation	
*dynain	Yes	Yes	Animation	
*.fz	Yes	Yes	Animation	
Intfor	Yes	Yes	Animation	
Ptf	Yes	Yes	Animation	
ABSTAT	Yes	NA	Plot	
BINOUT	Yes	Yes	Animation	
BNDOUT	Yes	Yes	Animation	
DBFSI	Yes	NA	Plot	
DEFORC	Yes	NA	Plot	



Results File Format	Plot Data	Animation Data	Default TOC Type		
*.dyn	Yes	NA	Plot		
ELOUT	Yes	NA	Plot		
GLSTAT	Yes	NA	Plot		
GECOUT	Yes	NA	Plot		
JNTFORC	Yes	NA	Plot		
MATSUM	Yes	NA	Plot		
NCFORC	Yes	NA	Plot		
NODFOR	Yes	NA	Plot		
NODOUT	Yes	NA	Plot		
RBDOUT	Yes	NA	Plot		
RCFORC	Yes	NA	Plot		
RWFOC	Yes	NA	Plot		
SBTOUT	Yes	NA	Plot		
SECFORC	Yes	NA	Plot		
SLEOUT	Yes	NA	Plot		
SPHOUT	Yes	NA	Plot		
SWFORC	Yes	NA	Plot		
NanoFluidX	NanoFluidX				
nFX	Yes	No	NA		
UltraFluidX					
uFX	Yes	No	NA		
HyperXtrude					
*.h3d	Yes	Yes	Animation		
*.out	Yes	NA	Plot		
FEMZIP					



Results File Format	Plot Data	Animation Data	Default TOC Type	
*.fz	Yes	Yes	Animation	
d3plot	Yes	Yes	Animation	
HW ASCII	HW ASCII			
*.hwascii	Yes	Yes	Animation	
MADYMO	MADYMO			
*.fai	Yes	NA	Plot	
*.kn3	Yes	Yes	Animation	
Marc				
*.t16	Yes	Yes	Animation	
Nastran			,	
*.op2	Yes	Yes	Animation	
*.pch	Yes	NA	Plot	
NIKE3D				
*n3plot	Yes	Yes	Animation	
Pamcrash				
*.DSY	Yes	Yes	Animation	
*.erfh5	Yes	Yes	Animation	
*.THP	Yes	NA	Plot	
*.fz	Yes	Yes	Animation	
*.h3d	Yes	Yes	Animation	
Permas				
*A##	Yes	Yes	Animation	
Other Ascii formats				
*.xgr	Yes	NA	Plot	
*.dat	Yes	NA	Plot	



Results File Format	Plot Data	Animation Data	Default TOC Type
*.col	Yes	NA	Plot
*.csv	Yes	NA	Plot
*.rvp	Yes	NA	Plot



Note: The default TOC type (plot or animation) will be identified depending on the file type registration and the parameter isDefault in the plugin def.xml file.

17.4.3 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 <code>site_config.xml</code> 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.

6. Save the file and restart Access Web using the command, service pbsworks-pa restart.



17.4.4 Configure RVS Parameters

Main parameters related to RVS in Access Web.

Parameters for Result Service

The default value of the result service parameters are stored and listed in the following file site config.xml. This file is located at PA HOME/config/resultservice/config/site config.xml.

Parameter in site_config.xml

TOC Size

The maximum TOC size-limit in bytes.

Default value is 2097152 (In bytes).

Configure the maximum TOC size using the parameter <SizeLimit toc="2097152">.

AIF Impersonation

The result file computation and license check out are processed for the access 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. For the repeated RVS file request, the data is fetched from the cache. This will speed up the RVS performance.

Default value is set to true. For a repeated RVS request, . This will speed up the

If the value is changed to false, for every RVS query, the result file data is fetched from the database. Overall, this setting slows down the RVS performance.

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.

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.

Configure the operation default timeout using Operation defaultTimeout="6000"

Parameter in resultmanager.conf

The parameter is located at PA HOME/config/api gateway/default.d/resultmanager.conf

Browser Timeout

The amount of time for the browser should wait to respond to any RVS requests. If the server doesn't respond beyond this timeout value then a browser timeout message appears.





Note: The timeout value doesn't interrupt any of the RVS background operations.

Default value is 600 seconds.

Configure the browser timeout for RVS requests in the line cproxy_read_timeout 600sec> and enter the timeout value in seconds.

Parameters for Hypermath

The default value of the parameters are stored and listed in the following file <code>plugin_def.xml</code>. This file is located at PA HOME/config/resultservice/plugins/hypermath application/plugin def.xml

Parameters in plugin_def.xml

Socket timeout for HMath

It is the maximum amount of time that the HMath server should wait to setup a connection with RVS.

Default value is 6000 milliseconds.

Configure the socket timeout for HMath in the line <application id="HYPERMATH_APPLICATION"> and enter the <socketTimeout="6000"> value.

Connection timeout for HMath

It is the maximum amount of time that the HMath server should wait to respond for the data query from RVS.

Default value is 6000 milliseconds.

Configure the connection timeout for HMath in the line <application id="HYPERMATH APPLICATION"> and enter the <connectionTimeout="6000"> 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="6000"> 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="6000"> value.



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.

This chapter covers the following:

- 18.1 Application Definition Components (p. 210)
- 18.2 Sample Application Definition ShellScript (p. 212)
- 18.3 Map Icons to an Application (p. 213)
- 18.4 Define a Category for an Application Definition (p. 215)
- 18.5 Administration of Application Definitions (p. 216)
- 18.6 Sitewide Settings (p. 218)
- 18.7 Interactive Application Definitions (p. 222)

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, <code>site-config.xml</code>, 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 <code>site-config.xml</code> file must be updated manually if you add an application definition. Access Web does not create a backup the <code>site-config.xml</code> file. If you delete the <code>site-conifg.xml</code> 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 Map Icons to an Application

Map an icon to an application so that the icon gets displayed in the context menu and in the application list.

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

Two images are used to map an icon to an application. The first image must be a size 16x16 pixels and is used when displaying the application in a context menu such as submitting a job by right-clicking on a job input file. The second image must be a size of 64x64 pixels and is the icon that is displayed next to the name of the application when displaying available applications.

Figure 31:Context Menu Icons

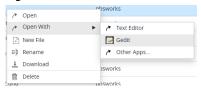
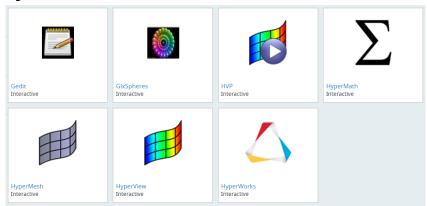


Figure 32:List Menu Icons



- **Note:** Only Administrators can map an icon to the application.
- 1. Login to the machine where Access Web is installed as root or as a user with sudo permissions.
- 2. Navigate to PA HOME/data/pas/targets/localhost/repository/applications/APPNAME. where APPNAME is the application folder. For example, let's assume that we are adding icon to the ShellScript application definition.
- **3.** Create an avatar directory.
- **4.** Navigate to the avatar directory.
- **5.** Place the application icon. Place one image of size 16x16 for the context menu and the other image of size 64x64 for the list
- **6.** Navigate to PA HOME/data/pas/targets/localhost/repository/applications/ShellScript.



7. Edit the application input file and add the <applicationIconSmall> xml element to display the icon in context menu and <applicationIconMedium> xml element to display the icon in the application list.

```
<ApplicationId>ShellScript</ApplicationId>
<ApplicationName>ShellScript</ApplicationName>
<ApplicationExtension>.fem</ApplicationExtension>
<ApplicationIconSmall>ShellScriptIconSmall.jpg</ApplicationIconSmall>
<ApplicationIconMedium>ShellScriptIconMedium.jpg</ApplicationIconMedium>
```

- **8.** Repeat steps 2 through 7 for all applications.
- **9.** Restart Access Web by entering the following command:

```
service pbsworks-pa restart
```

An example of the icons mapped to the application definition displayed in UI:



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.

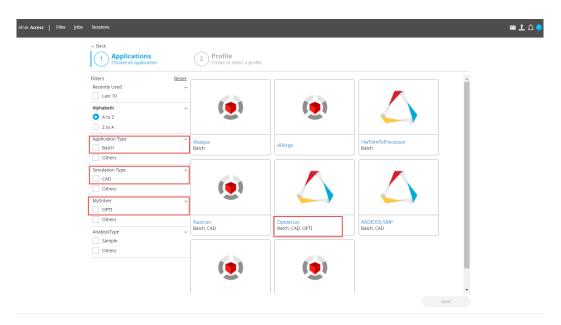


Figure 33: Application Definition Category

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>:

This tag indicates that the Optistruct application will be listed under the SimulationType and MySolver categories. The CAD and OPTI will be the subcategory of SimulationType and MySolver respectively. 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, <code>site-config.xml</code>. By putting some site specific application information in the, <code>site-config.xml</code> 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 <code>site-config.xml</code>. The location of this file is <code>PA HOME/data/pas/targets/localhost/repository</code>.

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-conifg.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 2019.4, 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">
              <Application versions/>
        <Application>
        <Application>
```

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>
          <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>Company2
 </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.

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 $' \ '$.



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 $' \ n'$.

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.



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 <code>COPY_BACK_FILES</code> can be added to an application definition so that job input files are copied to the stageout directory.



Note: The <code>COPY_BACK_FILES</code> arguments is disabled by default. Enable this field by setting the <code><FeatureEnabled></code> option to true. When <code><FeatureEnabled></code> 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 <code>DM_CLIENT_VIEW_MODE</code> 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.



=

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.

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

- **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.

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



Establish Access Controls

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 Managing Roles (p. 228)
- 19.2 Managing Users (p. 231)

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 Managing 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 menu located on the left-hand side of the web page.



3. Click Add Roles.

A role is created with a default role name and application user privileges.

- 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 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 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 name that describes the role.
 - 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 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 Ok.



19.2 Managing Users

Add a user, assign or remove a role from a user, or delete a user.



Note: User is auto populated on first time login to the access.

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 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 NIS/SSH username.
 - d) Click Save.

19.2.2 Assign a Role to a User

Assign a role to the user to establish user resources.

- 1. Click > Access Management.
- 2. Click **Users** from the 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.
 - 1 Tip: Select multiple users when you want to assign the same roles to multiple users.
- 4. Click Assign Roles.

The **Available Roles** menu is displayed.

- 5. Enable the checkbox next to the Role Name to assign the role to the user.
 - *1* **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 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.** Click to delete the role.
- 5. 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 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 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 Ok.



Troubleshoot Access Web

Troubleshoot Access Web, PAS, Results Visualization Service, and Remote Sessions.

This chapter covers the following:

- 20.1 Use the Diagnosis Script to Troubleshoot Issues (p. 234)
- 20.2 Troubleshoot PBS Application Services (p. 235)
- 20.3 Troubleshoot Remote Sessions Components (p. 244)
- 20.4 Troubleshoot Results Visualization Service (p. 264)
- 20.5 Logging (p. 273)

The following section provides the troubleshooting information and steps for Access Web and its services.

20.1 Use the Diagnosis Script to Troubleshoot Issues

Use the diagnosis script to gather log files 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 file 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.

- 1. Login to the machine where you have installed Access Web.
- 2. Navigate to PA_EXEC/init/
- **3.** Run the following command:

./pa-diagnosis.py

A zip file 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 PBS Application Services

Troubleshooting information and steps for PAS.

20.2.1 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 34: 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.



20.2.2 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

20.2.3 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.

20.2.4 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: 2019.2.0 Build: 20190624

REST Services

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20.2.5 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:

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:

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:

- **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 <code>flatuid</code> 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 <code>flatuid</code> is set to True, the Server assumes that <code>UserA@host1</code> is the same as <code>UserA@host2</code>. Therefore, if <code>flatuid</code> is True, <code>UserA@host2</code> can operate on <code>UserA@host1</code>'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



20.2.6 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 <code>flatuid</code> 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 <code>flatuid</code> is set to True, the Server assumes that <code>UserA@host1</code> is the same as <code>UserA@host2</code>. Therefore, if <code>flatuid</code> is True, <code>UserA@host2</code> can operate on <code>UserA@host1</code>'s job.

- 1. Login to the PBS Server as root or a user with sudo permissions.
- **2.** At the command line, enter the command:

qmqr

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 <code>Unknown resource_List.xxxxx</code> 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
   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:

amar

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 Troubleshoot Remote Sessions Components

Troubleshoot problems related to Remote Sessions and interactive applications.

20.3.1 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 Harware

Print the configurered GPU hardware if available.



```
GPU Hardware:
- output: 01:00.0 VGA compatible controller: NVIDIA Corporation GK106GL
[Quadro K4000] (rev al)
05:00.0 VGA compatible controller: NVIDIA Corporation GF106GL [Quadro 2000] (rev al)
```

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:
                         linux-vdso.so.1 (0x00007ffec4fa5000)
        libGL.so.1 \Rightarrow /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 \Rightarrow /lib64/libm.so.6 (0x00007f110d493000)
        libc.so.6 \Rightarrow /lib64/libc.so.6 (0x00007f110d0ef000)
        libdl.so.2 => /lib64/libdl.so.2 (0x00007f110ceeb000)
        libGLX.so.0 \Rightarrow /usr/lib64/libGLX.so.0 (0x00007f110ccbb000)
        libGLdispatch.so.0 => /usr/lib64/libGLdispatch.so.0 (0x00007f110c9ec000)
        libxcb.so.1 \Rightarrow /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)
        /1ib64\overline{/}1d-1inux-x86-64.so.2 (0\overline{x}0000555797423000)
        libXext.so.6 => /usr/lib64/libXext.so.6 (0x00007f110c019000)
        libXau.so.6 => /usr/lib64/libXau.so.6 (0x00007f110be15000)
  - TurboVNC:
                         linux-vdso.so.1 (0x00007ffe90db5000)
       - output:
        libm.so.6 \Rightarrow /lib64/libm.so.6 (0x00007fdee0ab9000)
        libpthread.so.0 => /lib64/libpthread.so.0 (0x00007fdee089b000)
        libpam.so.0 => /lib64/libpam.so.0 (0x00007fdee068c000)
        libc.so.6 \Rightarrow /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.



```
      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 16 0 0 None PXW

      0x138 24 dc
      0
      32 0 r y
      .
      8 8 8 8 . 4 24 8 16 16 16 16 16 0 0 None PXW

      0x139 24 tc
      0
      24 0 r . . 8 8 8 8 0 . 4 24 8 16 16 16 16 16 0 0 None PXW

      0x13a 24 dc
      0
      24 0 r . . 8 8 8 8 0 . 4 24 8 16 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 16 0 0 None PXW
```

Desktop Manager Environment

Status about Desktop Manager environment is provided.

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 Harware:
        - 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 al)
- X Server status: Running
- Dependency Library Check:
  - VirtualGL:
                         linux-vdso.so.1 (0x00007ffec4fa5000)
        libGL.so.1 \Rightarrow /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 \Rightarrow /lib64/libm.so.6 (0x00007f110d493000)
        libc.so.6 => /lib64/libc.so.6 (0x00007f110d0ef000)
        libdl.so.2 => /lib64/libdl.so.2 (0x00007f110ceeb000)
        libGLX.so.0 \Rightarrow /usr/lib64/libGLX.so.0 (0x00007f110ccbb000)
        libGLdispatch.so.0 => /usr/lib64/libGLdispatch.so.0 (0x00007f110c9ec000)
        libxcb.so.1 \Rightarrow /usr/lib64/libxcb.so.1 (0x00007f110c7cc000)
        libstdc++.so.6 => /usr/lib64/libstdc++.so.6 (0x00007f110c443000)
        libgcc_s.so.1 \Rightarrow /lib64/libgcc_s.so.1 (0x00007f110c22b000)
        /1ib64/1d-1inux-x86-64.so.2 (0\overline{x}00000555797423000)
        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 \Rightarrow /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)
- Harware 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 16 0 0 None PXW

      0x138 24 dc
      0 32 0 r y
      . 8 8 8 8 . 4 24 8 16 16 16 16 16 0 0 None PXW

      0x139 24 tc
      0 24 0 r . . 8 8 8 8 0 . 4 24 8 16 16 16 16 16 0 0 None PXW

      0x13a 24 dc
      0 24 0 r . . 8 8 8 8 0 . 4 24 8 16 16 16 16 16 0 0 None PXW

      0x13b 24 tc
      0 32 0 r . . 8 8 8 8 0 . 4 24 8 16 16 16 16 16 0 0 None PXW

- Desktop Manager Environment installed:
        - output: /usr/share/xsessions/qnome-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.
```



20.3.2 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
    - Gucad hostname matched - YES
    - Gucad port matched - YES
- PBSPro
     - PBSPro is installed - NO
     - PBSPro is running - SKIPPING
     - PBSPro iworkq configured: SKIPPING
     - PBSPro 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 standalone.

```
- 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 configration is same: SKIPPING
- PBSPro
- PBSPro
- PBSPro is installed - NO
- PBSPro is running - SKIPPING
- PBSPro is running - SKIPPING
- PBSPro GPU Resource configured: SKIPPING
- PBSP GPU Resource configured: SKIPPING
- PAS
- PAS is installed - YES
```



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.

```
- quacd
     - Guacd is installed - NO
     - Guacd is running - SKIPPING
    - Guacd configuration - SKIPPING
- pbsaccess
     - PBSAccess is installed - NO
     - PBSAccess is running - SKIPPING
     - PBSAccess Remote Session guacd configration 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 is installed - NO
         - Guacd is running - SKIPPING
         - Guacd configuration - SKIPPING
         - PBSAccess is installed - NO
         - PBSAccess is running - SKIPPING
         - PBSAccess Remote Session guard configration is same: SKIPPING
     - PBSPro
         - PBSPro is installed - YES
         - PBSPro is running - NO
              - output: pbs server is not running
pbs_sched is not running
pbs comm is not running
         - PBSPro iworkq configured: SKIPPING
         - PBSPro 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 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 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 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 None PXW
         - Desktop Manager Environment installed:

    output: gnome-classic.desktop, gnome-custom-session.desktop,

gnome.desktop,
mate.desktop
```

20.3.3 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.

20.3.4 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 $\sqrt{\sqrt{\log(X)}}$ 0.10g 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/vglrun -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

20.3.5 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.



20.3.6 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
    Gucad hostname matched - YES
    Gucad 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:

b) Change the Remote Sessions Proxy Port Number to the <code>bind_host</code> and <code>bind_port</code> values.



20.3.7 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

20.3.8 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.

20.3.9 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.



- 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

20.3.10 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.



- 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
                              8 8 8 .
0x05d 24 tc 0 32 0 r
                            8
                                        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
                           8 8 8 8 . 0 0 0 0 0 0
                                                           0 0 None PXW
0x060 24 tc 0 32 0 r
                          8 8 8 8 . 0 0 0 16 16 16 16 0 0 Slow PXW
                      У
0x061 24 tc 0 32 0 r y
                          8 8 8 8 . 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 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: YESoutput: OpenGL version string: NVIDIA Corporation
```

It should not be Mesa or some other kind of graphics library software.

```
RemoteSession agent: GPU hardware is configured: YESoutput: 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 GLXFBConf																					
visual																					
id der cl	sp	sz 1	L			ro		_							_						typ
0x135 24 tc				r	у		8	8	8	0	4	24	8	16	16	16	16	0	0	None	
0x136 24 dc	0																			None	
0x137 24 tc	0 :	32	0	r	У		8	8	8	8	4	24	8	16	16	16	16	0	0	None	PXW
0x138 24 dc	0 :	32	0	r	У		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	У		8	8	8	0	4	24	0	16	16	16	16	0	0	None	PXW
0x13e 24 dc	0	24	0	r	У		8	8	8	0	4	24	0	16	16	16	16	0	0	None	PXW
0x13f 24 tc	0 :	32	0	r	у		8	8	8	8	4	24	0	16	16	16	16	0	0	None	PXW
0x140 24 dc	0 :	32	0	r	у		8	8	8	8	4	24	0	16	16	16	16	0	0	None	PXW
0v141 24 to	a ·	24	a	r			R	R	8	а	4	24	a	16	16	16	16	a	a	None	PYW

Figure 35: 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.

20.3.11 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.



20.3.12 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

20.3.13 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.

- 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



20.4 Troubleshoot Results Visualization Service

Troubleshooting information and steps for RVS.

The following section provides the information about troubleshooting information and steps for RVS.

20.4.1 Troubleshoot Checklist

A quick checklist of pre-requisites for 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 System Requirements.
 - =

Note: Turn off pop-up blockers to view the running job file auto-refresh loading message for all the supported web browsers.

- 2. For Linux OS, ensure HyperMath is working fine before running RVS.
 - a) Verify if the shared library is accessible by running HMathserv at: /opt/2017.2/altair/scriptsh/hmath.
 - b) Install "libXScrnSaver-1.2.2-6.1.el7.x86_64" package to resolve the shared library error: "error while loading shared libraries:libXss.so.1".
- **3.** Ensure HyperWorks is installed in a location where all the Access Web users have read and write permissions.
 - HyperWorks is recommended to install in the ${\tt Home}$ location, which enables read permission to all the Access Web users.
- **4.** 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.
- 5. To check if there any of the HMath processes that are running, use the command:

```
ps -ef | grep hmathserv
```

The list of HMath process ids is displayed.

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

kill -9 cprocess id>



20.4.2 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:

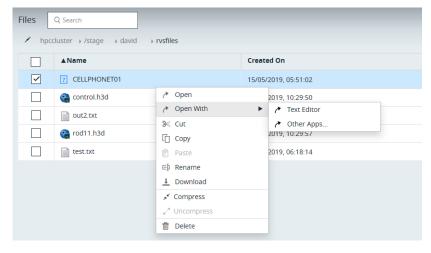
- RVS Options are Not Visible when a Result File is Right-Clicked
- · RVS Services are Down Message is Displayed

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.

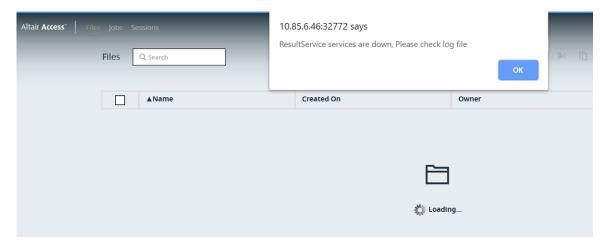


RVS Services are Down Message is Displayed

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/resultservicelog/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.

HyperMath License Error

Unable to post process the result files due to HWHyperMath license error.

Condition

HWHyperViewTrans licenses are not available in the license server.

Cause

I receive the following error while plotting a result file: License for HyperMath 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_EXEC/resultservice/scripts/setenv.sh.
- **3.** Use the Altair Hyperworks 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/licensing14.0.
- **6.** Verify the validity dates of HWHyperMath and HWHyperViewTrans licenses.

Cause

License for HyperMath is required indicates HWHyperMath feature is not available or insufficient licenses are available.

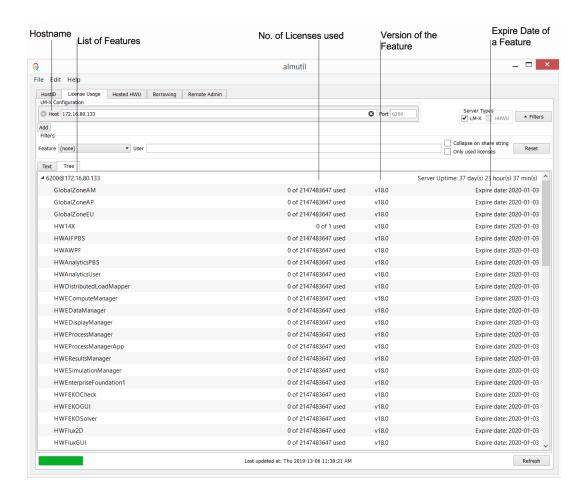
Remedy

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.
- 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.





If the error still persist even after the above checks, verify if there are any HWHyperMath process ids running. Kill the processs id and try again.

Remedy

Follow the given steps:

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

```
ps -ef | grep hmathserv
```

The list of HMath process ids is displayed.

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

```
kill -9 cess id>
```

HVTrans License Error

Unable to post process the result files due to HWHyperViewTrans license error.

Condition

HWHyperViewTrans licenses are not available in the license server.



I receive the following error while viewing an animation result file: License for HWHyperViewTrans 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_EXEC/resultservice/scripts/setenv.sh.
- **3.** Use the Altair Hyperworks 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/licensing14.0.
- **6.** Verify the validity dates of HWHyperMath and HWHyperViewTrans licenses.

Cause

License for HVTrans is required indicates HyperViewTrans feature is not available or insufficient licenses are available.

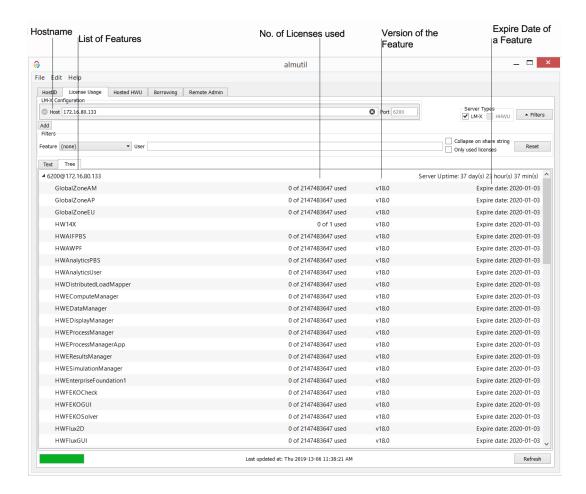
Remedy

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**.
- 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.





If the error still persist even after the above checks, verify if there are any HWHyperMath process ids running. Kill the running processes and try again.

Remedy

Follow the given steps:

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

```
ps -ef | grep hmathserv
```

The list of HMath 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.



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

I receive the following error while plotting a result file: Unable to extract TOC of a Result file.

Remedy

- **1.** Verify if the solver reader file type is activated.
- 2. To enable the solver reader file, navigate to HW_EXEC/hw/prefinc/ preferences common plot.mvw.
- **3.** Locate the following line of code:

```
*RegisterExternalColumnReader({external readers dir + "/hgtextcolumn.exe"})
```

4. Add the following line of code directly before the code referenced in the previous step to activate the solver reader:

```
*RegisterExternalReader({external_readers_dir + "/hg<solvername>.exe"}, "", "", ascii)
```

Cause

Insufficient permissions to read the result file.

Remedy

Ensure HyperWorks is installed in a location where all the Access Web users have read and write permissions.

• Hyperworks is 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 if the permissions.
 The image displays Access Web users having executable persmissions for the HyperWorks Desktop application.
 drwxr-xr-x. 5 root root 4096 May 6 10:27 hw2017.3

Cause

The reason could be HWHyperMath is not accessible.

Remedy

Verify if HyperMath is installed properly.

• Verify if HyperMath is accessible by running the HMathserv script at: /opt/2017.2/altair/scriptsh/hmath.



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

- 1. Download, "libXScrnSaver-1.2.2-6.1.el7.x86 64" package to resolve the shared library error.
- 2. Install libXScrnSaver rpm package using the following command: # yum install libXScrnSaver.



20.5 Logging

Information about defining PAS logging behavior and Log Files.

20.5.1 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 course-grained, and provide the default PAS logging.

To configure the level of logging, edit the server-log.xml file and set the <pri>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:

3. Update server-log.xml to get detailed troubleshooting information for the job status:



The following are examples of the type of messages that will be logged if debugging is enabled for the job status operation:

Table 3: 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>"</port>
After an EIFL web service API call to the EIFL server	"Success returning from eifl.waitExit(), port is <port>"</port>
For a job status request, before the web service API call to the EIFL server	"qstatJobs(): Success getting eifl server port <port>"</port>
After an EIFL web service API call to the EIFL server	"qstatJobs(): Success returning from eifl.waitExit(), port is <port>"</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>"</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:

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:

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:

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:

The following are examples of the type of messages that will be logged if debugging is enabled for this class:

Table 4: 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=""></job></job>
Once the job is submitted, PAS will record the job id.	"JobSubmit success. Job id: <jobid>"</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>
```

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:

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:

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:

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>
```

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:

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:

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:

4. Update the server-log.xml file to get details about the local file operation by adding the following XML:

5. Update the server-log.xml file to get details about the remote file operations by adding the following XML:

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:

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:

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:

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:

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:

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:

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:

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:

20.5.2 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

20.5.3 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/2019.4/_PAS Services_installation/Logs

The log files for the Apache Tomcat web server are located in: PBSWORKS_EXEC/pas/bin/pas-server/logs

