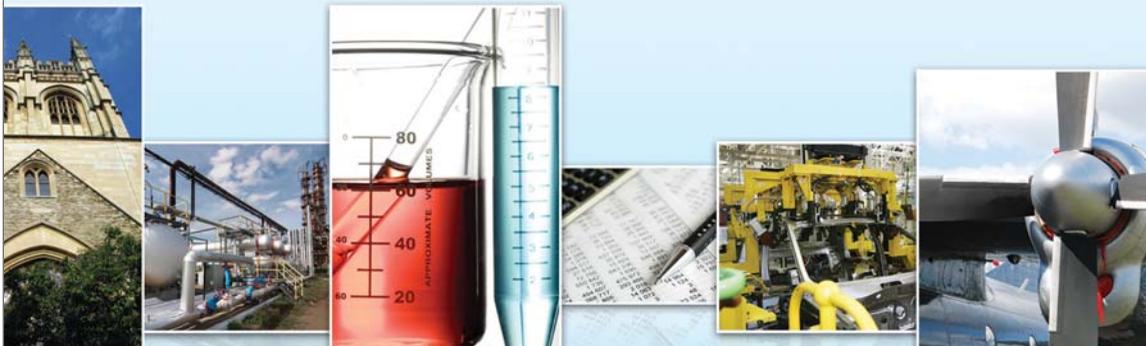


# PBS Analytics™ 13.0

## Release Notes



 Altair | PBS Works™

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## **PBS Analytics 13.0 Release Notes**

Updated: July 28, 2015.

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## Technical Support

Location	Telephone	e-mail
North America	+1 248 614 2425	pbssupport@altair.com
China	+86 (0)21 6117 1666	es@altair.com.cn
France	+33 (0)1 4133 0992	francesupport@altair.com
Germany	+49 (0)7031 6208 22	hwsupport@altair.de
India	+91 80 66 29 4500	pbs-support@india.altair.com
Italy	+39 800 905595	support@altairengineering.it
Japan	+81 3 5396 2881	pbs@altairjp.co.jp
Korea	+82 70 4050 9200	support@altair.co.kr
Scandinavia	+46 (0) 46 460 2828	support@altair.se
UK	+44 (0)1926 468 600	pbssupport@uk.altair.com

PBS Analytics	1
PBS Analytics Capabilities .....	1
PBS Analytics 13.0 Highlights.....	2
Installation Considerations .....	9
Migrating to PBSA 13.0.....	9
Resolved Issues .....	10
Known Issues .....	12

# PBS Analytics

Companies and institutions of all sizes use high performance computing to develop innovative new products and create entirely new markets. As a result, application workloads have become much larger and more complex than ever before. Comprehensive and robust analysis and visualization features are needed to help ensure limited computing resources are being used effectively and efficiently. As a core part of a PBS Works™ Suite solution, PBS Analytics turns oceans of data into insight, knowledge and intelligence.

Altair's PBS Analytics™ (PBSA) is an easy to use data analysis and visualization solution that provides PBS Works administrators with advanced job analyses to support data-driven planning and decision making. Easily extensible to meet your unique requirements, data from multiple PBS Professional servers can be aggregated into a common database.

## PBS Analytics Capabilities

- Flexible chart designer which provides added flexibility in creating clean, concise charts, including additional chart options (such as XYZ plots), to furnish a deeper understanding of the organization's HPC infrastructure and better root-cause analysis.
- Dashboards to visualize multiple charts within a single display.
- Slideshows to display key metrics to support staff (in the operations center) or as a show-piece (in the main lobby). Combine charts, dashboards, and even your own custom content into a continuous, looping display of the status of your HPC environment.
- Track hardware utilization, including accounting for configuration changes over time (i.e. adding/deleting nodes; downtime).
- Analyze job and workload historical usage data.
- Aggregate data from multiple PBS Professional servers.
- Drill-down to the underlying data and export this data to a Comma Separated Values (CSV) file.
- Fast, snappy and robust performance allowing analysis of big data quickly and easily leveraging a new, high-performance database and more robust data collectors.
- New utilization charts which analyze the utilization adjusted for configuration of the system, accounting for addition or deletion of nodes over time. Improves IT efficiency and justifies IT investments by illuminating actual usage and uncovering usage hot spots.
- Fully customizable with support for PBS Professional custom resources (software licenses, scratch space, etc.), and the ability to define custom metrics to meet unique requirements.

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## PBS Analytics 13.0 Highlights

Here's a quick look at the latest features available with PBSA13.0

### Improvements Lessen Installation and Configuration Time

The following improvements introduced with PBSA 13.0 make the installation quicker, and reduce the time necessary for post-installation configuration:

- During installation, the PBSA Service User automatically defaults to the user performing the installation, and the license server is automatically obtained from the Altair license path variable if present.
- The Data Collector copy time has been reduced from 5 minutes to 1 minute and the transportation time has been reduced from 10 minutes to 1 minute. Therefore, after installation there is no need for configuration of the Data Collectors.
- The Parser delay has been reduced from 30 minutes to 15 minutes. For most sites this time interval is suitable for transporting the accounting logs to the machine where the Parser is installed. In cases where the delay must be configured see section "Configuring the Parser" in the *PBS Analytics 13.0 Administrator's Guide*.

### Stability and Scalability

The following changes have been made to improve the stability and scalability of PBSA:

- The Parser runs as a separate leaner component. When problems arise, it is easier to restart the Parser without affecting other components.
- A reduced database schema size.
- The Mondrian server has been replaced with an optimized HPC domain aware query engine, improving query performance and database resource usage. It also improves chart building capabilities, such as sorting of x-axis values, selection of date range minimum and maximum values, and combining *Time-Advanced* Dimensions.
- The new query engine also reduces the dependency upon the node details and holiday files being tightly coupled with the product.
- Performance of parsing and caching improves linearly with an increase of cores.

### Upgrades to Latest JDK

PBSA 13.0 uses Java 8 enabling improved security.

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## Improvements to the Job Data Export Eliminates Manual Configuration

The PBSA 13.0 Web Application displays all relevant job data used to build a chart when a user clicks the **Job Data** button, or exports the job data to a comma separated values file. The systems administrator no longer needs to configure the values that will be displayed, therefore the “Configuring raw data fields” section has been removed from the *PBSA13.0 Administrator’s Guide*.

## Ability to Reset PBSA Including All Data Collectors

The `pbsa-data-reset` command now automatically resets all Data Collectors making the process for discarding parsed accounting log data straightforward and uncomplicated.

## Chart and Dashboards Sharing

A new category is available called “Shared”. PBSA users with special privileges can create, modify, and delete charts and dashboards within this category. All other users have viewing access to the charts and dashboards in the “Shared” category.

Charts and dashboards added to the “Shared” category are available to other users upon logging into PBSA, or by refreshing the browser’s cache (F5).

## Optional Node Configuration Improves Installation Process

Prior to PBSA 13.0, node configuration was necessary before the PBS Professional accounting logs could be parsed. Whenever a change was made to the node configuration, the previously parsed data had to be discarded and the accounting logs had to be reparsed.

With PBSA 13.0, node configuration is no longer necessary, making installation quick and easy. System administrators are able to install PBSA and then supply node information whenever they desire.

When PBS Professional node information is not supplied, the data displayed in the PBSA charts is confined to the cluster’s job activity (extracted from the PBS Professional accounting logs). Therefore, information such as how much memory and CPU is available and which nodes are down or unused is not available. Consequently, PBSA makes the following assumptions about these metrics:

- Availability = Used
- Downed nodes = 0
- Unused nodes = 0
- Percentage Utilization = 100%

Additionally, when node information is not supplied, the values for the PBSA Dimension *Server* are populated with the FQDN of the machines where the Data Collector is installed.

You may supply node information at any time and after the next Parser cycle completes, PBSA provides actual values for the above metrics, producing richer, more meaningful charts. The following table describes how the absence of node detail information will affect the default PBSA charts:

**Table 1-1: Absence of node information and its affect on PBSA charts**

Chart Name	Effect of the Absence of Node Information
Jobs Count By Day	No change to chart.
Jobs by Software by Group	No change to chart.
Jobs by Software by Node	Nodes having no job activity will not be represented in this chart.
Requested Vs Used Memory by Software	No change to chart.
Node Walltime by Group – Non Prime Time	Node CPU availability is not known, therefore the percentage of node walltime used by a group will not take into account unused or underused CPU resources.
Node Walltime by Group – Prime Time	Node CPU availability is not known, therefore the percentage of node walltime used by a group will not take into account unused or underused CPU resources.
Unused Node Capacity by Node	Node CPU availability is not known, therefore unused node capacity cannot be determined. It is assumed that all nodes were 100% utilized, thus unused node walltime is zero. Additionally, nodes having no job activity will not be represented in this chart.
Unused Node Capacity by Quarter	Node CPU availability is not known, therefore unused node capacity cannot be determined. It is assumed that all nodes were 100% utilized, thus unused node walltime is zero.
Used Vs Unused Node Cycle	Node CPU availability is not known, therefore unused node capacity cannot be determined. It is assumed that all nodes were 100% utilized, thus unused node walltime is zero. Additionally, nodes having no job activity will not be represented in this chart.

**Table 1-1: Absence of node information and its affect on PBSA charts**

Chart Name	Effect of the Absence of Node Information
Jobs By Exit Status	No change to chart.
Successful Vs Unsuccessful Jobs by Node	Node information is not available, therefore the chart will only display information about nodes where there was job activity. Nodes having no job activity will not be represented in this chart.
Successful Vs Unsuccessful Jobs by Software	No change to chart.
User Job Efficiency and Productivity	No change to chart.
Wait Time by Software by User	No change to chart.
Wait Time VS Overall Time by Software	No change to chart.
Daily Percentage Core Utilization	Node CPU availability is not known, therefore unused core utilization cannot be determined. This chart will either show 100% utilization on days where there is job activity, or will show 0% utilization on days where there is no job activity.
Daily Resource Usage	Node CPU availability is not known, therefore unused core utilization cannot be determined. It is assumed that all nodes were 100% utilized, thus unused cores is zero.
Queued Vs Running Memory by Software	No change to chart.
Running Cores Vs Queued Cores by Queue	No change to chart.
Running cores vs. Queued cores	Node CPU availability is not known, therefore it is assumed that available cores is equal to used cores.

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**Table 1-1: Absence of node information and its affect on PBSA charts**

Chart Name	Effect of the Absence of Node Information
Weekly Percentage Core Utilization	Node CPU availability is not known, therefore unused core utilization cannot be determined. This chart will either show 100% utilization during weeks where there is job activity, or will show 0% utilization during weeks where there is no job activity.

### **Reparsing Not Required for Holiday, Prime, and Non-Prime Time Changes**

With previous versions of PBSA, configuration of the following site specific information was optional, and PBSA provided defaults for:

- holidays
- prime time hours
- non-prime time hours

However, once the PBS Professional accounting logs were parsed, changes to this information meant having to discard the PBSA data and reparse all accounting logs. Similar to the node configuration, PBSA 13.0 now allows this information to be changed at any time and the PBSA charts will reflect those changes after the next Parser cycle completed.

For more information about the configuration conditions that require reparsing of the PBS Professional accounting logs see “Configuration changes after initial parsing” in the *PBS Analytics 13.0 Administrator’s Guide* .

### **Revamped Custom Resource Hook**

The custom resource configuration file has been converted to an XML format making the custom resource definition less error prone. The file is now located at:

```
INSTALL_DIR_13.0/portal/binaries/parser/hooks
```

Additionally, the process for adding a custom resource to PBSA has been simplified, and error handling and logging has improved. For more information see the chapter “PBSA Hooks” in the *PBS Analytics 13.0 Administrator’s Guide* .

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## Improved Logging

Improved logging of error messages, including the reasons for discarding a job while parsing the PBS Professional accounting logs. The section “PBSA Log File Messages” in the *PBS Analytics 13.0 Administrator’s Guide* provides a list of messages with a description and any required action.

Events and errors that occur while parsing the node detail and holiday configuration files are now written to the PBS Works log file (`pbsworks.log`).

## Database Schema Changes Improve Parsing and Caching Times

Changes to the PBSA database schema have improved the time required to parse and cache the PBS Professional account log data. Due to these improvements, the custom query file is no longer required to cache additional queries, and the “Creating custom queries” section has been removed from the *PBSA 13.0 Administrator’s Guide*.

## Improved Job Counting

PBSA 12.4 displayed job count against states (finished and running) based on the state of the job as of now (when the chart was generated). Based on customer feedback, improvements have been made to the way in which PBSA counts jobs. PBSA 13.0 displays job counts against states per a particular day.

The following tables describes the differences between PBSA 12.4 and 13.0:

**Table 1-2: Counting Jobs Comparison between PBSA 12.4 and 13.0**

Job	Jan 1	Jan 2	Jan 3	Jan 4	Jan 5
1					
2					
3					
4					
5					
PBSA 12.4	3 Finished	4 Finished	4 Finished	3 Finished	2 Finished
PBSA 13.0	3 Running 1 Finished	4 Running	4 Running 1 Finished	3 Running 1 Finished	2 Running 2 Finished

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## **Security Bugs Fixed**

The Poodle, Freak, and Logjam https security bugs are fixed.

## **New Parsing and Caching Progress Indicator Screen**

The Web Application has a new Progress Indicator Screen to visualize the progression of the parsing and caching process.

## **Unused Reporting Improvements**

Based on customer feedback, changes have been made to PBSA so that unused resources are not reported by default. PBSA users have the ability to report upon unused usage by adding the Resource State -> Unused filter to a chart.

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## Installation Considerations

An LM-X license server version 12.0.3 or above is required to provide licensing services for PBS Analytics 13.0.

### Migrating to PBSA 13.0

#### Migrating versions of PBSA prior to 12.3.x to 13.0

Due to major changes to chart definitions introduced in PBSA 12.4, user charts, dashboards, and slideshows created with versions of PBSA prior to 12.3.x cannot be preserved and used by PBSA 13.0. They must be recreated once PBSA 13.0 is installed.

For more information see the “Migrating to PBSA 13.0” chapter of the *PBS Analytics 13.0 Administrator’s Guide*.

#### Migrating PBSA version 12.3.x and 12.4.x

Migrating involves installing PBSA 13.0 on the same machine as PBSA 12.3.x or PBSA 12.4.x, and then running a migration tool installed with PBSA 13.0.

For more information see the “Migrating to PBSA 13.0” chapter of the *PBS Analytics 13.0 Administrator’s Guide*.

## Resolved Issues

Spectrum Id	Summary	Resolution
300554	For sites with multiple PBS complexes, the previous year's accounting log data is missing (not parsed) when accounting log data from different PBS complexes is parsed in separate parsing cycles.	This issue is fixed. For information about adding a new PBS complex to PBSA when a site has already parsed PBS Professional accounting log files see Chapter 13 "Adding a PBS Complex" of the <i>PBS Analytics 13.0 Administrator's Guide</i>
331523	Wait time is not getting calculated for jobs that are not finished.	Wait time is now calculated for running jobs and finished jobs.
331525	"Hide Empty Value" option does not hide zero values.	With PBSA 12.4, the "Hide Empty Value" option hid null values, but did not hide zero values. With PBSA 13.0, both null and zero values are hidden.
331527	Unused walltime is not getting displayed if there is no activity in the cluster.	This issue is fixed. When there is no activity on a node, the node and associated walltime are displayed as unused.
331531	After adding a node to the node details configuration file, the number of unused cores is two times more than available cores.	This issue is fixed.
331532	The calculation for Total Walltime Used does not take into consideration running jobs, where as Total CPU Walltime is calculated for both finished and running jobs.	Walltime used is now calculated for both running and finished jobs.

Spectrum Id	Summary	Resolution
331533	The Jobs by Exit Status chart shows the wrong count for running jobs. This default chart inaccurately displays job counts for jobs which run over several days.	This issue is fixed.
333857	The Unused Cores and Memory is greater than Available Cores and Memory.	This issue is fixed.
334137	Exporting a chart as a PDF or an image is not working when SSL is enabled.	This issue is fixed.
334138	The PBSA webhelp is missing topics for exporting a chart as an image and as a PDF.	Webhelp topics are available for exporting a chart as an image and as a PDF.

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## Known Issues

**Table 1-3:**

Spectrum Id	Summary	Description	Workaround
296171	Installer will not allow the data collector to be installed when the PBSA web application and parser have already been installed on the machine.	If the PBSA web application and parser have been installed on a machine, the data collector cannot be installed on that same machine in a separate installation process.	Install the PBSA web application, parser, and data collector as part of a single installation process. See sections “Deployment Option One” and “Installing on a single server” in the <i>PBS Analytics Administrator’s Guide</i> .
296175	The Values chart filter attribute “Hide Empty Values” is only applied for charts that are two dimensional.	When a chart filter is applied to a Values, the ability to hide empty values (equal to 0) is disabled for charts that are three dimensional.	There is no workaround at the present time.
296176	Print preview is not working for a chart type of “Table” when too many data points are displayed in the chart.	An empty page is displayed in Print Preview when there are too many data points in a chart for a chart type of “Table”.	Export the data to a Comma Separated Values (CSV) file and open it using your favorite spreadsheet tool.

**Table 1-3:**

<b>Spectrum Id</b>	<b>Summary</b>	<b>Description</b>	<b>Workaround</b>
296409	It is difficult to view charts when there are many chart legends attached to the chart.	Charts are being squeezed into a relatively small viewing area when there are too many chart legends.	Enable the “Hide Legends” chart property to eliminate chart legends. Once this chart property is applied to the chart, the chart will be rendered in a larger viewing area.
296178	Security Enhanced Linux (SELinux) should be disabled as it is not supported by PBSA 12.x.	PBSA 12.x does not support SELinux. You may experience some unpredictable behavior when SELinux is enabled.	SELinux can be disabled by changing parameters in the file: <pre>/etc/selinux/config.</pre> This file controls the state of SELinux. To disable SELinux: Edit <code>/etc/selinux/config</code> . Change the following parameters: SELINUX=disabled SELINUXTYPE=targeted Restart PBSA.  Check the status of SELinux using the command: <pre>sestatus</pre> You should see: SELinux status: disabled

**Table 1-3:**

<b>Spectrum Id</b>	<b>Summary</b>	<b>Description</b>	<b>Workaround</b>
311236	Parser discards PBS Professional accounting log records that are either corrupted, or have insufficient information.	<p>PBSA will not parse the following types of job records. These records will be written to the parser unsupported directory:</p> <ul style="list-style-type: none"><li>• E or R record with resources_used.mem attribute either missing or a value of 0</li><li>• any record with the exec_host attribute missing</li><li>• a job array main record</li><li>• any record with the user or group information missing</li><li>• any record with the start epoch attribute either missing or a value of 0</li><li>• any record with the qtime epoch attribute either missing or a value of 0</li><li>• E or R record with the end epoch attribute either missing or a value of 0</li><li>• E or R record with the resources_used.walltime attribute missing: Walltime will be calculated as “end – start”</li><li>• E or R record with a negative or very large walltime value: Walltime will be calculated as “end – start”</li></ul>	<p>A message will be written to the parser.log file describing the reason for discarding the record.</p> <p>Due to a dependency upon PBS Professional, these records will not be parsed until PBS Professional makes the necessary changes to the accounting log records.</p>

**Table 1-3:**

<b>Spectrum Id</b>	<b>Summary</b>	<b>Description</b>	<b>Workaround</b>
331524	Moving dimension from Z-Axis to X-axis and vice versa is broken in 12.4.	Dimensions cannot be moved to and from the X-axis to the Z-axis using drag and drop with PBSA 12.4. This behavior has been available with previous versions of PBSA.	Delete the dimension from the X or Z axis, and drag the dimension from the Dimension list to the appropriate axis.
331528	The number of available nodes and available CPUs are the same in the UI.	PBSA will display the number of cores when a user plots a chart for the available number of nodes.	There is no workaround available. A fix is scheduled for an upcoming release of PBSA.
331534	Reports are not rendered as expected when a single user runs the slideshow from four different browsers.	Open four different browsers. Login to PBSA using each browser and then run the same slideshow. The chart is not rendered as expected.	Login as a different user for each slide show.
329263	The chart Running Cores vs. Queued Cores by Week shows a dip in the available cores at the end of the year.	This issue is due to the end of the year falling on a weekday. The beginning date of every week is considered to be Sunday and ends on Saturday.	There is no workaround available. A fix is scheduled for an upcoming release of PBSA.

**Table 1-3:**

<b>Spectrum Id</b>	<b>Summary</b>	<b>Description</b>	<b>Workaround</b>
329266	The <code>pbsa-config-nodes</code> and <code>pbsa-setup-counsellor</code> scripts mistakenly report a node as down.	Nodes are incorrectly identified as down or offline by the scripts <code>pbsa-config-nodes</code> and <code>pbsa-setup-counsellor</code> , because the word “down” or “offline” in the comment of the <code>pbsnodes -av</code> output is misinterpreted.	There is no workaround available. A fix is scheduled for an upcoming release of PBSA.
332009	When a chart is exported to a PDF, it shows black boxes rather than letters and numbers on my system.	When a chart is exported to a PDF, all the letters and number are displayed as black boxes because fonts are not installed on the machine where PBSA is installed.	Install the Core Fonts for X.Org package <code>xorg-x11-fonts-core</code> for SLES platforms.
333854	The Total Available Cores is not equal to the summation of Used Cores and Unused Cores.	This issue occurs when the PBS Professional accounting log data does not match the node information present in the node details configuration file.	This is a corner case and there is no workaround for this issue.
333865	When a chart is dragged and released in the same category using IE9, the chart is not being released by the mouse.	This is an event handling issue specific to IE9.	There is no workaround available. A fix is scheduled for an upcoming release of PBSA.

**Table 1-3:**

Spectrum Id	Summary	Description	Workaround
351565	A time zone difference between the PBSA server and the PBS Professional server causes inaccurate running job counts.	Workload style charts are displaying an incorrect number of running jobs when the time zone of the PBSA server is later than the PBS Professional server time zone.	<p>Edit the file  <code>INSTALL_DIR_13.0/services/pbsa/parser/modules/pbsdata/config/config.xml</code>.</p> <p>Change the value of the “maximum duration of a job in days” parameter from 30 to 0.</p> <pre>&lt;MaxDurationOfJobinDays&gt;   &lt;Config name="DURATION" value="0" /&gt; &lt;/MaxDurationOfJobinDays&gt;</pre>
351568	During testing, parsing intermittently stopped after running 90+ consecutive days with database errors logged in the parser.log file.	<p>This issue causes the web application’s Progress Indicator Screen to remain in a suspended state, making the web application inaccessible.</p> <p>The error logged has the following format:</p> <p>Unable to create XXXX table</p> <p>For example:</p> <p>Unable to create rc_event_resource_occupancy table</p>	<p>PBSA has an internal health check component which should be able to recover the product from this situation within 24 hours.</p> <p>In case this health check fails to recover the system, then a PBSA data reset is required. The data reset will trigger the recreation of the database and will reparse the accounting logs. All of the user created reports will be retained.</p>

**Table 1-3:**

Spectrum Id	Summary	Description	Workaround
351569	The PBSA 13.0 Migration Tool does not migrate PBSA 12.3 charts having the Time-Holiday Dimension assigned as a chart filter, or to the x-axis, or z-axis.	When this issue occurs the following message is written to the <code>pbsworks.log</code> file: “Error occurred while loading the Chart.Details:- Record Not Found in Cube Tree id: [Day Dimension.Holiday Hierarchy]”.	Navigate to the following directory: <code>INSTALL_DIR_13.0/services/pbsa/repository</code> Execute the command: <code>find ./ -type f -exec sed -i -e 's/Day Dimension.Holiday Hierarchy/Holiday Dimension.Holiday Hierarchy/g' {} \;</code>
351576	Intermittently during installation of PBSA, the database does not get created.	A message similar to the following is displayed in the log file when the database is not created “Database has not been created”.	Uninstall PBSA and re-install the product. For more information about uninstalling PBSA, see the <i>PBSA 13.0 Administrator's Guide</i> .

**Table 1-3:**

<b>Spectrum Id</b>	<b>Summary</b>	<b>Description</b>	<b>Workaround</b>
351585	The projected end time of running jobs in PBSA 13.0 is estimated differently then PBSA 12.4.	<p>The lowest level of granularity of time for PBSA is a day. Therefore, PBSA does not have real time information for running jobs. PBSA calculates the projected end time of a running job differently between 12.4 and 13.0.</p> <p>For example,</p> <p>The Parser cycle begins at 1 AM.</p> <p>Walltime for a running job is calculated as follows:</p> <p>PBSA 12.4 assumes the job ran between midnight and 1 AM:</p> <p>Walltime = 1hr</p> <p>PBSA 13.0 assumes the job ran the whole day:</p> <p>Walltime = 24 hrs</p>	<p>No workaround.</p> <p>The calculation for running jobs will be accurate once the real-time monitoring feature is implemented in a future release.</p>