

Installing Platform Product Suite for SAS™ (Unix)

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Introduction

This document describes how to install the software required to run the **Platform Product Suite for SAS™** software (“Product Suite for SAS”) with the SAS Management Console® software on UNIX hosts. The Product Suite for SAS software includes the **Process Manager™ Server and Client**, and the **Platform LSF®** software (“LSF”). Each of these components is required to run jobs using the Product Suite for SAS. A separate document describes how to install **Platform Grid Management Service™**.

The Process Manager Server controls the submission of jobs to LSF, managing any dependencies between the jobs.

LSF dispatches all jobs submitted to it by the Process Manager Server, and returns the status of each jobs to the Process Manager Server. LSF also manages any resource requirements and performs load balancing within the compute cluster.

The Process Manager Client allows you to monitor your workload as it runs.

You can install all of the components on a single host, or you can install the Process Manager Server and LSF on separate hosts. This document describes how to install all components on a single host.

For an overview of the Process Manager components, see the introductory chapter in *Administering Process Manager*.

Assumptions

The following instructions assume that:

- ◆ You will install LSF and the Process Manager Server and Client on a single UNIX host. This host will act as the central point of control for a cluster of LSF hosts that actually run the jobs.
- ◆ You are creating an LSF cluster composed of only UNIX hosts. There will be no Windows hosts in your cluster.

Technical Support

Should you encounter problems or have questions regarding the use of LSF and scheduling jobs from SAS Management Console, please contact SAS directly. You can use one of the following methods to contact the SAS Technical Support staff.

- 1 Online problem/question submission:
http://support.sas.com/techsup/contact/track_intro.html
Choose SAS Management Console as the 'Product' value.
- 2 E-mail problem/question submission via EMITS facility:
<http://support.sas.com/techsup/contact/emits.html>
Choose SAS Management Console as the 'Product' value.
- 3 Telephone Support Information for North America:
http://support.sas.com/techsup/contact/telephone_support.html

- 4 If you are not based in North America, use the links in the following URL for information on how to contact other SAS Technical Support offices around the world:

<http://support.sas.com/techsup/contact/index.html>

While any SAS software user may contact Technical Support, priority is given to designated SAS support personnel at your site. (Note, you can use web-based forms to find out who the SAS support personnel are at your site or re-designate SAS support personnel at your site using links from this URL:

<http://support.sas.com/techsup/contact/index.html>

Supported Versions and Requirements

Versions

SAS Management Console version

SAS 9.2

LSF version LSF version 6.2

Process Manager Server requirements

It is recommended that you install the Process Manager Server software on a dedicated machine.

The Process Manager Server software must be installed on an LSF server host, but it is recommended that it not be an LSF master host.

J2RE 1.4 (Java Runtime Environment) is installed with the Process Manager Server.

The Process Manager Server requires the following:

- ◆ Approximately 135 MB free disk space for installation, and an additional 2 KB per job to handle jobs running simultaneously
- ◆ 256 MB RAM for processing purposes

Installation Directories

Caution Do not install Process Manager and LSF to the same directory.

The Process Manager and LSF installation produces the following directory structure:

- ◆ Machine-independent files are independent of the host type, and are shared by all host types (man pages, configuration files, include files, examples, etc.)
- ◆ JS_TOP is the directory in which the Process Manager Server and Client files are installed. For example:

```
/usr/local/pm
```

- ◆ LSF_TOP is the directory in which LSF files are installed. For example:

```
/usr/local/lsf
```

Generally, LSF_TOP is mounted from a file server and all files associated with LSF (state files, binaries for the different architectures, configuration files) are stored in this file share.

- ◆ Machine-dependent files are installed under LSF_TOP/6.2/*platform_name*. These directories and the files underneath represent the machine-dependent files. Machine-dependent files are specific to a particular host type and are the LSF command binaries, server daemons, libraries, and utilities.

Pre-Installation Requirements

- ❑ License files provided to you by SAS, which license both LSF and the Process Manager Server.
- ❑ A shared file system for the hosts. The shared file system needs to be writable by `root` during the installation. See “[Determine Hosts on which to Install LSF](#)” on page 8 for details on share management.
- ❑ The installation must be performed as root. This includes the distribution installation as well as the host setup steps. The root account must be able to write into the file system mounted at `LSF_TOP`.
- ❑ During installation, you will be required to provide an LSF primary administrator account. You can use an existing user account, or you can create a new account. The default is `lsfadmin`.

This account must:

- ❖ Exist on all hosts in the LSF cluster
- ❖ Have the same UID (user id) on each host in the cluster

Create a dedicated primary LSF administrator account to allow more than one person to modify the configuration files. Assigning an individual user account as the LSF administrator prevents anyone else from modifying the configuration.

Caution Do not configure the root account as the primary LSF administrator.

Determine Hosts on which to Install LSF

There are two scenarios for installing LSF. Pick the one that best suits your environment.

Install LSF locally on one host

Install LSF locally on one host and run LSF only on one host. If this is how you plan to install LSF, there is no need to export or mount a file system. LSF can be installed in a local directory such as `/usr/local/lsf`.

Proceed to “[Install the Platform Process Manager Software](#)” on page 10.

Install LSF on a file server

The file server that you select to install LSF can be:

- ◆ A host in the LSF cluster that shares its distribution through NFS
For example, there are two hosts in the cluster, hostA and hostB.
 - ❖ On hostA, the directory `/usr/local/lsf` is shared by exporting.
 - ❖ On hostB, `/usr/local/lsf` is mounted from `hostA:/usr/local/lsf`.
- ◆ A dedicated server that is not part of the LSF cluster, and is used to store files. This configuration is used for larger clusters of 10 or more hosts, or if you want the added reliability and availability of a dedicated file server.

For instructions on preparing the shares, proceed to “[Prepare Shares to Install LSF on a File Server](#)” on page 9.

Prepare Shares to Install LSF on a File Server

Prerequisites for creating shares

Regardless of whether you install on one host and share the distribution or whether you install on a dedicated server, the share must be set up so that root can write to the file system from the client. This is controlled with the `root` option of the Solaris `share` command, or the `exportfs` command in other UNIX platforms such as HP-UX.

Create and share the LSF directories on the file server

- 1 Log on to the file server host as `root`.
- 2 Create the share:
 - Solaris
 - a Edit the `/etc/dfs/dfstab` file and add the line:
`share -F nfs -o rw,root=client1:client2 -d "LSF share" /export/lsf`
 - b Run the command `shareall`.
 - Other UNIX platforms:
 - a Edit the `/etc/exports` file and add the line:
`/export/lsf -root=client1:client2`
 - b If the host has not shared a file system before, you may need to start the NFS service using a script in `/etc/init.d`, `/sbin/init.d`.
 - c Run the command:
`exportfs /export/lsf`
- 3 Make sure the NFS service is started and that NFS will start at boot.
 On many systems it is possible to share a file system but that will not automatically start NFS.

Mount directories on LSF hosts

Repeat the following steps on each LSF host.

- 1 Log on as root to an LSF host that will be running LSF jobs.
- 2 Edit the `/etc/fstab` file (`/etc/vfstab` on Solaris) and add an entry such as:
`fileserver:/export/lsf /usr/local/lsf nfs hard,bg,intr 0 0`
 Refer to your local man pages for `fstab` and `mount` to see the local format. The options 'hard,bg,intr' are recommended but not mandatory.
- 3 Make sure the `/usr/local/lsf` directory exists on the host.
- 4 Mount the directory. Run the command:
`mount /usr/local/lsf`

Where to go next [“Install the Platform Process Manager Software”](#) on page 10

Install the Platform Process Manager Software

The following instructions assume you are installing both LSF and Process Manager together on the same UNIX host.

- 1 “Prepare the license file” on page 10
- 2 “Prepare distribution files” on page 10
- 3 “Edit install.config” on page 10
- 4 “Run the install script” on page 15
- 5 “Set up server hosts with hostsetup” on page 15

Caution Do not install Process Manager and LSF to the same directory.

Prepare the license file

Use the license files obtained from SAS and copy the contents into a file where both LSF and Process Manager can access their license information. For example, in a location available to both, create a file called `license.dat`.

Prepare distribution files

The Process Manager distribution files are located on a CD labeled **Platform Product Suite for SAS (for UNIX)** in the root directory.

- 1 Log in as `root` to one of the hosts that will be running LSF jobs.
- 2 Mount the **Platform Product Suite for SAS** CD. For example: on `/mnt/cdrom`.
- 3 If the SAS Software Navigator was used to extract the package, then you have a directory containing the installation files. For example, for AIX, the directory is called `pm3.1_sas_aix5.tar/pm3.1_sas_pinstall`. This directory contains the following:
 - ❖ `install.config`—the configuration file where you define your installation prior to installing
 - ❖ `jsinstall`—the install script for installing both LSF and the Process Manager Server and Client

Otherwise, locate the package for your operating system and unpack it. For example, for AIX, you need the following file:

```
pm3.1_sas_aix5.tar
```

Extract the file as follows:

```
tar xvf pm3.1_sas_aix5.tar
```

This creates a directory called `pm3.1_sas_pinstall`, containing the following:

- ❖ `install.config`—the configuration file where you define your installation prior to installing
- ❖ `jsinstall`—the install script for installing both LSF and the Process Manager Server and Client

Edit install.config

- 1 Change to the `pm3.1_sas_pinstall` directory:


```
cd pm3.1_sas_pinstall
```

- 2 As an administrator, edit `pm3.1_sas_pinstall/install.config` to define your configuration.
- Note that there are two other `install.config` files in subdirectories. The `install.config` file you edit is directly under `pm3.1_sas_pinstall`.
- Remove the comment symbol (`#`) and set values for the following parameters:
- a `JS_TOP`
Specify the full path to the Process Manager server host. For example:
`JS_TOP=/usr/share/pm`
 - b `JS_HOST`
Specify the fully-qualified host name of the Process Manager Server host. For example:
`JS_HOST=hostB.platform.com`
 - c `JS_PORT=1966`
Use the default port number, 1966.
Ensure that you change this value if another process is already using the port.
For example:
`JS_PORT=1234`
 - d `JS_ADMINS`
Specify the user name of the primary LSF administrator. For example:
`JS_ADMINS=lsfadmin`
 - e `JS_LICENSE`
Specify the full path and name of the license file. For example:
`JS_LICENSE=/usr/share/lsf/6.2/cluster1/license.dat`
 - f `JS_MAILHOST`
Specify the name of the mail server host if you want to receive emails from LSF. The default is *localhostname*. For example:
`JS_MAILHOST=[SMTP|Exchange:]hostname`
 - g `LSF_INSTALL`
Specify `LSF_INSTALL=true` (case sensitive) to install both LSF and Process Manager. (If LSF is already installed, specify `LSF_INSTALL=false` and specify `LSF_ENVDIR`.)
 - h `LSF_TOP`
Specify the full path to the top-level LSF installation directory in the following format:
`LSF_TOP="/path"`
where *path* must be shared and accessible to all hosts in the cluster. This cannot be the root directory (`/`).
 - i `LSF_CLUSTER_NAME`
Specify a name for the LSF cluster to be created. Specify up to 39 characters, no spaces. Do not use an LSF host name. For example:
`LSF_CLUSTER_NAME="pm_cluster"`
 - j `ENABLE_HPC_INST`

Enable LSF HPC installation and add the Platform_HPC license keyword to the PRODUCTS line of `lsf.cluster.cluster_name` if it is not already there. By default, LSF HPC is not configured.

```
ENABLE_HPC_INST=Y
```

k LSF_ADD_SERVERS

List LSF server hosts to be added to the cluster.

Specify a list of host names two ways:

- ◇ Host names separated by spaces
- ◇ Name of a file containing a list of host names, one host per line. For example:

```
LSF_ADD_SERVERS=:lsf_server_hosts
```

```
hosta
```

```
hostb
```

```
hostc
```

```
hostd
```

The first host listed is the LSF master host.

3 Save `install.config`.

Using 64-bit Hardware in 32-bit Kernel Mode on an AIX5 Platform

If a host has 64-bit hardware but runs in 32-bit kernel mode, you must install and enable the `bos.64bit` fileset.

You must also make modifications to LSF. See “[Modifying LSF environment for AIX5](#)” on page 16.

Installing Library Patch Upgrade for Solaris 2.7 64-bit Machine

If you are running Process Manager on a Solaris 2.7 64-bit machine, you need to ensure that you have the latest shared library patch for C++ from Sun Microsystems.

- 1 Navigate to Sun Microsystem's patch access.
- 2 Search for patch 106327-23 and download it. (This patch is dependent on 106950-13 or greater.)
- 3 Unzip files to a temporary directory and apply the patch.

Run the install script

- 1 As `root`, run the install script as follows:

```
./jsinstall -f install.config
```

 This installs LSF and then Process Manager. A directory is created for each component and an `install.log` file is created in each directory. All the events of the installation are logged here.
- 2 Review the license agreement. When asked if you purchased LSF, respond accordingly.
- 3 Accept the terms and conditions of the agreement by specifying **y**.
- 4 When prompted, select the LSF component for the current operating system, and press **Enter**. The software performs a pre-installation check, prior to installing LSF.
- 5 When prompted, select the Process Manager Server and Client for the current operating system, and press **Enter**. A message tells you when installation is successful.

Set up server hosts with `hostsetup`

You now need to set up LSF hosts. Repeat the following steps on each LSF host on which jobs will run. Start with the LSF master host.

- 1 Log on as `root`.
- 2 Run `hostsetup` and configure the daemons to start automatically at boot. From `/usr/local/lsf/6.2/install`:

```
./hostsetup --top="/usr/local/lsf" --boot="y"
```

```
-----
```

```
  L S F    H O S T S E T U P    U T I L I T Y
```

```
-----
```

This script sets up local host (LSF server or client) environment.
 Setting up LSF server host "curie" ...
 Checking LSF installation for host "hostB" ... Done
 LSF service ports are defined in
 /usr/local/lsf/conf/lsf.conf.
 Checking LSF service ports definition on host "curie" ...
 Done
 ... Setting up LSF server host "hostB" is done
 ... LSF host setup is done.

Where to go next “[Start Up LSF](#)” on page 16

Start Up LSF

Set up the LSF environment (cshrc.lsf and profile.lsf)

Before using LSF, you must set up the LSF execution environment.

After logging on to an LSF host as an administrator, use one of the following shell environment files to set your LSF environment:

- ◆ For example, in `csh` or `tcsh`:
`source LSF_TOP/conf/cshrc.lsf`
- ◆ For example, in `sh`, `ksh`, or `bash`:
`. LSF_TOP/conf/profile.lsf`

These two files are created by `lsfinstall` to set `LSF_ENVDIR` and update the `PATH` environment variables.

Modifying LSF environment for AIX5

If you have a host with 64-bit hardware running in 32-bit kernel mode, you must modify `cshrc.lsf` and `profile.lsf`.

In `cshrc.lsf`:

Change

```
if ( "$_shlap64" != "0" ) then
  set BINARY_TYPE="aix5-64"
else
  set BINARY_TYPE="aix5-32"
endif
```

to

```
if ( "$_shlap64" != "0" ) then
  set BINARY_TYPE="aix5-64"
else
  set BINARY_TYPE="aix5-64"
endif
```

In `profile.lsf`:

Change

```
if [ `ps -e -o "comm" |grep shlap64` ]; then
  BINARY_TYPE="aix5-64"
else
  BINARY_TYPE="aix5-32"
fi
```

to

```
if [ `ps -e -o "comm" |grep shlap64` ]; then
  BINARY_TYPE="aix5-64"
else
  BINARY_TYPE="aix5-64"
fi
```

Start LSF

Use `lsadmin` and `badmin` to start LSF:

- 1 Log on as `root` to each LSF server host.
Start with the LSF master host, and repeat these steps on all LSF hosts.

- 2 Use the following commands to start the LSF cluster:

```
lsadmin limstartup
```

```
lsadmin resstartup
```

```
badmin hstartup
```

Before using any LSF commands, wait a few minutes for all the LIMs to do the following:

- ◆ Contact each other
- ◆ Select a master host
- ◆ Exchange initialization information

Where to go next [“Check LSF Status”](#) on page 18

Check LSF Status

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 - ◆ “Check cluster configuration (lsadmin)” on page 18
 - ◆ “Find out Cluster Status (lsid and lsload)” on page 19
 - ◆ “Check LSF Batch configuration (badmin)” on page 20
 - ◆ “Find out LSF Batch system status (bhosts and bqueues)” on page 20

Example command output

The LSF commands shown in this section show examples of typical output. The output you see will differ according to your local configuration.

The commands are described briefly so that you can easily use them as a “sanity check” for your LSF installation. See the *LSF Reference* for complete usage and command options. You can use these commands on any LSF host. If you get proper output from these commands, your cluster is ready to use. If your output from the commands discussed in this section has errors, see the *LSF Reference* for help.

Check cluster configuration (lsadmin)

lsadmin ckconfig -v The `lsadmin` command controls the operation of an LSF cluster and administers the LSF daemons, `lim` and `res`. Use the `lsadmin ckconfig` command to check the LSF configuration files. The `-v` flag displays detailed information about the LSF configuration:

lsadmin ckconfig -v

```
LSF 6.2, Jun 5 2006
Copyright 1992-2006 Platform Computing Corporation
Reading configuration from /usr/local/lsf/conf/lsf.conf
Jun 5 10:54:14 2006 24854 5 6.2 /usr/local/lsf/6.2/sparc-sol2/etc/lim -C

Checking configuration files ...
Jun 5 10:54:14 2006 24854 7 6.2 setMyClusterName: searching cluster files ...
Jun 5 10:54:14 2006 24854 7 6.2 setMyClusterName: local host hostA belongs to cluster
sas_cluster
Jun 5 10:54:14 2006 24854 3 6.2 domanager():
/usr/local/lsf/conf/lsf.cluster.sas_cluster(13): The cluster manager is the invoker
<lsfadmin> in debug mode
Jun 5 10:54:14 2006 24854 7 6.2 initReadLoad: I have 1 CPUs
Jun 5 10:54:14 2006 24854 6 6.2 Checking Done.
-----
No errors found.
```

The messages shown are typical of normal output from `lsadmin ckconfig -v`. Other messages may indicate problems with your LSF configuration. See the *LSF Reference* for help with some common configuration errors.

Where to go next “Find out Cluster Status (lsid and lsload)” on page 19

Find out Cluster Status (lsid and lsload)

lsid Tells you if your LSF environment is set up properly. `lsid` displays the current LSF version number, cluster name, and host name of the current LSF master host for your cluster.

The LSF master name displayed by `lsid` may vary, but it is usually the first host configured in the `Hosts` section of

`LSF_CONFDIR/lsf.cluster.cluster_name`.

lsid

LSF 6.2, Jun 5 2006

Copyright 1992-2006 Platform Computing Corporation

My cluster name is sas_cluster

My master name is hostB

Cluster in ISV mode: SAS

If you see the message

Cannot open lsf.conf file

the `LSF_ENVDIR` environment variable is probably not set correctly. Use `cschrc.lsf` or `profile.lsf` to set up your environment.

lsload Displays the current load levels of the cluster. The output contains one line for each host in the cluster. The status should be `ok` for all hosts in your cluster. For example:

lsload

HOST_NAME	status	r15s	r1m	r15m	ut	pg	ls	it	tmp	swp	mem
hosta	ok	0.0	0.0	0.0	6%	0.2	2	1365	97M	65M	29M
hostb	-ok	0.0	0.0	0.0	9%	0.0	4	1	130M	319M	12M
hostc	ok	2.5	2.2	1.9	64%	56.7	50	0	929M	931M	4000M
hostd	ok	0.2	0.2	0.2	1%	0.0	0	367	93M	86M	50M
hoste	busy	*6.2	2.2	1.9	64%	56.7	50	0	929M	931M	4000M
hostf	unavail										

A `busy` status is shown for hosts with any load index beyond its configured thresholds. An asterisk (*) marks load indices that are beyond their thresholds, causing the host status to be `busy`. A minus sign (-) in front of the value `ok` means that RES is not running on that host.

If you see the message

LIM is down

or

LIM is not responding

after starting or reconfiguring LSF, wait a few seconds and try `lsload` again to give the LIMs time to initialize.

`lsload` also shows if LSF is licensed for the host. If you see the message

Host does not have a software license

you must install a valid LSF license or make sure that the license server is running properly.

- Other useful commands**
- ◆ The `lshosts` command displays configuration information for LSF hosts and their static resource information.
 - ◆ The `lsinfo` command displays cluster configuration information about resources, host types, and host models.

Check LSF Batch configuration (badmin)

badmin ckconfig -v

The `badmin` command controls and monitors the operation of the LSF Batch system. Use the `badmin ckconfig` command to check the LSF Batch configuration files. The `-v` flag displays detailed information about the configuration:

badmin ckconfig -v

```
Checking configuration files ...

Jun  5 17:39:57 2006 20246 6 6.2 minit: Trying to call LIM to get cluster name ...
Jun  5 17:39:58 2006 20246 6 6.2 Batch is enabled
Jun  5 17:39:58 2006 20246 6 6.2 Process Manager Server is enabled
Jun  5 17:39:58 2006 20246 6 6.2 autoAdjustInit: Auto-adjustment is disabled
Jun  5 17:39:58 2006 4433 6 6.2 Checking Done
-----
No errors found.
```

The messages shown above are the normal output from `badmin ckconfig -v`. Other messages may indicate problems with the Platform LSF Batch configuration. See the *LSF Reference* for help with some common configuration errors.

Find out LSF Batch system status (bhosts and bqueues)

- bhosts** The `bhosts` command tells you if LSF Batch is running properly. `bhosts` displays the status of LSF Batch server hosts in the cluster, and other details about the batch hosts:
- ◆ Maximum number of job slots allowed by a single user
 - ◆ Total number of jobs in the system, jobs running, jobs suspended by users, and jobs suspended by the system
 - ◆ Total number of reserved job slots

The status should be `ok` for all hosts in your cluster. For example:

bhosts

HOST_NAME	STATUS	JL/U	MAX	NJOBS	RUN	SSUSP	USUSP	RSV
hosta	ok	-	-	0	0	0	0	0
hostb	ok	-	-	0	0	0	0	0
hostc	ok	-	-	0	0	0	0	0
hostd	ok	-	-	0	0	0	0	0

If you see the message

```
lsbatch daemons not responding
```

after starting or reconfiguring LSF, wait a few seconds and try `bhosts` again to give the SBDs time to initialize.

bqueues LSF Batch queues organize jobs with different priorities and different scheduling policies. The `bqueues` command displays available queues and their configuration parameters. For a queue to accept and dispatch jobs, the status should be `Open:Active`.

bqueues

QUEUE_NAME	PRIO	STATUS	MAX	JL/U	JL/P	JL/H	NJOBS	PEND	RUN	SUSP
owners	43	Open:Active	-	6	-	-	0	0	0	0
priority	43	Open:Active	-	-	-	-	0	0	0	0
night	40	Open:Active	-	-	-	-	0	0	0	0
chkpnt_rerun_qu	40	Open:Active	-	-	-	-	0	0	0	0
short	35	Open:Active	-	-	-	-	0	0	0	0
license	33	Open:Active	-	-	-	-	0	0	0	0
normal	30	Open:Active	-	-	-	-	0	0	0	0
idle	20	Open:Active	-	-	-	-	0	0	0	0

The queue information displayed by `bqueues` is configured in `lsb.queues`. Eight queues are defined by default in `lsb.queues`. Modify this file to add, delete, or change queues.

bqueues -l To see more detailed queue information, use `bqueues -l`:

bqueues -l normal

QUEUE: normal

-- For normal low priority jobs, running only if hosts are lightly loaded. This is the default queue.

PARAMETERS/STATISTICS

PRIO	NICE	STATUS	MAX	JL/U	JL/P	JL/H	NJOBS	PEND	RUN	SSUSP	USUSP	RSV
30	20	Open:Active	-	-	-	-	8	8	0	0	0	0

STACKLIMIT MEMLIMIT

2048 K 5000 K

SCHEDULING PARAMETERS

	r15s	r1m	r15m	ut	pg	io	ls	it	tmp	swp	mem
loadSched	-	-	-	-	-	-	-	-	-	-	-
loadStop	-	-	-	-	-	-	-	-	-	-	-

USERS: all users

HOSTS: all hosts used by the LSF Batch system

`bqueues -l` shows the following kinds of information about the queue:

- ◆ What kinds of jobs are meant to run on the queue
- ◆ Resource usage limits
- ◆ Hosts and users are able to use the queue
- ◆ Scheduling threshold values:
 - ❖ `loadSched` is the threshold for LSF to dispatch a job automatically
 - ❖ `loadStop` is the threshold for LSF to suspend a job automatically

Other useful commands

- ◆ The `bparams` command displays information about the LSF Batch configuration parameters.

- ◆ The `bhist` command displays historical information about jobs.

For more information

- ◆ See the *LSF Administrator's Guide* for more information about seeing the status of your cluster.
- ◆ See the *LSF Reference* for detailed information about the commands described in this section.
- ◆ See *Administering Process Manager* for detailed information about Process Manager configuration and maintenance.

Where to go next [“Start the Process Manager Components”](#) on page 23

Start the Process Manager Components

Start the Process Manager Server

- 1 After the installation is complete, set the Process Manager environment:
 - ❖ On `cs`h or `tc`sh:


```
source JS_TOP/conf/cshrc.js
```
 - ❖ On `sh`, `ksh` or `bash`:


```
. JS_TOP/conf/profile.js
```

where `JS_TOP` is the top-level Process Manager installation directory, the value specified in the `install.config` file.
- 2 Run `jadmin start` to start the Process Manager Server:


```
jadmin start
```
- 3 To start the daemon on the Server host at boot time, run `bootsetup` on the Server host.

Set the client environment

- 1 Set the Process Manager environment on each client:
 - ❖ On `cs`h or `tc`sh:


```
source JS_TOP/conf/cshrc.js
```
 - ❖ On `sh`, `ksh` or `bash`:


```
. JS_TOP/conf/profile.js
```

where `JS_TOP` is the top-level Process Manager installation directory, the value specified in the `install.config` file.
- 2 After the Process Manager Server has started, run the client applications to verify the success of the installation:
 - a Run `floweditor`
 - b Run `caleditor`
 - c Run `flowmanager`

Both the Calendar Editor and the Flow Manager require a connection to the Server to be able to start. If you are unable to start either application, there is an error in the configuration, or the Server is not started.

Where to go next Install any additional clients required. For instructions, see *Administering Process Manager*.

To install Platform Grid Management Service, see *README for Platform LSF Grid Management Services - Version 6.2* (`README.gms`).

