Platform LSF
Version 9 Release 1.3

Installing on UNIX and Linux

SC27-5314-03

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Note
Before using this information and the product it supports, read the information in "Notices" on page 39.

First edition

This edition applies to version 9, release 1 of IBM Platform LSF (product number 5725G82) and to all subsequent releases and modifications until otherwise indicated in new editions.

Significant changes or additions to the text and illustrations are indicated by a vertical line (|) to the left of the change.

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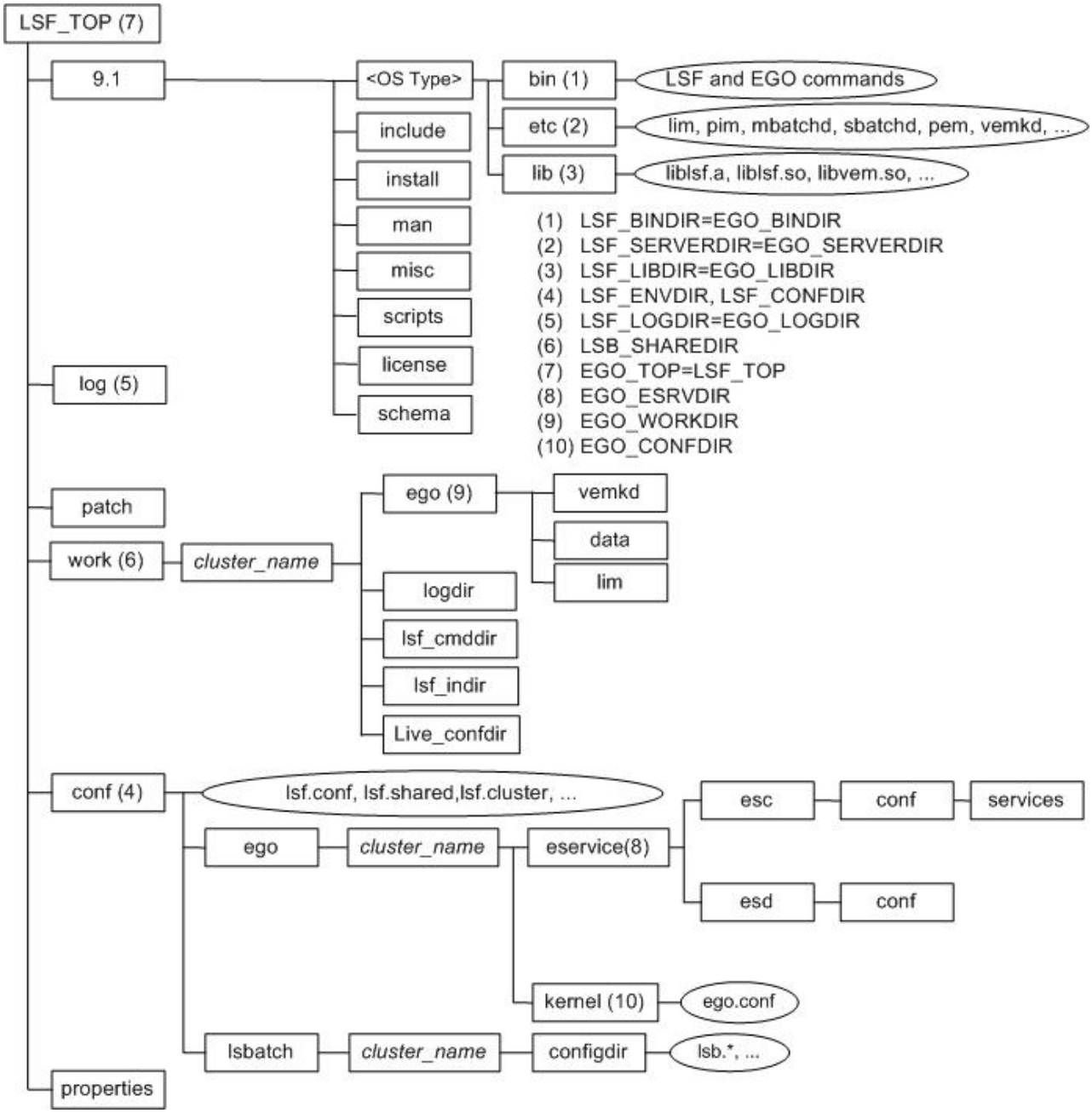
Chapter 1. Example installation directory structure



Chapter 2. Plan your installation

Plan your installation to determine the required parameters for the `install.config` file.

- Choose a primary LSF administrator (owns the LSF and EGO configuration files and log files; for example, `LSF_ADMINS="lsfadmin"`)
- Choose a shared LSF installation directory (for example, `LSF_TOP="/usr/share/lsf"`)
- Choose LSF hosts (master host, master candidates, server hosts, and client-only hosts); for example:

  ```
  LSF_ADD_SERVERS="hostm hostb hostc hostd"
  LSF_MASTER_LIST="hostm hostd"
  LSF_ADD_CLIENTS="hoste hostf"
  ```

  Important: Do not use the name of any host, user, or user group as the name of your cluster.
- Choose LSF server hosts that are candidates to become the master host for the cluster, if you are installing a new host to be dynamically added to the cluster (for example, `LSF_MASTER_LIST="hosta hostb"`
- Choose a cluster name (39 characters or less with no white spaces; for example, `LSF_CLUSTER_NAME="cluster1"`)
- If you are installing LSF Standard Edition, choose a configuration template to determine the initial configuration of your new cluster (for example, `CONFIGURATION_TEMPLATE="HIGH_THROUGHPUT"`). Select one of the following templates depending on the type of jobs your cluster will run:

  DEFAULT
  Select this template for clusters with mixed workload. This configuration can serve different types of workload with good performance, but is not specifically tuned for a particular type of cluster.

  PARALLEL
  Select this template for clusters running large parallel jobs. This configuration is designed for long running parallel jobs and should not be used for clusters that mainly run short jobs due to the longer reporting time for each job.

  HIGH_THROUGHPUT
  This template is designed to be used for clusters that mainly run short jobs, where over 80% of jobs finish within one minute. This high turnover rate requires LSF to be more responsive and fast acting, but will consume more resources as the daemons become busier.

  Note: Do not specify **`CONFIGURATION_TEMPLATE`** for LSF Express Edition and Advanced Edition. These editions have their own default configuration templates for all installations.
- If you are planning to use IBM Platform Analytics or IBM Platform Application Center, set `ENABLE_STREAM="Y"` to enable LSF event streaming.
- If you have made any custom changes to your existing **`esubs`**, create a backup of these.
- If you are planning to run an unattended install, set `SILENT_INSTALL="Y"` and `LSF_SILENT_INSTALL_TARLIST="ALL | Package_Name ..."`. The silent install is a

non-interactive installation without any input and output. Installation log files show output and error messages during the installation.

- If you are planning to run a quiet install, set `LSF_QUIET_INSTALL="Y"`. The quiet install shows all messages but does not prompt for confirmations.

EGO in the LSF cluster

When EGO is enabled in the cluster, EGO may control services for components. This is recommended. It allows failover among multiple management hosts, and allows EGO cluster commands to start, stop, and restart the services.

See the LSF administrator documentation for more details on the benefits of enabling EGO and using EGO to control the services.

Installation choices

When you install the cluster and enable EGO, you can configure the following separately:

- EGO control of **sbatchd** and **res**

Chapter 3. Prepare your systems for installation

- Ensure the installation file system on the file server host has enough disk space for all host types (see the LSF installer script package information below).
- Ensure the top-level LSF installation directory (LSF_TOP=EGO_TOP) is accessible with the same path name from all hosts in the LSF cluster (for example, `/usr/share/lsf`).
- Ensure the installation file system containing LSF_TOP (EGO_TOP) is writable by the user account that is running **lsfinstall**.
- Create user accounts for LSF administrators (for example, **lsfadmin**).
- Get the LSF entitlement file for the edition you are installing:
  - `platform_lsf_std_entitlement.dat` for LSF Standard Edition
  - `platform_lsf_exp_entitlement.dat` for LSF Express Edition
  - `platform_lsf_adv_entitlement.dat` for LSF Advanced Edition
- Select the appropriate LSF installer script package:
  - `lsf9.1.3_lsfinstall_linux_x86_64.tar.Z` for Linux x86_64 platforms requiring the Linux JRE. Requires approximately 120 MB.
  - `lsf9.1.3_lsfinstall.tar.Z` for all other platforms requiring the JRE. Requires approximately 1300 MB.
  - `lsf9.1.3_no_jre_lsfinstall.tar.Z` for all platforms not requiring the JRE. JRE version 1.4 or higher must already be installed on the system. Requires approximately 1 MB.
- Get the LSF installer script package that you selected and extract it.

  For example,
  - Linux x86_64 platforms: `# zcat lsf9.1.3_lsfinstall_linux_x86_64.tar.Z | tar xvf -`
  - Other platforms: `# zcat lsf9.1.3_lsfinstall.tar.Z | tar xvf -`
  - No JRE required: `# zcat lsf9.1.3_no_jre_lsfinstall.tar.Z | tar xvf -`
- Get the LSF distribution packages for all host types you need and put them in the same directory as the extracted LSF installer script.

  For example, for Linux 2.6 kernel glibc version 2.3, the distribution package is `lsf9.1.3_linux2.6-glibc2.3-x86_64.tar.Z`.

  Do not extract the distribution packages.
- If you are installing LSF on MacOS, obtain the JRE from the Apple support website or via software update and install the JRE on the MacOS host first. You can also set the `$JAVA_HOME` environment variable to point to the JRE installation directory. The LSF installation program will search for the JRE in `$JAVA_HOME`. If `$JAVA_HOME` is not set or LSF cannot find the JRE in `$JAVA_HOME`, LSF will then search for the JRE in `$PATH`.
- Get the LSF documentation tar file `lsf9.1.3_documentation.tar.Z` and put it in the same directory as the extracted LSF installer script. Do not extract the tar file.

Integrating LDAP with LSF

To install LSF in an LDAP environment, check that the following are satisfied:

- The LSF administrator is a defined user in LDAP.
- The OS is configured to use LDAP for authentication.

- The LDAP administrator grants privileges to the LSF installer user (usually root) to retrieve the user list from the LDAP server.

IBM Platform entitlement files

LSF uses entitlement files to determine which feature set to be enabled or disabled based on the edition of the product. The entitlement files are:

- LSF Standard Edition - `platform_lsf_std_entitlement.dat`
- LSF Express Edition - `platform_lsf_exp_entitlement.dat`
- LSF Advanced Edition - `platform_lsf_adv_entitlement.dat`

The entitlement file is installed as `<LSF_TOP>/conf/lsf.entitlement`.

You must download the entitlement file for the edition of the product you are running, and set **LSF_ENTITLEMENT_FILE** in `install.config` to the full path to the entitlement file you downloaded.

If you are installing LSF Express Edition, you can later upgrade to LSF Standard Edition to take advantage of the additional functionality of LSF Standard Edition. Simply reinstall the cluster with the LSF Standard entitlement file (`platform_lsf_std_entitlement.dat`). You can also upgrade to LSF Advanced Edition to take advantage of even more functionality. Simply reinstall the cluster with the LSF Advanced entitlement file (`platform_lsf_adv_entitlement.dat`).

You can also manually upgrade from LSF Express Edition to Standard Edition or Advanced Edition. Get the LSF Standard entitlement configuration file `platform_lsf_std_entitlement.dat` or `platform_lsf_adv_entitlement.dat`, copy it to `<LSF_TOP>/conf/lsf.entitlement` and restart your cluster. The new entitlement configuration enables additional functionality, but you may need to change some of the default LSF Express configuration parameters to use the LSF Standard Edition or Advanced Edition features.

Once LSF is installed and running, run the **lsid** command to see which edition of LSF is enabled.

Chapter 4. Install a new LSF cluster (lsfinstall)

1. Log on as root to the LSF installation file server.

   If you are not root, see Chapter 6, "If you install LSF as a non-root user," on page 11.
2. Change to `lsf9.1.3_lsfinstall/`.
3. Edit `./install.config` or `./slave.config` to specify the installation variables you want.

   Uncomment the options you want in the template file, and replace the example values with your own settings.

   Tip: The sample values in the `install.config` and `slave.config` template files are examples only. They are *not* default installation values.

   The following `install.config` parameters are required for installation:

   - **LSF_TOP**
   - **LSF_ADMINS**
   - **LSF_CLUSTER_NAME**
   - **LSF_MASTER_LIST**
   - **LSF_ENTITLEMENT_FILE**
   - **LSF_TARDIR**

     If you do not specify this parameter, the default value is the parent directory of the current working directory from which **lsfinstall** is run.
   - **CONFIGURATION_TEMPLATE** (LSF Standard Edition only)

     If you do not specify this parameter, the default value is `DEFAULT`.

   If you are intending to include some servers in your cluster that will not share the specified **LSF_TOP** in `slave.config`, then you must complete the `slave.config` file and run `lsfinstall -f -s slave.config`.

   For details on `install.config` parameters, refer to install.config.

   For details on `slave.config` parameters, refer to slave.config.
4. Run **lsfinstall -f install.config** to install the cluster.
5. Test your cluster by running some basic LSF commands (for example, **lsid**, **lshosts**, **bhosts**).

Chapter 5. After installing LSF

1. Optional. Run **hostsetup** to set up LSF hosts.

   Note: Running **hostsetup** is required if you will be running IBM POE jobs using IBM Parallel Environment Runtime Edition (or IBM PE Runtime Edition).

   a. Log on to each LSF server host as root. Start with the LSF master host.

      If you are integrating LSF with IBM Parallel Environment (IBM PE), you must log on as root.

      Otherwise, you can continue with host setup if you are not root, but by default, only root can start the LSF daemons.

   b. Run **hostsetup** on each LSF server host. For example, to use the LSF cluster installed in /usr/share/lsf and configure LSF daemons to start automatically at boot time:

      ```
      # cd /usr/share/lsf/9.1/install
      # ./hostsetup --top="/usr/share/lsf" --boot="y"
      ```

      For complete **hostsetup** usage, enter **hostsetup -h**.

2. Log on to the LSF master host as root, and set your LSF environment:
   - For **csh** or **tcsh**: % source *<LSF_TOP>*/conf/cshrc.lsf
   - For **sh**, **ksh**, or **bash**: $. *<LSF_TOP>*/conf/profile.lsf

3. Optional. Enable LSF for users.

   Ensure all users Include *<LSF_TOP>*/conf/cshrc.lsf or *<LSF_TOP>*/conf/profile.lsf in their .cshrc or .profile.

4. Run **lsfstartup** to start the cluster.

   lsfstartup will use RSH to connect to all nodes in the cluster and start LSF. If RSH is not configured in your environment, you can configure **lsfstartup** to use SSH by adding the following line to your lsf.conf:

   ```
   LSF_RSH=ssh
   ```

5. Test your cluster by running some basic LSF commands (for example, **lsid**, **lshosts**, **bhosts**).

   After testing your cluster, be sure all LSF users include LSF_CONFDIR/cshrc.lsf or LSF_CONFDIR/profile.lsf in their .cshrc or .profile.

Chapter 6. If you install LSF as a non-root user

If you install without root permissions, you must choose either a single-user cluster or a multi-user cluster:

- Single-user: Your user account must be primary LSF administrator. This account will be able to start LSF daemons, but it is the only user account that can submit jobs to the cluster. To display load information this user account must also be able to read the system kernel information, such as `/dev/kmem`.
- Multi-user: By default, only root can start the LSF daemons. Any user can submit jobs to your cluster. To make the cluster available to other users, you must manually change the ownership and setuid bit for **`lsadmin`** and **`badmin`** to root, and the file permission mode to `-rwsr-xr-x` (4755) so that the user ID bit for the owner is `setuid`.

  Use the following commands to set the correct owner, user ID bit, and file permission mode for a multi-user cluster:

  ```
  # chown root lsadmin badmin eauth swtbl_api ntbl_api
  # chmod 4755 lsadmin badmin eauth swtbl_api ntbl_api
  ```

Running IBM POE jobs in LSF

- Single-user: To run IBM POE jobs, you must manually change the ownership and setuid bit for **`swtbl_api`** and **`ntbl_api`** to root, and the file permission mode to `-rwsr-xr-x` (4755) so that the user ID bit for the owner is setuid.

  Use the following commands to set the correct owner, user ID bit, and file permission mode:

  ```
  # chown root swtbl_api ntbl_api
  # chmod 4755 swtbl_api ntbl_api
  ```

Chapter 7. Add hosts

Set up hosts to join the cluster.

Note:

If you will be running IBM POE jobs using IBM Parallel Environment Runtime Edition (or IBM PE Runtime Edition) you must run **hostsetup**.

If you are integrating LSF with IBM Parallel Environment (IBM PE), you must run **hostsetup** as root.

1. `# hostsetup --top="/usr/share/lsf" --boot="y"`

   This sets up a host to use the cluster installed in /usr/share/lsf. It also configures the LSF daemons to start automatically (**--boot="y"**).
2. `# hostsetup --top="/usr/share/lsf" --silent`

   This is the silent installation option which does not display any output messages.

Running host setup remotely (rhostsetup)

Before using **rhostsetup**, you must configure the following parameters at the top of the script:

- LSF_RSHCMD: Remote shell command (e.g, **rsh** or **ssh**) accessing the remote host.
- LSF_HOSTS: Lists hosts to run **hostsetup** on.
- LSF_TOPDIR: Sets the **hostsetup --top** option. Specify the full path to the top-level installation directory. **rhostsetup** tries to detect this from lsf.conf if it is not defined here.
- LSF_BOOT: Sets the **hostsetup --boot** option. Default is no (**n**).
- LSF_QUIET: Sets the **hostsetup --quiet** option. Default is no (**n**).

Use the **rhostsetup** script to launch **hostsetup** on remote hosts.

If you are integrating LSF with IBM Parallel Environment (IBM PE), you must run **rhostsetup** as root.

rhostsetup uses either **ssh** or **rsh**. It is included in the installer script package lsf9.1.3_lsfinstall.tar.Z and is located in the lsf9.1.3_lsfinstall directory created when you uncompress and extract the installer script package.

After installation, **rhostsetup** is located in *<LSF_TOP>*/9.1/install/.

Run the **rhostsetup** script.

For example:

```
LSF_RSHCMD="ssh -n"
LSF_HOSTS="hostA hostB hostC"
LSF_TOPDIR=/usr/local/ls
LSF_BOOT=y
LSF_QUIET=n
```

Enable LSF HPC Features

HPC features are installed on UNIX or Linux hosts as part of the PARALLEL template. When you install, some changes are made for you automatically. You should add the appropriate resource names under the RESOURCES column of the Host section of `lsf.cluster.`*`cluster_name`*.

The HPC feature installation Automatically configures the following files:

- `lsb.modules`
- `lsb.resources`
- `lsb.queues`
- `lsf.cluster`
- `lsf.conf`
- `lsf.shared`

lsb.modules

- Adds the external scheduler plugin module names to the PluginModule section of `lsb.modules`:

```
Begin PluginModule
SCH_PLUGIN          RB_PLUGIN   SCH_DISABLE_PHASES
schmod_default        ()                ()
schmod_fcfs           ()                ()
schmod_fairshare      ()                ()
schmod_limit          ()                ()
schmod_parallel       ()                ()
schmod_reserve        ()                ()
schmod_mc             ()                ()
schmod_preemption     ()                ()
schmod_advrsv         ()                ()
schmod_ps             ()                ()
schmod_affinity       ()                ()
#schmod_dc            ()                ()
schmod_aps            ()                ()
schmod_cpuset         ()                ()
End PluginModule
```

Note:

The HPC plugin names must be configured after the standard LSF plugin names in the PluginModule list.

lsb.resources

For IBM POE jobs, **`lsfinstall`** configures the ReservationUsage section in `lsb.resources` to reserve HPS resources on a per-slot basis.

Resource usage defined in the ReservationUsage section overrides the cluster-wide RESOURCE_RESERVE_PER_SLOT parameter defined in `lsb.params` if it also exists.

```
Begin ReservationUsage
RESOURCE           METHOD
adapter_windows    PER_TASK
nrt_windows        PER_TASK
End ReservationUsage
```

lsb.queues

Configures hpc_ibm queue for IBM POE jobs and the hpc_ibm_tv queue for debugging IBM POE jobs:

```
Begin Queue
QUEUE_NAME   = hpc_linux
PRIORITY     = 30
NICE         = 20
#RUN_WINDOW   = 5:19:00-1:8:30 20:00-8:30
#r1m         = 0.7/2.0   # loadSched/loadStop
#r15m         = 1.0/2.5
#pg           = 4.0/8
#ut           = 0.2
#io           = 50/240
#CPULIMIT     = 180/hostA # 3 hours of host hostA
#FILELIMIT    = 20000
#DATALIMIT    = 20000     # jobs data segment limit
#CORELIMIT    = 20000
#TASKLIMIT    = 5         # job processor limit
#USERS        = all       # users who can submit jobs to this queue
#HOSTS        = all       # hosts on which jobs in this queue can run
#PRE_EXEC     = /usr/local/lsf/misc/testq_pre >> /tmp/pre.out
#POST_EXEC    = /usr/local/lsf/misc/testq_post |grep -v Hey
DESCRIPTION  = IBM Platform LSF 9.1 for linux.
End Queue

Begin Queue
QUEUE_NAME   = hpc_linux_tv
PRIORITY     = 30
NICE         = 20
#RUN_WINDOW   = 5:19:00-1:8:30 20:00-8:30
#r1m         = 0.7/2.0    # loadSched/loadStop
#r15m         = 1.0/2.5
#pg           = 4.0/8
#ut           = 0.2
#io           = 50/240
#CPULIMIT     = 180/hostA # 3 hours of host hostA
#FILELIMIT    = 20000
#DATALIMIT    = 20000     # jobs data segment limit
#CORELIMIT    = 20000
#TASKLIMIT    = 5         # job processor limit
#USERS        = all       # users who can submit jobs to this queue
#HOSTS        = all       # hosts on which jobs in this queue can run
#PRE_EXEC     = /usr/local/lsf/misc/testq_pre >> /tmp/pre.out
#POST_EXEC    = /usr/local/lsf/misc/testq_post |grep -v Hey
TERMINATE_WHEN = LOAD PREEMPT WINDOW
RERUNNABLE = NO
INTERACTIVE = NO
DESCRIPTION  = IBM Platform LSF 9.1 for linux debug queue.
End Queue

Begin Queue
QUEUE_NAME   = hpc_ibm
PRIORITY     = 30
NICE         = 20
#RUN_WINDOW   = 5:19:00-1:8:30 20:00-8:30
#r1m         = 0.7/2.0    # loadSched/loadStop
#r15m         = 1.0/2.5
#pg           = 4.0/8
#ut           = 0.2
#io           = 50/240
#CPULIMIT     = 180/hostA  # 3 hours of host hostA
#FILELIMIT    = 20000
#DATALIMIT    = 20000      # jobs data segment limit
#CORELIMIT    = 20000
#TASKLIMIT    = 5          # job processor limit
```

```
#USERS        = all        # users who can submit jobs to this queue
#HOSTS        = all        # hosts on which jobs in this queue can run
#PRE_EXEC     = /usr/local/lsf/misc/testq_pre >> /tmp/pre.out
#POST_EXEC    = /usr/local/lsf/misc/testq_post |grep -v Hey
RES_REQ = select[ poe > 0 ]
EXCLUSIVE = Y
REQUEUE_EXIT_VALUES = 133 134 135
DESCRIPTION  = IBM Platform LSF 9.1 for IBM. This queue is to run POE jobs ONLY.
End Queue

Begin Queue
QUEUE_NAME   = hpc_ibm_tv
PRIORITY     = 30
NICE         = 20
#RUN_WINDOW   = 5:19:00-1:8:30 20:00-8:30
#r1m          = 0.7/2.0    # loadSched/loadStop
#r15m          = 1.0/2.5
#pg            = 4.0/8
#ut            = 0.2
#io            = 50/240
#CPULIMIT     = 180/hostA  # 3 hours of host hostA
#FILELIMIT    = 20000
#DATALIMIT    = 20000      # jobs data segment limit
#CORELIMIT    = 20000
#TASKLIMIT    = 5          # job processor limit
#USERS        = all        # users who can submit jobs to this queue
#HOSTS        = all        # hosts on which jobs in this queue can run
#PRE_EXEC     = /usr/local/lsf/misc/testq_pre >> /tmp/pre.out
#POST_EXEC    = /usr/local/lsf/misc/testq_post |grep -v Hey
RES_REQ = select[ poe > 0 ]
REQUEUE_EXIT_VALUES = 133 134 135
TERMINATE_WHEN = LOAD PREEMPT WINDOW
RERUNNABLE = NO
INTERACTIVE = NO
DESCRIPTION  = IBM Platform LSF 9.1 for IBM debug queue. This queue is to run POE jobs ONLY.
End Queue
```

lsf.cluster.*cluster_name*

For IBM POE jobs, configures the ResourceMap section of `lsf.cluster.`*`cluster_name`* to map the following shared resources for POE jobs to all hosts in the cluster:

```
Begin ResourceMap
RESOURCENAME        LOCATION
poe                 [default]
adapter_windows     [default]
nrt_windows         [default]
dedicated_tasks     (0@[default])
ip_tasks            (0@[default])
us_tasks            (0@[default])
End ResourceMap
```

lsf.conf

- **LSB_SUB_COMMANDNAME=Y** to `lsf.conf` to enable the **LSF_SUB_COMMANDLINE** environment variable required by esub.
- **LSF_ENABLE_EXTSCHEDULER=Y**: LSF uses an external scheduler for topology-aware external scheduling.
- **LSB_CPUSET_BESTCPUS=Y**: LSF schedules jobs based on the shortest CPU radius in the processor topology using a best-fit algorithm. On HP-UX hosts, sets the full path to the HP vendor MPI library `libmpirm.sl` `LSF_VPLUGIN="/opt/mpi/lib/pa1.1/libmpirm.sl"`

- **LSB_RLA_PORT=***port_number*, where *port_number* is the TCP port used for communication between the LSF HPC topology adapter (RLA) and sbatchd. The default port number is 6883.
- **LSB_SHORT_HOSTLIST=1**: Displays an abbreviated list of hosts in **bjobs** and **bhist** for a parallel job where multiple processes of a job are running on a host. Multiple processes are displayed in the format `processes*hostA`.

lsf.shared

Defines the following shared resources required by HPC features in `lsf.shared`:

```
Begin Resource
RESOURCENAME    TYPE    INTERVAL INCREASING  DESCRIPTION       # Keywords
slurm           Boolean    ()    ()          (SLURM)
cpuset          Boolean    ()    ()          (CPUSET)
mpich_gm        Boolean    ()    ()          (MPICH GM MPI)
lammpi          Boolean    ()    ()          (LAM MPI)
mpichp4         Boolean    ()    ()          (MPICH P4 MPI)
mvapich         Boolean    ()    ()          (Infiniband MPI)
sca_mpimon      Boolean    ()    ()          (SCALI MPI)
ibmmpi          Boolean    ()    ()          (IBM POE MPI)
hpmpi           Boolean    ()    ()          (HP MPI)
intelmpi        Boolean    ()    ()          (Intel MPI)
crayxt3         Boolean    ()    ()          (Cray XT3 MPI)
crayx1          Boolean    ()    ()          (Cray X1 MPI)
fluent          Boolean    ()    ()          (fluent availability)
ls_dyna         Boolean    ()    ()          (ls_dyna availability)
nastran         Boolean    ()    ()          (nastran availability)
pvm             Boolean    ()    ()          (pvm availability)
openmp          Boolean    ()    ()          (openmp availability)
ansys           Boolean    ()    ()          (ansys availability)
blast           Boolean    ()    ()          (blast availability)
gaussian        Boolean    ()    ()          (gaussian availability)
lion            Boolean    ()    ()          (lion availability)
scitegic        Boolean    ()    ()          (scitegic availability)
schroedinger    Boolean    ()    ()          (schroedinger availability)
hmmer           Boolean    ()    ()          (hmmer availability)
adapter_windows Numeric    30    N    (free adapter windows on css0 on IBM SP)
nrt_windows     Numeric    30    N    (The number of free nrt windows on IBM systems)
poe             Numeric    30    N    (poe availability)
css0            Numeric    30    N    (free adapter windows on css0 on IBM SP)
csss            Numeric    30    N    (free adapter windows on csss on IBM SP)
dedicated_tasks Numeric    ()    Y    (running dedicated tasks)
ip_tasks        Numeric    ()    Y    (running IP tasks)
us_tasks        Numeric    ()    Y    (running US tasks)
End Resource
```

Optional LSF HPC features configuration

After enabling LSF HPC features, you can define the following in `lsf.conf`:

- LSF_LOGDIR=*directory*

  In large clusters, you should set LSF_LOGDIR to a local file system (for example, `/var/log/lsf`).

- LSB_RLA_WORKDIR=*directory* parameter, where *directory* is the location of the status files for RLA. Allows RLA to recover its original state when it restarts. When RLA first starts, it creates the directory defined by LSB_RLA_WORKDIR if it does not exist, then creates subdirectories for each host.

  You should avoid using `/tmp` or any other directory that is automatically cleaned up by the system. Unless your installation has restrictions on the LSB_SHAREDIR directory, you should use the default:

  `LSB_SHAREDIR/`*`cluster_name`*`/rla_workdir`

- On Linux hosts running HP MPI, set the full path to the HP vendor MPI library `libmpirm.so`.

  ```
  LSF_VPLUGIN="/opt/hpmpi/lib/linux_ia32/libmpirm.so"
  ```

- LSB_RLA_UPDATE=*time_seconds*

  Specifies how often the HPC scheduler refreshes free node information from the LSF topology adapter (RLA).

  Default: 600 seconds

Chapter 8. install.config

About install.config

The `install.config` file contains options for LSF installation and configuration. Use **`lsfinstall -f install.config`** to install LSF using the options specified in `install.config`.

Template location

A template `install.config` is included in the installer script package `lsf9.1.3_lsfinstall.tar.Z` and is located in the `lsf9.1.3_lsfinstall` directory created when you uncompress and extract the installer script package. Edit the file and uncomment the options you want in the template file. Replace the example values with your own settings to specify the options for your new installation.

Important:

The sample values in the `install.config` template file are examples only. They are not default installation values.

After installation, the `install.config` containing the options you specified is located in *`LSF_TOP`*`/9.1/install/`.

Format

Each entry in `install.config` has the form:

```
NAME="STRING1 STRING2 ..."
```

The equal sign `=` must follow each `NAME` even if no value follows and there should be no spaces around the equal sign.

A value that contains multiple strings separated by spaces must be enclosed in quotation marks.

Blank lines and lines starting with a pound sign (#) are ignored.

Parameters

- CONFIGURATION_TEMPLATE
- EGO_DAEMON_CONTROL
- ENABLE_DYNAMIC_HOSTS
- ENABLE_EGO
- ENABLE_STREAM
- LSF_ADD_SERVERS
- LSF_ADD_CLIENTS
- LSF_ADMINS
- LSF_CLUSTER_NAME
- LSF_DYNAMIC_HOST_WAIT_TIME
- LSF_ENTITLEMENT_FILE

- LSF_MASTER_LIST
- LSF_QUIET_INST
- LSF_SILENT_INSTALL_TARLIST
- LSF_TARDIR
- LSF_TOP
- PATCH_BACKUP_DIR
- PATCH_HISTORY_DIR
- SILENT_INSTALL

CONFIGURATION_TEMPLATE

Syntax

```
CONFIGURATION_TEMPLATE="DEFAULT" | "PARALLEL" | "HIGH_THROUGHPUT"
```

Description

LSF Standard Edition on UNIX or Linux only. Selects the configuration template for this installation, which determines the initial LSF configuration parameters specified when the installation is complete. The following are valid values for this parameter:

DEFAULT
: This template should be used for clusters with mixed workload. This configuration can serve different types of workload with good performance, but is not specifically tuned for a particular type of cluster.

PARALLEL
: This template provides extra support for large parallel jobs. This configuration is designed for long running parallel jobs, and should not be used for clusters that mainly run short jobs due to the longer reporting time for each job.

HIGH_THROUGHPUT
: This template is designed to be used for clusters that mainly run short jobs, where over 80% of jobs finish within one minute. This high turnover rate requires LSF to be more responsive and fast acting. However, this configuration will consume more resources as the daemons become busier.

The installer uses the DEFAULT configuration template when installing LSF Standard Edition on Windows.

Note: Do not specify **CONFIGURATION_TEMPLATE** for LSF Express Edition and Advanced Edition. These editions have their own default configuration templates for all installations.

The installer specifies the following initial configuration file parameter values based on the selected configuration template:

- DEFAULT
  - `lsf.conf`:

    ```
    DAEMON_SHUTDOWN_DELAY=180
    LSF_LINUX_CGROUP_ACCT=Y
    LSF_PROCESS_TRACKING=Y
    ```

  - `lsb.params`:

```
JOB_DEP_LAST_SUB=1
JOB_SCHEDULING_INTERVAL=1
MAX_JOB_NUM=10000
NEWJOB_REFRESH=Y
SBD_SLEEP_TIME=7
```

- PARALLEL
  - `lsf.conf`:

    ```
    LSB_SHORT_HOSTLIST=1
    LSF_LINUX_CGROUP_ACCT=Y
    LSF_PROCESS_TRACKING=Y
    LSF_ENABLE_EXTSCHEDULER=Y
    LSF_HPC_EXTENSIONS="CUMULATIVE_RUSAGE LSB_HCLOSE_BY_RES SHORT_EVENTFILE"
    ```

    Refer to the Enable LSF HPC Features section for a full description.
  - `lsb.params`:

    ```
    JOB_DEP_LAST_SUB=1
    JOB_SCHEDULING_INTERVAL=1
    NEWJOB_REFRESH=Y
    ```
- HIGH_THROUGHPUT
  - `lsf.conf`:

    ```
    LSB_MAX_PACK_JOBS=300
    LSB_SHORT_HOSTLIST=1
    ```
  - `lsb.params`:

    ```
    CONDENSE_PENDING_REASONS=Y
    JOB_SCHEDULING_INTERVAL=50ms
    MAX_INFO_DIRS=500
    MAX_JOB_ARRAY_SIZE=10000
    MAX_JOB_NUM=100000
    MIN_SWITCH_PERIOD=1800
    NEWJOB_REFRESH=Y
    PEND_REASON_UPDATE_INTERVAL=60
    SBD_SLEEP_TIME=3
    ```

The installer specifies the following initial configuration parameters for all configuration templates:

- `lsf.conf`:

  ```
  EGO_ENABLE_AUTO_DAEMON_SHUTDOWN=Y
  LSB_DISABLE_LIMLOCK_EXCL=Y
  LSB_MOD_ALL_JOBS=Y
  LSF_DISABLE_LSRUN=Y
  LSB_SUBK_SHOW_EXEC_HOST=Y
  LSF_PIM_LINUX_ENHANCE=Y
  LSF_PIM_SLEEPTIME_UPDATE=Y
  LSF_STRICT_RESREQ=Y
  LSF_UNIT_FOR_LIMITS=MB
  ```
- `lsb.params`:

  ```
  ABS_RUNLIMIT=Y
  DEFAULT_QUEUE=normal interactive
  JOB_ACCEPT_INTERVAL=0
  MAX_CONCURRENT_QUERY=100
  MAX_JOB_NUM=10000
  MBD_SLEEP_TIME=10
  PARALLEL_SCHED_BY_SLOT=Y
  ```

In addition, the installer enables the following features for all configuration templates:

- Fairshare scheduling (LSF Standard Edition and Advanced Edition): All queues except `admin` and `license` have fairshare scheduling enabled as follows in `lsb.queues`:

```
Begin Queue
...
FAIRSHARE=USER_SHARES[[default, 1]]
...
End Queue
```

- Host groups (LSF Standard Edition on UNIX or Linux): Master candidate hosts are assigned to the `master_hosts` host group.
- User groups (LSF Standard Edition on UNIX or Linux): LSF administrators are assigned to the `lsfadmins` user group.
- Affinity scheduling in both `lsb.modules` and `lsb.hosts`.

Example

```
CONFIGURATION_TEMPLATE="HIGH_THROUGHPUT"
```

Default

DEFAULT (the default configuration template is used)

EGO_DAEMON_CONTROL

Syntax

```
EGO_DAEMON_CONTROL="Y" | "N"
```

Description

Enables EGO to control LSF **res** and **sbatchd**. Set the value to "Y" if you want EGO Service Controller to start **res** and **sbatchd**, and restart if they fail. To avoid conflicts, leave this parameter undefined if you use a script to start up LSF daemons.

Note:

If you specify EGO_ENABLE="N", this parameter is ignored.

Example

```
EGO_DAEMON_CONTROL="N"
```

Default

N (**res** and **sbatchd** are started manually)

ENABLE_DYNAMIC_HOSTS

Syntax

```
ENABLE_DYNAMIC_HOSTS="Y" | "N"
```

Description

Enables dynamically adding and removing hosts. Set the value to "Y" if you want to allow dynamically added hosts.

If you enable dynamic hosts, any host can connect to cluster. To enable security, configure LSF_HOST_ADDR_RANGE in `lsf.cluster.`*`cluster_name`* after

installation and restrict the hosts that can connect to your cluster.

Example

```
ENABLE_DYNAMIC_HOSTS="N"
```

Default

N (dynamic hosts not allowed)

ENABLE_EGO

Syntax

```
ENABLE_EGO="Y" | "N"
```

Description

Enables EGO functionality in the LSF cluster.

ENABLE_EGO="Y" causes **lsfinstall** uncomment LSF_EGO_ENVDIR and sets LSF_ENABLE_EGO="Y" in `lsf.conf`.

ENABLE_EGO="N" causes **lsfinstall** to comment out LSF_EGO_ENVDIR and sets LSF_ENABLE_EGO="N" in `lsf.conf`.

Set the value to "Y" if you want to take advantage of the following LSF features that depend on EGO:

- LSF daemon control by EGO Service Controller
- EGO-enabled SLA scheduling

Default

N (EGO is disabled in the LSF cluster)

ENABLE_STREAM

Syntax

```
ENABLE_STREAM="Y" | "N"
```

Description

Enables LSF event streaming.

Enable LSF event streaming if you intend to install IBM Platform Analytics or IBM Platform Application Center.

Default

N (Event streaming is disabled)

LSF_ADD_SERVERS

Syntax

LSF_ADD_SERVERS="*host_name* [*host_name*...]"

Description

List of additional LSF server hosts.

The hosts in LSF_MASTER_LIST are always LSF servers. You can specify additional server hosts. 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.

Valid Values

Any valid LSF host name.

Example 1

List of host names:

```
LSF_ADD_SERVERS="hosta hostb hostc hostd"
```

Example 2

Host list file:

```
LSF_ADD_SERVERS=:lsf_server_hosts
```

The file `lsf_server_hosts` contains a list of hosts:

```
hosta
hostb
hostc
hostd
```

Default

Only hosts in LSF_MASTER_LIST are LSF servers.

LSF_ADD_CLIENTS

Syntax

`LSF_ADD_CLIENTS="`*host_name* [*host_name...*]"

Description

List of LSF client-only hosts.

Tip:

After installation, you must manually edit `lsf.cluster.`*cluster_name* to include the host model and type of each client listed in LSF_ADD_CLIENTS.

Valid Values

Any valid LSF host name.

Example 1

List of host names:

```
LSF_ADD_CLIENTS="hoste hostf"
```

Example 2

Host list file:

```
LSF_ADD_CLIENTS=:lsf_client_hosts
```

The file `lsf_client_hosts` contains a list of hosts:

```
hoste
hostf
```

Default

No client hosts installed.

LSF_ADMINS

Syntax

`LSF_ADMINS="`*user_name* [*user_name ...*]`"`

Description

Required. List of LSF administrators.

The first user account name in the list is the primary LSF administrator. It cannot be the root user account.

Typically this account is named lsfadmin. It owns the LSF configuration files and log files for job events. It also has permission to reconfigure LSF and to control batch jobs submitted by other users. It typically does not have authority to start LSF daemons. Usually, only root has permission to start LSF daemons.

All the LSF administrator accounts must exist on all hosts in the cluster before you install LSF. Secondary LSF administrators are optional.

CAUTION:

You should *not* configure the root account as the primary LSF administrator.

Valid Values

Existing user accounts

Example

```
LSF_ADMINS="lsfadmin user1 user2"
```

Default

None—required variable

LSF_CLUSTER_NAME

Syntax

LSF_CLUSTER_NAME="*cluster_name*"

Description

Required. The name of the LSF cluster.

Example

```
LSF_CLUSTER_NAME="cluster1"
```

Valid Values

Any alphanumeric string containing no more than 39 characters. The name cannot contain white spaces.

Important:

Do not use the name of any host, user, or user group as the name of your cluster.

Default

None—required variable

LSF_DYNAMIC_HOST_WAIT_TIME

Syntax

LSF_DYNAMIC_HOST_WAIT_TIME=*seconds*

Description

Time in seconds slave LIM waits after startup before calling master LIM to add the slave host dynamically.

This parameter only takes effect if you set ENABLE_DYNAMIC_HOSTS="Y" in this file. If the slave LIM receives the master announcement while it is waiting, it does not call the master LIM to add itself.

Recommended value

Up to 60 seconds for every 1000 hosts in the cluster, for a maximum of 15 minutes. Selecting a smaller value will result in a quicker response time for new hosts at the expense of an increased load on the master LIM.

Example

```
LSF_DYNAMIC_HOST_WAIT_TIME=60
```

Hosts will wait 60 seconds from startup to receive an acknowledgement from the master LIM. If it does not receive the acknowledgement within the 60 seconds, it will send a request for the master LIM to add it to the cluster.

Default

Slave LIM waits forever

LSF_ENTITLEMENT_FILE

Syntax

LSF_ENTITLEMENT_FILE=*path*

Description

Full path to the LSF entitlement file. LSF uses the entitlement to determine which feature set to be enable or disable based on the edition of the product. The entitlement file for LSF Standard Edition is `platform_lsf_std_entitlement.dat`. For LSF Express Edition, the file is `platform_lsf_exp_entitlement.dat`. For LSF Advanced Edition, the file is `platform_lsf_adv_entitlement.dat`. The entitlement file is installed as `<LSF_TOP>/conf/lsf.entitlement`.

You must download the entitlement file for the edition of the product you are running, and set **LSF_ENTITLEMENT_FILE** to the full path to the entitlement file you downloaded.

Once LSF is installed and running, run the **lsid** command to see which edition of LSF is enabled.

Example

```
LSF_ENTITLEMENT_FILE=/usr/share/lsf_distrib/lsf.entitlement
```

Default

None — required variable

LSF_MASTER_LIST

Syntax

LSF_MASTER_LIST="*host_name* [*host_name* ...]"

Description

Required for a first-time installation. List of LSF server hosts to be master or master candidates in the cluster.

You must specify at least one valid server host to start the cluster. The first host listed is the LSF master host.

During upgrade, specify the existing value.

Valid Values

LSF server host names

Example

```
LSF_MASTER_LIST="hosta hostb hostc hostd"
```

Default

None⌂—⌂required variable

LSF_QUIET_INST

Syntax

```
LSF_QUIET_INST="Y" | "N"
```

Description

Enables quiet installation.

Set the value to Y if you want to hide the LSF installation messages.

Example

```
LSF_QUIET_INST="Y"
```

Default

N (installer displays messages during installation)

LSF_SILENT_INSTALL_TARLIST

Syntax

```
LSF_SILENT_INSTALL_TARLIST="ALL" | "Package_Name ..."
```

Description

A string which contains all LSF package names to be installed. This name list only applies to the silent install mode. Supports keywords ?all?, ?ALL? and ?All? which can install all packages in LSF_TARDIR.

```
LSF_SILENT_INSTALL_TARLIST="ALL" | "lsf9.1.3_linux2.6-glibc2.3-
x86_64.tar.Z"
```

Default

None

LSF_TARDIR

Syntax

```
LSF_TARDIR="/path"
```

Description

Full path to the directory containing the LSF distribution tar files.

Example

```
LSF_TARDIR="/usr/share/lsf_distrib"
```

Default

The parent directory of the current working directory. For example, if **lsfinstall** is running under `usr/share/lsf_distrib/lsf_lsfinstall` the LSF_TARDIR default value is `usr/share/lsf_distrib`.

LSF_TOP

Syntax

`LSF_TOP="/`*path*`"`

Description

Required. Full path to the top-level LSF installation directory.

Valid Value

The path to LSF_TOP must be shared and accessible to all hosts in the cluster. It cannot be the root directory (/). The file system containing LSF_TOP must have enough disk space for all host types (approximately 300 MB per host type).

Example

```
LSF_TOP="/usr/share/lsf"
```

Default

None - required variable

PATCH_BACKUP_DIR

Syntax

`PATCH_BACKUP_DIR="/`*path*`"`

Description

Full path to the patch backup directory. This parameter is used when you install a new cluster for the first time, and is ignored for all other cases.

The file system containing the patch backup directory must have sufficient disk space to back up your files (approximately 400 MB per binary type if you want to be able to install and roll back one enhancement pack and a few additional fixes). It cannot be the root directory (/).

If the directory already exists, it must be writable by the cluster administrator (`lsfadmin`).

If you need to change the directory after installation, edit PATCH_BACKUP_DIR in *LSF_TOP*`/patch.conf` and move the saved backup files to the new directory manually.

Example

```
PATCH_BACKUP_DIR="/usr/share/lsf/patch/backup"
```

Default

LSF_TOP/patch/backup

PATCH_HISTORY_DIR

Syntax

PATCH_HISTORY_DIR="/*path*"

Description

Full path to the patch history directory. This parameter is used when you install a new cluster for the first time, and is ignored for all other cases.

It cannot be the root directory (/). If the directory already exists, it must be writable by lsfadmin.

The location is saved as PATCH_HISTORY_DIR in LSF_TOP/patch.conf. Do not change the directory after installation.

Example

PATCH_BACKUP_DIR="/usr/share/lsf/patch"

Default

LSF_TOP/patch

SILENT_INSTALL

Syntax

SILENT_INSTALL="Y" | "N"

Description

Enabling the silent installation (setting this parameter to Y) means you want to do the silent installation and accept the license agreement.

Default

N

Chapter 9. slave.config

About slave.config

Dynamically added LSF hosts that will not be master candidates are *slave hosts*. Each dynamic slave host has its own LSF binaries and local `lsf.conf` and shell environment scripts (`cshrc.lsf` and `profile.lsf`). You must install LSF on each slave host.

The `slave.config` file contains options for installing and configuring a slave host that can be dynamically added or removed.

Use **`lsfinstall -s -f slave.config`** to install LSF using the options specified in `slave.config`.

Template location

A template `slave.config` is located in the installation script directory created when you extract the installer script package. Edit the file and uncomment the options you want in the template file. Replace the example values with your own settings to specify the options for your new LSF installation.

Important:

The sample values in the slave.config template file are examples only. They are not default installation values.

Format

Each entry in `slave.config` has the form:

```
NAME="STRING1 STRING2 ..."
```

The equal sign = must follow each `NAME` even if no value follows and there should be no spaces around the equal sign.

A value that contains multiple strings separated by spaces must be enclosed in quotation marks.

Blank lines and lines starting with a pound sign (#) are ignored.

Parameters

- EGO_DAEMON_CONTROL
- ENABLE_EGO
- EP_BACKUP
- LSF_ADMINS
- LSF_ENTITLEMENT_FILE
- LSF_LIM_PORT
- LSF_SERVER_HOSTS
- LSF_TARDIR
- LSF_LOCAL_RESOURCES

- LSF_TOP
- SILENT_INSTALL
- LSF_SILENT_INSTALL_TARLIST

EGO_DAEMON_CONTROL

Syntax

```
EGO_DAEMON_CONTROL="Y" | "N"
```

Description

Enables EGO to control LSF res and sbatchd. Set the value to "Y" if you want EGO Service Controller to start res and sbatchd, and restart if they fail.

All hosts in the cluster must use the same value for this parameter (this means the value of EGO_DAEMON_CONTROL in this file must be the same as the specification for EGO_DAEMON_CONTROL in `install.config`).

To avoid conflicts, leave this parameter undefined if you use a script to start up LSF daemons.

Note:

If you specify EGO_ENABLE="N", this parameter is ignored.

Example

EGO_DAEMON_CONTROL="N"

Default

N (res and sbatchd are started manually)

ENABLE_EGO

Syntax

```
ENABLE_EGO="Y" | "N"
```

Description

Enables EGO functionality in the LSF cluster.

ENABLE_EGO="Y" causes **`lsfinstall`** uncomment LSF_EGO_ENVDIR and sets LSF_ENABLE_EGO="Y" in `lsf.conf`.

ENABLE_EGO="N" causes **`lsfinstall`** to comment out LSF_EGO_ENVDIR and sets LSF_ENABLE_EGO="N" in `lsf.conf`.

Set the value to "Y" if you want to take advantage of the following LSF features that depend on EGO:

- LSF daemon control by EGO Service Controller
- EGO-enabled SLA scheduling

Default

N (EGO is disabled in the LSF cluster)

EP_BACKUP

Syntax

```
EP_BACKUP="Y" | "N"
```

Description

Enables backup and rollback for enhancement packs. Set the value to "N" to disable backups when installing enhancement packs (you will not be able to roll back to the previous patch level after installing an EP, but you will still be able to roll back any fixes installed on the new EP).

You may disable backups to speed up install time, to save disk space, or because you have your own methods to back up the cluster.

Default

Y (backup and rollback are fully enabled)

LSF_ADMINS

Syntax

LSF_ADMINS="*user_name* [*user_name ...*]"

Description

Required. List of LSF administrators.

The first user account name in the list is the primary LSF administrator. It cannot be the root user account.

Typically this account is named lsfadmin. It owns the LSF configuration files and log files for job events. It also has permission to reconfigure LSF and to control batch jobs submitted by other users. It typically does not have authority to start LSF daemons. Usually, only root has permission to start LSF daemons.

All the LSF administrator accounts must exist on all hosts in the cluster before you install LSF. Secondary LSF administrators are optional.

Valid Values

Existing user accounts

Example

```
LSF_ADMINS="lsfadmin user1 user2"
```

Default

None—required variable

LSF_ENTITLEMENT_FILE

Syntax

LSF_ENTITLEMENT_FILE=*path*

Description

Full path to the LSF entitlement file. LSF uses the entitlement to determine which feature set to be enable or disable based on the edition of the product. The entitlement file for LSF Standard Edition is `platform_lsf_std_entitlement.dat`. For LSF Express Edition, the file is `platform_lsf_exp_entitlement.dat`. The entitlement file is installed as `<LSF_TOP>/conf/lsf.entitlement`.

You must download the entitlement file for the edition of the product you are running, and set **LSF_ENTITLEMENT_FILE** to the full path to the entitlement file you downloaded.

Once LSF is installed and running, run the **lsid** command to see which edition of LSF is enabled.

Example

```
LSF_ENTITLEMENT_FILE=/usr/share/lsf_distrib/lsf.entitlement
```

Default

None - required variable

LSF_LIM_PORT

Syntax

LSF_LIM_PORT="*port_number*"

Description

TCP service port for slave host.

Use the same port number as LSF_LIM_PORT in `lsf.conf` on the master host.

Default

7869

LSF_SERVER_HOSTS

Syntax

LSF_SERVER_HOSTS="*host_name* [*host_name ...*]"

Description

Required for non-shared slave host installation. This parameter defines a list of hosts that can provide host and load information to client hosts. If you do not

define this parameter, clients will contact the master LIM for host and load information. List of LSF server hosts in the cluster to be contacted.

Recommended for large clusters to decrease the load on the master LIM. Do not specify the master host in the list. Client commands will query the LIMs on the LSF_SERVER_HOSTS, which off-loads traffic from the master LIM.

Define this parameter to ensure that commands execute successfully when no LIM is running on the local host, or when the local LIM has just started.

You should include the list of hosts defined in LSF_MASTER_LIST in `lsf.conf`; specify the primary master host last. For example:

```
LSF_MASTER_LIST="lsfmaster hostE"
LSF_SERVER_HOSTS="hostB hostC hostD hostE lsfmaster"
```

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.

Valid Values

Any valid LSF host name

Examples

List of host names:

```
LSF_SERVER_HOSTS="hosta hostb hostc hostd"
```

Host list file:

```
LSF_SERVER_HOSTS=:lsf_server_hosts
```

The file `lsf_server_hosts` contains a list of hosts:

```
hosta hostb hostc hostd
```

Default

None

LSF_TARDIR

Syntax

`LSF_TARDIR="/`*path*`"`

Description

Full path to the directory containing the LSF distribution tar files.

Example

```
LSF_TARDIR="/usr/local/lsf_distrib"
```

Default

The parent directory of the current working directory. For example, if **lsfinstall** is running under usr/share/lsf_distrib/lsf_lsfinstall the LSF_TARDIR default value is usr/share/lsf_distrib.

LSF_LOCAL_RESOURCES

Syntax

LSF_LOCAL_RESOURCES="*resource* ..."

Description

Defines instances of local resources residing on the slave host.

- For numeric resources, define name-value pairs:
  "[resourcemap *value***resource_name*]"
- For Boolean resources, define the resource name in the form:
  "[resource *resource_name*]"

When the slave host calls the master host to add itself, it also reports its local resources. The local resources to be added must be defined in lsf.shared.

If the same resource is already defined in lsf.shared as default or all, it cannot be added as a local resource. The shared resource overrides the local one.

Tip:

LSF_LOCAL_RESOURCES is usually set in the slave.config file during installation. If LSF_LOCAL_RESOURCES are already defined in a local lsf.conf on the slave host, **lsfinstall** does not add resources you define in LSF_LOCAL_RESOURCES in slave.config. You should not have duplicate LSF_LOCAL_RESOURCES entries in lsf.conf. If local resources are defined more than once, only the last definition is valid.

Important:

Resources must already be mapped to hosts in the ResourceMap section of lsf.cluster.*cluster_name*. If the ResourceMap section does not exist, local resources are not added.

Example

```
LSF_LOCAL_RESOURCES="[resourcemap 1*verilog] [resource linux]"
```

Default

None

LSF_TOP

Syntax

LSF_TOP="/*path*"

Description

Required. Full path to the top-level LSF installation directory.

Important:

You must use the same path for every slave host you install.

Valid value

The path to LSF_TOP cannot be the root directory (/).

Example

```
LSF_TOP="/usr/local/lsf"
```

Default

None—required variable⌂

SILENT_INSTALL

Syntax

```
SILENT_INSTALL="Y" | "N"
```

Description

Enabling the silent installation (setting this parameter to Y) means you want to do the silent installation and accept the license agreement.

Default

N

LSF_SILENT_INSTALL_TARLIST

Syntax

```
LSF_SILENT_INSTALL_TARLIST="ALL" | "Package_Name ..."
```

Description

A string which contains all LSF package names to be installed. This name list only applies to the silent install mode. Supports keywords ?all?, ?ALL? and ?All? which can install all packages in LSF_TARDIR.

```
LSF_SILENT_INSTALL_TARLIST="ALL" | "lsf9.1.3_linux2.6-glibc2.3-
x86_64.tar.Z"
```

Default

None

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