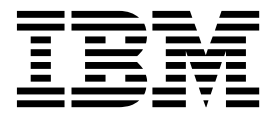


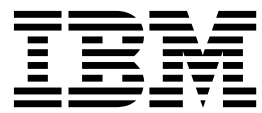
IBM Spectrum LSF
Version 10 Release 1.0

Installing on UNIX and Linux



IBM Spectrum LSF
Version 10 Release 1.0

Installing on UNIX and Linux



Note

Before using this information and the product it supports, read the information in “Notices” on page 45.

This edition applies to version 10, release 1 of IBM Spectrum LSF (product numbers 5725G82 and 5725L25) 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.

If you find an error in any IBM Spectrum Computing documentation, or you have a suggestion for improving it, let us know.

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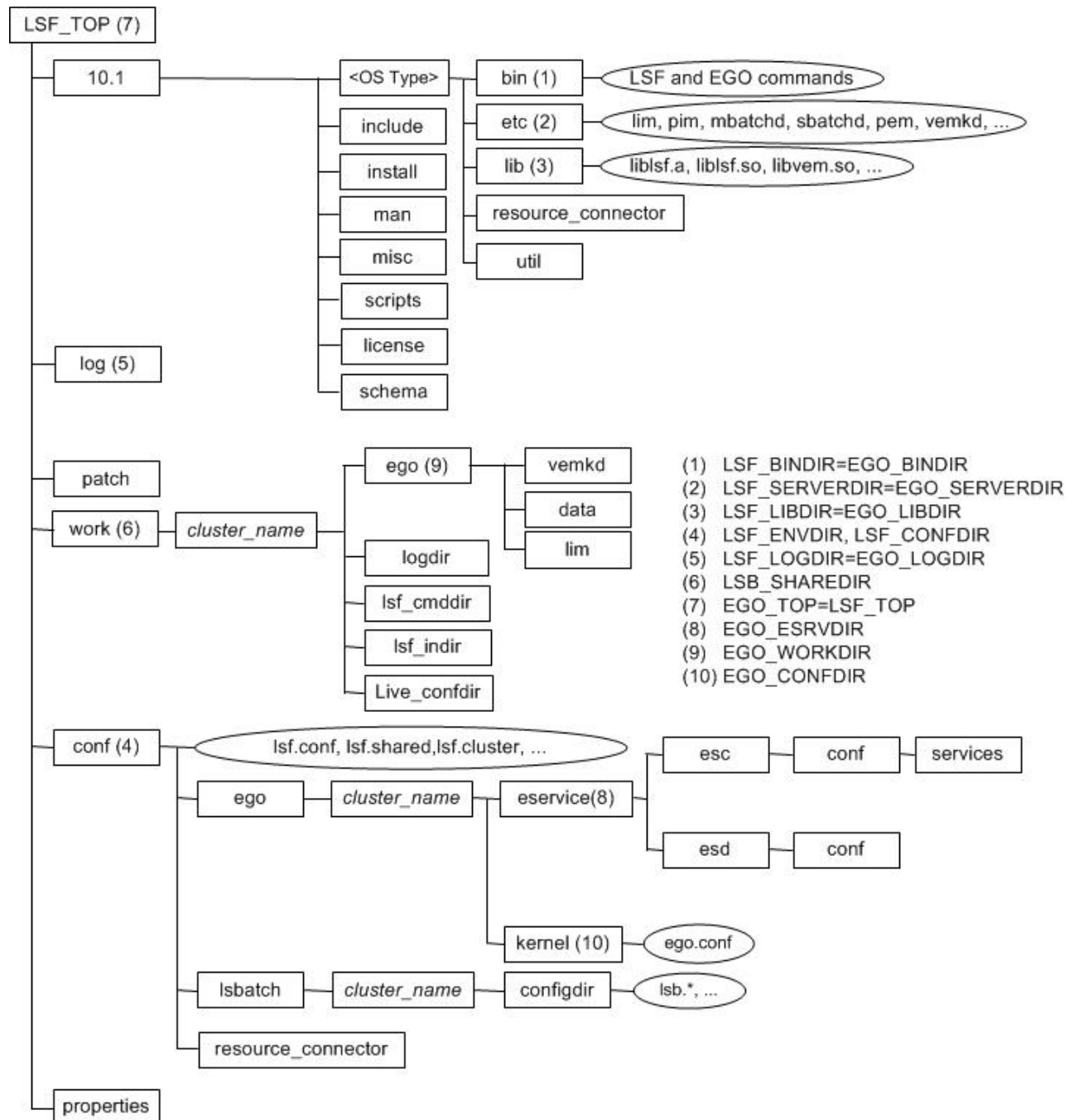
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Chapter 1. Example installation directory structure

The following diagram illustrates an example directory structure after the LSF installation is complete.



Chapter 2. Planning 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 that has 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 that 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 tuned for a particular type of cluster.

PARALLEL

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

HIGH_THROUGHPUT

This template is 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 use more resources as the daemons become busier.

Note: Do not specify the `CONFIGURATION_TEMPLATE` parameter 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 Spectrum LSF Analytics or IBM Spectrum LSF Application Center, set `ENABLE_STREAM="Y"` to enable LSF event streaming.

- If you made any custom changes to your existing **esubs**, create a backup of these changes.
- If you are planning to run an unattended installation, set `SILENT_INSTALL="Y"` and `LSF_SILENT_INSTALL_TARLIST="ALL | Package_Name ..."`. The silent installation 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 installation, set `LSF_QUIET_INSTALL="Y"`. The quiet installation shows all messages but does not prompt for confirmations.

EGO in the LSF cluster

Enable EGO in the cluster to allow EGO to control services for components.

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

See Manage LSF on EGO 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 the **sbatchd** and **res** daemons.

Master host selection

To achieve the highest degree of performance and scalability, use a powerful master host.

LSF has no minimum CPU requirement. For the systems that LSF is supported on, any host with sufficient physical memory can run LSF as master host. Swap space is normally configured as twice the physical memory. LSF daemons in a cluster on Linux x86-64 use about 488 MB of memory when no jobs are running. Active jobs use most of the memory that LSF requires.

Cluster size	Active jobs	Minimum required memory (typical)	Recommended server CPU
			(Intel, AMD, OpenPower, or equivalent)
Small (<100 hosts)	1,000	1 GB (32 GB)	Any server CPU
	10,000	2 GB (32 GB)	Recent server CPU
Medium (100 - 1000 hosts)	10,000	4 GB (64 GB)	Multi-core CPU (2 cores)
	50,000	8 GB (64 GB)	Multi-core CPU (4 cores)
Large (>1000 hosts)	50,000	16 GB (128 GB)	Multi-core CPU (4 cores)
	500,000	32 GB (256 GB)	Multi-core CPU (8 cores)

Chapter 3. Preparing your systems for installation

Follow these steps to plan and prepare for installation.

- Make sure that the installation file system on the file server host has enough disk space for all host types.
- Make sure that the top level LSF installation directory (that is, the LSF_TOP directory, which is the same as the EGO_TOP directory) is accessible with the same path name from all hosts in the LSF cluster (for example, the /usr/share/lsf directory).
- Make sure that the installation file system that contains the LSF_TOP directory (EGO_TOP) is writable by the user account that is running the **lsfinstall** script.
- Create user accounts for LSF administrators (for example, create the **lsfadmin** user account).
- Get the LSF entitlement file for the edition you are installing:
 - **lsf_std_entitlement.dat** file for LSF Standard Edition
 - **lsf_exp_entitlement.dat** file for LSF Express Edition
 - **lsf_adv_entitlement.dat** file for LSF Advanced Edition
- Select the appropriate LSF installer script package:
 - **lsf10.1_lsfinstall_linux_x86_64.tar.Z** file for Linux x86_64 platforms that require the Linux JRE. Requires approximately 120 MB.
 - **lsf10.1_lsfinstall.tar.Z** file for all other platforms that require the JRE. Requires approximately 1300 MB.
 - **lsf10.1_no_jre_lsfinstall.tar.Z** file 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.
 - Linux x86_64 platforms

```
# zcat lsf10.1_lsfinstall_linux_x86_64.tar.Z | tar xvf -
```
 - Other platforms

```
# zcat lsf10.1_lsfinstall.tar.Z | tar xvf -
```
 - No JRE required

```
# zcat lsf10.1_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 **lsf10.1_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 through 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 searches for the JRE in **\$PATH**.

UNIX and Linux Installer packages

The same installer packages are used for LSF Express Edition, LSF Standard Edition, and LSF Advanced Edition on UNIX and Linux.

lsf10.1_lsfinstall.tar.Z

The standard installer package. Use this package in a heterogeneous cluster with a mix of systems other than x86-64. Requires approximately 1 GB free space.

lsf10.1_lsfinstall_linux_x86_64.tar.Z

Use this smaller installer package in a homogeneous x86-64 cluster. If you add other non-x86-64 hosts, you must use the standard installer package. Requires approximately 100 MB free space.

lsf10.1_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 free space.

lsf10.1_lsfinstall_linux_ppc64le.tar.Z

Installer package for Linux on IBM Power 6, 7, and 8 Little-Endian (LE) systems

IBM Spectrum LSF entitlement files

LSF uses *entitlement files* to determine which feature set is enabled or disabled based on the edition of the product.

The following LSF entitlement configuration files are available for each edition:

LSF Standard Edition

lsf_std_entitlement.dat

LSF Express Edition

lsf_exp_entitlement.dat

LSF Advanced Edition

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 the **LSF_ENTITLEMENT_FILE** parameter in the `install.config` file 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. Reinstall the cluster with the LSF Standard entitlement file (`lsf_std_entitlement.dat`).

You can also upgrade to LSF Advanced Edition to take advantage of even more functionality. Reinstall the cluster with the LSF Advanced entitlement file (`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 `lsf_std_entitlement.dat` or `lsf_adv_entitlement.dat`, copy it to `<LSF_TOP>/conf/lsf.entitlement`, and restart your cluster. The new entitlement configuration enables extra functionality, but you might need to change some of the default LSF Express configuration parameters to use the LSF Standard Edition or LSF Advanced Edition features.

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

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.

Chapter 4. Installing a new LSF cluster

Run the **lsfinstall** script to install a new LSF cluster

1. Log in to the LSF installation file server as root.
If you are not root, see Chapter 6, “If you install LSF as a non-root user,” on page 13.
2. Change to the `lsf10.1_lsfinstall/` directory.
3. Edit the `./install.config` or `./slave.config` file to specify the installation variables you want.

Uncomment the options that 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 the **lsfinstall** script is run.

- **CONFIGURATION_TEMPLATE** (LSF Standard Edition only)

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

If you intend to include some servers in your cluster that do not share the specified **LSF_TOP** file path in the `slave.config` file, then you must complete the `slave.config` file and run the following command:

```
lsfinstall -f -s slave.config
```

4. Run the **lsfinstall** script command while specifying the `install.config` file to install the cluster.

```
lsfinstall -f install.config
```

5. Test your cluster by running some basic LSF commands.

For example, run the **lsid**, **lshosts**, and **bhosts** commands.

Chapter 5. Configuring a cluster

Set your LSF environment, enable LSF for users, start your cluster, and run some basic commands to test your installation. You can optionally run the **hostsetup** script to set up LSF to start automatically.

To complete your LSF installation and get your cluster up and running, follow the steps in the `lsf_getting_started.html` file. After you set up your LSF server hosts and verify that your cluster is running correctly, see the `lsf_quick_admin.html` file to learn more about your new LSF cluster. After installation, remember to bring your cluster up to date by applying the latest updates and bug fixes.

1. Log in 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

2. Optional. Enable LSF for users.

Ensure that all users include <LSF_TOP>/conf/cshrc.lsf or <LSF_TOP>/conf/profile.lsf in their .cshrc or .profile files.

3. Run the **lsfstartup** command to start the cluster.

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

```
LSF_RSH=ssh
```

4. Optional. Run the **hostsetup** command to set up LSF hosts and automatic LSF startup.

Note: Running the **hostsetup** command is only required if you will be running IBM POE jobs by using IBM Parallel Environment (IBM PE).

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

Note:

If you are integrating LSF with IBM PE, you must log in as root.

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

- b. Run the **hostsetup** command on each LSF server host.

Important: Before you run the **hostsetup** command, make sure that the hosts you want to set up are in the `lsf.cluster.cluster_name` file.

For example, run the following commands to use the LSF cluster that is installed in the `/usr/share/lsf` directory and configure LSF daemons to start automatically at boot time:

```
# cd /usr/share/lsf/10.1/install
# ./hostsetup --top="/usr/share/lsf" --boot="y"
```

For complete usage of the **hostsetup** command, run the **hostsetup -h** command.

5. Test your cluster by running some basic LSF commands.

For example, run the **lsid**, **lshosts**, and **bhosts** commands.

After you test your cluster, be sure that all LSF users include the `LSF_CONFDIR/cshrc.lsf` or `LSF_CONFDIR/profile.lsf` commands in their `.cshrc` or `.profile` files.

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, then set file ownership and permissions for specific files.

Single user

Your user account must be the 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 the `/dev/kmem` device.

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 the **lsadmin** and **badmin** binary files 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 the **swtbl_api** and **ntbl_api** binary files 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. Adding hosts to the cluster

Run the **hostsetup** command on a host to add that host to the cluster.

Note: If you plan to run IBM POE jobs by using IBM Parallel Environment Runtime Edition (or IBM PE Runtime Edition), you must run the **hostsetup** command.

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

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

This command sets up a host to use the cluster that is installed in the `/usr/share/lsf` directory. It also configures the LSF daemons to start automatically (with the `--boot="y"` option).

- `# hostsetup --top="/usr/share/lsf" --silent`

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

Adding a remote host with the **rhostsetup** command

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

- **LSF_RSHCMD** is the remote shell command (for example, the **rsh** or **ssh** commands) accessing the remote host.
- **LSF_HOSTS** lists hosts on which to run the **hostsetup** command.
- **LSF_TOPDIR** sets the **hostsetup --top** option. Specify the full path to the top-level installation directory. If the path is not defined here, **rhostsetup** attempts to detect the top-level installation directory from the `lsf.conf` file.
- **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 start **hostsetup** on remote hosts.

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

The **rhostsetup** script uses either **ssh** or **rsh**. It is included in the installer script package `lsf10.1_lsfinstall.tar.Z` and is located in the `lsf10.1_lsfinstall` directory, which is created when you decompress and extract the installer script package.

After installation, the **rhostsetup** script is located in the `<LSF_TOP>/10.1/install/` directory.

Run the **rhostsetup** script.

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

Chapter 8. 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. Add the appropriate resource names under the RESOURCES column of the Host section of the `lsf.cluster.cluster_name` file.

The HPC feature installation automatically configures the following files:

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

lsb.modules

- The HPC feature installation adds the external scheduler plug-in module names to the PluginModule section of the `lsb.modules` file:

```
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_demand       ()           ()
schmod_aps           ()           ()
schmod_cpuset        ()           ()
End PluginModule
```

Note:

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

lsb.resources

For IBM POE jobs, the HPC feature installation configures the ReservationUsage section in the `lsb.resources` file to reserve HPS resources on a per-slot basis.

Resource usage that is defined in the ReservationUsage section overrides the cluster-wide **RESOURCE_RESERVE_PER_TASK** parameter that is defined in the `lsb.params` file if it also exists.

```

Begin ReservationUsage
RESOURCE          METHOD
adapter_windows   PER_TASK
nrt_windows       PER_TASK
End ReservationUsage

```

lsb.queues

The HPC feature installation 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
#DATA LIMIT     = 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 Spectrum LSF 10.1 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
#DATA LIMIT     = 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 Spectrum LSF 10.1 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
#DATA LIMIT   = 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 Spectrum LSF 10.1 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
#DATA LIMIT    = 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 Spectrum LSF 10.1 for IBM debug queue. This queue is to run POE jobs ONLY.
End Queue

```

lsf.cluster.cluster_name

For IBM POE jobs, the HPC feature installation configures the ResourceMap section of the `lsf.cluster.cluster_name` file 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

The HPC feature installation defines the following parameters in the `lsf.conf` file:

LSB_SUB_COMMANDNAME=Y

Enables the **LSF_SUB_COMMANDLINE** environment variable that is required by the **esub** script.

LSF_ENABLE_EXTSCHEULER=Y

LSF uses an external scheduler for topology-aware external scheduling.

LSB_CPUSSET_BESTCPUS=Y

LSF schedules jobs based on the shortest CPU radius in the processor topology by 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

Defines the TCP port that is used for communication between the LSF HPC topology adapter (RLA) and the **sbatchd** daemon. The default port number is 6883.

LSB_SHORT_HOSTLIST=1

Displays an abbreviated list of hosts in the **bjobs** and **bhist** commands 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

The HPC feature installation defines the following shared resources that are required by HPC features in the `lsf.shared` file:

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)	
hammer	Boolean	()	()	(hammer 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 the installer enables the LSF HPC features, you can define optional parameters in the `lsf.conf` file.

Define the following optional parameters in the `lsf.conf` file for use with the HPC features:

LSF_LOGDIR=*directory*

In large clusters, set the **LSF_LOGDIR** parameter to a local file system. For example, `/var/log/lsf`.

LSB_RLA_WORKDIR=*directory*

Define 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 that is defined by the **LSB_RLA_WORKDIR** if it does not exist, then creates subdirectories for each host.

Do not use `/tmp` or any other directory that is automatically cleaned up by the system. Unless your installation has restrictions on the **LSB_SHAREDIR** directory, use the default value, which is `LSB_SHAREDIR/cluster_name`.

LSF_VPLUGIN=*directory*

On Linux hosts running HP MPI, set the full path to the HP vendor MPI library `libmpirm.so`. For example, `/opt/hpmi/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). The default is 600 seconds.

Chapter 9. Registering service ports

By default, port numbers for LSF services are defined in the `lsf.conf` file. You can also configure ports by modifying the `/etc/services` file or the NIS or NIS+ database. If you define port numbers in the `lsf.conf` file, port numbers that are defined in the service database are ignored.

LSF uses dedicated UDP and TCP ports for communication. All hosts in the cluster must use the same port numbers to communicate with each other.

The service port numbers can be any numbers 1024 - 65535 that are not already used by other services.

Make sure that the port numbers you supply are not already used by applications that are registered in your service database by checking the `/etc/services` file or by using the command **ypcat services**

lsf.conf

By default, port numbers for LSF services are defined in the `lsf.conf` file. You can also configure ports by modifying the `/etc/services` file or the NIS or NIS+ database. If you define port numbers in the `lsf.conf` file, port numbers that are defined in the service database are ignored.

1. Log on to any host as root.
2. Edit the `lsf.conf` file and add the following lines:

```
LSF_RES_PORT=3878
LSB_MBD_PORT=3881
LSB_SBD_PORT=3882
```
3. Add the same entries to the `lsf.conf` file on every host.
4. Save the `lsf.conf` file.
5. Run the **lsadmin reconfig** command to reconfigure LIM.
6. Run the **badmin mbdrestart** command to restart the **mbatchd** daemon.
7. Run the **lsfstartup** command to restart all daemons in the cluster.

/etc/services

Configuring services manually

Tip:

During installation, use the **hostsetup --boot="y"** option to set up the LSF port numbers in the service database.

1. Use the `LSF_TOP/version/install/instlib/example.services` file as a guide for adding LSF entries to the services database.

If any other service that is listed in your services database has the same port number as one of the LSF services, you must change the port number for the LSF service. You must use the same port numbers on every LSF host.

2. Log on to any host as root.

3. Edit the `/etc/services` file and add the contents of the `LSF_TOP/version/install/instlib/example.services` file:


```
# /etc/services entries for LSF daemons
#
res      3878/tcp # remote execution server
lim      3879/udp # load information manager
mbatchd 3881/tcp # master lsbatch daemon
sbatchd 3882/tcp # slave lsbatch daemon
#
# Add this if ident is not already defined
# in your /etc/services file
ident 113/tcp auth tap # identd
```
4. Run the **lsadmin reconfig** command to reconfigure LIM.
5. Run the **badmin reconfig** command to reconfigure **mbatchd**.
6. Run the **lsfstartup** command to restart all daemons in the cluster.

NIS or NIS+ database

If you are running NIS, you need to modify the services database only one time per NIS master. On some hosts, the NIS database and commands are in the `/var/yp` directory; on others, NIS is found in the `/etc/yp` directory.

1. Log on to any host as root.
2. Run the `lsfshutdown` command to shut down all the daemons in the cluster.
3. To find the name of the NIS master host, use the command:

```
ypwhich -m services
```

4. Log on to the NIS master host as root.
5. Edit the `/var/yp/src/services` or `/etc/yp/src/services` file on the NIS master host and add the contents of the `LSF_TOP/version/install/instlib/example.services` file:

```
# /etc/services entries for LSF daemons.
#
res      3878/tcp # remote execution server
lim      3879/udp # load information manager
mbatchd 3881/tcp # master lsbatch daemon
sbatchd 3882/tcp # slave lsbatch daemon
#
# Add this if ident is not already defined
# in your /etc/services file
ident 113/tcp auth tap # identd
```

Make sure that all the lines you add either contain valid service entries or begin with a comment character (`#`). Blank lines are not allowed.

6. Change the directory to `/var/yp` or `/etc/yp`.
7. Use the following command:

```
ypmake services
```

On some hosts, the master copy of the services database is stored in a different location.

On systems that run NIS+, the procedure is similar. For more information, see your system documentation.

8. Run the **lsadmin reconfig** command to reconfigure LIM.
9. Run the **badmin reconfig** command to reconfigure the **mbatchd** daemon.
10. Run the **lsfstartup** command to restart all daemons in the cluster.

Chapter 10. install.config

The `install.config` file contains options for LSF installation and configuration. Use the `lsfinstall -f install.config` command to install LSF with the options that are specified in the `install.config` file.

Template location

A template `install.config` is included in the installer script package `lsf10.1_lsfinstall.tar.Z` and is located in the `lsf10.1_lsfinstall` directory that is created when you decompress and extract the installer script package. Edit the file and uncomment the options that 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` file that contains the options that you specified is located in the `LSF_TOP/10.1/install/` directory.

Format

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

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

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

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

Blank lines and lines that start with a number 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 that are specified when the installation is complete. The following are valid values for this parameter:

DEFAULT

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

PARALLEL

This template provides extra support for large parallel jobs. Since this configuration is designed for long running parallel jobs, do not use this configuration for clusters that mainly run short jobs due to the longer reporting time for each job.

HIGH_THROUGHPUT

This template is 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 uses 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 the **CONFIGURATION_TEMPLATE** parameter 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"
```

For a full description of the PARALLEL configuration template, refer to *Enable LSF HPC features in Installing IBM Spectrum LSF on UNIX and Linux*.

lsb.params

```
JOB_DEP_LAST_SUB=1
JOB_SCHEDULING_INTERVAL=1
NEWJOB_REFRESH=Y
TRACK_ELIGIBLE_PENDINFO=Y
```

- **HIGH_THROUGHPUT**

lsf.conf

```
LSB_MAX_PACK_JOBS=300
LSB_SHORT_HOSTLIST=1
```

lsb.params

```
JOB_SCHEDULING_INTERVAL=50ms
MAX_INFO_DIRS=500
MAX_JOB_ARRAY_SIZE=10000
MAX_JOB_NUM=100000
MIN_SWITCH_PERIOD=1800
NEWJOB_REFRESH=YSBD_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_SLEEP_TIME_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
RELAX_JOB_DISPATCH_ORDER=Y
```

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

- Fairshare scheduling (LSF Standard Edition and Advanced Edition): The following example for the `lsb.queues` file enables fairshare scheduling for all queues except `admin` and `license`:

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

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

Example

```
EGO_DAEMON_CONTROL="N"
```

Default

N (the **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 the **LSF_HOST_ADDR_RANGE** parameter in the `lsf.cluster.cluster_name` file 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 functions in the LSF cluster.

ENABLE_EGO="Y" causes the `lsfinstall` command to uncomment the **LSF_EGO_ENVDIR** parameter and sets the **LSF_ENABLE_EGO="Y"** parameter in the `lsf.conf` file.

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

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

- LSF daemon control by EGO service controller
- SLA scheduling with EGO enabled

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 Spectrum LSF Analytics or IBM Spectrum LSF Application Center.

Default

N (Event streaming is disabled)

LSF_ADD_SERVERS

Syntax

`LSF_ADD_SERVERS="host_name [host_name...]"`

Description

List of extra LSF server hosts.

The hosts in the **LSF_MASTER_LIST** parameter are always LSF servers. Use the **LSF_ADD_SERVERS** parameter to specify extra server hosts. Specify a list of host names two ways:

- Host names that are separated by spaces
- The name of a file that contains 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 `lsf_server_hosts` file contains a list of hosts:

```
hosta
hostb
hostc
hostd
```

Default

Only hosts in the **LSF_MASTER_LIST** parameter 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 the `lsf.cluster.cluster_name` file to include the host model and type of each client that is listed in the **LSF_ADD_CLIENTS** parameter.

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 `lsf_client_hosts` file 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. This user name cannot be the root user account.

Typically, this account is named `lsfadmin`. This account owns the LSF configuration files and log files for job events. This account also has permission to reconfigure LSF and to control batch jobs that are submitted by other users. The primary LSF administrator 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 cannot 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 that contains 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 that the slave LIM waits after startup before it calls the master LIM to add the slave host dynamically.

This parameter takes effect only 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.

Specify a 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 acknowledgment from the master LIM. If it does not receive the acknowledgment 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 enable or disable based on the edition of the product. The entitlement file for LSF Standard Edition is `lsf_std_entitlement.dat`. For LSF Express Edition, the file is `lsf_exp_entitlement.dat`. For LSF Advanced Edition, the file is `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 the **LSF_ENTITLEMENT_FILE** parameter to the full path to the entitlement file you downloaded.

After 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 that is 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 that contains all LSF package names to be installed. This name list applies only to the silent installation mode. Supports keywords all, ALL, and All, which can install all packages in the directory that is specified by the **LSF_TARDIR** parameter.

```
LSF_SILENT_INSTALL_TARLIST="ALL" | "lsf10.1_linux2.6-glibc2.3-x86_64.tar.Z"
```

Default

None

LSF_TARDIR

Syntax

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

Description

Full path to the directory that contains the LSF distribution TAR files.

Example

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


Default

The parent directory of the current working directory. For example, if the **lsfinstall** command is running under the `usr/share/lsf_distrib/lsf_lsfinstall` directory, the default value of the **LSF_TARDIR** parameter 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 the **LSF_TOP** directory must be shared and accessible to all hosts in the cluster. It cannot be the root directory (/). The file system that contains the **LSF_TOP** directory 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 that contains the patch backup directory must have sufficient disk space to back up your files, which is approximately 400 MB per binary type if you want to be able to install and roll back one enhancement pack and a few more fixes. It cannot be the root directory (/).

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

If you need to change the directory after installation, edit the **PATCH_BACKUP_DIR** parameter in the `LSF_TOP/patch.conf` directory 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 exists, it must be writable by `lsfadmin`.

The location is saved as the **PATCH_HISTORY_DIR** parameter in the `LSF_TOP/patch.conf` directory. 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 that you want to do the silent installation and accept the license agreement.

Default

N

Chapter 11. slave.config

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

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.

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

Template location

A template `slave.config` file 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 the `slave.config` file 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 the 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 the **EGO_DAEMON_CONTROL** parameter in the `slave.config` file must be the same as the specification for the **EGO_DAEMON_CONTROL** parameter in the `install.config` file).

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 the `lsfinstall` command to uncomment the **LSF_EGO_ENVDIR** parameter and sets the **LSF_ENABLE_EGO="Y"** parameter in the `lsf.conf` file.

ENABLE_EGO="N"

Causes the `lsfinstall` command to comment out the **LSF_EGO_ENVDIR** parameter and sets the **LSF_ENABLE_EGO="N"** parameter in the `lsf.conf` file.

Set the value to "Y" 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 `lsf_std_entitlement.dat`. For LSF Express Edition, the file is `lsf_exp_entitlement.dat`. For LSF Advanced Edition, the file is `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_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" | "lsf10.1_linux2.6-glibc2.3-x86_64.tar.Z"
```

Default

None

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