
Using the Platform LSF blaunch Framework

Platform LSF
Version 8.0
January 2011



Copyright

© 1994-2011 Platform Computing Corporation.

Although the information in this document has been carefully reviewed, Platform Computing Corporation ("Platform") does not warrant it to be free of errors or omissions. Platform reserves the right to make corrections, updates, revisions or changes to the information in this document.

UNLESS OTHERWISE EXPRESSLY STATED BY PLATFORM, THE PROGRAM DESCRIBED IN THIS DOCUMENT IS PROVIDED "AS IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL PLATFORM COMPUTING BE LIABLE TO ANYONE FOR SPECIAL, COLLATERAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION ANY LOST PROFITS, DATA, OR SAVINGS, ARISING OUT OF THE USE OF OR INABILITY TO USE THIS PROGRAM.

We'd like to hear from you

You can help us make this document better by telling us what you think of the content, organization, and usefulness of the information. If you find an error, or just want to make a suggestion for improving this document, please address your comments to doc@platform.com.

Your comments should pertain only to Platform documentation. For product support, contact support@platform.com.

Document redistribution and translation

This document is protected by copyright and you may not redistribute or translate it into another language, in part or in whole.

Internal redistribution

You may only redistribute this document internally within your organization (for example, on an intranet) provided that you continue to check the Platform Web site for updates and update your version of the documentation. You may not make it available to your organization over the Internet.

Trademarks

LSF is a registered trademark of Platform Computing Corporation in the United States and in other jurisdictions.

ACCELERATING INTELLIGENCE, PLATFORM COMPUTING, PLATFORM SYMPHONY, PLATFORM JOB SCHEDULER, PLATFORM ISF, PLATFORM ENTERPRISE GRID ORCHESTRATOR, PLATFORM EGO, and the PLATFORM and PLATFORM LSF logos are trademarks of Platform Computing Corporation in the United States and in other jurisdictions.

UNIX is a registered trademark of The Open Group in the United States and in other jurisdictions.

Linux is the registered trademark of Linus Torvalds in the U.S. and other countries.

Microsoft is either a registered trademark or a trademark of Microsoft Corporation in the United States and/or other countries.

Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

Intel, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Other products or services mentioned in this document are identified by the trademarks or service marks of their respective owners.

Third-party license agreements

<http://www.platform.com/Company/third.part.license.htm>

Third-party copyright notices

<http://www.platform.com/Company/Third.Party.Copyright.htm>

Contents

Open MPI	5
Platform MPI	6
MVAPICH	7
Intel MPI and mpich2	8

Open MPI

LSF must be installed and running. You must build Open MPI according to the Open MPI documentation for implement Open MPI with LSF.

Open MPI 1.3.2 and up is tightly integrated with LSF's blaunch functionality.

1. Run Open MPI jobs in LSF.

```
bsub -n2 -o %J.out -e %J.err mpiexec mympi.out
```

Platform MPI

Platform MPI (formerly HP-MPI) is partially integrated with LSF.

1. Set the MPI_REMSH environment variable.

MPI_REMSH=blaunch;export MPI_REMSH

2. Run your job. For example:

bsub -n 16 -R "span[ptile=4]" \$MPI_ROOT/bin/mpirun -lsb_mcpu_hosts a.out

Using Platform MPI with Infiniband:

bsub -n 16 -R "span[ptile=4]" \$MPI_ROOT/bin/mpirun -lsb_mcpu_hosts -IBV a.out

MVAPICH

MVAPICH can be integrated with LSF.

1. Choose from two options:

- a) Change the MVAPICH source code (if you only want to run MVAPICH with LSF).

Modify the MVAPICH source code: `RSH_CMD = 'bl aunch'` and build the package.

- b) Write a wrapper script.

Wrap `/usr/bin/rsh` on the first execution host or all candidate execution hosts for `bl aunch` as follows:

Example wrapper script:

```
cat /usr/bin/rsh
#!/bin/sh
#
# wrapper /usr/bin/rsh
# blaunch is used when applicable
#
if [ -z "$LSF_BINDIR" \
    -o -z "$LSB_JOBID" \
    -o -z "$LSB_JOBINDEX" \
    -o -z "$LSB_JOBRES_CALLBACK" \
    -o -z "$LSB_DJOB_HOSTFILE" ]; then
    RSH="/usr/bin/rsh. bin"
else
    RSH=$LSF_BINDIR/bl aunch
fi
SRSH $*
```

- c) If you wrote a wrapper script, specify host file with a script.

Example:

```
cat run.mvapich
#!/bin/sh
#BSUB -n 2
#BSUB -o %J.out
#BSUB -e %J.err
#BSUB -R 'span[ptile=1]'
mpirun_rsh -rsh -np $LSB_DJOB_NUMPROC -hostfile $LSB_DJOB_HOSTFILE mympi
```

2. Run **bsub**.

For example, **bsub < run.mvapich**.

Intel MPI and mpich2

Intel MPI is a variation of MPICH2. This solution applies to either integration.

1. Create a wrapper script around mpdboot, without the daemonize option.

It should:

- loop all hosts and blaunch mpd without -d option in background
- at the end, check whether the mpd ring is constructed correctly
- exit 0 if correctly constructed, otherwise print out error

Example:

```
#!/usr/bin/env python2.3
"""
mpdboot for LSF
[-f | --hostfile hostfile]
[-i | --ifhn=alternate_interface_hostname_of_ip_address]
[-f | --hostfile hostfile]
[-h]
"""
import re
import string
import time
import sys
import getopt
from time import ctime
from os import environ, path
from sys import argv, exit, stdout
from popen2 import Popen4
from socket import gethostname, gethostbyname

def mpdboot():
    # change me
    MPI_ROOTDIR="/opt/mpich2"
    #
    mpdCmd="%s/bin/mpd" % MPI_ROOTDIR
    mpdtraceCmd="%s/bin/mpdtrace" % MPI_ROOTDIR
    mpdtraceCmd2="%s/bin/mpdtrace -l" % MPI_ROOTDIR
    nHosts = 1
    host=""
    ip=""
    localHost=""
    localIp=""
    found = False
    MAX_WAIT = 5
    t1 = 0
    hostList=""
    hostTab = {}
    cols = []
    hostArr = []
    hostfile = environ.get('LSB_DJOB_HOSTFILE')
    binDir = environ.get('LSF_BINDIR')
    if environ.get('LSB_MCPU_HOSTS') == None \
        or hostfile == None \
        or binDir == None:
        print "not running in LSF"
        exit (-1)
    rshCmd = binDir + "/blaunch"
    p = re.compile("\w+_d+s+(\d+.\d+.\d+.\d+)")
    #
    try:
        opts, args = getopt.getopt(sys.argv[1:], "hf:i:", ["help", "hostfile=", "ifhn="])
    except getopt.GetoptError, err:
        print str(err)
        usage()
        sys.exit(-1)
    fileName = None
```



```

ifhn = None
for o, a in opts:
    if o == "-v":
        version()
        sys.exit()
    elif o in ("-h", "--help"):
        usage()
        sys.exit()
    elif o in ("-f", "--hostfile"):
        fileName = a
    elif o in ("-i", "--ifhn"):
        ifhn = a
    else:
        print "option %s unrecognized" % o
        usage()
        sys.exit(-1)
if fileName == None:
    if ifhn != None:
        print "--ifhn requires a host file containing 'hostname
ifhn=alternate_interface_hostname_of_ip_address'\n"
        sys.exit(-1)
    # use LSB_DJOB_HOSTFILE
    fileName = hostfile
localHost = gethostname()
localIp = gethostbyname(localHost)
pihn = re.compile("\w\s+ifhn=\d+\.\d+\.\d+\.\d+")
try:
    # check the hostfile
    machinefile = open(fileName, "r")
    for line in machinefile:
        if not line or line[0] == '#':
            continue
        line = re.split('#', line)[0]
        line = line.strip()
        if not line:
            continue
        if not pihn.match(line):
            # should not have --ifhn option
            if ifhn != None:
                print "host file %s not valid for --ifhn" % (fileName)
                print "host file should contain 'hostname ifhn=ip_address'"
                sys.exit(-1)
            host = re.split(r'\s+', line)[0]
            if cmp(localHost, host) == 0 \
                or cmp(localIp, gethostbyname(host)) == 0:
                continue
            hostTab[host] = None
        else:
            # multiple blaunch-es
            cols = re.split(r'\s+ifhn=', line)
            host = cols[0]
            ip = cols[1]
            if cmp(localHost, host) == 0 \
                or cmp(localIp, gethostbyname(host)) == 0:
                continue
            hostTab[host] = ip
            nHosts += 1
            #print "line: %s" % (line)
    machinefile.close()
except IOError, err:
    print str(err)
    exit(-1)
# launch an mpd on local host
if ifhn != None:
    cmd = mpdCmd + " --ifhn=%s " % (ifhn)
else:
    cmd = mpdCmd
print "Starting an mpd on localhost:", cmd
Popen4(cmd, 0)
# wait til 5 seconds at max
while t1 < MAX_WAIT:
    time.sleep(1)
    trace = Popen4(mpdtraceCmd2, 0)

```

```

# hostname_portnumber (IP address)
line = trace.fromchild.readline()
if not p.match(line):
    t1 += 1
    continue
strings = re.split('\s+', line)
(basehost, baseport) = re.split('_', strings[0])
#print "host:", basehost, "port:", baseport
found = True
host=""
break
if not found:
    print "Cannot start mpd on localhost"
    sys.exit(-1)
else:
    print "Done starting an mpd on localhost"
# launch mpd on the rest of hosts
if nHosts < 2:
    sys.exit(0)
print "Constructing an mpd ring ..."
if ifhn != None:
    for host, ip in hostTab.items():
        #print "host : %s ifhn %s\n" % (host, ip)
        cmd="%s %s %s -h %s -p %s --ifhn=%s" % (rshCmd, host, mpdCmd, basehost, baseport, ip)
        #print "cmd:", cmd
        Popen4(cmd, 0)
else:
    for host, ip in hostTab.items():
        #print "host : %s ifhn %s\n" % (host, ip)
        hostArr.append(host + " ")
    hostList = string.join(hostArr)
    #print "hostList: %s" % (hostList)
    cmd="%s -z \'%s\' %s -h %s -p %s" % (rshCmd, hostList, mpdCmd, basehost, baseport)
    #print "cmd:", cmd
    Popen4(cmd, 0)
# wait till all mpds are started
MAX_TIMEOUT = 300 + 0.1 * (nHosts)
t1 = 0
started = False
while t1 < MAX_TIMEOUT:
    time.sleep(1)
    trace = Popen4(mpdtraceCmd, 0)
    if len(trace.fromchild.readlines()) < nHosts:
        t1 += 1
        continue
    started = True
    break
if not started:
    print "Failed to construct an mpd ring"
    exit(-1)
print "Done constructing an mpd ring at ", ctime()
def usage():
    print __doc__
if __name__ == '__main__':
    mpdboot()

```

```

cat run.intelmpi
#!/bin/sh
#BSUB -n 2
#BSUB -o %J.out
#BSUB -e %J.err
mpdboot.lsf
mpiexec -np $NUMPROC mympi.out
mpdall exit

```

2. Run bsub.

For example, **bsub < run.intelmpi**.

Index

H

HP MPI 6

I

Intel MPI 8

M

mpich2 8

MVAPICH 7

O

Open MPI 5