



# Sun HPC ClusterTools™ 8.2.1 Software Release Notes

---

Sun Microsystems, Inc.  
[www.sun.com](http://www.sun.com)

Part No. 821-0840-10  
October 2009, Revision A

Submit comments about this document by clicking the Feedback[+] link at: <http://www.sun.com>

Copyright 2009 Sun Microsystems, Inc., 4150 Network Circle, Santa Clara, California 95054, U.S.A. All rights reserved.

U.S. Government Rights - Commercial software. Government users are subject to the Sun Microsystems, Inc. standard license agreement and applicable provisions of the FAR and its supplements.

This distribution may include materials developed by third parties.

Parts of the product may be derived from Berkeley BSD systems, licensed from the University of California. UNIX is a registered trademark in the U.S. and in other countries, exclusively licensed through X/Open Company, Ltd.

Sun Microsystems, the Sun logo, Java, Netra, Solaris, docs.sun.com, Sun HPC ClusterTools, Sun Cluster, and Sun are trademarks or registered trademarks of Sun Microsystems, Inc. or its subsidiaries in the U.S. and other countries.

All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. in the U.S. and other countries. Products bearing SPARC trademarks are based upon architecture developed by Sun Microsystems, Inc.

AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices.

Products covered by and information contained in this service manual are controlled by U.S. Export Control laws and may be subject to the export or import laws in other countries. Nuclear, missile, chemical biological weapons or nuclear maritime end uses or end users, whether direct or indirect, are strictly prohibited. Export or reexport to countries subject to U.S. embargo or to entities identified on U.S. export exclusion lists, including, but not limited to, the denied persons and specially designated nationals lists is strictly prohibited.

DOCUMENTATION IS PROVIDED "AS IS" AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID.

---

Copyright 2009 Sun Microsystems, Inc., 4150 Network Circle, Santa Clara, California 95054, Etats-Unis. Tous droits réservés.

Cette distribution peut comprendre des composants développés par des tierces parties.

Des parties de ce produit pourront être dérivées des systèmes Berkeley BSD licenciés par l'Université de Californie. UNIX est une marque déposée aux Etats-Unis et dans d'autres pays et licenciée exclusivement par X/Open Company, Ltd.

Sun Microsystems, le logo Sun, Java, Netra, Solaris, docs.sun.com, Sun HPC ClusterTools, Sun Cluster, et Sun sont des marques de fabrique ou des marques déposées de Sun Microsystems, Inc. ou ses filiales aux Etats-Unis et dans d'autres pays.

Toutes les marques SPARC sont utilisées sous licence et sont des marques de fabrique ou des marques déposées de SPARC International, Inc. aux Etats-Unis et dans d'autres pays. Les produits portant les marques SPARC sont basés sur une architecture développée par Sun Microsystems, Inc.

AMD, Opteron, le logo AMD, et le logo AMD Opteron sont des marques de fabrique ou des marques déposées de Advanced Micro Devices.

Les produits qui font l'objet de ce manuel d'entretien et les informations qu'il contient sont regis par la législation américaine en matière de contrôle des exportations et peuvent être soumis au droit d'autres pays dans le domaine des exportations et importations. Les utilisations finales, ou utilisateurs finaux, pour des armes nucléaires, des missiles, des armes biologiques et chimiques ou du nucléaire maritime, directement ou indirectement, sont strictement interdites. Les exportations ou réexportations vers des pays sous embargo des Etats-Unis, ou vers des entités figurant sur les listes d'exclusion d'exportation américaines, y compris, mais de manière non exclusive, la liste de personnes qui font objet d'un ordre de ne pas participer, d'une façon directe ou indirecte, aux exportations des produits ou des services qui sont regis par la législation américaine en matière de contrôle des exportations et la liste de ressortissants spécifiquement désignés, sont rigoureusement interdites.

LA DOCUMENTATION EST FOURNIE "EN L'ETAT" ET TOUTES AUTRES CONDITIONS, DECLARATIONS ET GARANTIES EXPRESSES OU TACITES SONT FORMELLEMENT EXCLUES, DANS LA MESURE AUTORISEE PAR LA LOI APPLICABLE, Y COMPRIS NOTAMMENT TOUTE GARANTIE IMPLICITE RELATIVE A LA QUALITE MARCHANDE, A L'APTITUDE A UNE UTILISATION PARTICULIERE OU A L'ABSENCE DE CONTREFACON.



Please  
Recycle



Adobe PostScript

# Contents

---

1. **Sun HPC ClusterTools 8.2.1  
Software Release Notes** 1
  - Major New Features 1
  - Related Software 1
  - Disabling Installation Notification 2
  - Mellanox Host Channel Adapter Support 3
  - Known Issues 3
    - PLPA does not recognize multiple hardware threads per core (CR 6887809) 3
    - On Some Linux Variants, Analyzer May Not Show ClusterTools MPI State Profiling Data (CR 6854789) 4
    - ClusterTools built with Pathscale compiler does not support XRC in OpenIB BTL. (CR 6852175) 4
    - MPI Library is Not Thread-Safe (CR 6474910) 4
    - Using udapl BTL on Local Zones Fails for MPI Programs (CR 6480399) 5
    - udapl BTL in Open MPI Should Detect That a udapl Connection is Not Accessible and Not Just Hang (CR 6497612) 5
    - MPI Is Not Handling Resource Exhaustion Gracefully (CR 6499679) 6
    - Request Script Prevents SUNWompiat From Propagating to Nonglobal Zone During Zone Creation (CR 6539860) 6
    - udapl BTL Use of Fragment Free Lists Can Potentially Starve a Peer Connection and Prevent Progress (CR 6542966) 6

TotalView: MPI-2 Support Is Not Implemented (CR 6597772) 7

TotalView: Message Queue for Unexpected Messages is Not Implemented (CR 6597750) 7

Slow Startup Seen on Large SMP (CR 6559928) 8

DDT Message Queue Hangs When Debugging 64-Bit Programs (CR 6741546) 8

MPI\_Comm\_spawn Fails When uDAPL BTL is in Use on Solaris (CR 6742102) 8

# Sun HPC ClusterTools 8.2.1 Software Release Notes

---

This document describes late-breaking news about the Sun HPC ClusterTools™ 8.2.1 (ClusterTools 8.2.1) software. The information is organized into the following sections:

- [“Major New Features” on page 1](#)
- [“Related Software” on page 1](#)
- [“Disabling Installation Notification” on page 3](#)
- [“Mellanox Host Channel Adapter Support” on page 3](#)
- [“Known Issues” on page 3](#)

---

## Major New Features

The following feature has been added to Sun HPC ClusterTools software:

- Enhanced `paffinity` capabilities — New options have been added to `mpirun` to facilitate the binding of processes to processor sockets or cores for improved performance. The new options include `-bycore`, `-bysocket`, `-bind-to-core`, `-bind-to-socket`, `-bind-to-none`, and `-report-bindings`. For more information, see the `mpirun` man page.

---

## Related Software

Sun HPC ClusterTools 8.2.1 software works with the following versions of related software:

- Solaris™ 10 11/06 OS, or any subsequent Solaris 10 OS release that supports Sun HPC ClusterTools 8.2.1 software. If you are running Solaris 10 11/06 OS, you must install patch 125792-01 (for systems with SPARC® processors) or patch 125793-01 (for systems with AMD™ processors), plus any patches that those patches require.
- Red Hat Linux versions 5 (RHEL)
- SuSe Linux versions 10 (SLES)
- CentOS 5.3 Linux
- OpenSolaris 2009.06
- Sun™ Studio 10, 11, 12, and 12 U1 C, C++, and Fortran compilers
- gcc Linux compiler versions 3.3.3, 3.4.6, and 4.1.2
- Intel 11.0 20081105 compiler
- PGI 7.1-4 compiler
- Pathscale 3.2 compiler
- Distributed resource management (DRM) frameworks:
  - Sun™ Grid Engine Version 6.2
  - Altair PBS Professional 9.2 or Cluster Resources Torque 2.3
- Development Tools:
  - The TotalView 8.4.1 debugger from TotalView Technologies (formerly Etnus) supports debugging MPI applications on SPARC and AMD systems running the Solaris OS. Compatibility limitations might exist. See the TotalView Web site at [www.totalviewtech.com](http://www.totalviewtech.com) for a list of compilers that TotalView supports. For more information about using TotalView with OPEN MPI see the Open MPI FAQ at:  
<http://www.open-mpi.org/faq>
  - The DDT 2.1.3 debugger from Allinea also supports debugging on SPARC- and AMD-based systems running the Solaris OS.
  - The Sun Studio 12 U1 Performance Analyzer supports performance analysis of MPI applications on SPARC and x86/x64 systems.

---

**Note** – When TotalView is used to debug applications compiled with the Intel compiler, the stack trace feature is unable to display the full execution stack.

---

---

## Disabling Installation Notification

To improve ClusterTools, Sun collects anonymous information about your cluster during installation. If you want to turn this feature off, use the `-w` option with `ctinstall`.

The communication between `ctinstall` and Sun works only if the Sun HPC ClusterTools software installation process completes successfully. It does not work if the installation fails for any reason.

---

## Mellanox Host Channel Adapter Support

Sun HPC ClusterTools 8.2.1 software requires the Solaris OS to have the latest Infiniband updates to support use of the Mellanox ConnectX IB HCA.

This download is available at:

<http://www.sun.com/download/index.jsp?cat=Hardware%20Drivers&tab=3&subcat=InfiniBand>

For more information about Mellanox HCA support, contact the ClusterTools 8.2.1 software development alias at `ct-feedback@sun.com`.

---

## Known Issues

This section highlights some of the outstanding CRs (Change Requests) for the ClusterTools 8.2.1 software components. A CR might be a defect, or it might be an RFE (request for enhancement).

Each CR has an identifying number assigned to it. To avoid ambiguity when inquiring about a CR, include its CR number in any communications. The heading for each CR description includes the associated CR number.

## PLPA does not recognize multiple hardware threads per core (CR 6887809)

Running the default Clustertools 8.2.1 on a system with Hyper-Threads (such as Intel Xeon Processor x5570) could cause multiple processes to be bound to the same core, resulting in poor performance.

**Workaround:** Unless you are an expert user, you may want to avoid binding in this situation. You could use the default behavior or explicitly specify `-bind-to-none`. If you *are* an expert user, you can specify the exact binding behavior you want with rankfiles. See the `mpiexec` man page for more information about rankfiles

## On Some Linux Variants, Analyzer May Not Show ClusterTools MPI State Profiling Data (CR 6854789)

Analyzer experiments may not contain ClusterTools MPI State profiling data on some Linux systems when the application is compiled with GNU or Intel compilers. This issue is exhibited on the Linux variants RHEL 5.3 and CentOS 5.3.

**Workaround:** Supply the option `-wl, --enable-new-dtags` to ClusterTools `mpi*` link commands. This flag causes the compiled executable to define `RUNPATH` in addition to `RPATH`, allowing ClusterTools MPI State libraries to be enabled via the `LD_LIBRARY_PATH` environment variable.

## ClusterTools built with Pathscale compiler does not support XRC in OpenIB BTL. (CR 6852175)

The Pathscale and PGI environments in which ClusterTools 8.2.1 was built did not include OFED 1.3.1 or higher. Consequently, XRC support is not available with ClusterTools 8.2.1 built with either of these two compilers.

**Workaround:** Use ClusterTools 8.2.1 software with Sun Studio or GCC compiled libraries.

## MPI Library is Not Thread-Safe (CR 6474910)

The Open MPI library does not currently support thread-safe operations. If your applications contain thread-safe operations, they might fail.

**Workaround:** None.

## Using udapl BTL on Local Zones Fails for MPI Programs (CR 6480399)

If you run an MPI program using the udapl BTL in a local (nonglobal) zone in the Solaris OS, your program might fail and display the following error message:

```
Process 0.1.3 is unable to reach 0.1.0 for MPI communication.  
If you specified the use of a BTL component, you may have  
forgotten a component (such as "self") in the list of  
usable components.
```

```
PML add procs failed
```

```
--> Returned "Unreachable" (-12) instead of "Success" (0)
```

```
-----  
*** An error occurred in MPI_Init  
*** before MPI was initialized  
*** MPI_ERRORS_ARE_FATAL (goodbye)
```

**Workarounds:** Either run the udapl BTL in the Solaris global zone only, or use another interconnect (such as tcp) in the local zone.

## udapl BTL in Open MPI Should Detect That a udapl Connection is Not Accessible and Not Just Hang (CR 6497612)

This condition happens when the udapl BTL is not available on one node in a cluster. The Infiniband adapter on the node could be unavailable or misconfigured, or there might not be an Infiniband adapter on the node.

When you run an Open MPI program using the udapl BTL under such conditions, the program might hang or fail, but no error message is displayed. When a similar operation fails under the tcp BTL, the failure results in an error message.

**Workaround:** Add the following MCA parameter to your command line to exclude the udapl BTL:

```
--mca btl ^udapl
```

For more information about MCA parameters and how to exclude functions at the command line, refer to the *Sun HPC ClusterTools 8.2.1 Software User's Guide*.

## MPI Is Not Handling Resource Exhaustion Gracefully (CR 6499679)

If an MPI job exhausts the resources of the CPUs, the program can fail or show segmentation faults. This might happen when nodes are oversubscribed.

**Workaround:** Avoid oversubscribing the nodes.

For more information about oversubscribing nodes and the `--nooversubscribe` option, refer to the *Sun HPC ClusterTools 8.2.1 Software User's Guide*.

## Request Script Prevents SUNWompiat From Propagating to Nonglobal Zone During Zone Creation (CR 6539860)

When you set up nonglobal zones in the Solaris OS, the Solaris OS packages propagate from the global zone to the new zones.

However, if you installed Sun HPC ClusterTools software on the system before setting up the zones, `SUNWompiat` (the Open MPI installer package) does not get propagated to the new nonglobal zone. It causes the `Install_Uutilities` directory not to be available on nonglobal zones during new zone creation. This also means that the links to `/opt/SUNWhpc` do not get propagated to the local zone.

**Workaround:** There are two workarounds for this issue.

1. From the command line, use the full path to the Sun HPC ClusterTools executable you want to use. For example, type `/opt/SUNWhpc/HPC8.2.1/bin/mpirun` instead of `/opt/SUNWhpc/bin/mpirun`.
2. Reinstall Sun HPC ClusterTools 8.2.1 software in the non-global zone. This process allows you to activate Sun HPC ClusterTools 8.2.1 software (thus creating the links to the executables) on nonglobal zones.

## udapl BTL Use of Fragment Free Lists Can Potentially Starve a Peer Connection and Prevent Progress (CR 6542966)

When using a peer-to-peer connection with the `udapl` BTL (byte-transfer layer), the `udapl` BTL allocates a free list of fragments. This free list is used for send and receive operations between the peers. The free list does not have a specified

maximum size, so a high amount of communication traffic at one peer might increase the size of the free list until it interferes with the ability of the other peers to communicate.

This issue might appear as a memory resource issue to an Open MPI application. This problem has only been observed on large jobs where the number of uDAPL connections exceeds the default value of `btl_udapl_max_eager_rdma_peers`.

**Workaround:** For example, if an Open MPI application running over uDAPL/IB (Infiniband) reports an out-of-memory error for `alloc` or for privileged memory, and if those two values have already been increased, the following might allow the program to run successfully.

1. At the command line, add the following MCA parameter to your `mpirun` command:

```
--mca btl_udapl_max_eager_rdma_peers x
```

where  $x$  is equal to the number of peer uDAPL connections that the Open MPI job will establish.

2. If the setting in [Step 1](#) does not fix the problem, then set the following MCA parameter with the `mpirun` command at the command line:

```
--mca mpi_preconnect_all 1
```

## TotalView: MPI-2 Support Is Not Implemented (CR 6597772)

The TotalView debugger might not be able to determine if an `MPI_Comm_spawn` operation has occurred, and might not be able to locate the new processes that the operation creates. This is because the current version of the Open MPI message dumping library (`ompi/debuggers/ompi_dll.c`) does not implement the functions and interfaces for the support of MPI 2 debugging and message dumping.

**Workaround:** None.

## TotalView: Message Queue for Unexpected Messages is Not Implemented (CR 6597750)

The Open MPI DLL for the TotalView debugger does not support handling of unexpected messages. Only pending send and receive queues are supported.

**Workaround:** None.

## Slow Startup Seen on Large SMP (CR 6559928)

On a large SMP (symmetric multiprocessor) with many CPUs, ORTE might take a long time to start up before the MPI job runs. This is a known issue with the MPI layer.

---

**Note** – This behavior has improved in the ClusterTools 8.2 release as a result of changes in shared memory use. But the CR continues to be in effect.

---

**Workaround:** Reduce `mpool_sm_min_size` and `btl_sm_eager_limit` settings. This may shorten startup time. For more information, see the OMPI FAQ entry at:

<http://www.open-mpi.org/faq/?category=sm#decrease-sm>

## DDT Message Queue Hangs When Debugging 64-Bit Programs (CR 6741546)

When using the Allinea DDT debugger to debug an application compiled in 64-bit mode on a SPARC-based system, the program might not run when loaded into the DDT debugger. In addition, if you try to use the View ->Message Queue command, the debugger issues a popup dialog box with the message Gathering Data, and never finishes the operation.

**Workaround:** Set the environment variable `DDT_DONT_GET_RANK` to 1.

## MPI\_Comm\_spawn Fails When uDAPL BTL is in Use on Solaris (CR 6742102)

When using `MPI_Comm_spawn` or other spawn commands in Open MPI, the uDAPL BTL might hang and return timeout messages similar to the following:

```
[btl_udapl_component.c:1051:mca_btl_udapl_component_progress]
WARNING: connection event not handled :
DAT_CONNECTION_EVENT_TIMED_OUT
```

**Workaround:** Use the TCP BTL with the spawn commands instead of the uDAPL BTL. For example:

```
--mca btl self,sm,tcp
```

