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About this book

The book General Parallel File System for Linux®: Problem Determination Guide helps you handle any problems you may encounter with the GPFS licensed program.

Throughout this publication you will see various command and component names beginning with the prefix mmfs. This is not an error. GPFS shares many components with the related products IBM Multi-Media Server and IBM VideoCharger.

Who should use this book

This book is intended for system administrators of GPFS systems. It assumes that you are, and it is particularly important that you be, experienced with and understand the Linux® operating system and are familiar with the GPFS concepts presented in the General Parallel File System for Linux®: Concepts, Planning, and Installation Guide. It also assumes that you are familiar with the subsystems used to manage your disks.

Use the information in this book when diagnosing problems encountered with the usage of GPFS.

For a list of related books with which you should be familiar, see the Bibliography on page 121.

How this book is organized

This book consists of:

• Chapter 1, “GPFS problem determination tools”, on page 1 provided to assist you in isolating and correcting error conditions.
• Chapter 2, “Possible GPFS problems”, on page 13 a discussion of errors that might occur during the use of GPFS.
• Chapter 3, “Messages”, on page 43 includes explanations and suggested responses to error messages.
• “Glossary” on page 117
• “Bibliography” on page 121

Typography and terminology

This book uses the following typographical conventions:

<table>
<thead>
<tr>
<th>Convention</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bold</strong></td>
<td><strong>Bold</strong> words or characters represent system elements that you must use literally, such as commands, subcommands, flags, path names, directories, file names, values, and selected menu options.</td>
</tr>
<tr>
<td><strong>Bold Underlined</strong></td>
<td><strong>Bold Underlined</strong> keywords are defaults. These take effect if you fail to specify a different keyword.</td>
</tr>
</tbody>
</table>
| *Italic*         | *Italic* words or characters represent variable values that you must supply  
|                  | • *Italic* are used for book titles  
<p>|                  | • <em>Italics</em> are used for general emphasis.                                                                                          |</p>
<table>
<thead>
<tr>
<th>Convention</th>
<th>Usage</th>
</tr>
</thead>
</table>
| Monospace  | All of the following are displayed in monospace type:  
* Displayed information  
* Message text  
* Example text  
* Specified text typed by the user  
* Field names as displayed on the screen  
* Prompts from the system  
* References to example text |
| { }        | Brackets enclose optional items in format and syntax descriptions. |
| { }        | Braces enclose a list from which you must choose an item in format and syntax descriptions. |
| < >        | Angle brackets (less-than and greater-than) enclose the name of a key on the keyboard. For example, `<Enter>` refers to the key on your terminal or workstation that is labeled with the word Enter. |
| ...        | An ellipsis indicates that you can repeat the preceding item one or more times. |
| <Ctrl-x>   | The notation `<Ctrl-x>` indicates a control character sequence. For example, `<Ctrl-c>` means that you hold down the control key while pressing `<c>`. |
| \         | The continuation character is used in coding examples in this book for formatting purposes. |
What's new

This section summarizes all the changes made to IBM® General Parallel File System for Linux®:

- “What’s new for version 1.3 of GPFS for Linux”
- “Changes for version 1.2 of GPFS for Linux” on page xii

What’s new for version 1.3 of GPFS for Linux

GPFS 1.3 provides several usability enhancements:

- GPFS has been tested with additional Linux distributions, Linux kernels, and IBM hardware.
- For `atime` and `mtime` values as reported by the `stat`, `fstat`, `gpfs_stat`, and `gpfs_fstat` calls, you may:
  - Suppress updating the value of `atime`.
    When suppressing the periodic update, these calls will report the time the file was last accessed when the file system was mounted with the `-S no` option or, for a new file, the time the file system was created.
  - Display the exact value for `mtime`.
    The default is to periodically update the `mtime` value for a file system. If it is more desirable to display exact modification times for a file system, specify the `-E yes` option.

Commands which have been updated:

1. `mmcrfs`
2. `mmchfs`
3. `mmlsfs`

- The capability to read from or write to a file with direct I/O. The `mmchattr` command has been updated with the `-D` option for this support.
- The default use designation for nodes in your GPFS nodeset has been changed from `manager` to `client`.

Commands which have been updated:

1. `mmconfig`
2. `mmchconfig`

- The terms to `install/uninstall GPFS quotas` have been replaced by the terms `enable/disable GPFS quota management`.
- The GPFS documentation is no longer shipped on the product CD-ROM. You may download, view, search, and print the supporting documentation for the GPFS program product in the following ways:
  1. In PDF format:
     - From the IBM Publications Center at [www.ibm.com/shop/publications/order](http://www.ibm.com/shop/publications/order)

To view the GPFS PDF publications, you need access to either the Adobe Acrobat Reader or the xpdf package available with the Red Hat® Linux distribution. The Acrobat Reader is freely available for downloading from the Adobe web site at [www.adobe.com](http://www.adobe.com). Since the GPFS documentation contains cross-book links, if you choose to download the PDF files they should all be placed in the same directory.
To view the GPFS HTML publications, you need access to an HTML document browser such as Netscape. An index file into the HTML files (index.html) is provided when downloading the tar file of the GPFS HTML publications. Since the GPFS documentation contains cross-book links, all files contained in the tar file should remain in the same directory.

The GPFS library includes:

- **General Parallel File System for Linux®: Concepts, Planning, and Installation Guide** GA22-7844 (PDF file name am4ins40.pdf)
- **General Parallel File System for Linux®: Administration and Programming Reference** SA22-7843 (PDF file name am4adm40.pdf)
- **General Parallel File System for Linux®: Problem Determination Guide**, GA22-7842 (PDF file name am4pdg40.pdf)
- **General Parallel File System for Linux®: RSCT Guide and Reference** SA22-7854 (PDF file name am4rct40.pdf)

New file system functions existing in GPFS 1.3 are not usable in existing file systems until you explicitly authorize these changes by issuing the `mmchfs -V` command.

For the latest support information see the Frequently Asked Questions at www.ibm.com/servers/eserver/clusters/software/gpfs.html.

### Changes for version 1.2 of GPFS for Linux

GPFS 1.2 provides several usability enhancements:

- Maximum GPFS nodeset size of 128 IBM Eserver xSeries machines. The maximum supported GPFS nodeset size has been increased from 32 machines to 128 machines
- A maximum file system size of 9 TB
  The maximum supported file system size has been increased from 1 TB to 9 TB
- Default quota limits
  The ability to apply default quotas values for a new user or groups writing to a file system. Applying default quotas ensures all users of the file system will have minimum quota limits established. If default quota values for a file system are not enabled, a new user or group has a quota value of zero which establishes no limit to the amount of space they can use. There are three new commands in support of default quotas:
  1. `mmdefquotaon`
  2. `mmdefquotaoff`
  3. `mmdefedquota`

Existing commands which have been updated to support default quotas:

1. `mmlsquota`
2. `mmrepquota`

- **Two-node nodesets**
  The minimum number of nodes in a GPFS nodeset has been decreased from three to two. In support of two-node nodesets we introduce:
  - single-node quorum
  - the `mmclearfence` command

and have enhanced three commands:

- `mmconfig`
- `mmchconfig`
- `mmlsconfig`
Backup network support for nodes in your GPFS cluster

In order to prevent nodes from appearing to have gone down when the network is merely saturated, the creation of a backup network for RSCT communication has been introduced. In support of backup networks, four commands have been enhanced:

1. `mmaddcluster`
2. `mmchcluster`
3. `mmcrcluster`
4. `mmlscluster`

The `mmrepquota` command has been enhanced to display a numerical user id.

GPFS is designed to operate with Red Hat™ 7.1 with a minimum kernel level of 2.4.2-2, as distributed and supported by Red Hat.

New file system functions existing in GPFS 1.2 are not usable in existing file systems until you explicitly authorize these changes by issuing the `mmchfs -V` command.


Migration

For information on migrating your system to the latest level of GPFS, see the [General Parallel File System for Linux®: Concepts, Planning, and Installation Guide](http://www.ibm.com/servers/eserver/clusters/software/gpfs.html).
Chapter 1. GPFS problem determination tools

This chapter describes the problem determination tools provided with GPFS. These tools are intended for the use of Linux systems expert service personnel who know how to collect data and run debugging routines. The information is organized as follows:

- "The MMFS log"
- "The Linux syslog facility" on page 2
- "Read-only mode mount" on page 4
- "The lsof command" on page 4
- "The mmfsadm command" on page 5
- "GPFS trace facility" on page 5
- "The mmgetstate command" on page 7
- "The mmclearfence command" on page 8
- "The mmlscluster command" on page 9
- "The mmlsconfig command" on page 9
- "The mmrefresh command" on page 10
- "Linux Kernel Crash Dump facility" on page 10
- "Information to collect before contacting the IBM Support Center" on page 11
- "How to contact the IBM Support Center" on page 11

Note: GPFS error logs and messages contain the MMFS prefix. This is intentional, because GPFS shares many components with the IBM Multi-Media LAN Server, a related licensed program.

The MMFS log

GPFS writes both operational messages and error data to the mmfs log file. The mmfs log can be found in the /var/adm/ras directory on each node. The mmfs log file is named mmfs.log.date, where date is the time stamp when the instance of GPFS started on the node. The latest mmfs log file can be found by using the symbolic file name /var/adm/ras/mmfs.log.latest. The mmfs log from the previous instance of GPFS can be found by using the symbolic file name /var/adm/ras/mmfs.log.previous. All other files have a timestamp appended to the file name.

At GPFS startup, files that have not been accessed during the last ten days are deleted. If you want to save old files, copy them elsewhere.

This example shows normal operational messages that appear in the mmfs log file:

Thu Feb 15 10:13:58 CST 2001 runmmfs starting
Removing old /var/adm/ras/mmfs.log.* files:
Loading modules from /usr/lpp/mmfs/bin
Module Size Used by
mmfs 452432 0 (unused)
mmfslinux_SMP4G 105588 0 [mmfs]
tracedev 6510518 0 [mmfs mmfslinux_SMP4G]
Thu Feb 15 10:14:00 2001: Cluster type: 'LC'
Thu Feb 15 10:14:00 2001: Using TCP communication protocol
Thu Feb 15 10:14:00 CST 2001 /var/mmfs/etc/gpfsready invoked
Thu Feb 15 10:14:00 2001: mmfsd ready
Thu Feb 15 10:38:24 2001: Reason for shutdown: Normal shutdown
The Linux syslog facility

GPFS records file system or disk failures using the Linux syslog facility. These failures can be viewed by issuing the command:

grep "mmfs:" /var/log/messages

The syslog contains information about several classes of events or errors. These classes are:

- MMFS_ABNORMAL_SHUTDOWN
- MMFS_DISKFAIL
- MMFS_ENVIRON
- MMFS_FSSTRUCT
- MMFS_GENERIC
- MMFS_LONGDISKIO
- MMFS_PHOENIX
- MMFS_QUOTA
- MMFS_SYSTEM_UNMOUNT
- MMFS_SYSTEM_WARNING

**MMFS_ABNORMAL_SHUTDOWN**

The **MMFS_ABNORMAL_SHUTDOWN** syslog entry means that GPFS has determined that it must shutdown all operations on this node because of a problem. This is most likely caused by some interaction with the Group Services component. Group services failures will result in abnormal shutdown, as well as loss of quorum. Not enough memory on the node to handle critical recovery situations can also cause this error. In general there will be other error log entries from GPFS or some other component associated with this syslog entry.

**MMFS_DISKFAIL**

The **MMFS_DISKFAIL** syslog entry indicates that GPFS has detected the failure of a disk and forced the disk to the stopped state. This is ordinarily not a GPFS error but a failure in the disk subsystem or the path to the disk subsystem.

**MMFS_ENVIRON**

**MMFS_ENVIRON** syslog entry records are associated with other records of the **MMFS_GENERIC** or **MMFS_SYSTEM_UNMOUNT** types. They indicate that the root cause of the error is external to GPFS and usually in the network that supports GPFS. Check the network and its physical connections. The data portion of this record supplies the return code provided by the communications code.

**MMFS_FSSTRUCT**

The **MMFS_FSSTRUCT** syslog entry indicates that GPFS has detected a problem with the on-disk structure of the file system. The severity of these errors depends on the exact nature of the inconsistent data structure. If it is contained to a single file, EIO errors will be reported to the application and operation will continue. If the inconsistency affects vital metadata structures, operation will cease on this file system. These errors are often associated with an **MMFS_SYSTEM_UNMOUNT** syslog entry and will probably occur on all nodes. If the error occurs on all nodes, some critical piece of the file system is inconsistent. This may occur as a result of a GPFS error or an error in the disk system. Issuing the **mmfsck** command may repair the error:

1. Issue the **mmfsck -n** command to collect data.
2. Issue the `mmfsck -y` command to repair the file system.

If the file system is not repaired after issuing the `mmfsck` command, contact IBM service.

**MMFS_GENERIC**

The **MMFS_GENERIC** syslog entry means that GPFS self diagnostics have detected an internal error, or that additional information is being provided with an **MMFS_SYSTEM_UNMOUNT** report. If the record is associated with an **MMFS_SYSTEM_UNMOUNT** report, the event code fields in the records will be the same. The error code and return code fields may describe the error. See Chapter 3, "Messages", on page 43 for a listing of codes generated by GPFS.

If the error is generated by the self diagnostic routines, service personnel should interpret the return and error code fields since the use of these fields varies by the specific error. Errors caused by the self checking logic will result in the shutdown of GPFS on this node.

**MMFS_GENERIC** errors may result from an inability to reach a critical disk resource. These errors may look different depending on the specific disk resource that has become unavailable, like logs and allocation maps. This type of error will usually be associated with other error indications. Other errors generated by disk subsystems, high availability components, and communications components at the same time as, or immediately preceding, the GPFS error should be pursued first because they may be the cause of these errors. **MMFS_GENERIC** error indications without an associated error of those types represent a GPFS problem that requires IBM Service. See "Information to collect before contacting the IBM Support Center" on page 11.

**MMFS_LONGDISKIO**

The **MMFS_LONGDISKIO** syslog entry indicates that GPFS is experiencing very long response time for disk requests. This is a warning message and may indicate that your disk system is overloaded or that a failing disk is requiring many I/O retries. Follow Linux instructions for monitoring the performance of your I/O subsystem on this node and on any disk server nodes that may be involved. The data portion of this error record specifies the disk involved. There may be related syslog entries from the disk or IBM Network Shared Disk (NSD) subsystems that will pinpoint the actual cause of the problem.

**MMFS_PHOENIX**

**MMFS_PHOENIX** syslog entries reflect a failure in GPFS interaction with Group Services. Go to the book *General Parallel File System for Linux®: RSCT Guide and Reference* Search for diagnosing group services problems. Follow the problem determination and repair action specified. These errors are usually not GPFS problems, although they will disrupt GPFS operation.

**MMFS_QUOTA**

The **MMFS_QUOTA** syslog entry is used when GPFS detects a problem in the handling of quota information. This syslog entry is created when the quota manager has a problem reading or writing the quota file. If the quota manager cannot read all entries in the quota file when mounting a file system with quotas enabled, the quota manager shuts down, but file system manager initialization continues. Client mounts will not succeed and will return an appropriate error message.

In order for GPFS quota accounting to work properly, the system administrator should ensure that the user and group information is consistent throughout the nodeset, such as the `/etc/passwd` and `/etc/group` files are identical across the nodeset. Otherwise, unpredictable and erroneous quota accounting will occur.

It may be necessary to run an offline quota check (`mmcheckquota`) to repair or recreate the quota file. If the quota file is corrupted, `mmcheckquota` will not restore it. The file must be restored from the backup copy. If there is no backup copy, an empty file may be set as the new quota file (this is equivalent to recreating the quota file). To set an empty file or use the backup file, issue the `mmcheckquota` command.
with the appropriate operand. Use the `-u UserQuotaFilename` for the user quota file or `-g GroupQuotaFilename` for the group quota file. Reissue the `mmcheckquota` command to check the file system inode and space usage.

**MMFS_SYSTEM_UNMOUNT**

The `MMFS_SYSTEM_UNMOUNT` syslog entry means that GPFS has discovered a condition which may result in data corruption if operation with this file system continues from this node. GPFS has marked the file system as disconnected and applications accessing files within the file system will receive `ESTALE` errors. This may be the result of:

- The loss of a path to all disks containing a critical data structure.
- An internal processing error within the file system.

See [“File system forced unmount” on page 29](#). Follow the problem determination and repair actions specified.

**MMFS_SYSTEM_WARNING**

The `MMFS_SYSTEM_WARNING` syslog entry means that GPFS has detected a system level value approaching its maximum limit. This may occur as a result of the number of inodes (files) reaching its limit. Issue the `mmchfs` command to increase the number of inodes for the file system so there is at least a minimum of 5% free.

**Syslog entry example**

This is an example of a syslog entry which indicates loss of the Group Services subsystem:

```
Feb 15 10:18:21 k145n01 mmfs: mmfsd: Error=MMFS_ABNORMAL_SHUTDOWN, ID=0x1FB9260D, Tag=0
Feb 15 10:18:21 k145n01 mmfs: Shutting down abnormally due to error in sharkd.c line 3099 \ retCode -1, reasonCode 3
```

**Read-only mode mount**

**Note:** Attempt this only after you’ve tried to repair the file system with the `mmfsck` command.

Some disk failures can result in the loss of enough metadata to render the entire file system unmountable. In that event it might be possible to preserve some user data through a read-only mode mount. This facility should only be used if a normal mount does not succeed, and should be considered a last resort to save some data after fatal disk failure.

Read-only mode mount is invoked by using the `-o ro` flags on the `mount` command. After a read-only mode mount is done, some data may be sufficiently accessible to allow copying to another file system. The success of this technique depends on the actual disk structures damaged.

**The lsof command**

The `lsof` (list open files) command returns the user processes that are actively using a file system. It is sometimes helpful in determining why a file system remains in use and cannot be unmounted.

The `lsof` command is available via anonymous ftp from `vic.cc.purdue.edu (cd to /pub/tools/unix/lsof)`. The inventor of the `lsof` command is Victor A. Abell (abe@purdue.edu), Purdue University Computing Center.
The mmfsadm command

The mmfsadm command is intended for use by trained service personnel. IBM suggests you do not run this command except under the direction of such personnel. The mmfsadm command extracts data from GPFS without using locking in order to ensure that it can collect the data in the event of locking errors. In certain rare cases, this may cause GPFS or the node to fail. Several options of this command exist and may be required for use:

**cleanup**
Delete shared segments left by a previously failed GPFS daemon without actually restarting the daemon.

**dump what**
Dumps the state of a large number of internal state values that may be useful in determining the sequence of events. The what parameter may be set to all, indicating that all available data should be collected, or to another value, indicating more restricted collection of data. The output is presented to stdout and should be collected by redirecting stdout.

**quorum n | reset**
Changes the required value for quorum to n or to the calculated value (reset). This parameter should never be used except under service direction because it may affect the consistency of your data.

**showtrace**
Shows the current level for each subclass of tracing available in GPFS. Trace level 9 provides the highest level of tracing for the class and trace level 0 provides no tracing. Intermediate values exist for most classes. More tracing requires more storage and results in a higher probability of overlaying the required event.

**trace class n**
Sets the value of tracing to the value specified by n. Actual trace gathering only occurs when the lxtrace command has been issued.

Other options provide interactive GPFS debugging, but are not described here. Output from the mmfsadm command will be required in almost all cases where a GPFS incident is being reported. The mmfsadm command collects data only on the node where it is executed. Depending on the nature of the problem, mmfsadm output may be required from several or all nodes. The mmfsadm output from the file system manager is often required.

To determine where the file system manager is, issue the mmismgr command:

```
mmismgr
```

Output similar to this example is displayed:

```
File System         Manager Node
------------------  -------------------------------
gpfs1               15 (kl45n15)
```

GPFS trace facility

The GPFS code is equipped with a large number of trace points to allow rapid problem determination of failures. GPFS tracing is based on the lxtrace command that is shipped with GPFS and uses trace IDs 306, 307, 308, and 309. The granularity of the trace is controlled using the mmfsadm trace command.

Generating GPFS trace reports

The mmtrace shell script provides an alternative to issuing the individual Linux trace commands (lxtrace). The script enables the GPFS trace facility for capturing trace events.

**Note:** The mmfsd daemon must be active in order to run this script.
To use the trace:

1. Ensure there was a directory for dumps created when the nodeset was configured. Issue the
   `mmlsconfig` command and look for the `dataStructureDump` entry. If no such directory exists, issue:
   ```bash
   mkdir /tmp/mmfs
   ```
2. Start the trace by issuing
   ```bash
   /usr/lpp/mmfs/bin/mmtrace
   ```
3. Recreate the problem
4. When the event to be captured occurs, stop the trace as soon as possible.
   ```bash
   /usr/lpp/mmfs/bin/mmtrace stop
   ```

   The output of the `mmtrace` shell script is returned in `/tmp/mmfs`.

5. If the problem results in a shutdown and restart of the file system, automatically stop the trace by
   uncommenting this line in the `/usr/lpp/mmfs/bin/runmmfs` file:
   ```bash
   $mmtrace stop
   ```

   In order to restore the system to the normal operating state, make this line a comment again after
   diagnosis of the problem is complete.

If the problem requires more detailed tracing, IBM service personnel may ask you to modify the GPFS
trace levels by modifying the `/usr/lpp/mmfs/bin/mmtrace` script. The default script includes:

```bash
$mmfsadm trace all 4
$mmfsadm trace tm 2 thread 1 mutex 1 vnode 1 ksvfs 1 kloc 0
$mmfsadm trace io 3 pga 1 mb 1 lock 2 dfs 2 fsck 3
```

Possible trace values include:

`trace_class` can be any of these terms:

- `alloc`: disk space allocation
- `allocmgr`: allocation manager
- `basic`: 'basic' classes
- `block`: block operations
- `bdl`: byte range locks
- `cleanup`: cleanup routines
- `cmd`: ts commands
- `defrag`: defragmentation
- `dentry`: dentry operations
- `disk`: physical disk I/O
- `disk lease`: disk lease
- `ds`: data shipping
- `errlog`: error logging
- `file`: file operations
- `fs`: file system
- `fsck`: online multinode fsck
- `inode`: inode operations
- `io`: physical I/O
- `kloc`: low-level vfs locking
- `ksvfs`: generic kernel vfs information
- `lock`: interprocess locking
- `log`: recovery log
- `malloc`: malloc/free in shared segment
- `mb`: mailbox message handling
- `memmgr`: memory manager
- `mmode`: mnode operations
- `msg`: call to routines in SharkMsg.h
mutex: mutexes and condition variables
nsd: network shared disk
pgalloc: page allocator tracing
pin: pinning to real memory
pit: parallel inode tracing
quota: quota management
shared: shared segments
smb: SMB locks
super: super operations
tasking: tasking system but not Thread operations
thread: operations in Thread class
tm: token manager
ts: daemon specific code
vnode: vnode layer of VFS kernel support
vnop: concise vnop description

**trace_level**
A value from 0 through 9 with an increasing level of detail. A value of 0 turns tracing off.
To display the trace level in use, issue the `mmfsadm showtrace` command.

**Tracing GPFS initialization**
If there is a need to trace GPFS initialization, the `mmtrace` and `mmfsadm` commands cannot be used.
The required trace classes and levels of tracing must be established before starting the GPFS daemon by using the `mmchconfig` command. The syntax for using the `mmchconfig` command in this way is:

```
mmchconfig trace="trace_class trace_level [trace_class trace_level]..." [-C NodesetId]
```

Here is an example:

```
mmchconfig trace="all 4"
mmchconfig trace="vnode 3 lock 1 nsd 2 tm 3 brl 4"
```

After the problem is resolved, turn the trace off by issuing:

```
mmchconfig trace="all 0"
```

**The mmgetstate command**
The `mmgetstate` command displays the state of the GPFS daemon on one or more nodes. The syntax of this command is:

```
mmgetstate [-L] [-k] [-v] [-a | -C NodesetId | -W NodeNameFile | [-w NodeName [,NodeName...]]]
[-n NodeNumber [,NodeNumber...]]]
```

The flags unique to this command are:

- **-L**  Additionally display quorum, number of nodes up, and total number of nodes.
- **-k**  Suppress headers and display the output in colon-separated fields:
  
  `nodesetId:nodeName:quorum:nodesUp:totalNodes:state`

- **-v**  Display intermediate error messages.

The remaining flags have the same meaning as in the `mmshutdown` command. They can be used to specify the nodes on which to get the state of the GPFS daemon.

The GPFS states recognized and displayed by this command are:

- **active**  GPFS is ready for operations. If this is a two-node nodeset with single-node quorum in effect, the other node is also active.
active (single-node mode)

GPFS is ready for operations on one of the nodes in a two-node nodeset with single-node quorum semantics. The other node is either down or is fenced out.

arbitrating

A node is trying to form quorum with the other available nodes. If single-node quorum is in effect, the node is trying to acquire the "Disk Fence".

down

GPFS daemon is not running on the node.

fenced out

Node failed to acquire the fence (single-node quorum is in effect).

unknown

Unknown value. Node cannot be reached or some other error occurred.

For example, to display the quorum, the number of nodes up, and the total number of nodes for nodeset set1, issue:

```
mmgetstate -L -C set1
```

The system displays output similar to:

```
GPFS nodeset    Node number  Node name  Quorum  Nodes up  Total nodes  GPFS state
------- --------- --------- ------- ---------- ----------- ----------
 set1        1    k145n29     13        24         24    active
 set1        2    k145n30     13        24         24    active
 set1        3    k145n31     13        24         24    active
 set1        4    k145n32     13        24         24    active
```

Here is an example using the -k flag to suppress headers and display the output for nodeset set1 in colon-separated fields:

```
mmgetstate -k -C set1
```

The system displays output similar to:

```
set1:2:k145n30:13:24:24:active
```

The **mmclearfence** command

The **mmclearfence** command clears fenced disks in a two-node nodeset using single-node quorum. The syntax of this command is:

```
mmclearfence
```

For any file system in the nodeset from where the command is issued, all fenced disks are cleared and any GPFS threads waiting on the fenced disks are woken up. There is a need to issue this command when:

1. A node does not have access to one or more disks and is waiting for the other node to join, however, that node is down.

   Before issuing the **mmclearfence** command, you must be certain the other node in the nodeset is down. Use of this command when the other node is active may cause data corruption.

2. If GPFS exits from each node at about the same time, it is possible that both nodes will fence disks from each other.
Chapter 1. GPFS problem determination tools
File systems in nodeset set1:
---------------------------------
/dev/fs1

The mmrefresh command

The mmrefresh command ensures the most recent GPFS cluster data files are on the specified nodes. The syntax of this command is:

```
mmrefresh [-f] [-a | -C NodesetId | -W NodeNameFile | [-w NodeName[,NodeName...]]
         [-n NodeNumber[,NodeNumber...]]
```

The -f flag can be used to force the GPFS cluster data files to be rebuilt whether they appear to be at the most current level or not. If no other option is specified, the command affects only the node on which it is executed. The remaining flags have the same meaning as in the mmshutdown command and are used to specify which nodes the refresh is to be performed on.

For example, to ensure that the GPFS cluster data files are at the latest level on all nodes in all nodesets, issue:

```
mmrefresh -a
```

Linux Kernel Crash Dump facility

As part of problem determination, it is often necessary to determine where kernel threads were executing at the time of a system hang or panic.

If your Linux software distribution does not come equipped with the Linux Kernel Crash Dump (LKCD) facility, obtain and install this function. You can find a link to the latest LKCD facility in the Frequently Asked Questions section at www.ibm.com/servers/eserver/clusters/software/gpfs.html.

Verifying LKCD is installed

To determine if your LKCD utilities have been installed, invoke the rpm query function:

```
rpm -q lkcdutils
```

Your output will be similar to this sample:

```
lkcdutils-1.0-2
```

You can also examine boot messages for vmdump messages to determine if your kernel is configured for kernel dumps by issuing this command:

```
dmesg | grep vmdump
```

Your output will be similar to this sample:

```
vmdump: setting dump_execute () as dump_function_ptr ...
vmdump: dump device opened: 0x309
```

If LKCD is either not installed or not configured, please follow the README distributed with the latest LKCD facility for installation and configuration.

Using LKCD to report problems to IBM

In the case of a system hang, or GPFS hang, IBM service may need you to retrieve traceback information for all kernel threads. Traceback information may be obtained by issuing the ksh command:

```
printf "task\nquit" | /sbin/lcrash | \
 /bin/awk '/^[a-f][0-9]+/ {print "task " $1; print "bt "$1 END {print "quit"} }' | \
 /sbin/lcrash /var/mmfs/tmp/complete.map /dev/mem /boot/Kerntypes
```
Note: In the event that GPFS is still active, you may also run this command via:

```
/usr/lpp/mmfs/bin/mmfsadm dump kthread
```

In the case of a system crash, these items should be provided to IBM service:

- `/var/mmfs/tmp/complete.map`
- `/boot/Kerntypes`
- The system dump

LKCD saves the system memory image in the `/var/log/vmdump` directory. Choose the vmdump image saved there with the time of the system boot after the crash occurred.

The `/var/mmfs/tmp/complete.map` file is a combination of the kernel symbols from `/boot/System.map` and GPFS kernel extension symbols at the time of the last run of GPFS.

The `/boot/Kerntypes` file is created as part of the LKCD installation.

### Information to collect before contacting the IBM Support Center

This data should be available when you contact the IBM Support Center:

1. A description of the problem.
2. Any syslog entries relating to the event:
   ```bash
grep "mmfs:" /var/log/messages
   ```
3. The output of the `mmfsadm dump all` command on at least the failing node and the file system manager node. Some errors require this output be available from all nodes.
   If GPFS is active, determine the file system manager node for each file system. Issue the `mmlsmgr` command.
4. Create a master `mmfs` log file that is merged and chronologically sorted for the date of the failure (see Chapter 2, “Possible GPFS problems”, on page 13).
5. The actual application output of the failure.
6. Traces on affected nodes, if available. In some cases this may mean all nodes.
7. If the noderset was configured to store dumps, any internal GPFS dumps written to that directory relating to the time of the failure. The default directory is `/tmp/mmfs`.
8. On the failing node, issue:
   ```bash
   rpm -qa
   ```
9. For all of the failing file systems, issue:
   ```bash
   mmlsfs Device
   ```
10. For all of the failing file systems, issue:
    ```bash
        mmlsdisk DeviceName
    ```

### How to contact the IBM Support Center

IBM support is available for:

- Customers with an IBM Software Maintenance contract
- Customers without an IBM Software Maintenance contract

#### Service for customers with an IBM Software Maintenance contract

If you have an IBM Software Maintenance service contract, you may phone IBM at:

1. In the United States the number for support is **1-800-IBM-SERV**.
2. Outside the United States, contact your local IBM Service Center or see the directory of worldwide contacts at [http://www.ibm.com/planetwide](http://www.ibm.com/planetwide).
Contact the IBM Support Center, for these problems:

- Node halt or crash not related to a hardware failure
- Node hang or response problems
- Failure in specific RSCT software subsystems
- Failure in other software supplied by IBM

You will be asked for the information you collected from “Information to collect before contacting the IBM Support Center” on page 11. You will be given a time period during which an IBM representative will return your call.

For failures in non-IBM software, follow the problem reporting procedures documented for that product.

For @server xSeries® (IA32) hardware failures, contact IBM Hardware Support at the number above.

For any problems reported to the IBM Support Center, a Problem Management Record (PMR) is created. A PMR is an online software record used to keep track of software problems reported by customers.

- The IBM Support Center representative will create the PMR and give you its number.
- Have the information you collected available as it will need to be included in the PMR.
- Record the PMR number. You will need it to send data to the IBM Support Center. You will also need it on subsequent phone calls to the IBM Support Center to discuss this problem.

Be sure that the person you identified as your contact can be reached at the phone number you provided in the PMR.

**Service for customers without an IBM Software Maintenance contract**

If you do not have an IBM Software Maintenance service contract, contact your IBM sales representative.

You should have the information you collected from “Information to collect before contacting the IBM Support Center” on page 11 available.
Chapter 2. Possible GPFS problems

This chapter describes the types of errors which may occur and their possible causes. It also provides information about conditions in the environment that can affect correct operation of the file system and suggests when to contact IBM.

Before following any of the debug steps discussed under the various topics, IBM suggests you merge and chronologically sort all of the `mmfs.log` entries from each node in the nodeset. The `mmfs.log` frequently shows problems on one node that actually originated on another node.

Issue the commands:
```
cat nodefilename | xargs -n1 -i \
rsh {} 'grep -h "date" /var/adm/ras/mmfs.log.[0-9]*' >> /tmp/log.out
```

Use the `/tmp/gpfs.allnodes` file created during installation. See the book [General Parallel File System for Linux®: Concepts, Planning, and Installation Guide](#) and search for files to ease the installation process. Issue a script similar to this example to collect the GPFS logs from the nodes.

This script generates a `/tmp/logs.sorted` file that is comprised of the syslog entries from all the nodes listed in `/tmp/gpfs.allnodes`, prefixed by `nodename`, and merged into a single sorted file. The output of this script will be used in the problem determination procedures discussed in this chapter.

```
#!/bin/ksh

#Sample script to gather, merge and sort mmfs.log files
#from nodes listed in file /tmp/gpfs.allnodes
#Assumes proper rsh execution (.rhosts files configured)

rm /tmp/logs.merged 2>/dev/null

for node in $(cat /tmp/gpfs.allnodes)
do
    echo Gathering mmfs logs on node $node
    rsh $node "grep -h "Oct 17" /var/adm/ras/mmfs.log*" > /tmp/${node}.output
    if [ -s /tmp/${node}.output ] then
        cat /tmp/${node}.output | \
        while read line
        do
            echo $node $line >> /tmp/logs.merged
        done
    fi
done

if [ -s /tmp/logs.merged ] then
    sort -k 4,5 /tmp/logs.merged > /tmp/logs.sorted
    echo sort return code $?
fi
exit
```

The topics discussed are:
- "Installation and configuration problems" on page 14
- "Single-node quorum problems" on page 18
- "GPFS modules cannot be loaded" on page 19
- "GPFS daemon will not come up" on page 19
- "GPFS daemon went down" on page 22
- "Delays and deadlocks" on page 25
- "Node cannot be added to the GPFS cluster" on page 27

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Installation and configuration problems

The General Parallel File System for Linux®: Concepts, Planning, and Installation Guide provides the step by step procedure for installing and migrating GPFS. However, some problems may occur if the procedures were not properly followed:

- Unable to start GPFS after installation of the latest level. Did you reboot GPFS subsequent to the last execution of GPFS at the old level and the first one at the new level? If you did, see “GPFS daemon will not come up” on page 19. If not, reboot. See the book General Parallel File System for Linux®: Concepts, Planning, and Installation Guide and search for initialization.
- Unable to access a file system. See “File system will not mount” on page 27.
- New GPFS functions will not operate. See “GPFS commands are unsuccessful” on page 31.
- If you have created more than one GPFS nodeset:
  1. Nodes within a GPFS nodeset do not interact with GPFS file systems outside that nodeset. However, these nodesets do not restrict the operation of any other software.
  2. The data in a given file system can only be accessed from within an individual nodeset. You must limit parallel jobs to nodes within a single nodeset. Parallel jobs which span nodesets may have access to different file systems and different data.
  3. Quorums are enforced within a nodeset. This may cause different failure patterns than existed prior to the splitting of nodes into multiple nodesets.
     For example, if a 3 node nodeset was created out of a 32 node cluster, 2 of the 3 nodes must be available to satisfy quorum requirements. The main nodeset would then require 15 of the 29 nodes, rather than 17 of the 32, to operate.
  4. Commands to change any state affect only those nodes within the nodeset from which they are issued unless a specific nodeset was targeted on the command line.

Linux configuration considerations

Depending on your system configuration, you may need to consider:

1. “Why are not all the disks showing up on the disk server nodes?” on page 15
2. “What additional drivers are needed for proper functioning of GPFS?” on page 15
3. “Why can only one host successfully attach to the fibre channel loop and see the fibre channel disks?” on page 15
4. “What are the performance tuning suggestions?” on page 15
5. “Why does GPFS not start automatically after rebooting nodes when using Myrinet?” on page 16
Why are not all the disks showing up on the disk server nodes?
This may be because the MULTI_LUN support may be disabled in your distribution's kernel. To enable this support, complete these steps on your disk server nodes:

1. On each node that has the FASTT Host Adapter, modify the /etc/modules.conf file to include the line:
   ```
   options scsi_mod max_scsi_luns=255
   ```
2. Rename your existing initial RAM disk (initrd) images located in the /boot directory. The initrd images have the extension .img, like initrd-2.4.2-2.img.
3. Make fresh copies of the initrd images by running the mknitrd command. For example:
   ```
   mknitrd initrd-2.4.2-2.img 2.4.2-2
   mknitrd initrd-2.4.2-2smp.img 2.4.2-2smp
   ```
4. Issue the command to refresh the lilo image:
   ```
   /sbin/lilo
   ```
5. If your Linux distribution is Red Hat, disable kudzu either by renaming the /etc/rc.d/init.d/kudzu file or by upgrading to kudzu-0.99.1-1. The upgrade is available from the Red Hat rawhide stream.
   **Attention:** If you do not do this, your machine will hang during subsequent boot.
6. Reboot the nodes. You should see the rest of the LUNs getting queried and configured.

What additional drivers are needed for proper functioning of GPFS?
In addition to the software drivers provided on your GPFS distribution media, ensure that the SCSI Generic driver sg.o is loaded on the disk servers before you start GPFS. That driver is needed for the proper functioning of the SCSI reserve command, which is used if you configure primary and backup disk servers.

Why can only one host successfully attach to the fibre channel loop and see the fibre channel disks?
Your host bus adapter may be configured with an enabled Hard Loop ID that conflicts with other host bus adapters on the same fibre channel loop.

To see if that is the case, reboot your machine and enter the adapter bios via Alt Q when the fibre channel adapter bios prompt appears. Under the Configuration Settings menu, select Host Adapter Settings and either ensure that the Adapter Hard Loop ID option is disabled or assign a unique Hard Loop ID per machine on the fibre channel loop.

What are the performance tuning suggestions?
Since systems vary, simulate an expected workload in GPFS and examine available performance indicators on your system. For an up-to-date list of tuning suggestions, see the Frequently Asked Questions at [www.ibm.com/servers/eserver/clusters/software/gpfs.html](http://www.ibm.com/servers/eserver/clusters/software/gpfs.html)

For instance, some SCSI drivers publish statistics in the /proc/scsi directory. If your disk driver reports many queued requests messages it may mean you should throttle back the helper threads in GPFS.

Suggested starting points are:

```bash
mmchconfig prefetchThreads=18
mmchconfig worker1Threads=24
```

If GPFS is configured to operate over Gigabit Ethernet, enable Jumbo frames to get optimal performance from the network and hence from GPFS. You can do that by ensuring that the MTU size for the communication adapter is set to 9000.

If GPFS is configured to operate over Myrinet, build the GM driver with the enable-new-features option for better IP performance. This enables the Jumbo frames for Myrinet IP driver. Also check if /proc/sys/net/ipv4/tcp_window_scaling is enabled. It should be enabled by default.

For both Ethernet and Myrinet, you can increase the IP performance by tuning the TCP window settings with the commands:
echo "262144" > /proc/sys/net/core/rmem_max
echo "262144" > /proc/sys/net/core/wmem_max
echo "262144" > /proc/sys/net/core/wmem_default
echo "262144" > /proc/sys/net/core/rmem_default

Why does GPFS not start automatically after rebooting nodes when using Myrinet?
If you have enabled GPFS, with the `mmconfig` or `mmchconfig` command, to autostart on reboot, ensure that the Myrinet driver is loaded and that the adapter is configured to run over IP when the machine boots up.

Problems with executing commands on other nodes
Many of the GPFS administration commands perform operations on nodes other than the node on which the command was issued. This is achieved by utilizing a remote execution shell and a remote file copy command. By default these items are `/usr/bin/rsh` and `/usr/bin/rcp`. You also have the option of specifying your own remote shell and remote file copy commands to be used instead of the default `rsh` and `rcp`. The remote shell and copy commands must adhere to the same syntax forms as `rsh` and `rcp` but may implement an alternate authentication mechanism. For details, see the `mmcrcluster` and `mmchcluster` commands. This section covers possible problems you may encounter with the use of remote commands.

Authorization problems
The `rsh` and `rcp` commands are used by GPFS administration commands to perform operations on other nodes. The `rsh` daemon (rshd) on the remote node must recognize the command being run and must obtain authorization to execute it.

For the `rsh` and `rcp` commands issued by GPFS administration commands to succeed, each node in the cluster must have an `.rhosts` file in the home directory for the root user, with file permission set to 600. This `.rhosts` file must list each of the nodes and the root user. If such an `.rhosts` file does not exist on each node in the cluster, the `rsh` and `rcp` commands issued by GPFS commands will fail with permission errors, causing the GPFS commands to fail in turn.

If you elected to use installation specific remote execution shell and remote file copy commands, you must ensure that proper authorization is granted to all nodes in the GPFS cluster and that GPFS communication among the nodes does not require a password.

Connectivity problems
Another reason why `rsh` may fail is that connectivity to a needed remote node has been lost. Error messages from `mmdsh` may indicate that connectivity to a remote node has been lost. Here is such an example:

```
mmdelnode k145n04
Verifying GPFS is stopped on all nodes ...
mmdsh: 6027-1617 There are no available nodes on which to run the command.
mmdelnode: 6027-1271 Unexpected error from verifyDaemonInactive: mmcommon onall.
    Return code: 1
```

If error messages indicate that connectivity to a node has been lost, use the `ping` command to verify whether the node can still be reached:

```
ping k145n04
PING k145n04: (9.114.68.69): 56 data bytes
<Ctrl-C>
-----k145n04 PING Statistics-----
3 packets transmitted, 0 packets received, 100% packet loss
```

If connectivity has been lost, restore it, then reissue the GPFS command.

GPFS error messages
When `rsh` problems arise, the system may display information similar to these error messages:

```
6027-1615 Node rsh process had return code value.
```
There are no available nodes on which to run the command.

**GPFS cluster data files are locked**

GPFS uses a file to serialize access of administration commands to the GPFS cluster data files. This lock file is kept on the primary GPFS cluster data server node in the `/var/mmfs/etc/mmlock` directory. If a system failure occurs before the cleanup of this lock file, the file will remain and subsequent administration commands may report that the GPFS cluster data files are locked. Besides a serialization lock, certain GPFS commands may obtain an additional lock. This lock is designed to prevent GPFS from coming up or file systems from being mounted during critical sections of the command processing. If this happens you will see a message that shows the name of the blocking command, similar to message:

6027-1242 GPFS is waiting for name

To release the lock:

1. Look for `/var/mmfs/mmlock/haslock`. If the `haslock` file exists, it will contain a process identification (PID) number for a process. If this PID number exists in the system, the `haslock` file will prevent execution of GPFS commands that need the lock. Examine the contents of the `haslock` file to obtain the PID number and name of the node to which the PID number pertains.

2. Determine who owns the lock. Go to the node shown and issue a `ps` command against the PID. If it is a GPFS administration command that is not responding, stopping the command (be sure you want to do this) will free the lock. If anything else has the PID, another error occurred to the original GPFS command causing it to die without freeing the lock, and this new process has the same PID. If this is the case, do not kill the process.

3. If any locks are held and you want to release them manually, from any node in the GPFS cluster issue the command:

   ```
   mmcommon frelocks
   ```

**GPFS error messages**

When GPFS commands are unable to retrieve or update the GPFS cluster data files, the system may display information similar to these error messages:

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6027-1628</td>
<td>Cannot determine basic environment information. Not enough nodes are available.</td>
</tr>
<tr>
<td>6027-1630</td>
<td>The GPFS cluster data on <code>nodename</code> is back level.</td>
</tr>
<tr>
<td>6027-1631</td>
<td>The commit process failed.</td>
</tr>
<tr>
<td>6027-1632</td>
<td>The GPFS cluster data on <code>node_name</code> is different than the data on <code>node_name</code>.</td>
</tr>
<tr>
<td>6027-1633</td>
<td>Failed to create a backup copy of the GPFS cluster data on <code>node_name</code>.</td>
</tr>
</tbody>
</table>

**Recovery from loss of GPFS cluster data files**

A copy of the GPFS cluster data files is stored in the `/var/mmfs/gen/mmsdrfs` file on each node. For proper operation, this file must exist on each node in the GPFS cluster. The latest level of this file is guaranteed to be on the primary, and secondary if specified. GPFS cluster data server nodes that were defined when the GPFS cluster was first created with the `mmcrcluster` command.

If the `/var/mmfs/gen/mmsdrfs` file is removed by accident from any of the nodes, you must copy it from either the primary or secondary GPFS cluster data server node. If the file is missing from both the primary and secondary GPFS cluster data server nodes, copy it from another node and issue the command:

```
mmchcluster -p LATEST
```

**Error numbers specific to GPFS applications calls**

When experiencing installation and configuration problems, GPFS may report these error numbers in the syslog entries, or return them to an application:

E_CONFIG = 215, Configuration invalid or inconsistent between different nodes.
This error is returned when the levels of software on different nodes cannot coexist. See the book General Parallel File System for Linux®: Concepts, Planning, and Installation Guide and search on programming specifications.

E_NO_QUOTA_INST = 237, No Quota management enabled.
To enable quotas for the file system issue the `mmchfs -Q yes` command. To disable quotas for the file system issue the `mmchfs -Q no` command.

E_OFFLINE = 208, Operation failed because a disk is off-line
This is most commonly returned when an open of a disk fails. Since GPFS will attempt to continue operation with failed disks, this will be returned when the disk is first needed to complete a command or application request. If this return code occurs, check your network shared disk for fenced or stopped states and check to determine if the network path exists. In rare situations, this will be reported if network shared disk definitions are incorrect.

E_ALL_UNAVAIL = 218, A replicated read or write failed because none of the replicas were available.
Multiple disks in multiple failure groups are unavailable. Follow the procedures in this document for unavailable disks.

Changing RSCT communication port numbers
The RSCT subsystem uses two UDP ports. These have been internally set to 12347 and 12348. Currently, there is no command that will allow you to specify different values. If this is a problem for your specific installation, you can force different port numbers to be used by editing the `/usr/lpp/mmfs/bin/mmglobfuncs.Linux` file and changing the initial assignment for variables `cthatsPort` and `cthagsPort`. Note that this change must be made before creating the GPFS cluster (before using the `mmcrcluster` command).

Single-node quorum problems
In a two-node nodeset with single-node quorum enabled, you may encounter the following:

- If the daemon is in a SINGLENODE state and does not have access to one or more disks, the daemon will wait for the other node to join. Issue the `mmgetstate` command to display the state of the daemon. If the daemon cannot be started on the other node and you are certain that the other node is down, issue the `mmclearfence` command. The waiting node will unfence itself and the fenced disks, proceed with pending mounts, and serve data in a SINGLENODE state.

  **Note:** Before issuing the `mmclearfence` command from the waiting node, you must be certain that the other node is down. Use of this command when the other node is active may cause data corruption.

- If the GPFS daemons exit from each node at about the same time, it is possible that both nodes will fence disks from each other, thinking that the other node has died. If both nodes fence each other’s disks, the node that first started the daemon will wait for the second node to join. In this event, look at the error data in the `mmfs` log file. Follow the problem determination and repair actions documented in this manual for the indicated errors.

  If you encounter problems bringing up the daemon from the second node, issue the `mmclearfence` command from the first node. This command clears the fences and wakes up the thread waiting for the active state. You can then proceed with mounting file systems in a single-node state.
GPFS modules cannot be loaded

You must build the mmfslinux module based on the kernel configuration of your system. See the [General Parallel File System for Linux®: Concepts, Planning, and Installation Guide](https://www.ibm.com/support/knowledgecenter/SSC295_6.3.0/com.ibm.nrm.63.doc/pfs_install.html) and search for GPFS open source portability layer. During mmstartup processing, GPFS loads the mmfslinux module.

Some of the more common problems that you may encounter are:

- If the mmfslinux module wasn't built, you may see messages similar to:

  Loading modules from /usr/lpp/mmfs/bin
  Error: /usr/lpp/mmfs/bin/mmfslinux kernel extension does not exist.
  Please compile a custom mmfslinux module for your kernel.
  See /usr/lpp/mmfs/src/README for directions.
  Error: unable to verify kernel/module configuration


- If the mmfslinux module is incompatible with your system, you will see messages similar to:

  Error: kernel configuration is UP while mmfslinux is SMP
  Please compile a custom mmfslinux module for your kernel.
  See /usr/lpp/mmfs/src/README for directions.
  Error: unable to verify kernel/module configuration

Or,

Loading modules from /usr/lpp/mmfs/bin
/usr/lpp/mmfs/bin/mmfslinux: kernel-module version mismatch
  /usr/lpp/mmfs/bin/mmfslinux was compiled for kernel version 2.4.2-2smp
  while this kernel is version 2.4.2-2.

This could happen when an mmfslinux module was created for one type of kernel, but was inadvertently installed on a kernel with different characteristics.

1. Remove the existing mmfslinux module in /usr/lpp/mmfs/bin/mmfslinux.
3. Reissue the mmstartup command.

GPFS daemon will not come up

Indications leading you to the conclusion that the GPFS daemon (mmfsd) will not come up:

- The file system has been enabled to mount automatically, but it is not there.
- You issue a GPFS command and receive the message:
  6027-665 Failed to connect to file system daemon: error_string
- The /var/adm/ras/mmfs.log.latest does not contain the message:
  6027-300 mmfsd ready

Steps to follow if the GPFS daemon does not come up

1. Verify the GPFS daemon has been started. Issue:

   lssrc -s mmfs

   If the response is inoperative, GPFS has not been started. Follow the procedure in [General Parallel File System for Linux®: Concepts, Planning, and Installation Guide](https://www.ibm.com/support/knowledgecenter/SSC295_6.3.0/com.ibm.nrm.63.doc/pfs_install.html) for starting GPFS. If you didn’t specify the autoload option on either the mmconfig or the mmchconfig command, you need to manually start the daemon. Issue:

   mmstartup
If you did specify the **autoload** option, someone issued `mmshutdown`.

2. Verify that the adapter upon which your GPFS cluster depends is up. The adapter type, IP address, and status can be determined by issuing:

   `lsrc -ls cthats`

   The status (St) column on your network line will be **S** if the adapter is up and **U** if the adapter is unavailable. The Adapter ID column gives the IP address of that adapter. If you cannot **ping** this IP address from other nodes in the GPFS cluster, follow the hardware problem determination procedures for your communications adapter.

3. Verify that the GPFS cluster data nodes are available. Look in the file `/var/adm/ras/mmfs.log.latest`. If you see the message **6027-1592 Unable to retrieve GPFS cluster files from node nodename**, determine the problem with accessing node *nodename* and correct it.

4. Verify that the GPFS environment is properly initialized by issuing these commands and ensuring that the output is as expected (if any of the commands produce unexpected results, this may be an indication of corrupted GPFS cluster data file information and you should contact IBM Service):

   - List all nodesets and their respective nodes. This will also assure that the GPFS system files are up to date. Correct any reported errors before continuing. Issue:
     `mmlsnode -a`
   - List all file systems that were created in this nodeset. Issue:
     `grep gpfs /etc/fstab`
   - List the number of nodes for the appropriate nodeset. This should be the same number as reported by the `mmlsnode` command:
     `cat /etc/cluster.nodes`

5. Verify that you are not hung in the initialization script. Issue:

   `ps -ef | grep mm`

   and look for **runmmfs**. If **runmmfs** is present, verify that RSCT is running. Issue:

   `lsrc -ls cthags`

   If you see the message:

   **0513-036 The request could not be passed to the cthags subsystem. Start the subsystem and try your command again.**

   you need to start RSCT. Issue:

   `/usr/sbin/rsct/bin/cthactrl -s`

6. GPFS requires a quorum of nodes (one plus half of the number of nodes in the GPFS nodeset) to be active members of a group before any operations can be honored. This requirement guarantees that a valid single token management domain exists for each GPFS file system. Prior to the existence of a quorum, most requests are rejected with a message indicating that quorum does not exist. To identify which nodes in the nodeset have daemons up or down, issue:

   `lsrc -ls cthags | grep gpfs`

   The output, shown in Figure 1 on page 24 displays how many members exist in each group. If more nodes have been started than are members of the group, see the book *General Parallel File System for Linux*: **RSCT Guide and Reference**. Follow the problem determination and repair actions specified.

   A node indicates that it is part of a quorum by writing a daemon ready message to `/var/adm/ras/mmfs.log.latest`. If you believe that enough nodes are active to achieve a quorum but no entry was written in `/var/adm/ras/mmfs.log.latest`, see the book *General Parallel File System for Linux*: **RSCT Guide and Reference**. Follow the problem determination and repair actions specified. These procedures should indicate:
• Group Services operations in progress that would inhibit recognition of all nodes as members of the group
• Communications failures that would inhibit the formation of GPFS groups

7. If the previous GPFS daemon was brought down and you are not able to start a new daemon, the previous daemon may not have gone away. If that is the case, you can shutdown the daemon using this procedure:
   a. Determine if the GPFS daemon is active by issuing:
      
      ```bash
      lssrc -s mmfs
      ```
      
      If the daemon is listed as active, shut it down. Issue:
      
      ```bash
      mmshutdown
      ```
   b. Wait for the command to finish. If the command does not successfully finish, the machine must be rebooted.
   c. Verify there are no GPFS utilities that are hung. Issue:
      
      ```bash
      ps -ef | grep mm
      ```
   d. If any GPFS commands are still active, the machine must be rebooted.

**GPFS error messages**

Shared segment problems (follow the problem determination and repair actions specified in the accompanying messages):

<table>
<thead>
<tr>
<th>Message Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6027-319</td>
<td>Could not create shared segment.</td>
</tr>
<tr>
<td>6027-320</td>
<td>Could not map shared segment.</td>
</tr>
<tr>
<td>6027-321</td>
<td>Shared segment mapped at wrong address (is value, should be value).</td>
</tr>
<tr>
<td>6027-322</td>
<td>Could not map shared segment in kernel extension.</td>
</tr>
</tbody>
</table>

For the remaining messages see the book *General Parallel File System for Linux®: RSCT Guide and Reference*. Search for diagnosing group services problems. Follow the problem determination and repair actions specified.

Groups Services problems:

<table>
<thead>
<tr>
<th>Message Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6027-809</td>
<td>Failed to subscribe to name group; rc = number.</td>
</tr>
<tr>
<td>6027-810</td>
<td>Could not connect to Group Services, rc = number.</td>
</tr>
<tr>
<td>6027-815</td>
<td>Failed to join Group Services groups.</td>
</tr>
<tr>
<td>6027-818</td>
<td>Subscription failed: Group number rc number</td>
</tr>
</tbody>
</table>

When this message is displayed, GPFS will automatically attempt to start again:

<table>
<thead>
<tr>
<th>Message Code</th>
<th>Description</th>
</tr>
</thead>
</table>

If this is not successful, follow the problem determination and repair actions specified.

Error detected when the `mmfsd` daemon subscribed to the adapter group and it did not see its node number on the subscriber list. This means that the node is not on the provider list of that adapter group:

<table>
<thead>
<tr>
<th>Message Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6027-835</td>
<td>Joining node (nodeNumber) has incompatible version number. Rejected</td>
</tr>
</tbody>
</table>

The `mmfsd` daemon is not compatible with the group version:

<table>
<thead>
<tr>
<th>Message Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6027-836</td>
<td>Joining node (number) has a different communication protocol type protocol_type than group’s protocol_type. Rejected</td>
</tr>
</tbody>
</table>
Network problems:

6027-306 Could not initialize inter-node communication.

Error numbers specific to GPFS application calls

When the daemon is unable to come up, GPFS may report these error numbers in syslog entries, or return them to an application:

E_CONFIG = 215, Configuration invalid or inconsistent between different nodes.

This error is returned when the levels of software on different nodes cannot coexist. See the book General Parallel File System for Linux®: Concepts, Planning, and Installation Guide and search for programming specifications.

GPFS daemon went down

There are a number of conditions that can cause the GPFS daemon to exit. These are all conditions where the GPFS internal checking has determined that continued operation would be dangerous to the consistency of your data. Some of these conditions are errors within GPFS processing but most represent a failure of the surrounding environment. In all cases, the daemon will exit and be restarted by the System Resource Controller (SRC) after recovery has been performed on its behalf by another node. Indications leading you to the conclusion that the daemon went down:

- Your application programs are getting a failure return code of ENODEV or ESTALE.

Applications running at the time of the failure will see either ENODEV or ESTALE errors. The ENODEV errors are generated by Linux until the daemon has restarted. The ESTALE error is generated by GPFS as soon as it restarts.

Any cluster wide Group Services failure results in a loss of quorum, initiating these recovery procedures. If GPFS is started and Group Services is not available, it will repeatedly exit and be restarted by the SRC until either Group Services is available or the administrator issues an mmshutdown command to terminate GPFS. In either case, when quorum is lost, applications with open files receive an ESTALE error return code until the files are closed and reopened. New file open operations will fail until quorum is restored and the file system is remounted. Applications accessing these files prior to GPFS return may receive a ENODEV return code from Linux.

- /var/adm/ras/mmfs.log.latest contains the message:

mmfsd terminated abnormally

Most GPFS daemon down error messages are in the mmfs.log.previous log for the instance that failed. If the daemon restarted, it generates a new mmfs.log.latest. Begin problem determination for these errors with syslog entries.

If an existing quorum is lost, GPFS exits all nodes to protect the integrity of your data. This is marked by an syslog entry on all nodes and an entry in the mmfs.log.latest file. In response to this exit, the SRC restarts GPFS on all nodes without administrator intervention. This restart attempts to rebuild a quorum and allows operations when quorum is achieved. Automatic file system mounts are performed, if specified.

- The syslog entry contains either MMFS_ABNORMAL_SHUTDOWN or MMFS_PHOENIX

If there are reports of errors from Group Services, follow the problem determination and repair actions specified in the book General Parallel File System for Linux®: RSCT Guide and Reference. Verify the Group Services daemon has not failed. If the Group Services daemon fails, so will the GPFS daemon. Syslog entries will indicate a GPFS failure. See the book General Parallel File System for Linux®: RSCT Guide and Reference. Search for diagnosing group services problems. Follow the problem determination and repair actions specified.

- Open requests are rejected with no such file or no such directory errors.
When quorum has been lost, requests are rejected until the node has rejoined a valid quorum and mounted its file systems. If messages indicate lack of quorum, follow the procedures in “GPFS daemon will not come up” on page 19.

- The syslog contains either an entry for MMFS_ENVIRON or MMFS_GENERIC.

GPFS may detect a network problem first, depending on the timing of the messages and the actual network problem. GPFS requires full connectivity between nodes to manage its file system and ensure data integrity.

When there is no communication between two nodes, one of them is considered to have failed. The failure to communicate appears to GPFS to be a network failure and the error report will show errors such as ECONNRESET or ETIMEOUT. The node that detects the failure waits for a short period to allow the Group Services function to determine that there has been a failure on the far end of the connection. If Group Services reports a failure has occurred on another node, failure processing for that node occurs. If no Group Services report is received, GPFS on the detecting node will exit, assuming that the network failure is local to that node.

There are cases where the error may actually be on a partner node. In this instance, the failure is partial and Group Services does not report the error. A severe shortage of memory on a partner node can cause this condition.

If GPFS reports the error and exits, it could be that:

- A partner node has failed in a way that Group Services could not detect and report.
  Determine whether all partner nodes are up and functioning correctly. Pinging all nodes is a start in this process, as ping will often work when other functions cannot. Use of the rsh command to execute commands on the other nodes will reveal the one or more nodes that are not behaving correctly. Correction of the problem on those nodes will be necessary.

- Communications on the reporting node have failed.
  Examine the syslog entries on this node for indications of network errors and make necessary repairs. GPFS is set up to respawn automatically after a failure. If GPFS exits on a node because of a perceived communication error and the error is local to the exiting node, it will fail similarly on the restart if the error persists. If the error is transient, the system may recover fully. In this case, examine the syslog entries, /var/adm/ras/mmfs.log.previous and /var/adm/ras/mmfs.log.latest, to determine the problem. See the book General Parallel File System for Linux®: RSCT Guide and Reference Search for diagnosing group services problems. Follow the problem determination and repair actions specified.

- Verify Group Services and Topology Services are functioning correctly.

    lssrc -ls cthags
    lssrc -ls cchats

    If the subsystems are declared down but are not really down, see the book General Parallel File System for Linux®: RSCT Guide and Reference Search for diagnosing topology services problems. Follow the problem determination and repair actions specified.

    If the subsystems are down, restart them:
    /usr/sbin/rsct/bin/cthagsctrl -s
    /usr/sbin/rsct/bin/cthatsctrl -s

    For all other errors follow the procedures for “Information to collect before contacting the IBM Support Center” on page 11

**GPFS daemon down due to adapter failure**

GPFS is configured to communicate over a specific adapter and network. Correct operation of GPFS depends on the availability of that network. GPFS monitors the availability of the communication adapter for failure and will shutdown the GPFS daemon if that adapter fails. GPFS operates over any adapter which supports the IP protocol, and relies on IP errors to detect communication failures. When a node detects a communication failure, it will exit with a syslog entry showing the communication partner. The corrective action is to repair the failed network component.
If an adapter group fails, GPFS will terminate execution on this node. A message will be issued to the \textit{mmfs.log.latest} file indicating that the adapter group membership has been lost. See the book \textit{General Parallel File System for Linux®: RSCT Guide and Reference} and search for diagnosing topology services problems. Then search for operational verification tests. Follow the problem determination and repair actions specified.

\textbf{Problems reported by Group Services}

Group Services will report the number of nodes that are members of particular groups. The memberships that are of interest are:

- Node membership to the recovery group
- Node membership to the NSD group
- Node memberships to the GPFS nodeset

The \texttt{lssrc} command is used to check on group memberships. Issue:

\begin{verbatim}
lssrc -ls cthags
\end{verbatim}

The system displays information similar to:

\begin{verbatim}
Subsysytem Group PID Status
cthaps cthags 838 active
1 locally-connected client. Their PIDs:
979(mmfsd)
HA Group Services domain information:
Domain established by node 1
Number of groups known locally: 3

<table>
<thead>
<tr>
<th>Group name</th>
<th>Number of providers</th>
<th>Number of local providers/subscribers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gpfs.set1</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>GpfsRec.set1</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>NsdGpfs.set1</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>
\end{verbatim}

\textit{Figure 1. Output from lssrc command}

This display shows that there are five members on the GPFS nodeset \texttt{set1}. These are identified by the group names \texttt{Gpfs.set1} and \texttt{GpfsRec.set1}. The \texttt{lssrc} command will show the GPFS memberships for the nodeset that the node on which the command is issued belongs. In order to list the members of a different nodeset, issue the \texttt{lssrc} command from a node within that nodeset.

\textbf{Group Services not active on node}

To determine if group services is active on a node, issue the \texttt{lssrc -lscthaps} command.

The system displays information similar to:

\begin{verbatim}
0513-036 The request could not be passed to the cthags subsystem.
\end{verbatim}

This shows that RSCT has not been started on this node. Start the subsystem and try your command again. Issue:

\begin{verbatim}
/usr/sbin/rsct/bin/cthactrl -s
\end{verbatim}

\textbf{GPFS join problems}

If GPFS cannot join a group, it exits, restarts, and tries again to join the group. Syslog entries will indicate a GPFS failure. This is not a GPFS failure, but a failure in Group Services or some other component upon which it is dependent. See the book \textit{General Parallel File System for Linux®: RSCT Guide and Reference} and search for diagnosing group services problems. Follow the problem determination and repair actions specified.
Delays and deadlocks

If file system processes appear to stop making progress, there may be a system resource problem or internal deadlock within GPFS.

1. First, check how full your file system is by issuing the mmdf command. If the mmdf command does not respond, contact IBM Service. Otherwise, the system displays information similar to:

```
  disk name  disk size failure group holds holds free KB free KB
  -------- --------- -------- -------- ------ -------------- ------------
gpfs33nsd  2097152 -1 yes yes   2049024 (98%)  1112 (0%)
gpfs35nsd  2097152 -1 yes yes   2049536 (98%)  1184 (0%)
gpfs37nsd  2097152 -1 yes yes   2047744 (98%)  470 (0%)
gpfs39nsd  2097152 -1 yes yes   2048512 (98%)  992 (0%)
  -------- ---------  --------
(totals)    8388608 8194816 (98%)  3760 (0%)
```

Inode Information
-----------------
Total number of inodes: 10240
Total number of free inodes: 10169

For file systems that are doing parallel file creates, if the total number of free inodes is not greater than 5% of the total number of inodes there is the potential for slowdown in file system access. Issue the mmchfs command to increase the number of inodes for the file system so there is at least a minimum of 5% free.

GPFS error messages

**6027-533** File system file_system is approaching the limit for the maximum number of inodes/files.

Syslog entry

```
Jul 19 12:51:49 cholesky mmfs: Error=MMFS_SYSTEM_WARNING ID=0x4DC797C6, Tag=3690419: File system warning. Volume fs1. Reason: File system fs1 is approaching the limit for the maximum number of inodes/files.
```

2. If the file system is not nearing its maximum number of files, look at threads that are waiting. On all nodes of a live system, to determine which nodes have threads waiting longer than 10 seconds and save the information to the file long_waiters issue this command on each node:

```
/usr/lpp/mmfs/bin/mmfsadm dump waiters 10
```

Determine which nodes have the long waiting threads.

For all nodes that have threads waiting longer than 10 seconds, issue:

```
mmfsadm dump all
```

Notes:

a. Each node can potentially dump up to 40 megabytes of data.

b. An mmfsadm dump all should only be run on nodes where you are sure the threads are really hung. An mmfsadm dump all can follow pointers that are changing and cause the node to crash.

To determine if a node is hung, determine the percentage of user time that is running (1 indicates quiet time), issue:

```
vmslot 5 2|tail -1
```

Your next course of action depends on the information found in the dump of the waiters. Examine each long waiting thread and determine what it is waiting on:
**kxAwaitIOCompletion**
Indicates an abnormal wait time for I/O completion. Look into Network Shared Disk problems. To determine which disk is being waited on, look in the dump disk section for:

- **In progress:**
- **In progress: read operation ...**
- **In progress: write operation ...**

If the lines below the **In progress** say **none**, there is no outstanding I/O for that device.

Look at the driver type and do one of the following:
- If the driver type is **disk** and you are experiencing a long wait for the operation, perform problem determination on the disk device to determine why the disk operations are not completing.
- If the driver type is **nsd** the problem could be either a communication or a disk problem. This section will list the active server node for the hung I/O operation on that NSD. To determine if the hung operation is a communication or disk device problem, go to the dump nsd section in the output for the active server node. Then go to the dump disk section. If there are long in progress times for the NSD in the dump disk section, perform disk problem determination again. If there are no in progress I/O operations, but there are long communication waiters, see the long Remote Procedure Call section below.

**Remote Procedure Call (RPC) waits**
Determine why the RPC has not completed on some other node.

In the dump, look in the tscomm section to find the same thread with pending messages to find the other nodes IP address and the message name that was sent. If there are multiple nodes with pending replies, you have to check all of them to see the holdup. success means the reply has already returned.

If the message is **tmMsgRevoke**, there might not be a thread on the other node to handle it. These can be queued on the lockable object for later handling.

At the end of the tscomm section, there may also be messages that have not been given a handler thread. This happens quite often when there are hundreds of sgmMsgMount requests coming to a file system manager all at once. This is normal.

In some rare cases where there are TCP problems, we have seen messages only partially returned. In this case there will be a few extra lines after a node in the connection table that shows how many bytes have been received so far and how many it expects.

In the dump from the other node see why the message handler for that message name is waiting. In the tscomm section, if you see destination ip@ pending, contact IBM Service.

**Wait on a mutex**
Follow the mutex pointer value in the dump mutexes section to see which thread is holding the mutex, and find that thread in the dump threads section to see why that thread is waiting. The desc pointer on a thread is what is recorded as a mutex holder.

If you see a by kernel thread, issue an mmfsadm dump kthread.

**Wait on condition variable**
These are harder than mutexes to diagnose, because it requires a knowledge of the semantics of state changes in internal structures. In these cases, the thread is waiting for another thread to make a state change and wake up the waiting thread (like a Linux event wait).

**Wait on a lock**
There are lockable objects such as OpenFiles, AllocSegments, IndBlocks, that have keys. The keys look like 4 hex words separated by colons. Finding the object that this thread is working on is usually a matter of:
a. Finding any object with the writer field holding the thread’s desc value (if the thread has an exclusive type lock), or finding any object that already has a lock on it. For example, [ lx ]. These locks are in the dump locks section, but also show up in the dump files and dump buffers sections.

If the node is also the file system manager, there is a dump tokenmgr section that has token information for all the nodes. Also for the file system manager in the dump threads section, look for a KX. If there is a KX call, this indicates a call to the kernel was being made. Issue an mmfsadm dump kthread.

b. It is usually difficult to find out why the threads that have the lock are not releasing it. Usually there is another thread, or kthread, to follow in this case.

Node cannot be added to the GPFS cluster

Indication leading you to the conclusion that a node cannot be added to a cluster:
• You issue the mmcrcluster or mmaddcluster command and receive the message:6027-1598 Node name was not added to the cluster. The node appears to already belong to a GPFS cluster.

Steps to follow if a node cannot be added to a cluster:
1. Run the mmlscluster command to verify that the node is not in the cluster.
2. If the node is not in the cluster, issue on the node that could not be added:
   mmremote removeFromCluster
3. Reissue the mmaddcluster command.
4. If you are still unable to add the node to the cluster, issue on the node that cannot be added:
   rm /var/mmfs/gen/mmsdrfs
5. Reissue the mmaddcluster command.

File system will not mount

Indications leading you to the conclusion that your file system will not mount:
• On performing a manual mount of the file system, you get errors from either Linux or GPFS.
• If the file system was created with the option of an automatic mount, you will have failure return codes in /var/adm/ras/mmfs.log.latest.
• Your application cannot access the data it needs. Check /var/adm/ras/mmfs.log.latest for messages.

If your file system will not mount, there are various courses of action to take:
1. Verify quorum includes this node. Check /var/adm/ras/mmfs.log.latest to ensure that a mmfsd ready message has been logged, and that no errors were reported on this or other nodes. See the book General Parallel File System for Linux®: RSCT Guide and Reference. Search for Group Services subsystem and follow the problem determination actions specified.
2. Verify a conflicting command is not executing. For example, a mount command may not be issued while the mmfsck command is executing. The mount command may not be issued until the conflicting command completes. Note that interrupting the mmfsck command is not a solution because the file system will not be mountable until the command completes. Try again after the conflicting command has completed.
3. Verify sufficient disks are available to access the file system by issuing the mmlsdisk command. GPFS requires a minimum number of disks to find a current copy of the core metadata. If sufficient disks cannot be accessed, the mount will fail. The corrective action is to fix the path to the disk. See “NSD failures” on page 33.

Missing disks can also cause GPFS to be unable to find critical metadata structures. The output of the mmlsdisk command will show unavailable disks. If you have not specified metadata replication, the failure of one disk may result in your file system being unmountable. If you have specified metadata replication, it will require two disks in different failure groups to disable the entire file
system. If there are down disks, issue the `mmchdisk start` command to restart them and retry the mount. If there are no disks down, look on the network shared disk servers for syslog entries. Identify any network shared disk that has caused a syslog entry to be generated.

If there are no disks down, you can also look locally for syslog entry reports, and follow the problem determination and repair actions specified in your disk vendor problem determination guide. If the disk has failed, follow the procedures in "NSD failures" on page 33.

4. If disk leasing is turned on, verify that the node has a valid lease. To determine if disk leasing is turned on, see "Disk leasing problems" on page 38.

5. Verify that communication paths to the other nodes are available. The lack of communication paths between all nodes in the nodeset may impede contact with the file system manager.

6. Verify the file system is not already mounted. Issue the command:

   ```
   mount
   ```

7. Verify the GPFS daemon on the file system manager is available. Run the `mmlsmgr` command to determine which node is currently assigned as the file system manager. Run a trivial data access command such as an `ls` on the mount point directory. If the command fails, see "GPFS daemon went down" on page 22.

8. Check to see if the mount point directory exists and that there is an entry for the file system in the `/etc/fstab` file. The device listed in column one of `/etc/fstab` must also appear in the `/dev` directory. If any of these elements are missing, an update to the configuration information may not have been propagated to this node. Issue the `mmrefresh` command to rebuild the configuration information on the node and reissue the `mount` command.

9. Check the number of file systems that are already mounted. There is a maximum number of 32 file systems for a GPFS nodeset.

10. If you issue the `mmchfs -V` command and attempt to run the file system with a previous level of GPFS, the file system will not mount.

   After you have issued the command, new data structures exist on the disk which cannot be understood by previous levels of GPFS. You must recreate the file system from the backup medium and restore the content in order to access it through the level of GPFS from which it was created.

11. Issue the `mmlsfs` command to check whether the automatic mount option has been specified or not. If automatic mount option is expected, check `/var/adm/ras/mmfs.log.latest` for progress reports:

    ```
    starting ...
    mounting ...
    mounted ....
    ```

12. If quotas are enabled, check if there was an error while reading quota files. See "MMFS_QUOTA" on page 3.

13. Verify the `maxblocksize` configuration parameter. If `maxblocksize` is less than the blocksize of the file system you are attempting to mount, you will not be able to mount it.


**GPFS error messages**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6027-304</td>
<td>Remount failed for name after daemon restart.</td>
</tr>
<tr>
<td>6027-419</td>
<td>Failed to read a file system descriptor.</td>
</tr>
<tr>
<td>6027-549</td>
<td>Failed to open name.</td>
</tr>
<tr>
<td>6027-580</td>
<td>Unable to access vital system metadata, too many disks are unavailable.</td>
</tr>
<tr>
<td>6027-645</td>
<td>Attention: mmcommon getEFOptions command has failed. Checking /etc/fstab.</td>
</tr>
</tbody>
</table>
Error numbers specific to GPFS application calls

When mount of a file system is not successful, GPFS may report these error numbers in syslog entries, or return them to an application:

**E_NO_QUOTA_INST = 237, No Quota management enabled.**

To enable quotas for the file system, issue the `mmchfs -Q yes` command. To disable quotas for the file system issue the `mmchfs -Q no` command.

File system will not unmount

Indications leading you to the conclusion that your file system will not unmount:

- Return codes or error messages indicate the file system will not unmount.

If your file system will not unmount, take this course of action:

- If you get an error message similar to:
  
  ```
  umount: /gpfs1: device is busy
  ```
  
  the file system will not unmount until all processes are finished accessing it. If `mmfsd` is up, the processes accessing the file system can be determined. See "The lsof command" on page 4. These processes can be killed with the command:
  
  ```
  lsof filesystem | grep -v COMMAND | awk '{print $2}' | xargs kill -9
  ```

  If `mmfsd` is not operational and all processes are finished accessing it, you can force an unmount of the file system with the command:
  
  ```
  umount -f filesystem
  ```

  **Note:** If `umount` is issued with the `-f` flag or `mmfsd` is not available, the `lsof` command will not be able to determine any processes attempting to access the file system.

- Verify that there are no disk media failures.
  
  Look on the NSD server node for syslog entries. Identify any NSD server node that has generated a syslog entry. See "Disk media failure" on page 36 for problem determination and repair actions to follow.

- If the file system must be unmounted, you can force the unmount by issuing the `umount -f` command.

  **Notes:**
  
  1. See "File system forced unmount" for the consequences of doing this.
  2. Before forcing the unmount of the file system, issue the `lsof` command and close any files that are open.

GPFS error messages

The unsuccessful `umount` of a file system can be associated with this GPFS message number:

**6027-511 Cannot unmount file_system: error_string.**

File system forced unmount

Indications leading you to the conclusion that your file system has been forced to unmount:

- Forced unmount messages in `var/adm/ras/mmfs.log.latest`.
- Your application no longer has access to data.
- Your application is getting E_STALE or ENOENT return codes.
- Multiple unsuccessful attempts to appoint a file system manager may cause the configuration manager to unmount the file system everywhere. Such situations involve the failure of paths to disk resources from many, if not all, nodes. The underlying problem may be at the Network Shared Disk level or lower. The syslog entries for each node that unsuccessfully attempted to appoint a file system manager will
reflect file system unmounts with errors that are either coded 212, or that occurred when they tried to assume management of the file system. Note that these errors apply to a specific file system although it is possible that shared disk communication paths will cause the unmount of multiple file systems.

If your file system has been forced to unmount, there are various courses of action to take:

1. With the failure of a single disk, if you have not specified multiple failure groups and replication of metadata, GPFS will not be able to continue because it cannot write logs or other critical metadata. If you have specified multiple failure groups and replication of metadata, the failure of multiple disks will put you in the same position. In either of these situations, GPFS will forcibly unmount the file system. This will be indicated in the syslog entries by records indicating exactly which access failed, with a MMFS_SYSTEM_UNMOUNT record indicating the forced unmount. The user response to this is to take the needed actions to restore the disk access and issue the mmchdisk command to disks that are shown as down in the information displayed by the mmisdisk command.

2. Internal errors in processing data on a single file system may cause loss of file system access. These errors may clear with the execution of the umount command, followed by a remount of the file system, but they should be reported as problems to IBM.

3. If an MMFS_QUOTA syslog entry containing Error writing quota file... is generated, the quota manager continues operation if the next write for the user or group is successful. If not, further allocations to the file system will fail. Check the error code in the log and make sure that the disks containing the quota file are accessible. Run the mmcheckquota command.

If the file system must be repaired without quotas:

a. Uninstall quota management by issuing the command:
   mmchfs Device -Q no

b. mount the file system. Make any necessary repairs and install the backup quota files.

c. umount the file system. Restore quota management by issuing the mmchfs Device -Q yes command. Then run the mmcheckquota command with both the -u and the -g options.

d. mount the file system.

GPFS error messages

Indications there are not enough disks available:

6027-418 Inconsistent file system quorum. readQuorum=number writeQuorum=number quorumSize=number.

6027-419 Failed to read a file system descriptor.

Indications the file system has been forced to unmount:

6027-473 File System file_system unmounted by the system with return code number and reason code number.

6027-474 Recovery Log I/O Failed, unmounting file_system.

Error numbers specific to GPFS application calls

When a file system has been forced to unmount, GPFS may report these error numbers in syslog entries, or return them to an application:

E_PANIC = 666, A file system has been forcibly unmounted because of an error. Most likely due to the failure of one or more disks containing the last copy of metadata.
   See the syslog entry for details.

E_ALL_UNAVAIL = 218, A replicated read or write failed because none of the replicas were available.
   Multiple disks in multiple failure groups are unavailable. Follow the procedures in this document for unavailable disks.
Multiple file system manager failures

The correct operation of GPFS requires that one node function as the file system manager at all times. This instance of GPFS has additional responsibilities for coordinating usage of the file system. When the file system manager node fails, another file system manager is appointed in a manner that is not visible to applications except for the time required to switch over.

There are situations where it may be impossible to appoint a file system manager. Such situations involve the failure of paths to disk resources from many, if not all, nodes. In this event, the configuration manager nominates several host names to successively try to become the file system manager. If none succeed, the configuration manager unmounts the file system everywhere. See “NSD failures” on page 33.

GPFS error messages

The inability to successfully appoint a file system manager after multiple attempts can be associated with both the error messages listed in “File system forced unmount” on page 29 as well as these additional messages:

- When a forced unmount occurred on all nodes:
  
  6027-635 The current file system manager failed and no new manager will be appointed.

- If message 6027-636 is displayed, it means there is a disk failure. See “NSD failures” on page 33 for problem determination and repair procedures:
  
  6027-636 Disks marked as stopped or off-line.

- Message 6027-632 is the last message in this series of messages (see the accompanying messages):
  
  6027-632 Failed to appoint a new manager for file_system.

- Message 6027-631 occurs on each attempt to appoint a new manager (see the messages on the referenced node for the specific reason as to why it failed):
  
  6027-631 Failed to appoint node name as manager for file_system.

- Message 6027-638 indicates which node had the original error (probably the original file system manager node):
  
  6027-638 File system file_system unmounted by node name.

Error numbers specific to GPFS application calls

When the appointment of a file system manager is unsuccessful after multiple attempts, GPFS may report these error numbers in syslog entries, or return them to an application:

E_NO_MGR = 212, The current file system manager failed and no new manager could be appointed.

This usually occurs when a large number of disks are unavailable or when there has been a major network failure. Run mmldisk to determine whether disks have failed and take corrective action if they have mmchdisk.

GPFS commands are unsuccessful

Unsuccessful command execution will be indicated by:

- Return codes indicating the GPFS daemon is no longer running.
- Command specific problems indicating you are unable to access the disks.
- A non-zero return code from the GPFS command.

GPFS commands can be unsuccessful for various reasons:

1. If all commands are generically unsuccessful, this may be due to a daemon failure. Verify the GPFS daemon is active. Issue:
lsrsrc -s mmfs

If the daemon is not active:

- There will be a `/var/adm/ras/mmfs.log.previous` file on the local node which enumerates the failing sequence of the GPFS daemon.
- There will be a `/var/adm/ras/mmfs.log.previous` file on the file system manager node which enumerates the failing sequence of the GPFS daemon.
- There is a communications failure with the file system manager node.

You will receive an ERRNO I/O communications error.

2. Verify the GPFS cluster data files are not locked and are accessible. To determine if the GPFS cluster data files are locked, see "GPFS cluster data files are locked" on page 17.

3. `rsh` is not functioning correctly. See "Authorization problems" on page 16.

If `rsh` is not functioning properly on a node in the GPFS cluster, a GPFS administration command that needs to execute work on that node will fail with a "permission is denied" error. The system displays information similar to:

```
mmlscluster
rshd: 0826-813 Permission is denied.
mmdsh: 6027-1615 k145n02 rsh process had return code 1.
mmlscluster: 6027-1591 Attention: Unable to retrieve GPFS cluster files from node k145n02
rshd: 0826-813 Permission is denied.
mmdsh: 6027-1615 k145n01 rsh process had return code 1.
mmlscluster: 6027-1592 Unable to retrieve GPFS cluster files from node k145n01
```

These messages indicate that `rsh` is not working properly on nodes k145n01 and k145n02.

If you encounter this type of failure, determine why `rsh` is not working on the identified node. Then fix the problem.

4. Most problems encountered during file system creation fall into four classes:

- You did not create network shared disks which are required to build the file system.
- Parameters not valid for the specification of the disks to be used.
- The creation operation cannot access the disk.
  - Follow the procedures for checking access to the disk. This can result from a number of factors including those described in "NSD failures" on page 33.
- Unsuccessful attempt to communicate with the file system manager.
  - The file system creation runs on the file system manager node. If that node goes down, the `mmcrfs` command may not succeed.

5. If the command was unsuccessful and you plan to permanently deinstall GPFS from a node, you should first remove the node from the nodeset. If this is not done and you run the `mmdelnodel` command after the `mmfs` code is deinstalled, the command will fail and display a message similar to this example:

```
Verifying GPFS is stopped on all nodes ... 
k145n05: ksh: /usr/lpp/mmfs/bin/mmremote: not found.
```

If this happens, shut down the node and run the `mmdelnodel` command again.

6. If the command is not responding, this could be a temporary condition if the GPFS daemon is still initializing, or it might indicate a problem. To determine which is the case, run this command on one or more nodes:

```
lsrsrc -ls cthags
```

If the GPFS line is not displayed, see "GPFS daemon will not come up" on page 19.
7. If you have successfully installed and are operating with the latest level of GPFS, but cannot execute the new functions available, it is probable that you have not issued the `mmchfs -V` command to change the version of the file system. This command must be issued for each of your file systems. Make sure you have operated with the new level of code for awhile and are certain you want to migrate to the latest level of GPFS. Issue the `mmchfs -V` command only after you have permanently decided to accept the latest level, as this will cause disk changes incompatible with previous levels of GPFS.

**GPFS error messages**

If message 6027-538 is returned from the `mmcrfs` command, check your disks with `mmlsdisk` to determine whether they are in a stopped state:

6027-538 Error accessing disks.

If the daemon failed while running the command, you will see message 6027-663 (follow the procedures in “GPFS daemon went down” on page 22):

6027-663 Lost connection to file system daemon.

If the daemon was not running when you issued the command, you will see message 6027-665 (follow the procedures in “GPFS daemon will not come up” on page 19):

6027-665 Failed to connect to file system daemon: error_string

When GPFS commands are unsuccessful, the system may display information similar to these error messages:

6027-1611 This command must be executed on a node that belongs to nodeset name.
6027-1626 Command is not supported in the type environment.
6027-1627 Command failed on nodes: node_list.

**System commands are unsuccessful**

If the unsuccessful execution of either the df or the du command is followed by a message that the file system is no longer available, see “File system forced unmount” on page 29.

**GPFS error messages**

Unsuccessful command completion can be associated with this message:

df: file system name: A file, file system, or message queue is no longer available

Return from df command. If this message is displayed, try accessing the file system again after a reasonable period of time has passed. If the result is the same, check for a syslog entry.

**NSD failures**

GPFS will only use disk devices prepared as Network Shared Disks (NSDs). This section provides information on the creation, use, and failure of NSDs.

**Creating and using NSD disks**

GPFS requires that disk devices be prepared as NSDs. This is achieved with the `mmcrnsd` command. For example:

`mmcrnsd -F descfile`
Here, descfile is a file containing the disk descriptors for the disks to be prepared as NSDs. Empty lines, or lines that start with the # are ignored. Each descriptor is on a separate line and consists of the fields given in this example:

device_name:primary_server:backup_server:data_type:failure_group

For a complete explanation of disk descriptors, see the book [General Parallel File System for Linux®: Concepts, Planning, and Installation Guide](#) and search for disk descriptors. All fields except device_name are optional. If a primary_server is not specified, the disk should be SAN-attached to all nodes in the nodeset.

For disks that are SAN-attached to all nodes in the nodeset, device_name should refer to the disk device name in /dev on the node on where the mmcrnsd command is being issued. If primary_server is specified, device_name must refer to the name of the disk on the primary server node. Note that the same disk may have different local names on different nodes.

When a primary server node is specified, that node performs all disk I/O operations on behalf of the other nodes in the cluster. An optional backup server node may be specified. This backup server node is designed to be active when the primary server node fails or is unavailable. If a backup server is defined, the SCSI GENERIC device driver with RESERVE/RESET capability must be available. To determine if your distribution of Linux comes with this capability, look for the scsi_reset_provider symbol in the /proc/ksyms file. For example:

```
# fgrep scsi_reset_provider /proc/ksyms
```

The system will display information similar to:

```
c01abb10 scsi_reset-provider
```

If the RESERVE/RESET capability is not available, all I/O operations to the disk will fail even when the NSD had been correctly created by mmcrnsd. The /var/adm/ras/mmfs.log.latest log will contain messages similar to:

```
6027-1800 IO prohibited on NSD nsdname because SCSI patch or SCSI generic device not available and a backup server is defined.
```

When the mmcrnsd command encounters an error condition, this message is displayed:

```
6027-1636 Error found while checking disk descriptor: descriptor
```

Here, descriptor is the disk descriptor that encountered the error. Usually, this message is preceded by one or more messages describing the error more specifically.

Another error from mmcrnsd is:

```
6027-1661 Failed while processing disk descriptor descriptor on node name
```

This error can occur if either the primary or backup server node does not have read and write access to the disk device. The primary server node needs to write a Physical Volume Identifier (PVID) to the raw disk device. If a backup server node is specified, the backup server node will scan its disk devices to find this PVID string. If the disk device is SAN-attached to all nodes in the nodeset, the PVID is written to the disk by the node on which the mmcrnsd command is running.

Another mmcrnsd failure gives this messages:

```
6027-1662 Disk descriptor descriptor refers to an existing NSD name.
```
This error message indicates that the disk is either an existing NSD, or that the disk was previously an NSD that had been removed from the GPFS cluster via the `mmdelnsd -p` command and had not been marked as available. In the latter case, `name` will be a null string and it is safe to rerun the command with the `-v` no flag.

**Displaying NSD information**

Use the `mmlsnsd` command to display information about the currently defined NSDs in the cluster. For example, if you issue `mmlsnsd`, your output may be similar to this:

<table>
<thead>
<tr>
<th>File system</th>
<th>NSD name</th>
<th>Primary node</th>
<th>Backup node</th>
</tr>
</thead>
<tbody>
<tr>
<td>gpfs1</td>
<td>gpfs15nsd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gpfsa</td>
<td>gpfs46nsd</td>
<td>k5n33</td>
<td>k5n36</td>
</tr>
<tr>
<td>(free disk)</td>
<td>gpfs47nsd</td>
<td>k5n11</td>
<td></td>
</tr>
</tbody>
</table>

The above shows that there are three NSDs in this cluster: gpfs15nsd is SAN-attached to all nodes in the nodeset, gpfs46nsd has both primary and backup server nodes defined, and disk gpfs47nsd is defined with a primary server only. In addition, disk gpfs47nsd is not assigned to any file system.

If you need to find out the local device names for these disks, you could use the `-m` option on the `mmlsnsd` command. For example, issuing `mmlsnsd -m` may produce output similar to this:

<table>
<thead>
<tr>
<th>NSD name</th>
<th>Device</th>
<th>Node name</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>gpfs15nsd</td>
<td>0972841D3AA84218 -</td>
<td>k5n29</td>
<td>(not found) directly attached</td>
</tr>
<tr>
<td>gpfs46nsd</td>
<td>/dev/sdb</td>
<td>k5n33</td>
<td>(in doubt) primary node</td>
</tr>
<tr>
<td>gpfs46nsd</td>
<td>/dev/sd5</td>
<td>k5n36</td>
<td>backup node</td>
</tr>
<tr>
<td>gpfs47nsd</td>
<td>0972842B45BF2314 -</td>
<td>k5n11</td>
<td>(error) primary node</td>
</tr>
</tbody>
</table>

The above shows that the first disk, gpfs15nsd, is not attached to the node on which the `mmlsnsd` command was issued: node k5n29. The next line shows that the local name for disk gpfs46nsd on its primary server is `/dev/sdb`. The words *(in doubt)* in the remarks field indicate that `mmlsnsd` was not able to confirm the result because it could not read the disk. Most likely the disk has been reserved by the backup node, see "Disk fencing" on page 36. The last line in the `mmlsnsd` output shows that the local device name for gpfs46nsd on its backup server is `/dev/sd5`. The last line shows that we were not able to determine the local device name for gpfs47nsd. Most likely the server node k5n11 is not reachable. Specifying the `-v` option on `mmlsnsd` may provide an indication for the nature of the problem.

To find the nodes to which disk gpfs15nsd is attached, and the corresponding local device names for the disk, issue `mmlsnsd -d gpfs15nsd -M`. You will receive output similar to this example:

<table>
<thead>
<tr>
<th>NSD name</th>
<th>Device</th>
<th>Node name</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>gpfs15nsd</td>
<td>0972841D3AA84218 -</td>
<td>k5n11</td>
<td>(error) directly attached</td>
</tr>
<tr>
<td>gpfs15nsd</td>
<td>0972841D3AA84218 -</td>
<td>k5n29</td>
<td>(not found) directly attached</td>
</tr>
<tr>
<td>gpfs15nsd</td>
<td>/dev/sdz</td>
<td>k5n30</td>
<td>directly attached</td>
</tr>
<tr>
<td>gpfs15nsd</td>
<td>/dev/sdz</td>
<td>k5n31</td>
<td>directly attached</td>
</tr>
<tr>
<td>gpfs15nsd</td>
<td>/dev/sdx</td>
<td>k5n32</td>
<td>directly attached</td>
</tr>
<tr>
<td>gpfs15nsd</td>
<td>0972841D3AA84218 -</td>
<td>k5n33</td>
<td>(not found) directly attached</td>
</tr>
<tr>
<td>gpfs15nsd</td>
<td>0972841D3AA84218 -</td>
<td>k5n36</td>
<td>(not found) directly attached</td>
</tr>
</tbody>
</table>

From the above output we can tell that disk gpfs15nsd is known as `/dev/sdz` on nodes k5n30 and k5n31, and as `/dev/sdx` on node k5n32. Furthermore, we know that the disk is not attached to nodes k5n29, k5n33, and k5n36. Since the first line indicates an error, we cannot tell at this time if the disk is attached to k5n11.

**Disk access**

NSD errors and GPFS configuration problems may be the result of a node's inability to access a disk. If you find a message in the syslog `/var/log/messages` that is similar to the example, your disk is not accessible:
Disk fencing
A backup server will service client I/O requests when the primary server is unavailable. In order to ensure data integrity, the backup server will fence a disk by issuing a **SCSI reserve** command as part of a fail over procedure when the primary server fails. The reservation is done to prevent the possibility that multiple nodes will be simultaneously performing I/O to the same disk.

This reservation is released under three conditions:
1. The mmfs daemon on the primary server rejoins the NSD group.
2. The mmfs daemon on the secondary server is shutdown.
3. The mmfs daemon on the secondary server is restarted after a node failure.

When the server disk is reserved, however, the output of the `mmlsnsd` command may still not be complete. This is not necessarily an error. For example, if the primary server is not operational, the disk must remain reserved. In rare instances, the secondary server may have failed while holding the reservation. If the secondary server cannot be brought back online, the primary server will be unable to service I/O requests. When this happens, client requests will fail with I/O errors and the Linux syslog will contain messages similar to:

```
Feb 13 15:18:00 k145n04 kernel: scsi2 (0,1,1) : RESERVATION CONFLICT
```

The `mmlsnsd` command will give the expected device for the NSD that is failing. In this case the reservation can be manually broken by resetting the device. The utility, `mmnsdreset`, is provided to reset the device and can be called by:

```
mmnsdreset -d device
```

If this fails to reset the device, `mmnsdreset` can also be invoked with the `-f` flag. This will reset the last known local device name of each of the NSDs for which it is a server. The device reset should only be done when the device reservation cannot be released by the secondary server.

Disk media failure
Regardless of whether you have chosen additional hardware or replication to protect your data against media failures, you first need to determine that the disk has completely failed. If the disk has completely failed and it is not the path to the disk which has failed, follow the procedures defined by your disk vendor.

1. Check on the states of the disks for the file system:
   ```
   mmlsdisk fs1 -e
   ```
   GPFS will mark disks down if there have been problems accessing the disk.

2. The next step is irreversible! Do not execute unless data has been replicated. This step may take a while to scan for bad disk addresses.
   ```
   mmdeldisk fs1 -d gpfs1n12 -p -n
   ```

   **Note:** Use only if you have replicated metadata.
   After the disk is properly prepared and available for use, prepare a disk descriptor for the disks to be used to recreate the file system.
Replicated metadata and data
If you have replicated metadata and data and only disks in a single failure group have failed, everything should still be running normally but with slightly degraded performance. You can determine the replication values set for the file system by issuing the `mmlsfs` command. Proceed with the appropriate course of action:

1. To repair the NSD, see “NSD failures” on page 33 and follow problem determination and the repair actions specified.
2. Issue:
   `mmaddisk fs1 -d gpfs12nsd`
3. To rereplicate data that only has single copy, issue:
   `mmrestripefs fs1 -r`

   **Note:** Optionally use `-b` instead `-r` to rebalance across all disks, but this takes a long time.
4. **Optionally**, check the file system for metadata inconsistencies by executing the off-line version of `mmfsck`:
   `mmfsck fs1`

   If `mmfsck` succeeds, you may still have errors that occurred. Check to verify no files were lost. If files containing user data were lost, you will have to restore the files from the backup media.

   If `mmfsck` fails, sufficient metadata was lost and you need to recreate your file system and restore the data from backup media.

Replicated metadata only
If you have only replicated metadata, you should be able to recover some, but not all, of the user data. Recover any data to be kept using normal file operations or erase the file. If you read a file in blocksize chunks and get a failure return code and an `EIO` errno, that block of the file has been lost. The rest of the file may have useful data to recover, or it can be erased.

No replication
When there is no replication, the system metadata has been lost and the file system is basically irrecoverable. You may be able to salvage some of the user data, but it will take work and time. A forced unmount of the file system will probably already have occurred. If not, it probably will very soon if you try to do any recovery work. You can manually force the unmount yourself:

1. `mount` the file system in **read-only** mode (see “Read-only mode mount” on page 4). This will bypass recovery errors and let you read whatever you can find. Directories may be lost and give errors, and parts of files will be missing. Get what you can now, for all will soon be gone. On a single node, issue:
   `mount /dev/fs1 -o ro`
2. If you read a file in blocksize chunks and get an `EIO` return code that block of the file has been lost. The rest of the file may have useful data to recover or it can be erased. To save the file system parameters for recreation of the file system, issue:
   `mmlsfs fs1 > fs1.saveparms`

   **Note:** This next step is **irreversible!**

   To delete the file system, issue:
   `mmdelfs fs1`
3. To repair the disks, see your disk vendor problem determination guide. Follow the problem determination and repair actions specified.
4. Delete the NSDs associated with the file system. Issue:
   `mmdelnsd nsdname`
5. Create a disk descriptor file for the disks to be used. This will include recreating NSDs for the new file system.
6. Recreate the file system with either different parameters or the same as you used before. Use the disk descriptor file.
7. Restore lost data from backups.

Partial disk failure
If the disk has only partially failed and you have chosen not to implement hardware protection against media failures, the steps to restore your data depends on whether or not you have used replication. If you have replicated neither your data nor metadata, you will need to restore the lost information from the backup media and execute the off-line version of the `mmfsck` command. If it is just the data which was not replicated, you will need to restore the data from the backup media. There is no need to run the `mmfsck` command if the metadata is intact.

If both your data and metadata have been replicated, implement these recovery actions:
1. Unmount the file system:
   ```
   umount /dev/ufs1
   ```
2. Delete the disk from the file system:
   ```
   mmdeldisk fs1 gpfs10nsd -p
   ```
3. If you are replacing the disk, add the disk:
   ```
   mmaddisk fs1 gpfs11nsd
   ```
   and then restripe the file system:
   ```
   mmrestripes fs1 -b
   ```
   **Note:** Ensure there is sufficient space elsewhere in your file system for the data to be stored by using the `mmdf` command.

Disk leasing problems
Disk leasing is activated if any disk in any file system in the nodeset is not using SCSI-2 reserve. In this mode, an active GPFS daemon is allowed to perform I/O operations if it holds a valid lease. The disk lease is renewed periodically by sending a renewal request to the configuration manager. If a node is not able to access the file systems (or to perform file system operations such as `mount` or `mmlsfs`), first check whether disk leasing is enabled. If disk leasing is enabled, verify that the node holds a valid lease. If the lease on a node has expired, check the communication path between the node and the configuration manager (there may be communication failure or configuration manager node failure and the subsequent takeover). If GPFS commands are issued without a valid lease, the command will not execute and the user will experience a delay.

Issue either of these commands to check lease values:
- `mmlsconfig`
  If disk leasing is enabled, this command will show the variable `useDiskLease` yes
- `mmfsadm dump cfgmgr`
  This command will show the current lease information on the local node. It will provide information similar to this display:

```
Cluster Configuration: Type: 'LC'
Domain .ppd.pok.ibm.com, 2 nodes in this cluster
autoSgLoadBalance off

<table>
<thead>
<tr>
<th>node idx</th>
<th>node no</th>
<th>host name</th>
<th>adapter ip address</th>
<th>admin node</th>
<th>status</th>
<th>fails</th>
<th>panics</th>
<th>SGs</th>
<th>mem daem</th>
<th>mem CPU free</th>
<th>mem CPU /sec</th>
<th>daemon TMreq</th>
<th>Last Failure Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>netfin45</td>
<td>9.114.67.109</td>
<td>y</td>
<td>up</td>
<td>0/0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0%</td>
<td>100%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>netfin46</td>
<td>9.114.67.110</td>
<td>y</td>
<td>up</td>
<td>0/0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0%</td>
<td>100%</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
```
Cluster configuration manager is 9.114.67.109 (other node); pendingOps 0
Stripe groups managed by this node:
(none)
Using TCP communication with epoch number 0, PrevLapiEpochNo 0
Phoenix Group Names:Gpfs.1, GpfsRec.1; Group State:Active; Quorum:2 Version:(4:4)
useDiskLease yes [duration 60 sec.]: goodToGo4IO 1 leaseExpired 0 howLong 0

NFS client with stale inode data

For performance reasons, the Linux NFS implementation caches file information on the client. Some of the information (for example, file state information such as file size and timestamps) is not kept up-to-date in this cache. The client may view stale inode data (on ls -l, for example) if exporting a GPFS filesystem via NFS. If this is not acceptable for a given installation, caching can be turned off by mounting the filesystem on the client using the -o actimeo=0 option.

Turning off NFS caching will result in extra file systems operations to GPFS, and slow down its performance.

Data integrity

GPFS takes extraordinary care to ensure the integrity of customer data. However, certain hardware failures, or in extremely unusual circumstances, the occurrence of a programming error can cause the loss of data in a file system. GPFS performs extensive checking to validate metadata and ceases using the file system should metadata be inconsistent. This can appear in two ways:
1. The file system will be unmounted and applications will begin seeing ESTALE return codes to file operations.
2. Syslog entries indicating a MMFS_SYSTEM_UNMOUNT and a corruption error are generated.

If actual disk data corruption occurs, this will appear on each node in succession. If this happens, examine the syslog entries on the NSD servers for any indication of a disk error that has been reported and take appropriate disk problem determination and repair actions prior to continuing. After completing any required disk repair actions run the off-line version of the mmfsck command on the file system.

If data corruption errors occur in only one node it is probable that memory structures within the node have been corrupted. In this case, the file system is probably good but a program error exists in GPFS or another authorized program with access to GPFS data structures. Follow the directions in Chapter 1, “GPFS problem determination tools”, on page 1 and then reboot the node. This should clear the problem.

If the problem repeats on one node without affecting other nodes check the programming specifications code levels to determine that they are current and compatible and that no hardware errors were reported. See the book General Parallel File System for Linux®: Concepts, Planning, and Installation Guide for correct software levels.

Error numbers specific to GPFS application calls

When there is the possibility of data corruption, GPFS may report these error numbers in syslog entries, or return them to an application:

E_VALIDATE=214, Invalid checksum or other consistency check failure on disk data structure.
This indicates that internal checking has found an error in a metadata structure. The severity of the error depends on which data structure is involved. The cause of this is usually GPFS software, disk hardware or other software between GPFS and the disk. Running mmfsck should repair the error. The urgency of this depends on whether the error prevents access to some file or whether basic metadata structures are involved.

Application program errors

When receiving application program errors, there are various courses of action to take:
1. Loss of file system access usually appears first as an error received by an application. Such errors are normally encountered when the application tries to access an unmounted file system. The most common reason for losing access to a single file system is a failure somewhere in the path to a large enough number of disks to jeopardize your data if operation continues. These errors may be reported in the syslog entries on any node because they are logged in the first node to detect the error. Check all error logs for errors.

2. There are several cases where the state of a given NSD disk will prevent access by GPFS. This will be seen by the application as I/O errors of various types and will be reported in the syslog entries as MMFS_SYSTEM_UNMOUNT or MMFS_DISKFAIL records. This state can be found by issuing the `mmlsdisk` command.

3. If allocation of data blocks or files (which quota limits should allow) fails, issue the `mmlsquota` command for the user or group.

   If usage is equal to or approaching the hard limit, or if the grace period has expired, make sure that no quotas are lost by checking *in doubt* values. Reduce quota usage by deleting or compressing files or moving them out of the file system. Consider increasing quota limit.

   If quotas are exceeded in the *in doubt* category, run the `mmcheckquota` command.

   **Note:** There is no way to force GPFS nodes to relinquish all their local shares in order to check for lost quotas. This can only be determined by running the `mmcheckquota` command immediately after mounting the file system, and before any allocations are made. In this case, the value *in doubt* is the amount lost.

   To display the latest quota usage information, use the `-e` option on either the `mmlsquota` or the `mmrepquota` commands. Remember that the `mmquotaon` and `mmquotaoft` commands do not enable and disable quota management. These commands merely control enforcement of quota limits. Usage continues to be counted and recorded in the quota files regardless of enforcement.

**GPFS error messages**

Application program errors can be associated with these GPFS message numbers:

- **6027-506**  
  *name* is already loaded at *address*.

- **6027-695**  
  File system is read-only.

- **6027-1324**  
  Unable to write new descriptor to the file *name*. Ensure the file system has enough space and retry.

**Performance problems**

This section describes types of performance problems and their possible causes.

**Slow GPFS start up**

Some SCSI controllers will report devices that do not exist, and this may cause some start up performance problems, specifically a slow start up of the GPFS daemon. Since the NSD devices do not necessarily have fixed local device names on each system, it may be necessary to scan all disk devices in order to find these disks. If a SCSI controller reports a disk device that is not accessible, GPFS will attempt to open and read a portion of that device. For some devices this can take a substantial amount of time. Start up performance of GPFS can be increased by removing those devices from the system configuration. This can be done at run time by issuing the command:

```
echo "scsi remove-single-device adapter chan id lun" >/proc/scsi/scsi
```

where *adapter*, *chan* (channel), *id*, and *lun* correspond to the missing device. A list of all SCSI devices can be found in `/proc/scsi/sg/devices`. The first line in this file corresponds to sda, the second to sdb, and so forth to the end of the file.
Long response time for I/O operations

Various courses of action to take if you are experiencing long response times:

- If you are using an ethernet network, performance can be significantly improved by switching to a high speed network, such as Myrinet.
- Check disk hardware.
- If GPFS is configured to operate over an ethernet network, check the ethernet network configuration:
  1. Make sure that the ethernet network is operating at Full Duplex, irrespective of the speed.
  2. Check for collisions on the ethernet network. To view the collision count, issue:
     `ifconfig`
  3. Make sure that all ethernet components, such as adapters and switches, are functioning properly.
Chapter 3. Messages

6027-300  mmfsd ready
Explanation: The mmfsd server is up and running.
User Response: None. Informational message only.

6027-301  Initialization file fileName could not be run.
Explanation: Failed to execvp the initialization shell script.
User Response: Check file existence and access permissions.

6027-302  Remount failed for mountid id: ernosDescription.
Explanation: mmfsd restarted and tried to remount the file systems that the VFS layer thought were still mounted.
User Response: Check the errors displayed and the errno description.

6027-304  Remount failed for device after daemon restart.
Explanation: A remount failed after daemon restart. This ordinarily occurs because one or more disks are unavailable. The mmlsdisk command will display the current state of the disks in the file system. Other possibilities include loss of connectivity to one or more disks.
User Response: Issue the mmlsdisk command and check for down disks. Run mmchdisk to start any down disks, then remount the file system.
If there is a problem with the disks or the connections to the disks, take the necessary corrective actions and remount the file system.

6027-305  Perform mmlsdisk for any disk failures and remount.
Explanation: Occurs in conjunction with message number 6027-304.
User Response: Follow the User Response for message number 6027-304.

6027-306  Could not initialize inter-node communication.
Explanation: The GPFS daemon was unable to initialize the communications required to proceed.
User Response: User action depends on the return code which is shown in the accompanying message (/usr/include/errno.h). The communications failure that caused the failure must be corrected. One possibility is an rc=67 error indicating that the required port is unavailable. This may mean that a previous version of the mmfs daemon is still running. Killing that daemon may clear the problem.

6027-310  command initializing. (Version versionName: Built date time)
Explanation: The mmfsd server has started execution.
User Response: None. Informational message only.

6027-311  mmfsd shutting down.
Explanation: The mmfsd server or mmcrfs is about to terminate.
User Response: None. Informational message only.

6027-312  Unknown trace class traceClass.
Explanation: The trace class is not recognized.
User Response: Specify a valid trace class.

6027-313  Cannot open configuration file fileName.
Explanation: The configuration file could not be opened.
User Response: The configuration file is copied from the SDR and placed in /var/mmfs/etc/mmfs.cfg. Verify that this file and the SDR files mmsdrfs and mmsdrcfg1 exist in your GPFS nodeset.

6027-314  command must run as root.
Explanation: The mmfsd server was run without root authority.
User Response: Contact the IBM Support Center.

6027-315  Bad config file entry in fileName, line number.
Explanation: The configuration file has an incorrect entry.
User Response: Fix the syntax error in the configuration file. Verify that you are not using a configuration file that was created on a release of GPFS subsequent to the one that you are currently running.
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Explanation</th>
<th>User Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>6027-316</td>
<td>Unknown config parameter <code>parameter</code> in <code>fileName</code>, line number.</td>
<td>There is an unknown parameter in the configuration file.</td>
<td>Fix the syntax error in the configuration file. Verify that you are not using a configuration file that was created on a release of GPFS subsequent to the one you are currently running.</td>
</tr>
<tr>
<td>6027-317</td>
<td>Old server with PID <code>pid</code> still running.</td>
<td>An old copy of <code>mmfsd</code> is still running.</td>
<td>Stop the mmfsd server, then restart it.</td>
</tr>
<tr>
<td>6027-318</td>
<td>Watchdog: Some process appears stuck; stopped the daemon process.</td>
<td>A high priority process got into a loop.</td>
<td>Stop the old instance of the mmfs server, then restart it.</td>
</tr>
<tr>
<td>6027-319</td>
<td>Could not create shared segment.</td>
<td>The shared segment could not be created.</td>
<td>Contact the IBM Support Center.</td>
</tr>
<tr>
<td>6027-320</td>
<td>Could not map shared segment.</td>
<td>The shared segment could not be mapped.</td>
<td>Contact the IBM Support Center.</td>
</tr>
<tr>
<td>6027-321</td>
<td>Shared segment mapped at wrong address (is <code>value</code>, should be <code>value</code>).</td>
<td>The shared segment did not get mapped to the expected address.</td>
<td>Contact the IBM Support Center.</td>
</tr>
<tr>
<td>6027-322</td>
<td>Could not map shared segment in kernel extension.</td>
<td>The shared segment could not be mapped in the kernel.</td>
<td>If an EINVAL error message is displayed, the kernel extension could not use the shared segment because it did not have the correct GPFS version number. Unload the kernel extension and restart the GPFS daemon.</td>
</tr>
<tr>
<td>6027-323</td>
<td>Error unmapping shared segment</td>
<td>The shared segment could not be detached.</td>
<td>Check reason given by error message.</td>
</tr>
<tr>
<td>6027-324</td>
<td>Could not create message queue for main process</td>
<td>The message queue for the main process could not be created. This is probably an operating system error.</td>
<td>Contact the IBM Support Center.</td>
</tr>
<tr>
<td>6027-328</td>
<td>Value <code>value</code> for parameter is out of range in <code>fileName</code>. Valid values are <code>value</code> through <code>value</code>. <code>value</code> used.</td>
<td>An error was found in the <code>/var/mmfs/etc/mmfs.cfg</code> files.</td>
<td>Check the mmfs.cfg file.</td>
</tr>
<tr>
<td>6027-329</td>
<td>Cannot pin the main shared segment: <code>name</code></td>
<td>Trying to pin the shared segment during initialization.</td>
<td>Check the mmfs.cfg file.</td>
</tr>
<tr>
<td>6027-334</td>
<td>Error initializing internal communications.</td>
<td>The mailbox system used by the daemon for communication with the kernel cannot be initialized.</td>
<td>Increase the size of available memory using the <code>mmchconfig</code> command.</td>
</tr>
<tr>
<td>6027-335</td>
<td>Configuration error: check <code>fileName</code>.</td>
<td>A configuration error is found.</td>
<td>Check the mmfs.cfg file and other error messages.</td>
</tr>
</tbody>
</table>
6027-336  Value value for configuration parameter parameter is not valid. Check fileName.

Explanation: A configuration error is found.
User Response: Check the mmfs.cfg file.

6027-337  Waiting for resources to be reclaimed before exiting.

Explanation: The mmfsd daemon is attempting to terminate, but cannot because data structures in the daemon shared segment may still be referenced by kernel code. This message may be accompanied by other messages that show which disks still have I/O in progress.
User Response: None. Informational message only.

6027-338  Waiting for number user(s) of shared segment to release it.

Explanation: The mmfsd daemon is attempting to terminate, but cannot because some process is holding the shared segment while in a system call. The message will repeat every 30 seconds until the count drops to zero.
User Response: Find the process that is not responding, and find a way to get it out of its system call.

6027-339  Non-numeric trace value value after class classname.

Explanation: The specified trace value is not recognized.
User Response: Specify a valid trace integer value.

6027-340  Could not retrieve the network interface configuration.

Explanation: The socket or ioctl call to retrieve the interface configuration fails.
User Response: Check reason for given error.

6027-341  Host ipAddress in nodeListFile is not valid.

Explanation: The IP address of a host listed in the node list file could not be retrieved.
User Response: Check node list file specified in error message.

6027-342  Duplicate address ipAddress in nodeListFile.

Explanation: The IP address appears more than once in the node list file.

User Response: Check node list file specified in error message.

6027-343  Local host not found in clusterNodesFile (local ip interfaces: interfaceList).

Explanation: The local host specified in the node list file could not be found.
User Response: Check node list file specified in error message.

6027-344  Empty node list file fileName.

Explanation: The node list file is empty.
User Response: Check node list file specified in error message.

6027-345  Network error on ipAddress, check connectivity.

Explanation: A TCP error has caused GPFS to exit due to a bad return code from an error. Exiting allows recovery to proceed on another node and resources are not tied up on this node.
User Response: Follow network problem determination procedures.

6027-346  Incompatible daemon version. My version = number, repl.my_version = number.

Explanation: The GPFS daemon tried to make a connection with another GPFS daemon. However, the other GPFS daemon is not the same version and it sent a reply indicating its version number is incompatible.
User Response: Verify your GPFS daemon version.

6027-347  Remote host ipAddress refused connection because IP address ipAddress was not in the node list file.

Explanation: The GPFS daemon tried to make a connection with another GPFS daemon. However, the other GPFS daemon sent a reply indicating it did not recognize the IP address of the connector.
User Response: Add the IP address of the local host to the node list file on the remote host.

6027-348  Error occurred in mutual authentication protocol, reason = errorDescription.

Explanation: Two connecting GPFS daemons failed to authenticate each other.
User Response: Verify your SP Security Services configuration.
6027-349 Incompatible Security Services configuration with destinationNode (local: authentication, remote: authentication).

Explanation: Two connecting GPFS daemons have different levels of Security Services.

User Response: Verify your SP Security Services configuration.

6027-350 name failed to load DCE run-time interfaces rc = error.

Explanation: The GPFS daemon is initialized to use Security Services, but failed to load the DCE run-time interfaces required by programs using DCE as an authentication method.

User Response: Verify your SP Security Services configuration.

6027-351 functionName failed with reason = errorMessage.

Explanation: The GPFS daemon failed in a security function.

User Response: Verify your SP Security Services configuration.

6027-352 Attention: library not loaded, err = error.

Explanation: The GPFS daemon failed to load libspsec.a dynamically.

User Response: Verify the installation of libspsec.a.

6027-353 library loaded.

Explanation: The GPFS daemon has loaded libspsec.a dynamically.

User Response: None. Informational message only.

6027-354 DCE run-time library loaded, process PID pid, local cell name name.

Explanation: The GPFS daemon successfully completed spsec_start and the DCE run-time interface is loaded.

User Response: None. Informational message only.

6027-355 lapi_err_hndlr: error code = number, error reason = reason.

Explanation: LAPI has found communication errors.

User Response: None. Informational message only.

6027-356 Lapi_window_init: The number of nodes (number) in cluster.nodes file does not match with the number of tasks (number) in the fileName file.

Explanation: The number of nodes in the switch partition table does not match the number of nodes in the cluster.nodes file.

User Response: Verify both files.

6027-357 Lapi_window_init: nodeName is not in cluster.nodes but in fileName.

Explanation: The node is in the switch partition table but not the cluster.nodes file.

User Response: Verify both files.

6027-358 Communication with mmspsecserver through socket name failed, err value: errorString, msgType messageType.

Explanation: Communication failed between spsecClient (the daemon) and spsecServer.

User Response: Verify both the communication socket and the mmspsecserver process.

6027-359 The mmspsecserver process is shutting down. Reason explanation.

Explanation: The mmspsecserver process received a signal from the mmfsd daemon or encountered an error on execution.

User Response: Verify the reason for shutdown.

6027-360 Disk name must be removed from the /etc/filesystems stanza before it can be deleted. Another disk in the file system can be added in its place if needed.

Explanation: A disk being deleted is found listed in the disks= list for a file system.

User Response: Remove the disk from list.

6027-362 Attention: No disks were deleted, but some data was migrated. The file system may no longer be properly balanced.

Explanation: The mmdeldisk command did not complete migrating data off the disks being deleted. The disks were restored to normal ready status, but the migration has left the file system unbalanced. This may be caused by having too many disks unavailable or insufficient space to migrate all of the data to other disks.

User Response: Check disk availability and space requirements. Determine the reason which caused the
command to end before successfully completing the migration and disk deletion. Reissue the `mmdeldisk` command.

6027-363 I/O error writing disk descriptor for disk name.

Explanation: An I/O error occurred when the `mmaddisk` command was writing a disk descriptor on a disk. This could have been caused by either a configuration error or an error in the path to the disk.

User Response: Determine the reason the disk is inaccessible for writing and reissue the `mmaddisk` command.

6027-364 I/O error accessing disks.

Explanation: An I/O error occurred when the `mmaddisk` command was reading a disk descriptor on a disk.

User Response: Determine the reason why the disk is inaccessible for reading, then reissue the `mmaddisk` command.

6027-366 I/O error writing file system descriptor for disk name.

Explanation: `mmaddisk` detected an I/O error while writing a file system descriptor on a disk.

User Response: Determine the reason the disk is inaccessible for writing and reissue the `mmaddisk` command.

6027-369 mmdeldisk completed.

Explanation: The `mmdeldisk` command has completed.

User Response: None. Informational message only.

6027-370 Cannot delete all disks in the file system.

Explanation: An attempt was made to delete all the disks in a file system.

User Response: Either reduce the number of disks to be deleted or use the `mmdelfs` command to delete the file system.

6027-371 Replacement disk must be in the same failure group as the disk being replaced.

Explanation: An improper failure group was specified for `mmrpldisk`.

User Response: Specify a failure group in the disk descriptor for the replacement disk that is the same as the failure group of the disk being replaced.
User Response: Either wait for the I/O operation to time out, or issue a device-dependent command to terminate the I/O.

6027-379 Could not invalidate disk(s).
Explanation: Trying to delete a disk and it could not be written to in order to invalidate its contents.
User Response: No action needed if removing that disk permanently. However, if the disk is ever to be used again, the *-v* flag must be specified with a value of *no* when using either the **mmcrfs** or **mmadddisk** command.

6027-394 Too many disks specified for file system. Maximum = number.
Explanation: Too many disk names were passed in the disk descriptor list.
User Response: Check the disk descriptor list or the file containing the list.

6027-416 Incompatible file system descriptor version or not formatted.
Explanation: Possible reasons for the error are:
1. A file system descriptor version that is not valid was encountered.
2. No file system descriptor can be found.
3. Disks are not correctly defined on all active nodes.
4. Disks, logical volumes, network shared disks, or virtual shared disks were incorrectly reconfigured after creating a file system.
User Response: Verify:
1. The disks are correctly defined on all nodes.
2. The paths to the disks are correctly defined and operative.

6027-417 Bad file system descriptor.
Explanation: A file system descriptor that is not valid was encountered.
User Response: Verify:
1. The disks are correctly defined on all nodes.
2. The paths to the disks are correctly defined and operative.

6027-418 Inconsistent file system quorum.
*readQuorum=value writeQuorum=value quorumSize=value*.
Explanation: A file system descriptor that is not valid was encountered.
User Response: Start any disks that have been stopped by the **mmchdisk** command or by hardware failures. If the problem persists, run off-line **mmfsck**.

6027-419 Failed to read a file system descriptor.
Explanation: Not enough valid replicas of the file system descriptor could be read from the file system.
User Response: Start any disks that have been stopped by the **mmchdisk** command or by hardware failures. Verify that paths to all disks are correctly defined and operative.

6027-441 Unable to open disk name.
Explanation: A disk name which is not valid was specified in **mmcrfs** command.
User Response: Correct the indicated command parameters.

6027-445 Value for option `-m` cannot exceed the number of metadata failure groups.
Explanation: The current number of replicas of metadata cannot be larger than the number of failure groups that are enabled to hold metadata.
User Response: Use a smaller value for `-m` on the **mmchfs** command, or increase the number of failure groups by adding disks to the file system.

6027-446 Value for option `-r` cannot exceed the number of data failure groups.
Explanation: The current number of replicas of data cannot be larger than the number of failure groups that are enabled to hold data.
User Response: Use a smaller value for `-r` on the **mmchfs** command, or increase the number of failure groups by adding disks to the file system.

6027-451 No disks= list found in mount options.
Explanation: No "disks=" clause found in the mount options list when opening a file system.
User Response: Check the operating system’s file system database and local **mmsdhrs** file for this file system.

6027-452 No disks found in disks= list.
Explanation: No disks listed when opening a file system.
User Response: Check the operating system’s file system database and local **mmsdhrs** file for this file system.
6027-453  No disk name found in a clause of the list.

Explanation: No disk name found in a clause of the disks= list.

User Response: Check the operating system’s file system database and local mmsdrfs file for this file system.

6027-461  Unable to find name device.

Explanation: Self explanatory.

User Response: There must be a /dev/sg/name special device defined. Check the error code. This could indicate a configuration error in the specification of disks, logical volumes, network shared disks, or virtual shared disks.

6027-462  name must be a char or block special device.

Explanation: Opening a file system.

User Response: There must be a /dev/sg/name special device defined. This could indicate a configuration error in the specification of disks, logical volumes, network shared disks, or virtual shared disks.

6027-463  SubblocksPerFullBlock was not 32.

Explanation: The value of the SubblocksPerFullBlock variable was not 32. This situation should never exist, and indicates an internal error.

User Response: Record the above information and contact the IBM Support Center.

6027-468  Disk name listed in fileName or local mmsdrfs file not found in device name.

Explanation: Trying to access a file system and the disks listed in the operating system’s file system database or the local mmsdrfs file for the device do not exist in the file system.

User Response: Check the validity of the operating system’s file system database and the local mmsdrfs file. Check also the configuration and availability of disks, logical volumes, network shared disks, or virtual shared disks.

6027-469  File system name does not match descriptor.

Explanation: The file system name found in the descriptor on disk does not match the corresponding device name in /etc/filesystems.

User Response: Check the operating system’s file system database.

6027-470  Disk name may still belong to an active file system.

Explanation: The disk being added by the mmcrfs mmaddisk or mmrpldisk command appears to still belong to some file system.

User Response: Verify that the disks you are adding do not belong to an active file system, and use the -v no option to bypass this check. Use this option only if you are certain that no other file system has this disk configured because you can cause data corruption in both file systems if this is not the case.

6027-471  You have requested that the file system be upgraded to version number. This will enable new functionality but will prevent you from using the file system with earlier releases of GPFS. Do you want to continue?

Explanation: Verification request in response to the mmchfs -V command. This is a request to upgrade the file system and activate functions which are incompatible with the previous release of GPFS.

User Response: Enter yes if you want the conversion to take place.

6027-472  Failed to enable extended attribute support.

Explanation: An error occurred while attempting to upgrade the file system to a version that supports extended attributes. The file to store extended attribute data could not be created. An additional GPFS message will be issued providing more specific information.

User Response: Follow the recommended action for the other message that occurs with this one.

6027-473  File System fileSystem unmounted by the system with return code value and reason code value.

Explanation: Console log entry caused by a forced unmount due to disk or communication failure.

User Response: Correct the underlying problem and remount the file system.

6027-474  Recovery Log I/O Failed, unmounting fileSystem.

Explanation: I/O to the recovery log failed.

User Response: Check the paths to all disks making up the file system. Run the mmlsdisk command to determine if GPFS has declared any disks unavailable. Repair any paths to disks which have failed. Remount the file system.
6027-475 | The option -F is not enabled. Use option -V to enable the most recent features.  
Explanation: `mmchfs -F` is not enabled under the current file system format version.  
User Response: Issue `mmchfs -V` to change the file system format to the latest format supported.  
Note: This is a request to upgrade the file system and activate functions which are incompatible with the previous release of GPFS.

6027-476 | The option -x is not enabled. Use option -V to enable most recent features.  
Explanation: The file system format version does not support the `mmchfs -x` option.  
User Response: Change the file system format version by issuing `mmchfs -V`.  
Note: This is a request to upgrade the file system and activate functions which are incompatible with the previous release of GPFS.

6027-477 | The option -z is not enabled. Use the -V option to enable most recent features.  
Explanation: The file system format version does not support the -z option on the `mmchfs` command.  
User Response: Change the file system format version by issuing `mmchfs -V`.  
Note: This is a request to upgrade the file system and activate functions which are incompatible with the previous release of GPFS.

6027-478 | The option -z is not enabled. `fileSystem` is still in use.  
Explanation: The file system is still mounted or another GPFS administration command (mm...) is running against the file system.  
User Response: Unmount the file system if it is mounted and wait for any command which is running to complete before reissuing the `mmchfs -z` command.

6027-479 | The file system utilizes features that are not available in this version of GPFS.  
Explanation: The file system descriptor specifies a wide disk address which is not available on the 32-bit version of GPFS.  
User Response: Use the 64-bit version of GPFS with wide disk address support.

6027-500 | `name` loaded and configured.  
Explanation: The kernel extension was loaded and configured.  
User Response: None. Informational message only.

6027-501 | `name:moduleName` unloaded.  
Explanation: The kernel extension was unloaded.  
User Response: None. Informational message only.

6027-502 | Incorrect parameter: `name`.  
Explanation: `mmfsmnthelp` was called with an incorrect parameter.  
User Response: Contact the IBM Support Center.

6027-504 | Not enough memory to allocate internal data structure.  
Explanation: Self explanatory.  
User Response: Increase ulimit or paging space.

6027-505 | Internal error, aborting.  
Explanation: Self explanatory.  
User Response: Contact the IBM Support Center.

6027-506 | program: `loadFile` is already loaded at `address`.  
Explanation: The program was already loaded at the address displayed.  
User Response: None. Informational message only.

6027-507 | program: `loadFile` is not loaded.  
Explanation: The program could not be loaded.  
User Response: None. Informational message only.

6027-510 | Cannot mount `fileSystem` on `mountPoint: errorString`.  
Explanation: There was an error mounting the GPFS file system.  
User Response: Determine action indicated by the error messages and error log entries. Errors in the disk path often cause this problem.

6027-511 | Cannot unmount `fileSystem`: `errorDescription`.  
Explanation: There was an error unmounting the GPFS file system.  
User Response: Take the action indicated by errorMessage.

6027-512 | `name` not listed in `/etc/vfs`.  
Explanation: Error occurred while installing the GPFS kernel extension, or when trying to mount a file system.  
User Response: Check for the `mmfs` entry in `/etc/vfs`
6027-514 Cannot mount \texttt{fileSystem} on \texttt{mountPoint}: Already mounted.

**Explanation:** An attempt has been made to mount a file system that is already mounted.

**User Response:** None. Informational message only.

6027-515 Cannot mount \texttt{fileSystem} on \texttt{mountPoint}

**Explanation:** There was an error mounting the named GPFS file system. Errors in the disk path usually cause this problem.

**User Response:** Take the action indicated by other error messages and error log entries.

6027-516 Cannot mount \texttt{fileSystem}

**Explanation:** There was an error mounting the named GPFS file system. Errors in the disk path usually cause this problem.

**User Response:** Take the action indicated by other error messages and error log entries.

6027-517 Cannot mount \texttt{fileSystem}: errorString

**Explanation:** There was an error mounting the named GPFS file system. Errors in the disk path usually cause this problem.

**User Response:** Take the action indicated by other error messages and error log entries.

6027-518 Cannot mount \texttt{fileSystem}: Already mounted.

**Explanation:** An attempt has been made to mount a file system that is already mounted.

**User Response:** None. Informational message only.

6027-520 Mount of \texttt{name} failed: cannot mount restorable file system for read/write.

**Explanation:** A file system marked as enabled for restore cannot be mounted read/write.

**User Response:** None. Informational message only.

6027-532 The quota record \texttt{number} in file \texttt{fileName} is not valid.

**Explanation:** A quota entry contained a checksum that is not valid.

**User Response:** Remount the file system with quotas disabled. Restore the quota file from back up, and run \texttt{mmcheckquota}.

6027-533 File system \texttt{fileSystem} is approaching the limit for the maximum number of inodes/files.

**Explanation:** The number of files created is approaching the file system limit.

**User Response:** Increase the maximum number of files with the \texttt{mmchfs} command to avoid reaching the inode limit and possible performance degradation.

6027-538 Error accessing disks.

**Explanation:** The \texttt{mmcrfs} command encountered an error accessing one or more of the disks.

**User Response:** Verify that the disk descriptors are coded correctly and that all named disks exist and are on-line.

6027-539 Unable to clear descriptor areas for \texttt{fileSystem}.

**Explanation:** The \texttt{mmdelfs} command encountered an error while invalidating the file system control structures on one or more disks in the file system being deleted.

**User Response:** If the problem persists, specify the \texttt{-p} option on the \texttt{mmdelfs} command.

6027-540 Formatting file system.

**Explanation:** The \texttt{mmcrfs} command began to write file system data structures onto the new disks.

**User Response:** None. Informational message only.

6027-541 Error formatting file system.

**Explanation:** The \texttt{mmcrfs} command encountered an error while formatting a new file system. This is often an I/O error.

**User Response:** Check the subsystems in the path to the disk. Follow the instructions from other messages that appear with this one.

6027-543 Error writing file system descriptor for \texttt{fileSystem}.

**Explanation:** The \texttt{mmcrfs} command could not successfully write the file system descriptor in a particular file system. Check the subsystems in the path.
to the disk. This is often an I/O error.

**User Response:** Check system error log, rerun mmcrfs.

<table>
<thead>
<tr>
<th>6027-544</th>
<th>Could not invalidate disk of fileSystem.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explanation:</strong> A disk could not be written to invalidate its contents. Check the subsystems in the path to the disk. This is often an I/O error.</td>
<td></td>
</tr>
<tr>
<td><strong>User Response:</strong> Ensure the indicated logical volume is writable.</td>
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<thead>
<tr>
<th>6027-549</th>
<th>Failed to open name.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explanation:</strong> The mount command was unable to access a file system. Check the subsystems in the path to the disk. This is often an I/O error.</td>
<td></td>
</tr>
<tr>
<td><strong>User Response:</strong> Follow the recommended actions for the other messages that occur with this one.</td>
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<thead>
<tr>
<th>6027-551</th>
<th>fileSystem is still in use.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explanation:</strong> The mmdefls or mmcrfs command found that the named file system is still mounted or that another GPFS command is running against the file system.</td>
<td></td>
</tr>
<tr>
<td><strong>User Response:</strong> Unmount the file system if it is mounted, or wait for GPFS commands in progress to terminate before retrying the command.</td>
<td></td>
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<thead>
<tr>
<th>6027-552</th>
<th>Scan completed successfully.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explanation:</strong> The scan function has completed without error.</td>
<td></td>
</tr>
<tr>
<td><strong>User Response:</strong> None. Informational message only.</td>
<td></td>
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<table>
<thead>
<tr>
<th>6027-553</th>
<th>Scan failed on number user or system files.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explanation:</strong> Data may be lost as a result of pointers that are not valid or unavailable disks.</td>
<td></td>
</tr>
<tr>
<td><strong>User Response:</strong> Some files may have to be restored from backup copies. Issue the mmlsdisk command to check the availability of all the disks which make up the file system.</td>
<td></td>
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<tr>
<th>6027-554</th>
<th>Scan failed on number out of number user or system files.</th>
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<td><strong>Explanation:</strong> Data may be lost as a result of pointers that are not valid or unavailable disks.</td>
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<tr>
<th>6027-555</th>
<th>The desired replication factor exceeds the number of available failure groups.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explanation:</strong> You have specified a number of replicas which exceeds the number of failure groups available.</td>
<td></td>
</tr>
<tr>
<td><strong>User Response:</strong> Reissue the command with a smaller replication factor or increase the number of failure groups.</td>
<td></td>
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<table>
<thead>
<tr>
<th>6027-556</th>
<th>Not enough space for the desired number of replicas.</th>
</tr>
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<tbody>
<tr>
<td><strong>Explanation:</strong> In attempting to restore the correct replication, GPFS ran out of space in the file system. The operation can continue but some data is not fully replicated.</td>
<td></td>
</tr>
<tr>
<td><strong>User Response:</strong> Make additional space available and reissue the command.</td>
<td></td>
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<tr>
<th>6027-557</th>
<th>Not enough space or available disks to properly balance the file.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explanation:</strong> In attempting to stripe data within the file system, data was placed on a disk other than the desired one. This is normally not a problem.</td>
<td></td>
</tr>
<tr>
<td><strong>User Response:</strong> Run mmrestripefs to rebalance all files.</td>
<td></td>
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<tr>
<th>6027-558</th>
<th>Some data are unavailable.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explanation:</strong> An I/O error has occurred or some disks are in the stopped state.</td>
<td></td>
</tr>
<tr>
<td><strong>User Response:</strong> Check the availability of all disks by issuing the mmlsdisk command and check the path to all disks. Reissue the command.</td>
<td></td>
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</tbody>
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<tr>
<th>6027-559</th>
<th>Some data could not be read or written.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explanation:</strong> An I/O error has occurred or some disks are in the stopped state.</td>
<td></td>
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<td><strong>User Response:</strong> Check the availability of all disks by issuing the mmlsdisk command and check the path to all disks. Reissue the command.</td>
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<tr>
<th>6027-561</th>
<th>Error migrating log.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explanation:</strong> There are insufficient available disks to continue operation.</td>
<td></td>
</tr>
<tr>
<td><strong>User Response:</strong> Restore the unavailable disks and reissue the command.</td>
<td></td>
</tr>
</tbody>
</table>
6027-562 Error processing inodes.

Explanation: There is no I/O path to critical metadata or metadata has been corrupted.

User Response: Verify that the I/O paths to all disks are valid and that all disks are either in the recovering or up availability. Issue the `mmlsdisk` command.

6027-563 Error processing allocation map.

Explanation: There is no I/O path to critical metadata or metadata has been corrupted.

User Response: Verify that the I/O paths to all disks are valid and that all disks are either in the recovering or up availability. Issue the `mmlsdisk` command.

6027-564 Error processing inode allocation map.

Explanation: There is no I/O path to critical metadata or metadata has been corrupted.

User Response: Verify that the I/O paths to all disks are valid and that all disks are either in the recovering or up availability. Issue the `mmlsdisk` command.

6027-565 Scanning user file metadata.

Explanation: Self explanatory.

User Response: None. Informational message only.

6027-566 Error processing user file metadata.

Explanation: Self explanatory.

User Response: None. Informational message only.

6027-567 Waiting for pending file system scan to finish.

Explanation: Self explanatory.

User Response: None. Informational message only.

6027-568 Waiting for number pending file system scans to finish.

Explanation: Self explanatory.

User Response: None. Informational message only.

6027-569 Incompatible parameters. Unable to allocate space for file system metadata. Change one or more of the following as suggested and try again:

Explanation: Incompatible file system parameters were detected.

User Response: Refer to the details given and correct the file system parameters.

6027-570 Incompatible parameters. Unable to create file system. Change one or more of the following as suggested and try again:

Explanation: Incompatible file system parameters were detected.

User Response: Refer to the details given and correct the file system parameters.

6027-571 Logical sector size value must be the same as disk sector size.

Explanation: This message is produced by the `mmcrfs` command if the sector size given by the `-l` option is not the same as the sector size given for disks in the `-d` option.

User Response: Correct the options and reissue the command.

6027-572 Completed creation of file system

fileSystem.

Explanation: The `mmcrfs` command has successfully completed.

User Response: None. Informational message only.

6027-573 All data on following disks of

fileSystem will be destroyed:

Explanation: Produced by the `mmdelfs` command to list the disks in the file system that is about to be destroyed. Data stored on the disks will be lost.

User Response: None. Informational message only.

6027-574 Completed deletion of file system

fileSystem.

Explanation: The `mmdelfs` command has successfully completed.

User Response: None. Informational message only.

6027-575 Unable to complete low level format for

fileSystem.

Explanation: The `mmcrfs` command was unable to create the low level file structures for the file system.

User Response: Check other error messages and the error log. This is usually an error accessing disks.

6027-576 Unable to allocate space for file system metadata. Decrease the value for option and try again.

Explanation: The `mmcrfs` command indicated that there was not enough space to create the reserved files for the file system.
**User Response:** Decrease the value for the minimum fragment size option, `-f`, and try again.

---

**6027-577**  
**Attention:** *number* user or system files are not properly replicated.

**Explanation:** GPFS has detected files that are not replicated correctly due to a previous failure.

**User Response:** Issue the `mmrestripfs` command at the first opportunity.

---

**6027-578**  
**Attention:** *number* out of *number* user or system files are not properly replicated.

**Explanation:** GPFS has detected files that are not replicated correctly due to a previous failure.

**User Response:** Issue the `mmrestripfs` command at the first opportunity.

---

**6027-579**  
Some unreplicated file system metadata has been lost. File system usable only in restricted mode.

**Explanation:** A disk was deleted that contained vital file system metadata that was not replicated.

**User Response:** Mount the file system in restricted mode (`-o rs`) and copy any user data that may be left on the file system. Then delete the file system.

---

**6027-580**  
Unable to access vital system metadata, too many disks are unavailable.

**Explanation:** Metadata is unavailable because the disks on which the data reside are stopped, or an attempt was made to delete them.

**User Response:** Either start the stopped disks, try to delete the disks again, or recreate the file system.

---

**6027-581**  
Unable to access vital system metadata, file system corrupted.

**Explanation:** When trying to access the file system, the metadata was unavailable due to a disk being deleted.

**User Response:** Determine why a disk is unavailable.

---

**6027-582**  
Some data has been lost.

**Explanation:** An I/O error has occurred or some disks are in the stopped state.

**User Response:** Check the availability of all disks by issuing the `mmlsdisk` command and check the path to all disks. Reissue the command.

---

**6027-583**  
Disk *name* cannot be added. Allocation map cannot accommodate it.

**Explanation:** Cannot add a disk that is so much larger than the disks initially used to create the file system that the allocation map cannot accommodate the new disk.

**User Response:** Break the disk into smaller pieces by creating logical volumes or recreate the file system.

---

**6027-584**  
Incompatible parameters. Unable to allocate space for root directory. Change one or more of the following as suggested and try again:

**Explanation:** Inconsistent parameters have been passed to the `mmcrfs` command which would result in the creation of an inconsistent file system. Suggested parameter changes are given.

**User Response:** Reissue the `mmcrfs` command with the suggested parameter changes.

---

**6027-585**  
Incompatible parameters. Unable to allocate space for ACL data. Change one or more of the following as suggested and try again:

**Explanation:** Inconsistent parameters have been passed to the `mmcrfs` command which would result in the creation of an inconsistent file system. The parameters entered require more space than is available. Suggested parameter changes are given.

**User Response:** Reissue the `mmcrfs` command with the suggested parameter changes.

---

**6027-586**  
Error creating spare logs.

**Explanation:** There are insufficient disks available for the `mmfsck` command to continue operation.

**User Response:** Restore the unavailable disks and reissue the `mmfsck` command.

---

**6027-587**  
Unable to initialize quota client because there is no quota server. Please check error log on the file system manager node. The `mmcheckquota` command must be run with the file system unmounted before retrying the command.

**Explanation:** StartQuotaClient failed.

**User Response:** If the quota file could not be read (check error log on file system manager. Issue the `mmlsmgr` command to determine which node is the file system manager), then the `mmcheckquota` command must be run with the file system unmounted.
6027-588  No more than number nodes can mount a file system.

Explanation: The limit of the number of nodes that can mount a file system was exceeded.

User Response: Observe the stated limit for how many nodes can mount a file system.

6027-589  Scanning file system metadata, phase number

Explanation: Self-explanatory.

User Response: None. Informational message only.

6027-590  GPFS is experiencing a shortage of pagepool. This message will not be repeated for at least one hour.

Explanation: Pool starvation occurs, buffers have to be continually stolen at high aggressiveness levels.

User Response: Issue the mmchconfig command to increase the size of pagepool.

6027-591  Unable to allocate sufficient inodes for file system metadata. Increase the value for option and try again.

Explanation: Too few inodes have been specified on the -N option of the mmcrfs command.

User Response: Increase the value for the -N option and reissue the mmcrfs command.

6027-592  Mount of fileSystem is waiting for the mount disposition to be set by some data management application.

Explanation: Data management utilizing DMAPI is enabled for the file system, but no data management application has set a disposition for the mount event.

User Response: Start the data management application and verify that the application sets the mount disposition.

6027-593  The root quota entry is not found in its assigned record.

Explanation: On mount, the root entry is not found in the first record of the quota file.

User Response: Issue the mmcheckquota command to verify that the use of root has not been lost.

6027-595  While creating quota files, file user.quota or group.quota, which does not contain quota information, was found in the root directory. To mount the file system so new quota files will be created, mount the file system without quotas, ensure the root directory does not contain files with the mentioned names and remount the file system with quotas. To mount the file system with other files used as quota files, use the command mmcheckquota.

Explanation: While mounting a file system, the state of the file system descriptor indicates that quota files do not exist. However, files which do not contain quota information but have either of the reserved names user.quota or group.quota, exist in the root directory.

User Response: To mount the file system so that new quota files will be created:
1. Mount the file system without quotas.
2. Verify there are no files in the root directory with the reserved names user.quota or group.quota.
3. Remount the file system with quotas.

To mount the file system with other files used as quota files, issue the mmcheckquota command.

6027-596  While creating quota files, file user.quota or group.quota, which contain quota information, was found in the root directory. The found file will be used as quota file.

Explanation: While mounting a file system, the state of the file system descriptor indicates that quota files do not exist. However, files which have either of the reserved names user.quota or group.quota and contain quota information, exist in the root directory. The file with the reserved name will be used as the quota file.

User Response: To mount the file system so that new quota files will be created:
1. Mount the file system without quotas.
2. Verify there are no files in the root directory with the reserved names of user.quota or group.quota.
3. Remount the file system with quotas.

To mount the file system with other files used as quota files, issue the mmcheckquota command.
The quota command is requested to process quotas for a type (user or group), which is not enabled.

**Explanation:** A quota command is requested to process quotas for a user or group quota type which is not enabled.

**User Response:** Verify the user or group quota type is enabled and reissue the command.

The supplied file does not contain quota information.

**Explanation:** A file supplied as a quota file does not contain quota information.

**User Response:** Change the file so it contains valid quota information and reissue the command.

To mount the file system so that new quota files are created:
1. Mount the file system without quotas.
2. Verify there are no files in the root directory with the reserved **user.quota** or **group.quota** name.
3. Remount the file system with quotas.

File supplied to the command does not exist in the root directory.

**Explanation:** The user-supplied name of a new quota file has not been found.

**User Response:** Ensure that a file with the supplied name exists. Then reissue the command.

Pool size changed to maximum available/allowed: \texttt{valueK = valueM}.

**Explanation:** The **mmchconfig** command could not allocate the entire amount of additional memory requested for the pagepool.

**User Response:** Leave the state as is, or free some memory and retry the command.

Error changing pool size.

**Explanation:** The **mmchconfig** command failed to change the pool size to the requested value.

**User Response:** Follow the recommended actions in the other messages that occur with this one.

**ERROR:** file system not mounted. Mount file system **fileSystem** and retry command.

**Explanation:** A GPFS command that requires the file system be mounted was issued.

**User Response:** Mount the file system and reissue the command.

Current pool size: \texttt{valueK = valueM}, min pool size: \texttt{valueK = valueM}, max block size: \texttt{valueK = valueM}.

**Explanation:** Displays current pool size, minimum pool size, and maximum block size.

**User Response:** None. Informational message only.

Parameter incompatibility: either the values of maxblocksize and minpagepool are incompatible or there is a mounted file system with a bigger block size.

**Explanation:** The **mmchconfig** command received incompatible parameters, or there is a mounted file system with a bigger block size than was specified via the **mmchconfig** command.

**User Response:** Correct the command line and reissue the command.

Minimum page pool size changed to \texttt{value}.

**Explanation:** Minimum page pool size successfully changed.

**User Response:** None. Informational message only.

Maximum block size changed to \texttt{number K}.

**Explanation:** Maximum block size successfully changed.

**User Response:** None. Informational message only.

**mmcommon getEFOptions name failed. Return code value.**

**Explanation:** **mmcommon getEFOptions** failed while looking up the names of the disks in a file system, usually by mount processing.

**User Response:** Check the preceding messages. A frequent cause for such errors is lack of space in /var.

File system manager takeover failed.

**Explanation:** An attempt to takeover as file system manager failed. The file system is unmounted to allow another node to try.

**User Response:** Check the return code. This is usually due to network or disk connectivity problems. Issue the **mmlsdisk** command to determine if the paths to the disk are unavailable, and issue the **mmchdisk** if necessary.
6027-609 File system fileSystem unmounted because it does not have a manager.
Explanation: The file system had to be unmounted because a file system manager could not be assigned. An accompanying message tells which node was the last manager.
User Response: Examine error log on the last file system manager node. Issue the mmldisk command to determine if a number of disks are down. Examine the other error logs for an indication of network, disk, or virtual shared disk problems. Repair the base problem and issue the mmchdisk command if required.

6027-610 Cannot mount file system fileSystem because it does not have a manager.
Explanation: The file system had to be unmounted because a file system manager could not be assigned. An accompanying message tells which node was the last manager.
User Response: Examine error log on the last file system manager node. Issue the mmldisk command to determine if a number of disks are down. Examine the other error logs for an indication of disk or network shared disk problems. Repair the base problem and issue the mmchdisk command if required.

6027-614 Value value for option name is out of range. Valid values are number through number.
Explanation: The value for an option in the command line arguments is out of range.
User Response: Correct the command line and reissue the command.

6027-619 Negative grace times are not allowed
Explanation: The mmedquota command received a negative value for the -t option.
User Response: Reissue the mmedquota command with a non-negative value for grace time.

6027-620 Hard quota limit must not be less than soft limit.
Explanation: The hard quota limit must be greater than or equal to the soft quota limit.
User Response: Reissue the mmedquota command and enter valid values when editing the information.

6027-621 Negative quota limits are not allowed.
Explanation: The quota value must be positive.
User Response: Reissue the mmedquota command and enter valid values when editing the information.

6027-623 All disks up and ready.
Explanation: Self-explanatory.
User Response: None. Informational message only.

6027-624 No disks
Explanation: Self-explanatory.
User Response: None. Informational message only.

6027-625 Migrate already pending.
Explanation: A request to migrate the file system manager failed because a previous migrate request has not yet completed.
User Response: None. Informational message only.

6027-626 Migrate to node nodeName already pending.
Explanation: A request to migrate the file system manager failed because a previous migrate request has not yet completed.
User Response: None. Informational message only.

6027-627 Node nodeName is already manager for fileSystem.
Explanation: A request has been made to change the file system manager node to the node that is already the manager.
User Response: None. Informational message only.

6027-628 Sending migrate request to current manager node nodeName.
Explanation: A request has been made to change the file system manager node.
User Response: None. Informational message only.

6027-629 Node nodeName resigned as manager for fileSystem.
Explanation: Progress report produced by the mmchmgr command.
User Response: None. Informational message only.

6027-630 Node nodeName appointed as manager for fileSystem.
Explanation: The mmchmgr command successfully changed the node designated as the file system manager.
User Response: None. Informational message only.
6027-631 Failed to appoint node **nodeName** as manager for **fileSystem**.

**Explanation:** A request to change the file system manager node has failed.

**User Response:** Accompanying messages will describe the reason for the failure. Also, see the **mmfs.log** file on the target node.

6027-632 Failed to appoint a new manager for **fileSystem**.

**Explanation:** An attempt to change the file system manager node has failed.

**User Response:** Accompanying messages will describe the reason for the failure. Also, see the **mmfs.log** file on the target node.

6027-633 Best choice node **nodeName** already manager for **fileSystem**.

**Explanation:** Informational message about the progress and outcome of a migrate request.

**User Response:** None. Informational message only.

6027-634 Node name or number **node** is not valid.

**Explanation:** A node number, IP address, or host name that is not valid has been entered in the configuration file or as input for a command.

**User Response:** Validate your configuration information and the condition of your network. This message may result from an inability to translate a node name.

6027-635 The current file system manager failed and no new manager will be appointed.

**Explanation:** The file system manager node could not be replaced. This is usually caused by other system errors, such as disk or communication errors.

**User Response:** See accompanying messages for the base failure.

6027-636 Disks marked as stopped or off-line.

**Explanation:** A disk continues to be marked down due to a previous error and was not opened again.

**User Response:** Check the disk status by issuing the **mmlsdisk** command, then issue the **mmchdisk start** command to restart the disk.

6027-637 RVSD is not active.

**Explanation:** The RVSD subsystem needs to be activated.

**User Response:** See the [Parallel System Support Programs for AIX: Diagnosis Guide](https://www.ibm.com) and search on diagnosing IBM Virtual Shared Disk problems.

6027-638 File system **fileSystem** unmounted by node **nodeName**.

**Explanation:** Produced in the console log on a forced unmount of the file system caused by disk or communication failures.

**User Response:** Check the error log on the indicated node. Correct the underlying problem and remount the file system.

6027-639 File system cannot be mounted in restricted mode and ro or rw concurrently.

**Explanation:** There has been an attempt to concurrently mount a file system from two nodes in different modes. One of the modes being **restricted**.

**User Response:** Decide which mount mode you wish to use, and use it on both nodes.

6027-640 File system is mounted.

**Explanation:** A command has been issued which requires that the file system be unmounted.

**User Response:** Unmount the file system and reissue the command.

6027-641 Unable to access vital system metadata. Too many disks are unavailable or the file system is corrupted.

**Explanation:** An attempt has been made to access a file system, but the metadata is unavailable. This can be caused by:
1. The disks on which the metadata resides are either stopped or there was an unsuccessful attempt to delete them.
2. The file system is corrupted.

**User Response:** To access the file system:
1. If the disks are the problem either start the stopped disks or try to delete them.
2. If the file system has been corrupted, you will have to recreate it from backup medium.
6027-642 File system has been deleted.
Explanation: Self-explanatory.
User Response: None. Informational message only.

6027-643 Node nodeName completed takeover for fileSystem.
Explanation: The mmchmgr command completed successfully.
User Response: None. Informational message only.

6027-644 The previous error was detected on node nodeName.
Explanation: An unacceptable error was detected. This usually occurs when attempting to retrieve file system information from the operating system's file system database or the cached GPFS system control data. The message identifies the node where the error was encountered.
User Response: See accompanying messages for the base failure. A common cause for such errors is lack of space in /var.

6027-645 Attention: mmcommon getEFOptions device has failed. Checking fileName.
Explanation: The names of the disks in a file system were not found in the cached GPFS system data, therefore an attempt will be made to get the information from the operating system's file system database.
User Response: If the command fails, see “File system will not mount” on page 27. A common cause for such errors is lack of space in /var.

6027-646 File system unmounted due to lost quorum.
Explanation: Quorum was lost, causing file systems to be unmounted.
User Response: Get enough nodes running the GPFS daemon to form a quorum.

6027-647 File fileName could not be run
Explanation: The named shell script could not be executed. This message is followed by the error string returned by exec.
User Response: Check file existence and access permissions.

6027-648 EDITOR environment variable must be an absolute pathname.
Explanation: The value of the EDITOR environment variable is not an absolute pathname.
User Response: Change the value of the EDITOR environment variable to an absolute pathname.

6027-649 This function is not available in the “try and buy” version of GPFS.
Explanation: You have invoked a function that is not allowed in the try and buy version of GPFS.
User Response: Purchase GPFS to receive this function.

6027-650 The mmfs daemon is shutting down abnormally.
Explanation: The GPFS daemon is shutting down as a result of an unrecoverable condition, typically a resource shortage.
User Response: Review error log entries, correct resource shortage condition and restart the GPFS daemon.

6027-660 Error displaying message from mmfsd daemon
Explanation: GPFS could not properly display an output string sent from the mmfsd daemon due to some error. A description of the error follows.
User Response: Check that GPFS is properly installed.

6027-661 mmfsd waiting for primary node nodeName.
Explanation: The mmfsd server has to wait during start up because mmfsd on the primary node is not yet ready.
User Response: None. Informational message only.

6027-662 mmfsd timed out waiting for primary node nodeName.
Explanation: The mmfsd server is about to terminate.
User Response: Ensure that the mmfs.cfg configuration file contains the correct host name or IP address of the primary node. Check mmfsd on the primary node.
6027-663 Lost connection to file system daemon.

Explanation: The connection between a GPFS command and the mmfsd daemon has broken. The daemon has probably crashed.

User Response: Ensure that the mmfsd daemon is running. Check the error log.

6027-664 Unexpected message from file system daemon.

Explanation: The version of the mmfsd daemon does not match the version of the GPFS command.

User Response: Ensure that all GPFS software components are at the same version.

6027-665 Failed to connect to file system daemon: errorString.

Explanation: An error occurred while trying to create a session with mmfsd.

User Response: Ensure that the mmfsd daemon is running. Also, only root can execute most GPFS commands. The mode bits of the commands must be set-user-id to root.

6027-666 Failed to determine file system manager.

Explanation: While running a GPFS command in a multi-node configuration, the local file system daemon is unable to determine which node is managing the file system affected by the command.

User Response: Check inter-node communication configuration and ensure enough GPFS nodes are up to make a quorum.

6027-667 Could not set up socket

Explanation: One of the calls to create or bind the socket used for sending parameters and messages between the command and the daemon failed.

User Response: Check additional error messages.

6027-668 Could not send message to file system daemon

Explanation: Attempt to send a message to the file system daemon failed.

User Response: Check if the file system daemon is up and running.

6027-669 Could not connect to file system daemon.

Explanation: The TCP connection between the command and the daemon could not be established.

User Response: Check additional error messages.

6027-670 Value for option is invalid. Valid values are list.

Explanation: The specified value for the given command option was not valid. The remainder of the line will list the valid keywords.

User Response: Correct the command line.

6027-671 Keyword missing or incorrect.

Explanation: A missing or incorrect keyword was encountered while parsing command line arguments

User Response: Correct the command line.

6027-672 Too few arguments specified.

Explanation: Too few arguments were specified on the command line.

User Response: Correct the command line.

6027-673 Too many arguments specified.

Explanation: Too many arguments were specified on the command line.

User Response: Correct the command line.

6027-674 Too many values specified for option name.

Explanation: Too many values were specified for the given option on the command line.

User Response: Correct the command line.

6027-675 Required value for option is missing.

Explanation: A required value was not specified for the given option on the command line.

User Response: Correct the command line.

6027-676 Option option specified more than once.

Explanation: The named option was specified more than once on the command line.

User Response: Correct the command line.
6027-677 Option option is incorrect.
Explanation: An incorrect option was specified on the command line.
User Response: Correct the command line.

6027-678 Misplaced or incorrect parameter name.
Explanation: A misplaced or incorrect parameter was specified on the command line.
User Response: Correct the command line.

6027-679 Device name is not valid.
Explanation: An incorrect device name was specified on the command line.
User Response: Correct the command line.

Explanation: An I/O request to a disk or a request to fence a disk has failed in such a manner that GPFS can no longer use the disk.
User Response: Check the disk hardware and the software subsystems in the path to the disk.

6027-681 Required option name was not specified.
Explanation: A required option was not specified on the command line.
User Response: Correct the command line.

6027-682 Device argument is missing.
Explanation: The device argument was not specified on the command line.
User Response: Correct the command line.

6027-683 Disk name is invalid.
Explanation: An incorrect disk name was specified on the command line.
User Response: Correct the command line.

6027-684 Value value for option option is incorrect.
Explanation: An incorrect value was specified for the named option.
User Response: Correct the command line.

6027-685 Value value for option option is out of range. Valid values are number through number.
Explanation: An out of range value was specified for the named option.
User Response: Correct the command line.

6027-686 option (value) exceeds option (value).
Explanation: The value of the first option exceeds the value of the second option. This is not permitted.
User Response: Correct the command line.

6027-687 Disk name is specified more than once.
Explanation: The named disk was specified more than once on the command line.
User Response: Correct the command line.

6027-688 Failed to read file system descriptor.
Explanation: The disk block containing critical information about the file system could not be read from disk.
User Response: This is usually an error in the path to the disks. If there are associated messages indicating an I/O error such as ENODEV or EIO, correct that error and retry the operation. If there are no associated I/O errors, then run the mmfsck command with the file system unmounted.

6027-689 Failed to update file system descriptor.
Explanation: The disk block containing critical information about the file system could not be written to disk.
User Response: This is a serious error, which may leave the file system in an unusable state. Correct any I/O errors, then run the mmfsck command with the file system unmounted to make repairs.

6027-690 Failed to allocate I/O buffer.
Explanation: Could not obtain enough memory (RAM) to perform an operation.
User Response: Either retry the operation when the mmfsd daemon is less heavily loaded, or increase the size of one or more of the memory pool parameters by issuing the mmchconfig command.

6027-691 Failed to send message to node nodeName.
Explanation: A message to another file system node could not be sent.
User Response: Check additional error message and...
the inter-node communication configuration.

**6027-692** Value for option is not valid. Valid values are yes, no.

**Explanation:** An option that is required to be yes or no is neither.

**User Response:** Correct the command line.

**6027-693** Cannot open disk name.

**Explanation:** Could not access the given disk.

**User Response:** Check the disk hardware and the path to the disk.

**6027-694** Disk not started; disk name has a bad volume label.

**Explanation:** The volume label on the disk does not match that expected by GPFS.

**User Response:** Check the disk hardware. For hot-pluggable drives ensure the proper drive has been plugged in.

**6027-695** File system is read-only.

**Explanation:** An operation was attempted that would require modifying the contents of a file system, but the file system is read-only.

**User Response:** Make the file system R/W before retrying the operation.

**6027-696** Too many disks are unavailable.

**Explanation:** A file system operation failed because all replicas of a data or metadata block are currently unavailable.

**User Response:** Issue the mmldisk command to check the availability of the disks in the file system; correct disk hardware problems, and then issue the mmchdisk command with the start option to inform the file system that the disk or disks are available again.

**6027-697** No log available.

**Explanation:** A file system operation failed because no space for logging metadata changes could be found.

**User Response:** Check additional error message. A likely reason for this error is that all disks with available log space are currently unavailable.

**6027-698** Not enough memory to allocate internal data structure.

**Explanation:** A file system operation failed because no memory is available for allocating internal data structures.

**User Response:** Stop other processes that may have main memory pinned for their use.

**6027-699** Inconsistency in file system metadata.

**Explanation:** File system metadata on disk has been corrupted.

**User Response:** This is an extremely serious error that may cause loss of data. Issue the mmfsck command with the file system unmounted to make repairs. There will be a “POSSIBLE FILE CORRUPTION” entry in the system error log that should be forwarded to the IBM Support Center.

**6027-700** Log recovery failed.

**Explanation:** An error was encountered while restoring file system metadata from the log.

**User Response:** Check additional error message. A likely reason for this error is that none of the replicas of the log could be accessed because too many disks are currently unavailable. If the problem persists, issue the mmfsck command with the file system unmounted.

**6027-701** Some file system data are inaccessible at this time.

**Explanation:** The file system has encountered an error that is serious enough to make some or all data inaccessible. This message indicates that an occurred that left the file system in an unusable state.

**User Response:** Possible reasons include too many unavailable disks or insufficient memory for file system control structures. Check other error messages as well as the error log for additional information. Unmount the file system and correct any I/O errors. Then remount the file system and try the operation again. If the problem persists, issue the mmfsck command with the file system unmounted to make repairs.

**6027-702** Some file system data are inaccessible at this time. Check error log for additional information. After correcting the problem, the file system must be unmounted and then mounted to restore normal data access.

**Explanation:** The file system has encountered an error that is serious enough to make some or all data inaccessible. This message indicates that an occurred that left the file system in an unusable state.

**User Response:** Possible reasons include too many unavailable disks or insufficient memory for file system control structures. Check other error messages as well as the error log for additional information. Unmount the file system and correct any I/O errors. Then remount the file system and try the operation again. If the problem persists, issue the mmfsck command with the file system unmounted to make repairs.
Some file system data are inaccessible at this time. Check error log for additional information.

Explanation: The file system has encountered an error that is serious enough to make some or all data inaccessible. This message indicates that an error occurred that left the file system in an unusable state.

User Response: Possible reasons include too many unavailable disks or insufficient memory for file system control structures. Check other error messages as well as the error log for additional information. Unmount the file system and correct any I/O errors. Then remount the file system and try the operation again. If the problem persists, issue the mmfsck command with the file system unmounted to make repairs.

Attention: Due to an earlier error normal access to this file system has been disabled. Check error log for additional information. After correcting the problem, the file system must be unmounted and then mounted again to restore normal data access.

Explanation: The file system has encountered an error that is serious enough to make some or all data inaccessible. This message indicates that an error occurred that left the file system in an unusable state.

User Response: Possible reasons include too many unavailable disks or insufficient memory for file system control structures. Check other error messages as well as the error log for additional information. Unmount the file system and correct any I/O errors. Then remount the file system and try the operation again. If the problem persists, issue the mmfsck command with the file system unmounted to make repairs.

Error code value.

Explanation: Provides additional information about an error.

User Response: See accompanying error messages.

The device name has no corresponding entry in fileName or has an incomplete entry.

Explanation: The command requires a device that has a file system associated with it.

User Response: Check the operating system’s file system database (the given file) for a valid device entry.

Unable to open file fileName.

Explanation: A given file cannot be opened.

User Response: Check to ensure the file exists and has the correct permissions.

Keyword name is incorrect. Valid values are list.

Explanation: An incorrect keyword was encountered.

User Response: Correct the command line.

Incorrect response. Valid responses are yes, no, or noall.

Explanation: A question was asked which requires a yes or no answer. The answer entered was neither yes, no, nor noall.

User Response: Enter a valid response.

Attention: Precedes an attention messages.

User Response: None. Informational message only.

Specified entity, such as a disk or file system, does not exist.

Explanation: A file system operation failed because the specified entity, such as a disk or file system, could not be found.

User Response: Specify existing disk, file system, etc.

Error in communications between mmfsd daemon and client program.

Explanation: A message sent between the mmfsd daemon and the client program had an incorrect format or content.

User Response: Verify that the mmfsd daemon is running.

Unable to start because conflicting program name is running. Wait until it completes.

Explanation: A program detects that it cannot start because a conflicting program is running. The program will automatically start once the conflicting program has ended as long as there are no other conflicting programs running at that time.

User Response: None. Informational message only.

Terminating because conflicting program name is running.

Explanation: A program detects that it must terminate because a conflicting program is running.

User Response: Retry the command once the conflicting program has ended.
6027-715  
*command* is finished waiting. Starting execution now.

**Explanation:** A program detects that it can now begin running because a conflicting program has ended.

**User Response:** None. Information message only.

6027-716  
Some file system data or metadata has been lost.

**Explanation:** Unable to access some piece of file system data that has been lost due to the deletion of disks beyond the replication factor.

**User Response:** If the function did not complete try to mount the file system in **restricted** mode.

6027-717  
Must execute mmfsck before mount.

**Explanation:** An attempt has been made to mount a file system on which an incomplete the `mmfsck` command was run.

**User Response:** Reissue the `mmfsck` command to the repair file system, then reissue the `mount` command.

6027-718  
The mmfsd daemon is not ready to handle commands yet.

**Explanation:** The `mmfsd` daemon is not accepting messages because it is restarting or stopping.

**User Response:** None. Informational message only.

6027-719  
Device type not supported.

**Explanation:** A disk being added to a file system with the `mmadddisk` or `mmcrfs` command is not a character mode special file, or has characteristics not recognized by GPFS.

**User Response:** Check the characteristics of the disk being added to the file system.

6027-720  
Actual sector size does not match given sector size.

**Explanation:** A disk being added to a file system with the `mmadddisk` or `mmcrfs` command has a physical sector size that differs from that given in the disk description list.

**User Response:** Check the physical sector size of the disk being added to the file system.

6027-721  
Host *name* in *fileName* is not valid.

**Explanation:** An host name or IP address that is not valid was found in a configuration file.

**User Response:** Check the configuration file specified in the error message.

6027-722  
Attention: Due to an earlier error normal access to this file system has been disabled. Check error log for additional information. The file system must be mounted again to resume data access.

**Explanation:** The file system has encountered an error that is serious enough to make some or all data inaccessible.

**User Response:** This message indicates that an error occurred that left the file system in an unusable state. Possible reasons include too many unavailable disks or insufficient memory for file system control structures. Check other error messages as well as the error log for additional information. Correct any I/O errors. Then remount the file system and try the operation again. If the problem persists, issue the `mmfsck` command with the file system unmouted to make repairs.

6027-723  
Attention: Due to an earlier error normal access to this file system has been disabled. Check error log for additional information. After correcting the problem, the file system be mounted again to restore normal data access.

**Explanation:** The file system has encountered an error that is serious enough to make some or all data inaccessible.

**User Response:** This message indicates that an error occurred that left the file system in an unusable state. Possible reasons include too many unavailable disks or insufficient memory for file system control structures. Check other error messages as well as the error log for additional information. Correct any I/O errors. Then remount the file system and try the operation again. If the problem persists, issue the `mmfsck` command with the file system unmounted to make repairs.

6027-724  
Incompatible file system format.

**Explanation:** An attempt was made to access a file system that was formatted with an older version of the product that is no longer compatible with the version currently running.

**User Response:** To change the file system format version to the current version, issue the `-V` option on the `mmchfs` command.

6027-725  
The mmfsd daemon is not ready to handle commands yet. Waiting for quorum.

**Explanation:** The GPFS `mmfsd` daemon is not accepting messages because it is waiting for quorum.

**User Response:** Determine why insufficient nodes
have joined the group to achieve quorum and rectify the problem.

6027-726 Quota initialization/start-up failed.

Explanation: Quota manager initialization was unsuccessful. The file system manager finished without quotas. Subsequent client mount requests will fail.

User Response: Check the error log and correct I/O errors. It may be necessary to issue the `mmcheckquota` command with the file system unmounted.

6027-727 Specified driver type type does not match disk name driver type type.

Explanation: The driver type specified on the `mmchdisk` command does not match the current driver type of the disk.

User Response: Verify the driver type and reissue the command.

6027-728 Specified sector size value does not match disk name sector size value.

Explanation: The sector size specified on the `mmchdisk` command does not match the current sector size of the disk.

User Response: Verify the sector size and reissue the command.

6027-729 Attention: No changes for disk name were specified.

Explanation: The disk descriptor in the `mmchdisk` command does not specify that any changes are to be made to the disk.

User Response: Check disk descriptor to determine if changes are needed.

6027-730 command on fileSystem.

Explanation: Quota was activated or deactivated as stated as a result of the `mmedquota` or `mmdefquotaon` or `mmdefquotaoff` commands.

User Response: None, informational only. This message is enabled via the `-v` flag on the `mmedquota` or `mmdefquotaon` or `mmdefquotaoff` commands.

6027-731 Error number while performing command for name quota on fileSystem

Explanation: An error occurred when switching quotas of a certain type on or off. If errors were returned for multiple file systems, only the error code is shown.

User Response: Check the error code shown by the message to determine the reason.

6027-732 Error while performing command on fileSystem.

Explanation: An error occurred while performing the stated command when listing or reporting quotas.

User Response: None. Informational message only.

6027-733 Edit quota: Bad format!

Explanation: The format of one or more quota limit entries was not valid.

User Response: Reissue the `mmedquota` command. Change only the values for the limits and follow the instructions given.

6027-734 Quota check for fileSystem ended prematurely.

Explanation: The user interrupted and terminated the command.

User Response: If ending the command was not intended, reissue the `mmcheckquota` command.

6027-735 Error editing string from mmfsd.

Explanation: An internal error occurred in the `mmfsd` when editing a string.

User Response: None. Informational message only.

6027-736 Attention: Due to an earlier error normal access to this file system has been disabled. Check error log for additional information. The file system must be unmounted and then restore normal data access.

Explanation: The file system has encountered an error that is serious enough to make some or all data inaccessible. This message indicates that an error had occurred that left the file system in an unusable state.

User Response: Possible reasons include too many unavailable disks or insufficient memory for file system control structures. Check other error messages as well as the error log for additional information. Unmount the file system and correct any I/O errors. Then remount the file system and try the operation again. If the problem persists, issue the `mmfsck` command with the file system unmounted to make repairs.

6027-737 Attention: No metadata disks remain.

Explanation: The `mmchdisk` command has been issued, but no metadata disks remain.

User Response: None. Informational message only.
6027-738  Attention: No data disks remain.

Explanation: The \texttt{mmchdisk} command has been issued, but no data disks remain.

User Response: None. Informational message only.

6027-739  Attention: Due to an earlier configuration change the file system is no longer properly balanced.

Explanation: The \texttt{mmlsdisk} command found that the file system is not properly balanced.

User Response: Issue the \texttt{mmrestripes -b} command at your convenience.

6027-740  Attention: Due to an earlier configuration change the file system is no longer properly replicated.

Explanation: The \texttt{mmlsdisk} command found that the file system is not properly replicated.

User Response: Issue the \texttt{mmrestripes -r} command at your convenience.

6027-741  Attention: Due to an earlier configuration change the file system may contain data that is at risk of being lost.

Explanation: The \texttt{mmlsdisk} command found that critical data resides on disks that are suspended or being deleted.

User Response: Issue the \texttt{mmrestripes -m} command as soon as possible.

6027-742  Error occurred while executing a command for fileSystem.

Explanation: A quota command encountered a problem on a file system. Processing continues with the next file system.

User Response: None. Informational message only.

6027-743  Disk state was updated successfully, but a subsequent metadata update could not be completed at this time.

Explanation: The \texttt{mmchdisk} command encountered an error after the disk status or availability change was already recorded in the file system configuration.

User Response: The most likely reason for this failure is that too many disks have become unavailable or still are unavailable after the disk state change. Issue a \texttt{mmchdisk start} command when more disks are available.

6027-744  Unable to run \texttt{command} while the file system is mounted in restricted mode.

Explanation: A command that can alter the data in a file system was issued while the file system was mounted in restricted mode.

User Response: Either unmount and reissue the command, or mount in \texttt{read-only} or \texttt{read-write} mode, and reissue the command.

6027-745  Attention: Failed to create spare log file(s). A subsequent disk failure may make the file system unavailable on some nodes.

Explanation: A disk state change command was not able to create as many spare log files as desired.

User Response: Free some space in the file system and reissue the command, or restripe the file system.

6027-746  Editing quota limits for this user or group not permitted.

Explanation: The root user or system group was specified for quota limit editing in the \texttt{mmedquota} command.

User Response: Specify a valid user or group in the \texttt{mmedquota} command. Editing quota limits for the root user or system group is prohibited.

6027-747  Too many nodes in cluster (max number) or file system (max number).

Explanation: The operation cannot succeed because too many nodes are involved.

User Response: Reduce the number of nodes to the applicable stated limit.

6027-748  Node \texttt{nodeName} not in system partition.

Explanation: An error occurred while verifying adapter address for names in \texttt{/etc/cluster.nodes}.

User Response: The node may have been placed in another partition. Check the SDR.

6027-749  Pool size changed to \texttt{number K = number M}.

Explanation: Pool size successfully changed.

User Response: None. Informational message only.
6027-800 Could not run command name.
Explanation: The GPFS daemon failed to open the specified command.
User Response: Verify correct installation.

6027-801 fileName fgets failed
Explanation: The GPFS daemon failed to read the specified file.
User Response: Verify correct installation and configuration.

6027-802 Incorrect request type for MmfsGrApprCb callback function: Protocol type = type notification type = type.
Explanation: Group Services returned invalid notification.
User Response: Go to the General Parallel File System for Linux®: RSCT Guide and Reference and search on diagnosing group services problems. Follow the problem determination and repair actions specified.

6027-804 Lost quorum. Shutting down the daemon.
Explanation: The mmfs group lost the quorum. GPFS became unavailable on sufficient nodes that quorum is lost. This could be caused by a communications failure between nodes, multiple GPFS failures, or Group Services failure.
User Response: See associated error logs on the failed nodes.

6027-805 The node number nodeNumber is not defined in fileName
Explanation: A given node number was not found in the cluster.nodes file.
User Response: Perform required configuration steps prior to starting GPFS on the node.

6027-806 Failed to open /dev/VSD0:
Explanation: /dev/VSD0 could not be opened.
User Response: Go to the Parallel System Support Programs for AIX: Diagnosis Guide and search on diagnosing IBM virtual shared disk problems. Follow the problem determination and repair actions specified.

6027-807 Virtual shared disk fence ioctl failed for disk name:
Explanation: Failed to fence or unfence virtual shared disks.
User Response: Go to the Parallel System Support Programs for AIX: Diagnosis Guide and search on diagnosing IBM virtual shared disk problems. Follow the problem determination and repair actions specified.

6027-808 The node addr ipAddress is not defined in fileName
Explanation: An address does not exist in the cluster.nodes file.
User Response: Perform required configuration steps prior to starting GPFS on the node.

6027-809 Fail to subscribe to name group; rc = value.
Explanation: Failed to subscribe to ha.vsd or adapter group.
User Response: Go to the General Parallel File System for Linux®: RSCT Guide and Reference and search on diagnosing group services problems. Follow the problem determination and repair actions specified.

6027-810 Could not connect to Group Services, rc = value.
Explanation: Failure to connect to Group Services.
User Response: Verify Group Services daemon is active. See “Problems reported by Group Services” on page 24 and “Group Services not active on node” on page 24.

6027-811 Group Services has failed. Shutting down the daemon. Rc = value.
Explanation: The mmfsd daemon could not connect to Group Services.
User Response: See “Problems reported by Group Services” on page 24 and “Group Services not active on node” on page 24.

6027-813 Recovering nodes nodeList.
Explanation: Written to the error log when recovery for a node has begun.
User Response: None if followed by a recovered nodes entry, specifying this node. If not followed by such a message, determine why recovery did not complete.
6027-814 Recovered nodes nodeList.

**Explanation:** Written to the error log when recovery for a node has completed.

**User Response:** None. Informational message only.

6027-815 Failed to join Group Services groups.

**Explanation:** The mmfsd daemon failed to join Group Services groups.

**User Response:** See "GPFS join problems" on page 24 and "Group Services not active on node" on page 24. Verify Group Services is installed and ensure HA_SYSPAR_NAME is set properly.


**Explanation:** The mmfsd daemon failed to join Group Services groups.

**User Response:** See "GPFS join problems" on page 24 and "Group Services not active on node" on page 24. Go to the [General Parallel File System for Linux®: RSCT Guide and Reference](#) and search on diagnosing group services problems. Follow the problem determination and repair actions specified.

6027-818 Subscription failed: Group subscriptionGroup rc value

**Explanation:** The mmfsd daemon failed to join the subsystem.

**User Response:** Go to the [General Parallel File System for Linux®: RSCT Guide and Reference](#) and search on diagnosing group services problems. Follow the problem determination and repair actions specified.

6027-819 State change failed. New state = state

**Explanation:**

**User Response:** React to other associated errors that caused the state change to fail.

6027-820 My adapter adapter has failed. Shutting down the daemon.

**Explanation:** Group Services reported that required adapters failed.

**User Response:** See "GPFS daemon down due to adapter failure" on page 23

6027-823 The adapter name group dissolved; Shutting down the daemon.

**Explanation:** The mmfsd daemon received adapter group dissolved notification from Group Services.

**User Response:** See "GPFS daemon down due to adapter failure" on page 23

6027-824 rvsd daemon is not active. SRC status=status.

**Explanation:** The mmfsd daemon tried to fence or unfence virtual shared disks.

**User Response:** Go to the [Parallel System Support Programs for AIX: Diagnosis Guide](#) and search on diagnosing IBM virtual shared disk problems. Follow the problem determination and repair actions specified.

6027-830 Could not get minor number for /dev/r name in name.

**Explanation:** The mmfsd daemon failed to obtain a virtual shared disk minor number.

**User Response:** Go to the [Parallel System Support Programs for AIX: Diagnosis Guide](#) and search on diagnosing IBM virtual shared disk problems. Follow the problem determination and repair actions specified.

6027-831 Terminated connections to Group Services.

**Explanation:** The mmfsd daemon has terminated abnormally.

**User Response:**

6027-832 configuration manager node nodeName not found in fileName.

**Explanation:** The node list is not configured correctly.

**User Response:** Check the node list file, Group Services, and the node in the error message.

6027-834 Joining node (nodeName) is not part of the group. Rejected.

**Explanation:** The joining node is not recognized as part of the cluster.

**User Response:** Verify cluster.nodes file, and verify that the name was resolved correctly using mmfsadm dump cfgmgr.

6027-835 Joining node (nodeName) has incompatible version number. Rejected

**Explanation:** The joining node did not have a compatible version number.

**User Response:** Verify that the same version of code is installed.
Joining node (nodeName) has a different communication protocol type protocolType than group's protocolType. Rejected.

Explanation: The joining node does not use the same communication protocol type.
User Response: Verify that all nodes have the same communication protocol type.

Node (nodeName) still has new flag in cluster.nodes file and cannot join in LAPI communication mode and was therefore rejected.

Explanation: A node with new flag in cluster.nodes file cannot join in LAPI communication mode. Rejected.
User Response: Change communication type to TCP.

Explicit join reject. Could be due to incompatible daemon version or communication protocol, or cfgmgr failed updating new node status in SDR, or no config manager, or single-node quorum mode with local adapter down.

Explanation: A node join was explicitly rejected.
User Response: Verify that the same version of software is installed on all nodes. Verify that all nodes have the same communication protocol type.

Node nodeName is a new node being added and cannot become config manager until it becomes part of the original nodeset. explanatoryString.

Explanation: The oldest node in the GPFS group is a node with the 'new' flag, and it cannot become configuration manager.
User Response: None. The daemon recycles.

Single-node Quorum: disks fenced from this node. Shutting down the daemon.

Explanation: Single-node quorum exists and the disks are fenced from the local node, preventing the mount operation form proceeding.
User Response: Determine why the cluster is in single-node state. If it is the desired state, manually unfence the disks. Otherwise, fix the network partition problem and restart GPFS on both nodes. See "Single-node quorum problems" on page 18.

Cluster type: value.

Explanation: This message appears during daemon initialization.
User Response: None. Informational message only.

Join rejected. Possible quorum loss, recovery protocol is in progress, or GPFS daemon failed on one or more nodes before approving the join. Recycling.

Explanation: The mmfsd daemon is rejected from joining the group. This may happen when other nodes are in the process of joining the group, and Group Services stops the first set of joins to start a new one.
User Response: Check that the node is part of the cluster.

Node (nodeName) is not part of the group:

Explanation: A node named in a join group is not part of the nodeset.
User Response: Verify the cluster.nodes file.

Some disks are fenced out. Waiting for its partner to join. If partner has gone for good, issue the 'mmfsadm ActivateSingleNode' command to reactivate this node.

Explanation: If useSingleNodeQuorum is set, a node can not mount in SINGLESTATE if any of the disks specified in the file system are fenced. The thread doing the mount command goes to wait state until its partner joins.
User Response: Determine why its partner node is down. If that partner is gone permanently, run the mmfsadm ActivateSingleNode command to reactivate the waiting node.

Activated the thread waiting for ACTIVE state.

Explanation: This message is issued by the mmfsadm ActivateSingleNode command.
User Response: None. Informational message only.

mmfsadm ActivateSingleNode works only in SINGLENODE state.

Explanation: The mmfsadm ActivateSingleNode command was issued when the group was not in SINGLENODE state.
User Response: None. Informational message only.
Node number could not be determined from Group Services subsystem.

Explanation: The `ha_gs_get_node_number()` call failed to retrieve the node number.

User Response: Ensure node number definitions have been properly defined to Group Services. Go to the *General Parallel File System for Linux®: RSCT Guide and Reference* and search on diagnosing group services problems. Follow the problem determination and repair actions specified.

Config manager `nodeNumber` failed updating new node status in SDR. Possible reasons: not enough Kerberos credentials. Node join rejected.

Explanation: The configuration manager failed to update the SDR with the new node.

User Response: None. The join will be rejected and the nodes will be recycled.

Lost quorum. Unmounting file systems

Explanation: The mmfs group lost the quorum. This error occurs when GPFS becomes unavailable on enough nodes that quorum is lost. The error can be caused by a failure of communications between the nodes, multiple GPFS failures, or a group services failure.

User Response: See associated error logs on the failed nodes for additional problem determination information.

Open failed.

Explanation: The `open` system call was not successful.

User Response: Check additional error messages.

Set replication failed.

Explanation: The `open` system call was not successful.

User Response: Check additional error messages.

-M and -R are only valid for zero length files.

Explanation: The `mmchattr` command received command line arguments that were not valid.

User Response: Correct command line and reissue the command.

-m value exceeds number of failure groups for metadata.

Explanation: The `mmchattr` command received command line arguments that were not valid.

User Response: Correct command line and reissue the command.

-r value exceeds number of failure groups for data.

Explanation: The `mmchattr` command received command line arguments that were not valid.

User Response: Correct command line and reissue the command.

Permission failure. The command requires root authority to execute.

Explanation: The `mktsb` command is issued with a non-zero `uid`.

User Response: Log on as `root` and issue the command again.

Bad file system. The specified file system is not VFS=mmfs.

Explanation: The `mktsb` command was issued with a file system which is not `VFS=mmfs`.

User Response: Reissue the command specifying the correct file system.

Bad file system. The specified name is not an installed file system.

Explanation: The `mktsb` command is issued with a non-existent file system name.

User Response: Reissue the command specifying the correct file system.

command command failed with error code value.

Explanation: An unexpected error is returned from a called function, such as `awk` or `grep`, for example.

User Response: Gather information about the problem and follow local site procedures for reporting hardware and software problems.

Configuration Backup/Restore failed.

Explanation: An unexpected error terminated the command.

User Response: Gather information about the problem and follow local site procedures for reporting hardware and software problems.
6027-956 Abnormal program termination.

Explanation: The user terminates the command using the Ctrl-C key sequence.

User Response: Reissue the command as appropriate.

6027-957 The following volumes are required, but were not found: volumes

Explanation: The mktsb -r command could not find the disks that are required to issue tscdfs.

User Response: Add the disks or reissue the command with a different archive.

6027-959 Archive operation failed.

Explanation: An unexpected error terminated the command.

User Response: Gather information about the problem and follow local site procedures for reporting hardware and software problems.

6027-960 The following devices are in-use, but must be unmounted: devices

Explanation: The mktsb -r command could not unmount the necessary file systems.

User Response: Free up these devices and issue unmount on them.

6027-961 Cannot execute command.

Explanation: The mmgetacli command cannot invoke the mmputacli or mmeditacli command.

User Response: Contact your system administrator.

6027-963 EDITOR environment variable not set

Explanation: Self-explanatory.

User Response: Set the EDITOR environment variable and reissue the command

6027-964 EDITOR environment variable must be an absolute path name

Explanation: Self-explanatory.

User Response: Set the EDITOR environment variable correctly and reissue the command

6027-965 Cannot create temporary file

Explanation: Self-explanatory.

User Response: Contact your system administrator.

6027-966 Cannot access fileName

Explanation: Self-explanatory.

User Response: Verify file permissions.

6027-967 Should the modified ACL be applied? yes or no

Explanation: Self-explanatory.

User Response: Respond yes if you want to commit the changes, no otherwise.

6027-971 Cannot find fileName

Explanation: Self-explanatory.

User Response: Verify the file name and permissions.

6027-972 name is not a directory (-d not valid).

Explanation: Self-explanatory.

User Response: None, only directories are allowed to have default ACLs.

6027-973 Cannot allocate number byte buffer for ACL.

Explanation: There was not enough available memory to process the request.

User Response: Contact your system administrator.

6027-974 Failure reading ACL (rc=number).

Explanation: An unexpected error was encountered by mmgetacli or mmeditacli.

User Response: Examine the return code, contact the IBM Support Center if necessary.

6027-976 Failure writing ACL (rc=number).

Explanation: An unexpected error encountered by mmputacli or mmeditacli.

User Response: Examine the return code, Contact the IBM Support Center if necessary.

6027-977 Authorization failure

Explanation: An attempt was made to create or modify the ACL for a file that you do not own.

User Response: Only the owner of a file or the root user can create or change the access control list for a file.
6027-978 Incorrect, duplicate, or missing access control entry detected.

Explanation: An access control entry in the ACL that was created had incorrect syntax, one of the required access control entries is missing, or the ACL contains duplicate access control entries.

User Response: Correct the problem and reissue the command.

6027-979 Incorrect ACL entry: entry.

Explanation: Self-explanatory.

User Response: Correct the problem and reissue the command.

6027-980 name is not a valid user name.

Explanation: Self-explanatory.

User Response: Specify a valid user name and reissue the command.

6027-981 name is not a valid group name.

Explanation: Self-explanatory.

User Response: Specify a valid group name and reissue the command.

6027-982 name is not a valid ACL entry type.

Explanation: Specify a valid ACL entry type and reissue the command.

User Response: Correct the problem and reissue the command.

6027-983 name is not a valid permission set.

Explanation: Specify a valid permission set and reissue the command.

User Response: Correct the problem and reissue the command.

6027-985 Failure deleting the ACL (rc=number).

Explanation: An unexpected error was encountered by mmdelacl.

User Response: Examine the return code. Contact the IBM Support Center if necessary.

6027-986 Cannot open fileName.

Explanation: Self-explanatory.

User Response: Verify the file name and permissions.

6027-1001 mmawk: Incorrect digit in field_number.

Explanation: A character other than a digit was specified for the field_number.

User Response: Use a valid integer for the last mmawk argument. If this message appears in another command, it is an internal processing error. Contact the IBM Support Center.

6027-1002 mmawk: Incorrect positive integer in field_number.

Explanation: The field_number parameter was zero or overflowed.

User Response: Specify an integer from 1 to 2G. If this message appears in another command, it is an internal processing error. Contact the IBM Support Center.

6027-1004 Incorrect [nodelist] format in file: nodeListLine

Explanation: The [nodelist] line in the input stream is not a comma-separated list of nodes.

User Response: Fix the format of the [nodelist] line in the mmfs.cfg input file. This is usually the NodeFile specified on the mmconfig command.

If no user created [nodelist] lines are in error, Contact the IBM Support Center.

If user created [nodelist] lines are in error, correct these lines.

6027-1005 Common is not sole item on [] line number.


User Response: Fix the format of the list of nodes in the mmfs.cfg input file. This is usually the NodeFile specified on the mmconfig command.

If no user created [nodelist] lines are in error, Contact the IBM Support Center.

If user created [nodelist] lines are in error, correct these lines.

6027-1006 Incorrect custom [] line number.

Explanation: A [nodelist] line in the input stream is not of the format: [nodelist]. This covers syntax errors not covered by messages 6027-1004 and 6027-1005.

User Response: Fix the format of the list of nodes in the mmfs.cfg input file. This is usually the NodeFile specified on the mmconfig command.

If no user created lines are in error, Contact the IBM Support Center.

If user created lines are in error, correct these lines.
If user created lines are in error, correct these lines.

**6027-1007**  attribute found in common multiple times: attribute.

**Explanation:** The attribute specified on the command line is in the main input stream multiple times. This is occasionally legal, such as with the trace attribute. These attributes, however, are not meant to be repaired by mmfixcfg.

**User Response:** Fix the configuration file (mmfs.cfg or mmfscfg1 in the SDR). All attributes modified by GPFS configuration commands may appear only once in common sections of the configuration file.

**6027-1008**  Attribute found in custom multiple times: attribute.

**Explanation:** The attribute specified on the command line is in a custom section multiple times. This is occasionally legal. These attributes are not meant to be repaired by mmfixcfg.

**User Response:** Fix the configuration file (mmfs.cfg or mmfscfg1 in the SDR). All attributes modified by GPFS configuration commands may appear only once in custom sections of the configuration file.

**6027-1022**  Missing mandatory arguments on command line.

**Explanation:** Some, but not enough, arguments were specified to the mmcrfsc command.

**User Response:** Specify all arguments as per the usage statement that follows.

**6027-1023**  File system size arguments must be an integer: value.

**Explanation:** The first two arguments specified to the mmcrfsc command are not integers.

**User Response:** File system size is an internal argument. mmcrfsc should never call the mmcrfsc command without a valid fssize argument. Contact the IBM Support Center.

**6027-1029**  Incorrect characters in integer field for option.

**Explanation:** An incorrect character was specified with the indicated option.

**User Response:** Use a valid integer for the indicated option.

**6027-1030**  Value below minimum for name option.

**Explanation:** The value specified with an option was below the minimum.

**User Response:** Use an integer in the legal range for the indicated option.

**6027-1031**  Value above maximum for option name.

**Explanation:** The value specified with an option was above the maximum.

**User Response:** Use an integer in the legal range for the indicated option.

**6027-1032**  Incorrect option optionName.

**Explanation:** An unknown option was specified.

**User Response:** Use only option shown in the syntax.

**6027-1033**  Option optionName specified twice.

**Explanation:** An option was specified more than once on the command line.

**User Response:** Use options only once.

**6027-1034**  Missing argument after optionName option.

**Explanation:** An option was not followed by an argument.

**User Response:** All options need an argument. Specify one.

**6027-1035**  Option -optionName is mandatory.

**Explanation:** A mandatory input option was not specified.

**User Response:** Specify all mandatory options.

**6027-1036**  Option expected at string.

**Explanation:** Something other than an expected option was encountered on the latter portion of the command line.

**User Response:** Follow the syntax shown. Options may not have multiple values. Extra arguments are not allowed.
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Explanation</th>
<th>User Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>6027-1038</td>
<td>IndirectSize must be &lt;= BlockSize and must be a multiple of BlockSize/32.</td>
<td>The IndirectSize specified was not a multiple of BlockSize/32 or the IndirectSize specified was larger than Blocksize.</td>
<td>Use valid values for IndirectSize and BlockSize.</td>
</tr>
<tr>
<td>6027-1039</td>
<td>InodeSize must be a multiple of LocalSectorSize (512).</td>
<td>The specified InodeSize was not a multiple of 512.</td>
<td>Use a valid value for InodeSize.</td>
</tr>
<tr>
<td>6027-1040</td>
<td>InodeSize must be less than or equal to Blocksize.</td>
<td>The specified InodeSize was not less than or equal to Blocksize.</td>
<td>Use a valid value for InodeSize.</td>
</tr>
<tr>
<td>6027-1042</td>
<td>DefaultMetadataReplicas must be less than or equal to MaxMetadataReplicas.</td>
<td>The specified DefaultMetadataReplicas was greater than MaxMetadataReplicas.</td>
<td>Specify a valid value for DefaultMetadataReplicas.</td>
</tr>
<tr>
<td>6027-1043</td>
<td>DefaultDataReplicas must be less than or equal MaxDataReplicas.</td>
<td>The specified DefaultDataReplicas was greater than MaxDataReplicas.</td>
<td>Specify a valid value for DefaultDataReplicas.</td>
</tr>
<tr>
<td>6027-1055</td>
<td>LogicalSectorSize must be a multiple of 512.</td>
<td>The specified LogicalSectorSize was not a multiple of 512.</td>
<td>Specify a valid LogicalSectorSize.</td>
</tr>
<tr>
<td>6027-1056</td>
<td>Blocksize must be a multiple of LogicalSectorSize * 32.</td>
<td>The specified Blocksize was not a multiple of LogicalSectorSize * 32.</td>
<td>Specify a valid value for Blocksize.</td>
</tr>
<tr>
<td>6027-1057</td>
<td>InodeSize must be less than or equal to Blocksize.</td>
<td>The specified InodeSize was not less than or equal to Blocksize.</td>
<td>Specify a valid value for InodeSize.</td>
</tr>
<tr>
<td>6027-1058</td>
<td>TrailerSize must be 0.</td>
<td>The specified TrailerSize was not 0.</td>
<td>Specify a valid value for TrailerSize.</td>
</tr>
<tr>
<td>6027-1059</td>
<td>Mode must be M or S: mode</td>
<td>The first argument provided in the mmcrfsc command was not M or S.</td>
<td>The mmcrfsc command should not be called by a user. If any other command produces this error, <a href="https://www.ibm.com/support">contact the IBM Support Center</a></td>
</tr>
<tr>
<td>6027-1060</td>
<td>BlockSize must be 16K, 64K, 256K, 512K, or 1M.</td>
<td>The specified value for BlockSize was not valid.</td>
<td>Specify a valid BlockSize value.</td>
</tr>
<tr>
<td>6027-1064</td>
<td>Effective user id must be root to execute.</td>
<td>The command has been issued by a user other than root.</td>
<td>Ensure the user is root before reissuing the command.</td>
</tr>
<tr>
<td>6027-1065</td>
<td>Could not open file fileName. errno value</td>
<td>The swt_pt_file file failed to open.</td>
<td>Verify whether or not the swt_pt_file file exists.</td>
</tr>
<tr>
<td>6027-1066</td>
<td>Number of nodes specified must be greater than zero</td>
<td>The number of tasks specified in the swt_pt_file is 0.</td>
<td>Verify the swt_pt_file file.</td>
</tr>
<tr>
<td>6027-1067</td>
<td>The job_key argument must be greater than zero. job_key = value</td>
<td>The job_key specified in the swt_pt_file is 0.</td>
<td>Verify the swt_pt_file file.</td>
</tr>
</tbody>
</table>
6027-1068  Component id name is too long
Explanation:  The component id specified in the swt_pt_file is greater than 8 characters in length.
User Response:  Verify the swt_pt_file file.

6027-1069  Error opening name, errno = value
Explanation:  The switch device driver failed to open.
User Response:  Contact the IBM Support Center.

6027-1070  Error from QUERY_ST. Adapter name
Window value Errno = number
Explanation:  A QUERY_ST switch ioctl failed.
User Response:  Contact the IBM Support Center.

6027-1074  Malloc failed for switch number and window id list. errno = value
Explanation:  calloc failed.
User Response:  Contact the IBM Support Center.

6027-1075  LOAD_ST: Request for load was unsuccessful. Adapter name errno = number
Explanation:  The switch partition table failed to load.
User Response:  Contact the IBM Support Center.

6027-1076  LOAD_ST: Request for load was successful. Adapter name
Explanation:  The switch partition table was successfully loaded.
User Response:  None. Informational message only.

6027-1077  UNLOAD_ST: Request for unload was unsuccessful. Adapter name Window value Errno = value
Explanation:  The switch partition table failed to unload.
User Response:  Contact the IBM Support Center.

6027-1078  UNLOAD_ST: Request for unload for window value adapter name was successful.
Explanation:  The switch partition table was successfully unloaded.
User Response:  None. Informational message only.

6027-1080  Node nodeName adapter name window value returned status.
Explanation:  Display of window status.
User Response:  None. Informational message only.

6027-1081  Adapter name Window value is RESERVED by name
Explanation:  Display of reserved window status.
User Response:  None. Informational message only.

6027-1082  fscanf failed with errno value
User Response:  Verify the swt_pt_file file.

6027-1083  Error from QUERY_ST: Adapter name compid (name) did not match
Explanation:  A QUERY_ST switch ioctl failed.
User Response:  Contact the IBM Support Center.

6027-1084  The specified block size (valueK) exceeds the maximum allowed block size currently in effect (valueK). Either specify a smaller value for the -B parameter or increase the maximum block size by issuing:

```
mmchconfig maxblocksize=valueK -i
```
Explanation:  The specified value for block size was greater than the value of the maxblocksize configuration parameter.
User Response:  Specify a valid block size value or increase the allowed block size by specifying a larger value on the maxblocksize parameter on the mmchconfig command.

6027-1113  Incorrect option option
Explanation:  A command received an option which is not correct.
User Response:  Correct command line and reissue the command.

6027-1114  Get adapter failed for IPA: ipAddress, nodeName while condition
Explanation:  A node being processed (from the command line or from another source) was recognized by the host command yet its IP address did not have a valid adapter in the SDR adapter table.
User Response:  If the IP address is not valid, something is wrong with the indicated node. If the IP address is valid, and should have an adapter, check the
integrity of the SDR. If the node name is localhost, the IP address will be valid, but will have no adapter. localhost should not be entered from the command line.

6027-1120  Interrupt received: No changes made.
Explanation: A GPFS administration command (mm...) received an interrupt before committing any changes.
User Response: None. Informational message only.

6027-1123  Disk name must be specified in disk descriptor.
Explanation: The disk name positional parameter (the first field) in a disk descriptor was empty. The bad disk descriptor is displayed following this message.
User Response: Correct the input and rerun the command.

6027-1124  Disk usage must be dataOnly, metadataOnly, or dataAndMetadata.
Explanation: The disk usage positional parameter (field 4) in a disk descriptor has a value which is not valid. The bad disk descriptor is displayed following this message.
User Response: Correct the input and reissue the command.

6027-1129  Cannot validate physical volume name: size
Explanation: The size of the named physical volume could not be determined or there already was a volume group on the specified physical volume.
User Response: Use a valid unused physical volume.

6027-1130  User-specified failure group must be in the range from -1 to 4000.
Explanation: A disk descriptor specified a failure group out of range. The bad disk descriptor is displayed following this message.
User Response: Correct the input and reissue the command.

6027-1131  Cannot determine the primary server for virtual shared disk name.
Explanation: The internally issued vsdatalst command did not show the primary server of the passed virtual shared disk.
User Response: The virtual shared disk may not be valid. Try vsdatalst -v and vsdatalst -g, looking for the virtual shared disk in question and its volume group. Correct the input and reissue the command.

6027-1132  Interrupt received: changes not propagated.
Explanation: An interrupt was received after changes were committed but before the changes could be propagated to all the nodes.
User Response: All changes will eventually propagate as nodes recycle or other GPFS administration commands are issued. Changes can be activated now by manually restarting the GPFS daemons.

6027-1133  Interrupt received. Only -A, -Q, and -T were changed.
Explanation: An interrupt was received in the mmchfs command. Any changes to -A, -Q, and -T attributes were successfully completed. No other file system attributes were changed.
User Response: Reissue the command if you want to change additional attributes of the file system. The changes can be undone by running mmchfs with the original values for the affected attributes.

6027-1135  Restriping may not have finished.
Explanation: An interrupt occurred during restriping.
User Response: Restart the restripe. Verify that the file system was not damaged by running the mmfsck command.

6027-1136  option option specified twice.
Explanation: An option was specified multiple times on a command line
User Response: Correct the error on the command line and reissue the command.

6027-1137  option value must be yes or no.
Explanation: A yes or no option was used with something other than yes or no.
User Response: Correct the error on the command line and reissue the command.

6027-1138  Incorrect extra argument: argument
Explanation: Non-option arguments followed the mandatory arguments.
User Response: Unlike most posix commands, the main arguments come first, followed by the optional arguments. Correct the error and reissue the command.
6027-1140 Incorrect integer for option: number
Explanation: An option requiring an integer argument was followed by something that cannot be parsed as an integer.
User Response: Specify an integer with the indicated option.

6027-1141 No disk descriptor file specified.
Explanation: An -F flag was not followed by the path name of a disk descriptor file.
User Response: Specify a valid disk descriptor file.

6027-1143 Cannot open fileName.
Explanation: A file could not be opened.
User Response: Verify that the specified file exists and that you have the proper authorizations.

6027-1145 parameter must be greater than 0: value
Explanation: A negative value had been specified for the named parameter, which requires a positive value.
User Response: Correct the input and reissue the command.

6027-1146 node_number failed.
Explanation: The node_number command failed.
User Response: Ensure PSSP is installed. If the error persists, go to the Parallel System Support Programs for AIX: Diagnosis Guide and search on diagnosing hardware and software problems. Follow the problem determination and repair actions specified and contact the IBM Support Center.

6027-1152 Cannot replace file fileName in the SDR.
Explanation: A GPFS administration command could not replace the specified file in the SDR.
User Response: Verify that you are authorized to use the SDRReplaceFile command. If the problem persists, go to the Parallel System Support Programs for AIX: Diagnosis Guide and search on diagnosing SDR problems. Follow the problem determination and repair actions specified and contact the IBM Support Center.

6027-1154 Incorrect node name nodeName specified for command.
Explanation: The user specified a node name which is not valid.
User Response: Use a valid name.

6027-1155 Node nodeName is already represented in some GPFS nodeset.
Explanation: The user specified a node that is already in use in an existing GPFS nodeset.
User Response: Nodes can belong to only one GPFS nodeset at a time. Specify a free node or delete the named node from its current GPFS nodeset.

6027-1158 Node nodeName represented twice on the command line.
Explanation: The same node was referenced more than once on the command line.
User Response: All nodes specified must be unique. Note that even though two node names might appear to be different on the command line, they may still refer to the same node.

6027-1163 GPFS is still active on nodeName.
Explanation: The GPFS daemon was discovered to be active on the specified node during an operation that requires the daemon to be stopped.
User Response: Stop the daemon on the specified node and rerun the command.

6027-1171 nodeName is already in a single-node GPFS nodeset.
Explanation: The node is configured as a single-node GPFS nodeset.
User Response: Nodes can belong to only one GPFS nodeset at a time. Run the command from another node, or delete the current GPFS nodeset.

6027-1178 parameter must be from value to value: valueSpecified
Explanation: A parameter value specified was out of range.
User Response: Keep the specified value within the range shown.

6027-1179 mmfixcfg failed while changing fileName.
Explanation: The mmfixcfg command failed to modify the cited file.
User Response: The cited file, or its copy in the SDR, may have illegal format. Check the preceding messages for more information. Correct any user modifications that have been made. If no user modifications have been made, contact the IBM Support Center.
6027-1188  Duplicate disk specified: disk

Explanation: A disk was specified more than once on the command line.

User Response: Specify each disk only once.

6027-1189  You cannot delete all the disks.

Explanation: The number of disks to delete is greater than or equal to the number of disks in the file system.

User Response: Delete only some of the disks. If you want to delete them all, use the mmdelfs command.

6027-1200  tscrfs failed. Cannot create device

Explanation: tscrfs failed.

User Response: See the GPFS error message from tscrfs.

6027-1204  command failed

Explanation: An internal command failed. This is usually a call to the GPFS daemon.

User Response: See the error message from the command that failed.

6027-1206  command currently runs only on an SP system.

Explanation: A GPFS administration command that only makes sense in an SP environment, was run from a non-SP system.

User Response: Use these commands only on SP systems.

6027-1207  There is already an existing file system using value.

Explanation: The mount point or device specified matches that of an existing file system. The mount point must be unique within a given nodeset. The device name must be unique across all GPFS nodesets.

User Response: Choose an unused name or path.

6027-1214  Cannot make virtual shared disks on a non-SP system.

Explanation: The mmmkvsd command was run in an environment with no control workstation

User Response: The mmmkvsd command should not be called in this situation.

6027-1215  Disk disk on nodeName (number megabytes) needs a partition size larger than the maximum of 256.

Explanation: A specified disk was larger than the maximum size of 1016 partitions * 256 MB partition size (about 260 GB)

User Response: The mmmkvsd command cannot handle disks this large. If possible, create the virtual shared disk manually and pass it in as existing.

6027-1216  createvsd did not create the virtual shared disk.

Explanation: This comes from the local node when createvsd fails.

User Response: Fix the error shown by the createvsd command.

6027-1217  createvsd failed

Explanation: This comes from the control workstation when createvsd fails.

User Response: The error is followed by the output of the createvsd command, and then the contents of the virtual shared disk rollback file. The problem should be shown in this output.

6027-1226  Could not command virtual shared disk diskName on nodeName.

Explanation: The cfgvsd or startvsd command failed on a remote node.


6027-1227  The SDR file is locked. Retrying ...

Explanation: Another GPFS administration command (mm...) has locked the SDR.

User Response: Wait to see if you get the lock.

6027-1228  Lock creation successful.

Explanation: Another GPFS administration command (mm...) has released the SDR lock.

User Response: None. Informational message only. The command will now continue.

6027-1229  Timed out waiting for lock: Try again later.

Explanation: Another GPFS administration command (mm...) kept the SDR locked for over a minute.

User Response: Try again later. If you think that no
other GPFS administration command is using the SDR, it can be unlocked on the control workstation. See “Delays and deadlocks” on page 25.

6027-1233 Incorrect keyword: value.

Explanation: The mmcommon or mmremote command is called with a keyword which is not valid.

User Response: See syntax shown. If this comes from inside another GPFS administration command (mm...), then check that all nodes including the control workstation have the same level of code in /usr/lpp/mmfs/bin. Otherwise, this is an internal processing error. Contact the IBM Support Center.

6027-1240 nodeName: cannot find disk with lspv.

Explanation: The hdisk specified does not exist on the server specified.

User Response: Choose a disk that exists.

6027-1241 nodeName: disk already has a volume group.

Explanation: The hdisk specified already has a volume group assigned.

User Response: When creating virtual shared disks, you must choose physical volumes that are not a member of any volume group.

6027-1242 GPFS is waiting for requiredCondition

Explanation: GPFS is unable to come up immediately due to the stated required condition not being satisfied yet.

User Response: This is an informational message. As long as the required condition is not satisfied, this message will repeat every 5 minutes. You may want to stop the GPFS daemon after a while, if it will be a long time before the required condition will be met.

6027-1248 Mount point must not be a relative path name: path

Explanation: The mount point did not begin with /.

User Response: Specify the absolute path name for the mount point.

6027-1249 dataStructureDump must not specify a relative path name: path

Explanation: The path name specified for dataStructureDump (-D option in the mmconfig command) did not begin with /.

User Response: Specify the absolute path for dataStructureDump.

6027-1251 pagepool (value ) must be greater than minpagepool (value).

Explanation: An incompatible change in a configuration attribute for pagepool has been specified.

User Response: Use valid relative values for pagepool attributes.

6027-1252 minpagepool (value ) must be ≥ maxblocksize (value ) × 5 + 640K.

Explanation: An incompatible change in the configuration attribute minpagepool or maxblocksize, relative to one another, has been specified.

User Response: Use valid relative values for the minpagepool and maxblocksize attributes.

6027-1253 Incorrect value for option option

Explanation: An incorrect argument was specified with an option requiring one of a limited number of legal arguments.

User Response: Use one of the legal values for the indicated flag.

6027-1258 Unexpected error from command. Return code: value.

Explanation: A GPFS administration command (mm...) received an unexpected error code from an internally called command.

User Response: Perform problem determination. See “GPFS commands are unsuccessful” on page 31.
6027-1283  A node name that is not valid was found in the mmsdrfs file.
Explanation: An IP address being converted does not have a valid adapter in the SDR adapter table.
User Response: Configuration data contained in the SDR is incorrect. Correct any user modifications that have been made. If no user modifications have been made to the SDR, contact the IBM Support Center.

6027-1291  Options name and name cannot be specified at the same time.
Explanation: Incompatible options were specified on the command line.
User Response: Select one of the options and reissue the command.

6027-1292  A list of nodes cannot be used with attribute name.
Explanation: The specified configuration attribute cannot be changed on only a subset of nodes. This attribute must be the same on all nodes in the nodeset.
User Response: Certain attributes, such as autoload, may not be customized from node to node. Change the attribute for the entire nodeset.

6027-1295  The GPFS configuration information is incorrect or not available.
Explanation: A problem has been encountered while verifying the configuration information and the execution environment.
User Response: Check the preceding messages for more information. Correct the problem and restart GPFS.

6027-1296  GPFS cannot be started on the control workstation.
Explanation: An attempt has been made to start the GPFS daemon on the control workstation.
User Response: Start GPFS on nodes other than the control workstation.

6027-1297  Each device specifies metadataOnly for disk usage. This file system could not store data.
Explanation: All disk descriptors specify metadataOnly for disk usage.
User Response: Change at least one disk descriptor in the file system to indicate the usage of dataOnly or dataAndMetadata.

6027-1298  Each device specifies dataOnly for disk usage. This file system could not store metadata.
Explanation: All disk descriptors specify dataOnly for disk usage.
User Response: Change at least one disk descriptor in the file system to indicate a usage of metadataOnly or dataAndMetadata.

6027-1299  Incorrect integer number specified for failure group.
Explanation: A disk descriptor’s specified failure group is not a valid integer.
User Response: Change the disk descriptor to indicate a valid failure group number.

6027-1301  Incorrect server node nodeName in disk descriptor.
Explanation: A disk descriptor specifies a server node that is not valid.
User Response: Specify a valid server node and reissue the command.

6027-1302  Successfully changed communication protocol to name.
Explanation: The communication protocol is successfully changed.
User Response: None. Informational message only.

6027-1304  Missing argument after name option
Explanation: An option was not followed by an argument.
User Response: Specify an argument and reissue the command.

6027-1305  Cannot execute (name): return code value
Explanation: A command was not successfully invoked.
User Response: Determine why the command is not accessible.

6027-1306  Command name failed with return code value.
Explanation: A command was not successfully executed.
User Response: Correct the failure specified by the command and reissue the command.
<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
<th>User Response</th>
<th>Explanation</th>
<th>User Response</th>
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<td>6027-1307</td>
<td>Disk <code>disk</code> on node <code>nodeName</code> already has a volume group <code>vgName</code> which doesn’t appear to have been created by this program in a prior invocation. Correct config file or remove the volume group and retry.</td>
<td>Either remove the virtual shared disk or remove the disk descriptor and retry.</td>
<td>The specified disk already belongs to a volume group.</td>
<td></td>
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<tr>
<td>6027-1308</td>
<td>Disk <code>disk</code> on node <code>nodeName</code> already has a logical volume <code>vgName</code> which doesn’t appear to have been created by this program in a prior invocation. Correct config file or remove the logical volume and retry.</td>
<td>Either remove the volume group or remove the disk descriptor and retry.</td>
<td>The specified disk already has a logical volume.</td>
<td></td>
</tr>
<tr>
<td>6027-1309</td>
<td>Disk <code>disk</code> on node <code>nodeName</code> already has multiple logical volumes which don’t appear to have been created by this program in a prior invocation. Correct config file or remove the logical volumes and retry.</td>
<td>Either remove the logical volumes or remove the disk descriptor and retry.</td>
<td>The specified disk already had multiple logical volumes.</td>
<td></td>
</tr>
<tr>
<td>6027-1311</td>
<td>The global volume group <code>vgName</code> we’re attempting to define for node <code>nodeName</code> and disk <code>disk</code> is already defined with different server nodes or volume group. Correct config file or remove the offending global volume group and retry.</td>
<td>Either remove the global volume group or remove the disk descriptor and retry.</td>
<td>The global volume group was defined with different parameters.</td>
<td></td>
</tr>
<tr>
<td>6027-1312</td>
<td>The virtual shared disk <code>diskName</code> we’re attempting to define for global volume group <code>vgName</code>, node <code>nodeName</code>, and logical volume <code>lvName</code> is already defined with different parameters. Correct config file or remove the offending virtual shared disk and retry.</td>
<td>Either remove the volume group or specify a different disk.</td>
<td>The virtual shared disk was already defined.</td>
<td></td>
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<tr>
<td>6027-1323</td>
<td>A prior invocation of this command has recorded a partial completion in the file <code>name</code>. Should we restart at prior failing step (number)? [y]/n =&gt;</td>
<td></td>
<td>The <code>mmcrvsd</code> command was restarted on a prior failing descriptor file.</td>
<td></td>
</tr>
<tr>
<td>6027-1324</td>
<td>Unable to rewrite new descriptor to the file <code>fileName</code>. Ensure the file system has enough space and retry.</td>
<td></td>
<td>There was either not enough space in the file system or the file system was write protected.</td>
<td></td>
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<tr>
<td>6027-1325</td>
<td>Volume name from descriptor file <code>fileName</code> does not define a primary server nor is it a currently defined virtual shared disk.</td>
<td></td>
<td>A disk descriptor did not define a primary server.</td>
<td></td>
</tr>
<tr>
<td>6027-1327</td>
<td>Cannot open (<code>fileName</code>) : return code value.</td>
<td></td>
<td>The file could not be opened.</td>
<td></td>
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<tr>
<td>6027-1328</td>
<td>Cannot determine node number for host (<code>nodeName</code>).</td>
<td></td>
<td>A lookup in the system data repository could not determine the node number.</td>
<td></td>
</tr>
<tr>
<td>6027-1330</td>
<td><code>diskName</code> is already in volume group <code>vgName</code> and cannot be added to <code>vgName</code>.</td>
<td></td>
<td>The specified disk already belongs to a volume group.</td>
<td></td>
</tr>
</tbody>
</table>
6027-1332 Cannot find disk with command.
Explanation: The specified disk cannot be found.
User Response: Specify a correct disk name.

6027-1333 option requires a value.
Explanation: The specified command option requires a value.
User Response: Specify a value and reissue the command.

6027-1334 Incorrect option: name
Explanation: The specified command option is not valid.
User Response: Specify a valid option and reissue the command.

6027-1335 Interrupt received.
Explanation: A command has been interrupted by the user.
User Response: Retry the command.

6027-1336 The volume group vgName cannot be imported because the disk with physical volume ID value cannot be found.
Explanation: The specified volume group cannot be imported.
User Response: Ensure that the disk with the stated physical volume ID is known on the node issuing this message.

6027-1337 Failed to obtain DCE credentials; dsrvgt name command rc= value. Continuing.
Explanation: An attempt to obtain spbgroot DCE credentials has failed. Processing continues, but there may be a authentication failure later on.
User Response: Go to the Parallel System Support Programs for AIX: Diagnosis Guide and search on diagnosing per node key management (PNKM) problems. Follow the problem determination and repair actions specified.

6027-1338 communicationProtocol is not supported.
Explanation: The requested communication protocol is not supported by the installed code.
User Response: Ensure the correct level of code is installed.

6027-1339 communicationProtocol value must be LAPI or TCP.
Explanation: The value supplied as the communicationProtocol attribute is other than LAPI or TCP.
User Response: Specify a correct attribute value and reissue the command.

6027-1340 Nodeset name contains entries for deleted nodes. Run mmdelnodel -c first.
Explanation: The nodeset was found to contain entries for previously deleted nodes.
User Response: Use the mmdelnodel -c command to remove the deleted node entries, then reissue the command.

6027-1341 Starting force unmount of GPFS file systems.
Explanation: Progress information for the mmshutdown command.
User Response: None. Informational message only.

6027-1342 Unmount not finished after value seconds. Waiting value more seconds.
Explanation: Progress information for the mmshutdown command.
User Response: None. Informational message only.

6027-1343 Unmount not finished after value seconds.
Explanation: Progress information for the mmshutdown command.
User Response: None. Informational message only.

6027-1344 Shutting down GPFS daemons.
Explanation: Progress information for the mmshutdown command.
User Response: None. Informational message only.

6027-1345 Finished.
Explanation: Progress information for the mmshutdown command.
User Response: None. Informational message only.
6027-1347  Reserve window was not completed on nodes: nodeList. Make sure that there are available windows and run mmchconfig comm_protocol=LAPI. Use the chgcss QUERY command to check window availability.

Explanation: There are nodes that do not have reserved LAPI windows, and one of the following is true:
1. A new GPFS nodset that will use the LAPI communication protocol was being created.
2. The communication protocol of an existing nodset was being changed.
3. The communication protocol was LAPI and the GPFS daemon was being started.
4. Nodes were being added to a nodset (the mmaddnode command does not reserve LAPI windows).

A list of the nodes which do not have reserved LAPI windows is displayed.

User Response: Use the chgcss QUERY command to check window availability. Ensure there are available windows on the specified nodes and reissue the failing action.

6027-1348  Failed to release windows on nodes: nodeList Run mmchconfig comm_protocol=TCP again

Explanation: An attempt has either been made to change the communication protocol from LAPI to TCP/IP and there are still nodes with reserved LAPI windows, or to start the mmfsd daemon after an incomplete communications protocol change.

User Response: Correct any problems and reissue the mmchconfig comm_protocol=TCP command.

6027-1350  Failed to release LAPI windows from the following nodes: nodeList. Since these nodes are being deleted from the GPFS nodset, correct any problems and release the windows using the /usr/lpp/ssp/css/chgcss command.

Explanation: The mmdeletenode command with the -a or -c option failed to release LAPI windows.

User Response: Respond as directed by the error message.

6027-1351  Could not load switch partition table

Explanation: Failed to load the switch partition table.

User Response: Contact the IBM Support Center.

6027-1352  The following nodes belong to nodset nodesetName but do not have reserved LAPI windows: nodeList Before attempting to start GPFS you must successfully execute the command mmchconfig comm_protocol=LAPI -C nodestId

Explanation: The mmaddnode command was issued to add nodes to a GPFS nodset that uses the LAPI communication protocol but not all nodes (whether new or existing) were able to reserve LAPI windows.

User Response: Follow the recommended procedures in the error message.

6027-1354  A prior invocation of this command has recorded a partial completion in the file (fileName). We will restart at prior failing step (value).

Explanation: The mmcrvsd or mmcrlv command was restarted on a prior failing descriptor file.

User Response: None. Informational message only.

6027-1355  The nodes (nodeName) and (nodeName) specified for disk (disk) must be defined within the same concurrent PSSP cluster.

Explanation: An attempt had been made to create concurrent virtual shared disks and the specified nodes are either not defined in the PSSP cluster, or the specified nodes are not in the same cluster.

User Response: Specify nodes in the same PSSP cluster using the vsdnode command.

6027-1356  The same primary and backup nodes (nodeName) cannot be specified for disk (disk).

Explanation: Both the primary and backup node for a virtual shared disk are the same node.

User Response: Specify different nodes for primary and backup.

6027-1357  The nodset can not be determined. Use the -C nodestId option, or issue the command from a node that belongs to the desired nodset.

Explanation: The nodset ID was not specified on the command line and the command was issued from a node that does not belong to a GPFS nodset.

User Response: Specify the nodset ID or issue the command from a different node.
6027-1358 Unexpected line in the mmsdrfs file: line.

Explanation: mmsdrfs contains a line that is not valid.

User Response: Configuration data contained in the SDR is incorrect. If no user modifications have been made to the SDR, contact the IBM Support Center. If user modifications have been made, correct these modifications.

6027-1361 Attention: There are no available valid VFS type values for mmfs in /etc/vfs.

Explanation: An out of range number was used as the vfs number for GPFS.

User Response: The valid range is 8-32. Check /etc/vfs and remove unneeded entries.

6027-1362 -a option cannot be used if other GPFS nodesets already exist.

Explanation: The mmconfig command was invoked with the -a (add all nodes) option, but some of the nodes already belong to previously created GPFS nodesets.

User Response: Reissue the command, providing the node names in a file or in a node list.

6027-1363 nodeset nodesetName is empty.

Explanation: An attempt was made to execute a command on an empty nodeset.

User Response: Add nodes to the nodeset and reissue the command.

6027-1364 No disks specified

Explanation: There were no disks in the descriptor list or file.

User Response: Specify at least one disk on the mmcrfs command.

6027-1365 Disk diskName already exists in file system fileSystem.

Explanation: The specified disk name already belongs to another GPFS file system.

User Response: Specify a different disk, or first delete the disk from its current file system.

6027-1366 Marking the disks as available

Explanation: A GPFS file system has been successfully deleted. The process of marking the file system disks as available is beginning.

User Response: None. Informational message only.

6027-1367 Attention: Not all disks were marked as available

Explanation: The process of marking the disks as available could not be completed.

User Response: Before adding these disks to a GPFS file system, you should either reformat them, or use the -v no option on the mmcrfs or mmaddisk command.

6027-1368 sysctl failed with the following unexpected errors:

Explanation: A sysctl request to execute a command on a set of nodes returned one or more unexpected errors. The messages from sysctl are displayed following this message.

User Response: Correct the problems and reissue the command.

6027-1370 Removing old nodeset information from the deleted nodes. This is an asynchronous process.

Explanation: The nodes were successfully removed from the GPFS nodeset and a request is sent to all old nodes to clean up any GPFS nodeset-related files.

User Response: This is an informational message. The command does not wait for the cleanup to finish.

6027-1371 Propagating the changes to all affected nodes. This is an asynchronous process.

Explanation: A process is initiated to notify other nodes in the nodeset about the changes made by the command.

User Response: This is an informational message. The command does not wait for notification to finish.

6027-1373 Unexpected error from SDRChangeAttrValues. Return code: value. The SDR Gpfs object remains locked. Follow the recommended user action.

Explanation: A command which marked the Gpfs object in the SDR as busy cannot free it.

User Response: Ensure that the original command cannot complete its task and then issue the following command:

SDRChangeAttrValuesGpfsrunning_cmnd="""

6027-1374 File system fileSystem does not belong to GPFS nodeset name.

Explanation: The named file system was not found in the nodeset in which it was expected to be.
User Response: If the file system was specified as part of a GPFS command, reissue the command with a valid file system.

6027-1375 Disk descriptor name should refer to an existing virtual shared disk. Use mmcrvrsd to create the virtual shared disks and reissue the command.

Explanation: A non-virtual shared disk was given as input to either the mmcrfs, mmadddisk, or mmrpldisk command.

User Response: Create the virtual shared disks first. Then reissue the command.

6027-1377 Attention: Unknown attribute specified: name Press the ENTER key to continue.

Explanation: The mmchconfig command received an unknown attribute.

User Response: Unless directed otherwise by the IBM Support Center, press any key to bypass this attribute.

6027-1378 Incorrect record found in the mmsdrfs file (code value):

Explanation: A line that is not valid was detected in the mmsdrfs file in the SDR.

User Response: Configuration data contained in the SDR is incorrect. If no user modifications have been made to the SDR, contact the IBM Support Center. If user modifications have been made, correct these modifications.

6027-1379 command is not valid for single-node GPFS nodesets.

Explanation: The specified command was issued for a single-node GPFS nodeset, but the command is not valid on a single-node nodeset.

User Response: Convert the single-node nodeset to a multi-node GPFS nodeset by deleting the single-node nodeset first, and then creating a multi-node nodeset. Then reissue the failing command.

6027-1380 Incorrect value for GPFS nodeset id: name

Explanation: A GPFS nodeset id that is not valid was specified on the command line. GPFS nodeset ids must be a maximum of 8 alphanumeric characters long and cannot contain a period, or certain keywords: “0”, “AVAIL”, “VSD”, etc...

User Response: Specify a valid GPFS nodeset id.

6027-1381 GPFS nodeset name does not exist.

Explanation: The specified nodeset is not found in the SDR file mmsdrfs.

User Response: None. Informational message only.

6027-1382 Node name does not belong to any GPFS nodeset.

Explanation: The specified node was not found in any GPFS nodeset.

User Response: None. Informational message only.

6027-1383 There are no known GPFS nodesets.

Explanation: The command could not find any GPFS nodesets in the mmsdrfs file.

User Response: None. Informational message only.

6027-1384 GPFS nodeset name already exists.

Explanation: The -C option on the mmconfig command was used to request that a specific identifier be assigned to the new nodeset, however there already is a GPFS nodeset with that name.

User Response: Specify a different nodeset id, or allow the system to generate one. Use the mmisnode command to display all existing GPFS nodesets.

6027-1385 Error encountered while processing command. Return code value.

Explanation: A GPFS administration command (mm...) encountered an unexpected error from the specified command.

User Response: Check any preceding messages and correct the problem. Ensure that affected nodes are available and all authorization requirements are met.

6027-1386 Unexpected value for Gpfs object: value.

Explanation: A function received a value that is not allowed for the Gpfs SDR object.

User Response: Perform problem determination.

6027-1388 File system fileSystem does not belong to any GPFS nodeset.

Explanation: The file system was not found in any of the GPFS nodesets.

User Response: If the file system was specified as part of a GPFS command, reissue the command with a valid file system.
6027-1390  Node nodeName does not belong to nodeset name, or is represented multiple times on the command line.

Explanation: Nodes which are not valid were specified.

User Response: Verify the list of nodes. All specified nodes must belong to the same GPFS nodeset and a node can be specified only once.

6027-1393 Incorrect node designation specified: type

Explanation: A node designation that is not valid was specified. Valid values are client or manager.

User Response: Correct the command line and reissue the command.

6027-1394 nodeList must be specified with attribute name.

Explanation: An attempt has been made to change a configuration attribute which requires a node list.

User Response: Specify the node list and reissue the command.

6027-1397 The communication protocol change is not complete

Explanation: The mmchconfig command could not successfully change the communication protocol.

User Response: Check the preceding messages, correct the problems, and reissue the mmchconfig command.

6027-1450 Cannot allocate storage.

Explanation: Sufficient memory cannot be allocated to execute the mmdefragfs command.

User Response: Increase the available memory.

6027-1500 Open of device failed with error:

Explanation: The open of a device failed. Operation of the file system will continue unless this disk is needed for an operation. Often, in replicated disk situations, it will not be needed.

User Response: Take needed repair action on the specified disk or the path to the specified disk.

6027-1501 Volume label of disk name is name, should be uid.

Explanation: The UID in the disk descriptor does not match the expected value from the file system descriptor. This could occur if a disk was overwriten by another application or if IBM Virtual Shared Disk incorrectly identified the disk.

User Response: Check the disk configuration.

6027-1502 Volume label of disk diskName is corrupt.

Explanation: The disk descriptor has a bad magic number, version, or checksum. This could occur if a disk was overwriten by another application or if IBM Virtual Shared Disk incorrectly identified the disk.

User Response: Check the disk configuration.

6027-1503 Completed adding disks to file system name.

Explanation: The mmaddisk command successfully completed.

User Response: None. Informational message only.

6027-1530 Attention: parameter is set to value.

Explanation: The configuration parameter is temporarily assigned a new value.

User Response: Check the mmfs.cfg file. Using the mmchconfig command, set a valid value for the configuration parameter.

6027-1531 parameter value.

Explanation: The configuration parameter was changed from the default value.

User Response: Check the mmfs.cfg file.

6027-1532 Attention: parameter (value) is not valid in conjunction with parameter (value).

Explanation: A configuration parameter has a value that is not valid in relation to some other parameter. This can also happen when the default value for some parameter is not sufficiently large for the new, user set value of a related parameter.

User Response: Check mmfs.cfg file.

6027-1533 parameter cannot be set dynamically.

Explanation: The tsctl command encountered a configuration parameter which cannot be set dynamically.

User Response: Check the mmchconfig command arguments. If the parameter must be changed, use the mmshutdown mmconfig and mmstartup commands.
6027-1534  **parameter must have a value.**

**Explanation:**  The `tsctl` command encountered a configuration parameter that did not have a specified value.

**User Response:**  Check the `mmchconfig` command arguments.

---

6027-1535  **Unknown config name:** parameter

**Explanation:**  The `tsctl` command encountered an unknown configuration parameter.

**User Response:**  Check the `mmchconfig` command arguments.

---

6027-1536  **parameter must be set using the tschpool command.**

**Explanation:**  The `tsctl` command encountered a configuration parameter that must be set using the `tschpool` command.

**User Response:**  Check the `mmchconfig` command arguments.

---

6027-1537  **Connect failed to ipAddress: reason**

**Explanation:**  An attempt to connect sockets between nodes failed.

**User Response:**  Check the reason listed and the connection to the indicated IP address.

---

6027-1538  **Connect in progress to ipAddress**

**Explanation:**  Connecting sockets between nodes.

**User Response:**  None. Informational message only.

---

6027-1539  **Connect progress select failed to ipAddress: reason**

**Explanation:**  An attempt to connect sockets between nodes failed.

**User Response:**  Check the reason listed and the connection to the indicated IP address.

---

6027-1540  **Try and buy license has expired!**

**Explanation:**  Self explanatory.

**User Response:**  Purchase a GPFS license to continue using GPFS.

---

6027-1541  **Try and buy license expires in number days!**

**Explanation:**  Self explanatory.

**User Response:**  When the Try and Buy license expires you will need to purchase a GPFS license to continue using GPFS.

---

6027-1542  **Old shared memory exists but it is not valid or cleanable.**

**Explanation:**  A new GPFS daemon started and found existing shared segments. The contents were not recognizable, so the GPFS daemon could not clean them up.

**User Response:**
1. Stop the GPFS daemon from trying to start by issuing the `mmshutdown` command for the nodes having the problem.
2. Find the owner of the shared segments with keys from 0x9283a0ca through 0x9283a0d1. If a non-GPFS program owns these segments then GPFS cannot run on this node.
3. If these segments are left over from a previous GPFS daemon:
   a. Remove them by issuing:
      ```bash
      ipcrm -m shared_memory_id
      ```
   b. Restart GPFS by issuing the `mmstartup` command on the affected nodes.

---

6027-1555  **Mount point and device name cannot be equal: name**

**Explanation:**  The specified mount point is the same as the absolute device name.

**User Response:**  Enter a new device name or absolute mount point pathname.

---

6027-1556  **Interrupt received.**

**Explanation:**  A GPFS administration command received an interrupt.

**User Response:**  None. Informational message only.

---

6027-1557  **Nodeset name already uses communication protocol communicationProtocol**

**Explanation:**  The requested communication protocol is already in effect.

**User Response:**  None. Informational message only.

---

6027-1559  **The -i option failed. Changes will take effect after GPFS is restarted.**

**Explanation:**  The -i option on the `mmchconfig` command failed. The changes were processed successfully but will take effect only after the GPFS daemons are restarted.

**User Response:**  Check for additional error messages. Correct the problem and reissue the command.
6027-1560  **This GPFS nodeset contains file systems. You cannot delete the last node.**

**Explanation:** An attempt has been made to delete a GPFS nodeset that still has one or more file systems associated with it.

**User Response:** Before deleting the last node of a GPFS nodeset, delete all file systems that are associated with it, or move the file systems to other GPFS nodesets.

6027-1561  **Attention: Failed to remove node-specific changes.**

**Explanation:** The internal **mmfixcfg** routine failed to remove node-specific changes, if any, from the configuration file **mmfs.cfg**. This is of consequence only if there were such changes as a result of an **mmchconfig** command for some of the nodes being deleted and these nodes are later added back. This error occurs if there is something wrong with the format of the **mmfs.cfg** file.

**User Response:** If you add the nodes back later, ensure that the **mmfs.cfg** parameters for the nodes are set as desired.

6027-1562  **name** command cannot be executed. Either none of the nodes in the nodeset are reachable, or GPFS is down on all of the nodes.

**Explanation:** The command which was issued needed to perform an operation on a remote node, but none of the nodes that belong to the affected nodeset were reachable, or GPFS was not accepting commands on any of the nodes.

**User Response:** Ensure that the affected nodes are available and all authorization requirements met. Correct any problems and reissue the command.

6027-1563  **Attention: The file system may no longer be properly balanced.**

**Explanation:** The restripe phase of the **mmadddisk** or **mmdeldisk** command failed.

**User Response:** Determine the cause of the failure and run the **mmrestripefs** command.

6027-1564  **Attention: Failed to propagate changes to all currently active nodes.**

**Explanation:** The changes could not be propagated to all currently active nodes.

**User Response:** The changes will become visible after the nodes are restarted.

6027-1565  **disk not found in file system** fileSystem.

**Explanation:** A disk specified for deletion or replacement does not exist.

**User Response:** Specify existing disks for the indicated file system.

6027-1567  **fileSystem** is already in nodeset name

**Explanation:** An attempt has been made to move a file system but it already is in the specified nodeset.

**User Response:** None. Informational message only.

6027-1568  **Command failed. Only** parameterList were changed.

**Explanation:** The **mmchfs** command failed while making the requested changes. Any changes to the attributes in the indicated parameter list were successfully completed. No other file system attributes were changed.

**User Response:** Reissue the command if you want to change additional attributes of the file system. Changes can be undone by issuing the **mmchfs** command with the original value for the affected attribute.

6027-1569  **The volume group** volumeName **exists, but partition information cannot be determined. Perhaps it needs to be varied on?**

**Explanation:** The **mmvsdhelper** subroutine has successfully found the requested volume group, but attempts to get the free physical partitions with the **lsvg** command are failing.

**User Response:** Ensure volume group is varied on with the **varyonvg** command.

6027-1571  **Unexpected failure executing** command. Check the preceding messages, if any. Check /etc/sysctl.mmcmd.acl, restart sysctl on node, or run kinit on this node.

**Explanation:** Sysctl could not execute the named command.

**User Response:** Check the preceding messages, if any. Common reasons for such failures are an improperly-set **sysctl** environment and lack of properly-set **sysctl** authorizations. Verify that **sysctl** is properly set on all nodes and on the control workstation, and that all nodes and the control workstation have adequate permissions. Authorization for the GPFS administration (mm...) commands is controlled by the /etc/sysctl.mmcmd.acl file on each node and on the control workstation. Depending on the installation’s security policies, a Kerberos ticket may also be needed locally.
Pagepool (value) must be >= maxblocksize (value) x 5 + 640K.

Explanation: An attempt was made to change the maxblocksize configuration attribute, but the current value of the pagepool attribute on at least one node is not sufficiently large.

User Response: Increase the value of pagepool or decrease the value of maxblocksize.

Command completed: No changes made.

Explanation: Self-explanatory.

User Response: None. Informational message only.

Command affects nodesets that run older releases of the GPFS code. This command contains options, or requires services that are not available in prior releases. Run the command from a node that belongs to nodeset name.

Explanation: A command was issued that affects a nodeset running an older release of GPFS and some of the processing takes place on one or more of the affected nodes.

User Response: Run the command from a node that has the older version of GPFS. Use the mmisnode -C command to display the members of a nodeset. If the command is not available in the older version, you cannot execute it.

File fileName does not contain node names.

Explanation: The specified file does not contain valid node names.

User Response: Node names must be specified one per line. The name localhost and lines that start with '#' character are ignored.

Failed to release windows on nodes: nodeList. Run mmchconfig comm_protocol=TCP again, or run mmdelnodel -c

Explanation: A nodeset contains entries for previously deleted nodes and the LAPI windows for one or more of these nodes could not be released.

User Response: Correct any problems and run the mmchconfig comm_protocol=TCP command again, or run the mmdelnodel -c command to remove from the nodeset all entries for previously-deleted nodes. After that, use the following command to release the LAPI windows on each of the failing nodes:

/usr/lpp/ssp/css/chgcss -l css0 -a window=cmd:RELEASE/id:nodesetID

Failed to obtain Kerberos credentials; ksvr tgt name command rc=value. Continuing.

Explanation: An attempt to obtain SPbgAdm Kerberos credentials has failed. Processing continues, but there may be an authentication failure later on.

User Response: Check the preceding messages. Ensure that _PRINCIPLE root.SPbgAdm is defined in the file /etc/sysctl.mmcmd.acl. If the problem persists, go to the [Parallel System Support Programs for AIX Diagnosis Guide](index.html) and search on diagnosing per node key management (PNKM) problems. Follow the problem determination and repair actions specified.

Command commandName is currently executing and has the Gpfs object locked. If the Gpfs object remains locked for a prolonged time, follow the recommended user action.

Explanation: Some other command is executing and has locked the Gpfs object.

User Response: Wait for the other process to finish. If the original command cannot complete its task, issue the following command to release the lock:

SDRChangeAttrValues GPFS running_cmnd="".

Unknown GPFS execution environment: value

Explanation: A GPFS administration (mm...) command is asked to operate on an unknown GPFS cluster type. Examples of supported GPFS cluster types are sp, hacmp, rpd, and lc.

User Response: Verify that the correct level of GPFS is installed on the node. If this is a cluster environment, ensure the node has been defined as a member of the GPFS cluster with the help of the mmcrcluster or the maddcluster command. This message may also be generated if there is corruption in the GPFS system files. Perform problem determination and contact the IBM Support Center.

nodeName cannot be reached.

Explanation: A command needs to issue a remote function on a particular node but the node is not reachable.

User Response: Determine why the node is unreachable, correct the problem, and reissue the command.
6027-1591 Attention: Unable to retrieve GPFS cluster files from node nodeName.

Explanation: A command could not retrieve the GPFS cluster files from a particular node. An attempt will be made to retrieve the GPFS cluster files from a backup node.

User Response: None. Informational message only.

6027-1592 Unable to retrieve GPFS cluster files from node nodeName.

Explanation: A command could not retrieve the GPFS cluster files from a particular node.

User Response: Correct the problem and reissue the command.

6027-1594 Run the command command until successful.

Explanation: The command could not complete normally. The GPFS cluster data may be left in a state that precludes normal operation until the problem is corrected.

User Response: Check the preceding messages, correct the problems, and issue the specified command until it completes successfully.

6027-1596 The same node was specified for both the primary and the secondary server.

Explanation: A command would have caused the primary and secondary GPFS system data repository nodes to be the same.

User Response: Specify a different primary or secondary node.

6027-1597 Node nodeName is specified more than once.

Explanation: The same node appears more than once on the command line or in the input file for the command.

User Response: All specified nodes must be unique. Note that even though two node names may appear different on the command line or in the input file, they may still refer to the same node.

6027-1598 Node nodeName was not added to the cluster. The node appears to already belong to a GPFS cluster.

Explanation: A GPFS cluster command found that a node to be added to a cluster already has GPFS cluster files on it.

User Response: Use the mmlscluster command to verify that the node is in the correct cluster. If it is not, follow the procedure in "Node cannot be added to the GPFS cluster" on page 27.

6027-1599 The level of GPFS on node nodeName does not support type clusters.

Explanation: A GPFS cluster command found that the level of the GPFS code on a node to be added to a cluster does not support type clusters.

User Response: Install the correct level of GPFS.

6027-1600 Make sure that the following nodes are available: nodeList

Explanation: A GPFS command was unable to complete because nodes critical for the success of the operation were not reachable or the command was interrupted.

User Response: This message will normally be followed by a message telling you which command to issue as soon as the problem is corrected and the specified nodes become available.

6027-1602 nodeName is not a member of this cluster.

Explanation: A command found that the specified node is not a member of the GPFS cluster.

User Response: Correct the input or add the node to the GPFS cluster and reissue the command.

6027-1603 The following nodes could not be added to the GPFS cluster: nodeList. Correct the problems and use mmcrcluster or mmaddcluster to add these nodes to the cluster.

Explanation: The mmcrcluster or the mmaddcluster command was unable to add the listed nodes to a GPFS cluster.

User Response: Correct the problems that prevented the nodes from being added and then reissue the mmcrcluster or mmaddcluster command as appropriate.

6027-1604 The name option is not allowed for nodesets that have more than 2 nodes.

Explanation: A single-node quorum algorithm is requested for a nodeset with more than two nodes.

User Response: Reissue the command without this option.
6027-1608  Node nodeName still appears as a previously deleted member of nodeset nodesetName. Run mmdelnodelc-C nodesetId before deleting the node from the GPFS cluster.

Explanation: The specified node was deleted from a nodeset without specifying the -c option on the mmdelnodel command.

User Response: Issue the mmdelnodel -c command for the specified nodeset and then reissue the mmdelcluster command to remove the node from the cluster.

6027-1610  Disk disk is the only disk in file system fileSystem. You cannot replace a disk when it is the only remaining disk in the file system.

Explanation: The mmrpldisk command was issued, but there is only one disk in the file system.

User Response: Add a second disk and reissue the command.

6027-1611  This command must be executed on a node that belongs to nodeset name.

Explanation: The nature of the change requested requires that the command be run on a node that belongs to the affected nodeset.

User Response: Issue the command from a node that belongs to the specified nodeset. Issue the mmlsnode -C command to display the members of a GPFS nodeset.

6027-1613  WCOLL (working collective) environment variable not set.

Explanation: The mmdsh command is invoked without explicitly specifying the nodes on which the command is to run, by means of the -F or -L options, and the WCOLL environment variable has not been set.

User Response: Change the invocation of the mmdsh command to use the -F or -L flags, or set the WCOLL environment variable before invoking the mmdsh command.

6027-1614  Cannot open file fileName. Error string was: errorString.

Explanation: The mmdsh command was unable to successfully open a file.

User Response: Determine why the file could not be opened and correct the problem.

6027-1615  nodeName rsh process had return code value.

Explanation: A child rsh process created by the mmdsh command completed with a non-zero return code.

User Response: Determine why the child rsh process failed and correct the problem.

6027-1616  Caught SIG signal - terminating the child processes.

Explanation: The mmdsh command has received a signal causing it to terminate.

User Response: Determine what caused the signal and correct the problem.

6027-1617  There are no available nodes on which to run the command.

Explanation: The mmdsh command found that there are no available nodes on which to run the specified command. Although nodes were specified, none of the nodes were reachable.

User Response: Determine why the specified nodes were not available and correct the problem.

6027-1618  Unable to pipe. Error string was: errorString.

Explanation: The mmdsh command attempted to open a pipe but the pipe command failed.

User Response: Determine why the call to pipe failed and correct the problem.

6027-1619  Unable to redirect outputStream. Error string was: string.

Explanation: The mmdsh command attempted to redirect an output stream using open but the open command failed.

User Response: Determine why the call to open failed and correct the problem.

6027-1623  -a option cannot be used if -V no is specified.

Explanation: The mmconfig command was invoked with both the -a (add all nodes) option and the -V no (do not monitor virtual shared disks) option.

User Response: Reissue the command providing the node names in a file or in a node list.
**6027-1625  Option cannot be used with attribute name**

**Explanation:** An attempt was made to change a configuration attribute and the change was requested take effect immediately (-i or -I option). However, the specified attribute does not allow the operation.

**User Response:** If the change must be made now, leave off the -i or -I option. Then recycle the nodes to pick up the new value.

**6027-1626  Command is not supported in the type environment.**

**Explanation:** A GPFS administration (mm...) command is not supported in the specified environment.

**User Response:** Verify if the task is needed in this environment, and if it is use a different command.

**6027-1627  Command failed on nodes: nodeList.**

**Explanation:** A GPFS command was unable to complete successfully on the listed nodes.

**User Response:** Correct the problems and reissue the command.

**6027-1628  Cannot determine basic environment information. Not enough nodes are available.**

**Explanation:** The mmchcluster command was unable to retrieve the GPFS cluster data files. Usually, this is due to too few nodes being available.

**User Response:** Correct any problems and ensure that as many of the nodes in the cluster are available as possible. Reissue the command. If the problem persists, record the above information and contact the IBM Support Center.

**6027-1629  Error retrieving data from nodeName to nodeName.**

**Explanation:** A GPFS command is unable to correctly copy data (checksum error).

**User Response:** Correct any communication problems and reissue the command.

**6027-1630  The GPFS cluster data on nodeName is back level.**

**Explanation:** A GPFS command attempted to commit changes to the GPFS cluster data repository, but the data in the repository was already at a higher level. This can happen if the GPFS system files were altered outside the GPFS environment, or if the mmchcluster command did not complete successfully.

**User Response:** Correct any problems and reissue the command. If the problem persists, issue the mmrefresh -f -a command.

**6027-1631  The commit process failed.**

**Explanation:** A GPFS administration (mm...) command cannot commit its changes to the GPFS cluster data repository.

**User Response:** Check the preceding messages, correct the problem, and reissue the command. If the problem persists, perform problem determination and contact the IBM Support Center.

**6027-1632  The GPFS cluster data on nodeName is different than the data on nodeName.**

**Explanation:** The GPFS cluster data on the primary repository node is different than the data on the backup repository node. This can happen if the GPFS cluster files were altered outside the GPFS environment or if the mmchcluster command did not complete successfully.

**User Response:** Correct any problems and issue the mmrefresh -f -a command. If the problem persists, perform problem determination and contact the IBM Support Center.

**6027-1633  Failed to create a backup copy of the GPFS cluster data on nodeName.**

**Explanation:** Commit could not create a correct copy of the GPFS cluster data.

**User Response:** Check the preceding messages, correct any problems, and reissue the command. If the problem persists, perform problem determination and contact the IBM Support Center.

**6027-1634  The GPFS cluster data repository node nodeName cannot be removed.**

**Explanation:** An attempt was made to delete a GPFS cluster data repository node.

**User Response:** You cannot remove a cluster data repository node unless all nodes in the GPFS cluster are being deleted. Before deleting a repository node, you must use the mmchcluster command to transfer its function to another node in the GPFS cluster.

**6027-1635  Node nodeName is an active member of nodeset name. The node cannot be removed from the GPFS cluster.**

**Explanation:** An attempt was made to delete an active node from the GPFS cluster.

**User Response:** Use the mmdelnode command with the -c option to delete the node from the nodeset.
6027-1636  Error found while checking disk descriptor: descriptor

Explanation: A disk descriptor was found to be unsatisfactory in some way.

User Response: Check the preceding messages, if any, and correct the condition that caused the disk descriptor to be rejected.

6027-1637  Command quitting. None of the specified nodes are valid.

Explanation: A GPFS command found that none of the specified nodes passed the required tests.

User Response: Determine why the nodes were not accepted, fix the problems, and reissue the command.

6027-1638  Command: There are no unassigned nodes in the cluster.

Explanation: A GPFS command in a cluster environment needs unassigned nodes, but found there are none.

User Response: Verify whether there are any unassigned nodes in the cluster. If there are none, either add more nodes to the cluster using the `mmaddcluster` command, or delete some nodes from the nodesets using the `mmdelnode` command, and then reissue the command.

6027-1639  Command failed. Check previous error messages to determine cause.

Explanation: A GPFS command failed due to previously-reported errors.

User Response: Check the previous error messages, fix the problems, and then reissue the command.

6027-1640  name option is not supported in the type environment.

Explanation: An option was specified on a GPFS command that is not compatible with the specified environment.

User Response: Reissue the command after having eliminated any options that are not compatible with the specified environment.

6027-1642  command: Starting GPFS ...

Explanation: Progress information for the `mmstartup` command.

User Response: None. Informational message only.

6027-1643  Unable to set fence id for volume group vgName (logical volume lvName).

Explanation: A GPFS command attempted to set the fence id for a disk, but the operation did not complete successfully.

User Response: Determine why the disk’s fence id cannot be set, fix the problem, and reissue the command.

6027-1644  Volume group vgName (logical volume lvName) was not varied online.

Explanation: A GPFS command attempted to vary a disk online, but the operation did not complete successfully.

User Response: Determine why the disk could not be varied online, fix the problem, and reissue the command.

6027-1645  Node nodeName is fenced out from logical volume lvName.

Explanation: A GPFS command attempted to access a logical volume, but found that the node attempting the operation was fenced out from the disk.

User Response: Check whether there is a valid reason why the node should be fenced out from the disk. If there is no such reason, use the `fence_node_in` script to allow the node to access the disk, then reissue the command.

6027-1646  Not all nodes are configured to use adapter name.

Explanation: The `-a` option was specified on the `mmconfig` command, but there is at least one node not configured to use the specified switch adapter.

User Response: Configure all nodes and reissue the command. When the `-a` option is specified in a PSSP environment, `mmconfig` first attempts to configure the nodeset over the ml0 switch adapter. If ml0 is not present, the command tries to use css0. If it is not possible to configure all nodes for one of these adapters, you cannot use the `-a` option and must specify the adapters explicitly using the `mmconfig -n` command.

6027-1647  LAPI is not supported over adapter name.

Explanation: The LAPI communications protocol was requested, but at least one of the nodes in the nodeset is using the specified adapter.

User Response: Specify the TCP communications protocol or reconfigure the nodeset over an acceptable network.
6027-1648  GPFS was unable to obtain a lock from node nodeName.
Explanation:  GPFS failed in its attempt to get a lock from another node in the nodeset.
User Response:  Verify that the reported node is reachable. Check previous error messages, if any. Fix the problems and then reissue the command.

6027-1661  Failed while processing disk descriptor descriptor on node nodeName.
Explanation:  A disk descriptor was found to be unsatisfactory in some way.
User Response:  Check the preceding messages, if any, and correct the condition that caused the disk descriptor to be rejected.

6027-1662  Disk descriptor descriptor refers to an existing NSD name.
Explanation:  The specified disk descriptor refers to an existing NSD.
User Response:  Specify another disk that is not an existing NSD.

6027-1663  Disk descriptor descriptor should refer to an existing NSD. Use mmcrnsd to create the NSD.
Explanation:  An NSD disk given as input is not known to GPFS.
User Response:  Create the NSD. Then rerun the command.

6027-1664  command: Processing node nodeName
Explanation:  Progress information for mmcrcluster command.
User Response:  None. Informational message only.

6027-1665  Issue the command from a node that remains in the cluster.
Explanation:  The nature of the requested change requires the command be issued from a node that will remain in the cluster.
User Response:  Run the command from a node that will remain in the cluster.

6027-1666  No disks were found.
Explanation:  A command searched for disks but found none.
User Response:  If NSD disks are desired, create some using the mmcrnsd command.

6027-1670  Incorrect or missing remote shell command: name
Explanation:  The specified remote command does not exist or is not executable.
User Response:  Specify a valid command.

6027-1671  Incorrect or missing remote file copy command: name
Explanation:  The specified remote command does not exist or is not executable.
User Response:  Specify a valid command.

6027-1672  option value parameter must be an absolute path name.
Explanation:  The mount point does not begin with '/'.
User Response:  Specify the full path for the mount point.

6027-1674  Cluster type type is not valid in name environment.
Explanation:  The specified cluster type is not supported in the given environment.
User Response:  Specify a valid command.

6027-1675  Command: Initializing needed RSCT subsystems.
Explanation:  Progress information for the mmcrcluster command.
User Response:  None. Informational message only.

6027-1677  Disk diskName not found.
Explanation:  The specified disk was not found.
User Response:  Specify an existing disk and reissue the command.

6027-1681  Node nodeName is being used as a primary or backup NSD server.
Explanation:  The specified node is defined as a server node for some disk.
User Response:  If you are trying to delete the node from a nodeset or from the GPFS cluster, you must either delete the disk or define another node as its server.

6027-1685  Processing continues without lock protection.
Explanation:  The command will continue processing although it was not able to obtain the lock that prevents other GPFS commands from running simultaneously.
User Response: Ensure that no other GPFS command is running. See the command documentation for additional details.

6027-1688 Command was unable to obtain the lock for the GPFS system data. Unable to reach the holder of the lock nodeName. Check the preceding messages, if any. Follow the procedure outlined in the GPFS Problem Determination Guide.

Explanation: A command requires the lock for the GPFS system data but was not able to obtain it.

User Response: Check the preceding messages, if any. Follow the procedure in the GPFS Problem Determination Guide for what to do when the GPFS system data is locked. Then reissue the command.

6027-1689 vpath disk diskName is not recognized as an IBM SDD device.

Explanation: The mmvsdhelper command found that the specified disk is a vpath disk, but it is not recognized as an IBM SDD device.

User Response: Ensure the disk is configured as an IBM SDD device. Then reissue the command.

6027-1698 Disk diskName belongs to vpath vpathName which is part of volume group vgName.

Explanation: The mmvsdhelper command found that the specified disk belongs to a vpath device which is part of a volume group.

User Response: Reissue the command using a different disk which does not belong to a vpath device that is part of a volume group.

6027-1699 Unable to obtain the name of the RSCT peer domain. The domain may be offline, or the node may be offline in the domain.

Explanation: The RSCT peer domain was not operational when a node was being added to a GPFS cluster, or the GPFS mmfsd daemon was starting in the RSCT peer domain environment.

User Response: Start RSCT peer domain services and reissue the failing command.

6027-1700 LoadLapiLib: Fail to load LAPI library. functionName not found. Changing communication protocol to TCP.

Explanation: The GPFS daemon failed to load liblapi_r.a dynamically.

User Response: Verify the installation of liblapi_r.a.

6027-1701 mmfsd waiting to connect to mmspsecserver. Setting up to retry every number seconds for number minutes.

Explanation: The GPFS daemon failed to establish a connection with the mmspsecserver process.

User Response: None. Informational message only.

6027-1702 Process pid failed at functionName call, socket socketName, errno value.

Explanation: Either the mmfsd daemon or the mmspsecserver process failed to create or set up the communication socket between them.

User Response: Determine the reason for the error.

6027-1703 The processName process encountered error: errorString.

Explanation: Either the mmfsd daemon or the mmspsecserver called the error log routine to log an incident.

User Response: None. Informational message only.

6027-1704 mmspsecserver (pid number) ready for service.

Explanation: The mmspsecserver process has successfully created all of the service threads necessary for mmfsd.

User Response: None. Informational message only.

6027-1705 command incorrect number of connections (number), exiting ....

Explanation: The mmspsecserver process is called with an incorrect number of connections. This will only happen when mmspsecserver is executed as an independent program.

User Response: Retry with a valid number of connections.

6027-1706 mmspsecserver: parent program is not mmfsd, exiting ...

Explanation: The mmspsecserver process was executed from a program other than mmfsd.

User Response: None. Informational message only.

6027-1707 mmfsd connected to mmspsecserver.

Explanation: The mmfsd daemon has successfully connected to mmspsecserver through the communications socket.

User Response: None. Informational message only.
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</tr>
</thead>
<tbody>
<tr>
<td>6027-1708</td>
<td>The mmfsd daemon failed to fork mmspsecserver. Failure reason</td>
<td>The mmfsd daemon failed to fork a child process.</td>
<td>Check the GPFS installation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>explanation.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6027-1709</td>
<td>Accepted and connected to ipAddress.</td>
<td>The local mmfsd daemon has successfully accepted and connected to a remote daemon.</td>
<td>None. Informational message only.</td>
<td></td>
</tr>
<tr>
<td>6027-1710</td>
<td>Connecting to ipAddress.</td>
<td>The local mmfsd daemon has started a connection request to a remote daemon.</td>
<td>None. Informational message only.</td>
<td></td>
</tr>
<tr>
<td>6027-1711</td>
<td>Connected to ipAddress.</td>
<td>The local mmfsd daemon has successfully connected to a remote daemon.</td>
<td>None. Informational message only.</td>
<td></td>
</tr>
<tr>
<td>6027-1712</td>
<td>Unexpected zero bytes received from name. Continuing.</td>
<td>This is an informational message. A socket read resulted in zero bytes being read.</td>
<td>If this happens frequently, check IP connections.</td>
<td></td>
</tr>
<tr>
<td>6027-1713</td>
<td>spsec_get_ts_authent failed: unable to determine currently active</td>
<td>The spsec_get_ts_authent subroutine failed with return code -1.</td>
<td>Check configuration file:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>authentication methods.</td>
<td></td>
<td>/spdata/sysctl/spsec/auth/methos</td>
<td></td>
</tr>
<tr>
<td>6027-1714</td>
<td>get_client_credentials failed: use authenticationMethod authentication method</td>
<td>The make_credentials subroutine failed in get_client_credentials with return code secFailure and DCE is an active authentication method.</td>
<td>Check DCE running status.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>instead.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6027-1715</td>
<td>EINVAL trap from connect call to ipAddress (socket name)</td>
<td>The connect call back to the requesting node failed.</td>
<td>This is caused by a bug in AIX socket support. Upgrade AIX kernel and TCP client support.</td>
<td></td>
</tr>
<tr>
<td>6027-1716</td>
<td>Close connection to ipAddress.</td>
<td>Connection socket closed.</td>
<td>None. Informational message only.</td>
<td></td>
</tr>
<tr>
<td>6027-1717</td>
<td>Accepted and connected (Security Status: Authenticated) to ipAddress</td>
<td>An authenticated connection to the stated IP address was obtained.</td>
<td>None. Informational message only.</td>
<td></td>
</tr>
<tr>
<td>6027-1718</td>
<td>My authent method</td>
<td>GPFS has detected a security protocol mismatch for the stated IP address. The connection will be shut down.</td>
<td>None. Informational message only.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>localAuthenticationMethod, remote [ipAddress] remoteAuthenticationMethod</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6027-1719</td>
<td>Error occurred in mutual authentication protocol with ipAddress,</td>
<td>GPFS detected an error while authenticating the connection with the stated IP address. The connection will be shut down.</td>
<td>None. Informational message only.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>reason = remote client failed to authenticate this daemon</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6027-1720</td>
<td>Accepted and connected (Security Status: Unauthenticated) to ipAddress</td>
<td>An unauthenticated connection to the stated IP address was obtained.</td>
<td>None. Informational message only.</td>
<td></td>
</tr>
<tr>
<td>6027-1721</td>
<td>LAPI communication protocol is not available on this platform.</td>
<td>LAPI was chosen as the communication protocol for this platform.</td>
<td>Change configuration to TCP protocol.</td>
<td></td>
</tr>
</tbody>
</table>
6027-1800  IO prohibited on NSD name because SCSI patch or SCSI generic device not available and a backup server is defined.

Explanation: The SCSI generic device has not been configured in the kernel or the SCSI reservation/reset has not been installed.

User Response: Configure the SCSI Generic device or apply the SCSI reservation patch to the kernel, rebuild the kernel and reboot.

6027-1802  command failed.

Explanation: No arguments or incorrect arguments were passed to the tsnstdreset command.

User Response: Run the command with correct arguments.

6027-1803  Global NSD disk, name, not found.

Explanation: A client tried to open a SAN-attached NSD disk but a scan of all disks failed to find that NSD.

User Response: Ensure the SAN-attached disk is available on every node that references it.

6027-1804  I/O to NSD disk, name, fails. No such NSD locally found.

Explanation: A server tried to perform I/O on an NSD disk but a scan of all disks failed to find that NSD.

User Response: Ensure the NSD disk is accessible to the client. If necessary, break a reservation.

6027-1850  Successfully subscribed to adapter group

Explanation: GPFS has successfully subscribed to the adapter group.

User Response: None. Informational message only.

6027-1851  Check your network adapter

Explanation: GPFS could not subscribe to the adapter group after waiting five minutes.

User Response: Check your network.

6027-1852  Adapter adapter is down. Wait for number sec.

Explanation: The GPFS network is down.

User Response: None. Retries will be attempted every five seconds for a total of five minutes.

6027-1853  Waiting for adapter adapter group subscription

Explanation: GPFS could not subscribe to the adapter group.

User Response: None. Retries will be attempted every five seconds for a total of five minutes.

6027-1857  Some disks are fenced out. Node waiting for its partner to join. If partner has gone for good, issue the mmclearfence command to reactivate this node.

Explanation: If useSingleNodeQuorum is set, a node cannot mount in SINGLESTATE if any of the disks specified in that file system are fenced. The thread doing the mount command goes to wait state until the partner joins.

User Response: Determine why the partner node is down. If that partner is gone for good, run the mmclearfence command to reactivate the waiting node.

6027-1858  Attention: two-node nodeset proceeding without adapter adapter group subscription

Explanation: useSingleNodeQuorum is set and GPFS cannot subscribe to the communication adapter group.

User Response: Check the network adapter if it is going to run with only two nodes.

6027-1859  Communication adapter is down in a two-node nodeset: I was chosen to shutdown.

Explanation: In a two-node nodeset, GPFS received a local adapter failure notification from Group Services.

User Response: None. The node which first receives a local adapter failure event will initiate recovery protocol and force the other node to exit.

6027-1860  Rejected node join protocol, unable to subscribe to the adapter group.

Explanation: In single-node quorum mode, a node was unable to join a GPFS nodeset because GPFS was unable to subscribe to an adapter group.

User Response: Check network adapter. When running in single-node quorum mode, GPFS must subscribe to an adapter group before a second node may join the nodeset.
6027-1861  Local adapter failed, initiate adapter down proposal.

Explanation:  In a two-node nodeset, GPFS detected that the local adapter has failed.

User Response:  Check the network adapter. The node which initiated the adapter down protocol will survive on the successful completion of the protocol, and the other will exit.

6027-1862  Local RVSD failed. Shutting down the daemon.

Explanation:  RVSD has failed on the local node of a two-node PSSP cluster using single-node quorum.

User Response:  See the [Parallel System Support Programs for AIX: Diagnosis Guide](https://www.ibm.com) and search for diagnosing Group Services problems and diagnosing IBM Virtual Shared Disk problems.

6027-1863  The adapter name group dissolved, wait for RVSD events.

Explanation:  An adapter group has dissolved in a two-node PSSP cluster using single-node quorum.

User Response:  None. The RVSD group membership will decide which node remains active.

6027-1864  The adapter name group DELTA_LEAVE, wait for RVSD events.

Explanation:  A local adapter failed in a two-node PSSP cluster using single-node quorum.

User Response:  None. The RVSD group membership will decide which node remains active.

6027-1865  Two-node nodeset: useSingleNodeQuorum yes

Explanation:  Produced on GPFS daemon initialization.

User Response:  None. Informational daemon message only.

6027-1901  Persistent reserve requirements are not met for one or more disks

Explanation:  GPFS detected one or more persistent reserve capable disks that were not setup correctly.

User Response:  Check the preceding error messages for more information.

6027-1902  The SSA fence id fenceId for node nodeName does not match its node number nodeNumber.

Explanation:  The SSA register does not have the correct value for the node.

User Response:  See the SSA product documentation for instructions on how to set the SSA register. The value must be equal to the node’s number displayed in the error message.

6027-1903  path must be an absolute path name

Explanation:  The path name did not begin with a /.

User Response:  Specify the absolute path name for the object.

6027-1904  Disk fencing setup problems detected for file system fileSystem.

Explanation:  One of the disks in the file system is not known to the node, or fencing was incorrectly setup for at least one disk in the file system.

User Response:  Ensure that all disks in the file system are available on the node reporting the message. Also ensure that the environment is correctly set for all disks in the file system. This error may have been caused by deleting and recreating the HACMP cluster or the RSCT peer domain on which the GPFS cluster is based.

6027-1905  name was not created by GPFS or could not be refreshed.

Explanation:  The attributes (device type, major/minor number) of the specified file system device name are not as expected.

User Response:  Check the preceding messages for detailed information on the current and expected values. These errors are most frequently caused by the presence of /dev entries that were created outside the GPFS environment. Resolve the conflict by renaming or deleting the offending entries. Reissue the command letting GPFS create the /dev entry with the appropriate parameters.
6027-1906 Unable to import a disk on node nodeName. The command was: commandString.

Explanation: GPFS was unable to import a disk on the cited remote node.
User Response: Informational message only. The logical volume will be automatically imported on the remote node later, when the node is available and the disk is used.

6027-1907 Unable to import the created logical volumes on one or more nodes (see earlier messages). The reported nodes may be down or unreachable. The created volumes will be imported later when used, once the problems with the nodes have been fixed.

Explanation: One or more remote nodes were down or unreachable at the time that the mmcrlv command created one or more logical volumes. These logical volumes could not be imported on the unreachable nodes.
User Response: Informational message only. The logical volumes will be automatically imported on the remote nodes later, when the nodes are available and the disks are used.

6027-1908 The RSCT peer domain is not operational. The domain may be offline, or the node may be offline in the domain.

Explanation: The RSCT peer domain was not operational when a node was being added to a GPFS cluster, or the GPFS mmfsd daemon was starting in the RSCT peer domain environment.
User Response: Start the RSCT peer domain and reissue the failing command.

6027-1921 Node nodeName does not belong to the same network as the rest of the nodes in the cluster.

Explanation: A GPFS cluster command found that the specified adapter for a node to be added to the cluster is not on the same network as previously-specified nodes in the cluster.
User Response: Specify an adapter that belongs to the same network as the other nodes in the cluster.

6027-1922 IP aliasing is not supported (nodeName). Specify the main device.

Explanation: IP aliasing is not supported.
User Response: Specify the IP address of the main device for the node.

6027-1923 Failed to register node nodeName with RSCT (command cthactrl -i failed).

Explanation: A GPFS cluster command was unable to register a new node with RSCT.
User Response: Examine accompanying error output from cthactrl to resolve the problem.

6027-1924 Failed to reinitialize the RSCT subsystems (command cthactrl -b failed).

Explanation: A GPFS cluster command could not reinitialize the RSCT subsystems. The cthactrl -b command failed.
User Response: Examine accompanying error output from cthactrl to resolve the problem.

6027-1925 Attention: Command partially succeeded. You must run the following command to complete the changes: command

Explanation: Self-explanatory.
User Response: Reissue the specified command.

6027-1926 Error detected on node nodeName.

Explanation: An unexpected error was encountered on the specified node.
User Response: Examine the preceding messages, correct the problem, and reissue the command. If the problem persists, perform problem determination and contact the IBM Support Center.

6027-1927 The requested disks are not known to GPFS.

Explanation: GPFS could not find the requested NSDs in the cluster.
User Response: Reissue the command, specifying known disks.

6027-1928 Secondary network adapter backupAdapter on node nodeName does not belong to the same secondary network as the rest of the nodes in the cluster.

Explanation: A GPFS cluster command found that the backup adapter on the reported node is not on the same secondary network as previously-specified nodes in the cluster.
User Response: Specify an adapter that belongs to the same secondary network as the other nodes in the cluster.
6027-1929 Failed to initialize the RSCT subsystems (command cthactrl -b failed).

Explanation: A GPFS cluster command could not initialize the RSCT subsystems. The cthactrl -b command failed.

User Response: Check for messages from the failing cthactrl -b command.

6027-1930 Disk diskName belongs to file system fileSystem.

Explanation: The mmdelnod command found that the requested disk to be deleted still belongs to a file system.

User Response: Remove the disk from the file system.

6027-1931 The following disks are not known to GPFS: diskNames

Explanation: These disks are not recognized by GPFS.

User Response: Define the disks to GPFS, or choose disks that are recognized by GPFS.

6027-1932 None of the specified disks were deleted.

Explanation: The mmdelnod command determined that none of the specified disks could be deleted.

User Response: Determine if the disks are part of a file system, and if so issue the mmdeldisk command.

6027-1935 file fileName is missing.

Explanation: The mmfsenv command did not find the file.

User Response: Check that the file exists and has correct permissions.

6027-1936 Disk diskName is not assigned a primary NSD server node.

Explanation: A GPFS administration command (mm...) found that the primary NSD server node has not been specified for the disk being created or changed.

User Response: Assign a primary NSD server node to the specified disk, using the mmchnsd command.

6027-1937 The primary and backup NSD servers must be on different nodes.

Explanation: Self-explanatory.

User Response: Change the primary or backup NSD server using the mmchnsd command.

6027-1938 NSD server nodes must belong to the same nodeset. Primary NSD node for disk diskName is nodeName in nodeset name. Backup NSD node for disk diskName is nodeName in nodeset name.

Explanation: A GPFS administration command (mm...) found that the primary NSD server node and the backup NSD server node for the disk are not on same nodeset.

User Response: Change the primary or backup NSD server using the mmchnsd command.

6027-1939 NSD server nodes must belong to the same nodeset as the file system. File system fileSystem is in nodeset name. Primary NSD node for disk diskName is nodeName in nodeset name.

Explanation: A GPFS administration command (mm...) found that the primary NSD server node for the disk and the file system do not belong to the same nodeset.

User Response: Change the primary NSD server using the mmchnsd command.

6027-1941 Cannot handle multiple interfaces for host hostName.

Explanation: Multiple entries were found for the given hostname or IP address either in /etc/hosts or by the host command.

User Response: Make corrections to /etc/hosts and reissue the command.

6027-1942 Unexpected output from the 'host -t a name' command:

Explanation: A GPFS administration command (mm...) received unexpected output from the host -t a command for the given host.

User Response: Issue the host -t a command interactively and carefully review the output, as well as any error messages.

6027-1943 Host name not found.

Explanation: A GPFS administration command (mm...) could not resolve a host from /etc/hosts or by using the host command.

User Response: Make corrections to /etc/hosts and reissue the command.

6027-1944 LAPI over mixed adapter types is not supported.

Explanation: The LAPI communication protocol was requested, but the adapter type specified for this node is different from that of other nodes.
**User Response:** Choose another node, or change the node’s adapter type to match the other nodes.

**6027-1945** Multi-link adapters over more than two devices are not supported.

**Explanation:** The LAPI communication protocol was requested but a multi-link adapter over more than two devices was specified.

**User Response:** Limit the multi-link adapter to one or two devices.

**6027-1946** Multi-link adapters must be defined over two different devices.

**Explanation:** The LAPI communication protocol was requested but multi-link defined over two same devices was specified.

**User Response:** Define the multi-link adapter over two different devices.

**6027-1947** All multi-link adapters must be defined over the same number of devices (one or two).

**Explanation:** The LAPI communication protocol was requested but multi-link adapter specified for this node is defined over a different number of devices than the multi-link adapters specified for the previous nodes.

**User Response:** Choose to have multi-link adapters work with either one or two devices. The same choice must be used for all nodes in the nodeset.

**6027-1948** LAPI over different switch planes is not supported.

**Explanation:** LAPI communication is limited to only one switch plane.

**User Response:** Choose one switch plane for all LAPI communication.

**6027-1949** The primary and secondary network names for node `nodeName` resolve to the same IP address `ipAddress`.

**Explanation:** A node cannot have the same primary and secondary network.

**User Response:** Choose a different primary or secondary network name.

**6027-1950** Local update lock is busy.

**Explanation:** More than one process is attempting to update the GPFS environment at the same time.

**User Response:** Repeat the command. If the problem persists, verify that there are no blocked processes.

**6027-1951** Failed to obtain the local environment update lock.

**Explanation:** The local environment update lock is held by another process.

**User Response:** Repeat the command. If the problem persists, verify that there are no blocked processes.

**6027-1952** The primary and secondary network names for node `nodeName` resolve to the same IP address `ipAddress`.

**Explanation:** A node cannot have the same primary and secondary network.

**User Response:** Choose a different primary or secondary network name.

**6027-1953** Secondary network adapter `backupAdapter` for node `nodeName` ignored.

**Explanation:** GPFS ignores the specified secondary network adapter because this cluster does not have a secondary network.

**User Response:** If you wish to define a secondary network for the cluster, issue the **mmchcluster -B** command.

**6027-1954** Secondary network adapter `backupAdapter` not known on node `nodeName`.

**Explanation:** The secondary network adapter is not defined on the specified node.

**User Response:** Choose a different secondary network adapter.

**6027-1955** Secondary network adapters were detected and ignored. This GPFS cluster does not have a secondary network. To define a secondary network for the cluster use mmchcluster -B.

**Explanation:** Secondary network adapters were found on a cluster that was defined without a secondary network.

**User Response:** To define a secondary network for the cluster, issue the **mmchcluster -B** command.

**6027-1956** Incorrect record found: `nodeLine`.

**Explanation:** This record contains errors.

**User Response:** Correct the record and reissue the command.

**6027-1957** Incorrect record found. Missing secondary network node name `nodeLine`.

**Explanation:** This record is missing a secondary network node name.

**User Response:** Correct the record and reissue the command.
6027-1958  Secondary network was not defined for nodes: nodeList. Correct the problems and run mmchcluster -B again.

Explanation: The specified nodes do not have secondary networks defined.

User Response: Correct the problems and reissue the mmchcluster -B command.

6027-1959  Descriptor diskDescriptor does not refer to a logical volume that was created by mmcrlv.

Explanation: GPFS has no record of the logical volume specified in the disk descriptor. Either the logical volume was not created using the mmcrlv command, or it does not exist at all.

User Response: Change the disk descriptor to specify a logical volume that was created using the mmcrlv command.

6027-1960  The GPFS daemon is not running on node nodeName.

Explanation: The GPFS daemon is not running on the stated node.

User Response: Start the GPFS daemon on the stated node.

6027-1961  useSingleNodeQuorum is not in effect.

Explanation: The mmclearfence command was issued when single node quorum was not in effect.

User Response: Issue mmchconfig to set the useSingleNodeQuorum attribute and then reissue the mmclearfence command.

6027-1962  Permission denied for disk diskName

Explanation: The user does not have permission to access disk diskName.

User Response: Correct the permissions and reissue the command.

6027-1963  Disk diskName not found

Explanation: The specified disk was not found.

User Response: Check the disk device name and permissions. Reissue the command.

6027-1964  I/O error on diskName

Explanation: An I/O error occurred on the specified disk.

User Response: Check for additional error messages. Check the error log for disk hardware problems.

6027-1965  logicalVolume is not a valid logical volume.

Explanation: The specified logical volume is not a valid logical volume with a corresponding volume group.

User Response: Reissue the command using a valid logical volume.

6027-1966  Failed to unfence diskName

Explanation: The specified disk could not be unfenced.

User Response: Check for accompanying error messages.

6027-1967  mmfenceforcein -l diskName failed with rc=value.

Explanation: The mmfenceforcein command failed with the above return code.

User Response: Investigate the return code to determine the cause of the failure.

6027-1968  Device device already exists on node nodeName

Explanation: This device already exists on the specified node.

User Response: None.

6027-1969  The prerequisite software for cluster type clusterType is not installed.

Explanation: GPFS has detected that software necessary for running the specified cluster type, has not been installed.


6027-1970  Disk lvName (pvid pvid) is not known on node nodeName

Explanation: The specified disk is not known on the above node.

User Response: Check the disk and node names and reissue the command.

6027-1971  Import of volume group vgName on node nodeName failed.

Explanation: Import of the specified volume group on the specified node failed.

User Response: Check for additional error messages. Check both names and reissue the command.
6027-1973  Volume group vgName is not known on node nodeName.

Explanation:  The above volume group is not defined on the specified node.

User Response:  Check both names and reissue the command.

6027-1974  Disk diskName is not known to GPFS.

Explanation:  The specified disk is not defined to GPFS.

User Response:  Check the disk name. Use the mmaddisk command to define this disk to GPFS.

6027-1975  The descriptor file contains more than one descriptor.

Explanation:  The descriptor file must contain only one descriptor.

User Response:  Correct the descriptor file.

6027-1976  The descriptor file contains no descriptor.

Explanation:  The descriptor file must contain only one descriptor.

User Response:  Correct the descriptor file.

6027-1977  No valid IP address was found for node nodeNumber.

Explanation:  The specified node number could not be correlated with a valid IP address. GPFS cannot communicate with the node.

User Response:  Check the node’s IP address and correct it, if necessary.

6027-1978  No disks found.

Explanation:  The file system does not contain any disks.

User Response:  Use the mmaddisk command to add disks to the GPFS file system.

6027-1979  Unable to unfence node nodeName from disk physicalDiskName (pvid pid).

Explanation:  The unfence of the above node failed.

User Response:  Check for additional error messages.

6027-1980  Unable to set persistent reserve key value for disk physicalDiskName.

Explanation:  GPFS failed to set the persistent reserve key value for the specified disk.

User Response:  Check for additional error messages. Check all input parameters and reissue the command.

6027-1981  Disk physicalDiskName is persistent reserve capable but is not using persistent reserve.

Explanation:  The specified disk is capable for persistent reserve, but is not presently using this feature.

User Response:  Change the disk to use persistent reserve.

6027-1982  Unable to set reserve policy for disk physicalDiskName to PR_shared.

Explanation:  This disk could not be set to use the persistent reserve feature.

User Response:  Ensure that the disk type is one that supports the persistent reserve feature.

6027-1983  The persistent reserve key value for disk physicalDiskName is not set correctly. The current key value (currentKeyValue) does not match the expected key value (expectedKeyValue).

Explanation:  The current and expected key values do not match.

User Response:  Check the key value and correct it.

6027-1984  The persistent reserve key for disk physicalDiskName is now being set to the correct value.

Explanation:  Self-explanatory.

User Response:  None. Informational message only.

6027-1985  The format of the GPFS kernel extension is not correct for this version of AIX.

Explanation:  This version of AIX is incompatible with the current format of the GPFS kernel extension.

User Response:  Contact your system administrator to check the AIX version and GPFS kernel extension.

6027-1986  IP address ipAddress on node nodeNumber appears to be non-functional.

Explanation:  The specified IP address on the specified node appears to be not working.

User Response:  Check the IP address on this node.
6027-1987  The value of the useDiskLease parameter cannot be determined. Defaulting to 'no'.

**Explanation:** Self-explanatory.

**User Response:** None. Informational message only.

6027-1988  GPFS is not using disk fencing because disk leasing is in effect.

**Explanation:** The `mmshow_fence` command was invoked to show which nodes are fenced out from disks, but disk leasing is in effect, not fencing. The fencing information is still displayed.

**User Response:** None. Informational message only.

6027-1989  Requesting access for node `nodeName` to disk `physicalDiskName (pvid pvid)`.

**Explanation:** Self-explanatory.

**User Response:** None. Informational message only.

6027-1990  Disk `diskName` has now been changed to use persistent reserve.

**Explanation:** Self-explanatory.

**User Response:** None. Informational message only.
Appendix. Restrictions and conventions for GPFS

This appendix lists by activity, usage restrictions and conventions which should be followed when using GPFS and assumes you are familiar with the GPFS product:

- "GPFS cluster configuration"
- "GPFS nodeset configuration" on page 106
- "Starting GPFS" on page 106
- "GPFS file system configuration" on page 106
- "GPFS cluster administration" on page 107
- "GPFS nodeset administration" on page 108
- "GPFS file system administration" on page 108
- "Disk administration in your GPFS file system" on page 110
- "LAPI" on page 111
- "Communicating file accessing patterns" on page 111
- "System configuration" on page 111

GPFS cluster configuration

These restrictions apply to the creation of your GPFS cluster:

1. The only valid GPFS cluster type is lc.

2. For the current maximum number of nodes supported, please consult the GPFS FAQ at www.ibm.com/servers/eserver/clusters/software/gpfs_faq.html

3. A node may only belong to one GPFS cluster at a time.

4. The hostname or IP address used for a node must refer to the communications adapter over which the GPFS daemons communicate. Alias interfaces are not allowed. Use the original address or a name that is resolved by the host command to that original address. You may specify a node using any of these forms:

   Format                        Example
   Short hostname                k145n01
   Long hostname                 k145n01.kgn.ibm.com
   IP address                    9.119.19.102

5. Nodes specified in the NodeFile which are not available when the mmcrcluster command is issued must be added to the cluster by issuing the mmaddcluster command.

6. You must have root authority to run the mmcrcluster command.

7. The mmcrcluster command will only be successful if the primary server and, if specified, the secondary server are available.

8. GPFS communication within a GPFS cluster must use the same network type across all nodes. The primary network type may be either Myrinet or Ethernet, but not a combination thereof. Likewise, the secondary network type may be either Myrinet or Ethernet, but not a combination thereof.

9. Should any node in the GPFS cluster have been defined with a secondary network, all nodes in the cluster must also have a secondary network defined.

10. The authentication method between nodes in the GPFS cluster must be established when the mmcrcluster command is issued:
   a. When using rcp and rsh for remote communication, a properly configured .rhosts file must exist in the root users home directory, normally /root, on each node in the GPFS cluster.
   b. If you have designated the use of a different remote communication program on either the mmcrcluster or the mmchcluster command, you must ensure:
1) Proper authorization is granted to all nodes in the GPFS cluster.
2) The nodes in the GPFS cluster can communicate without the use of a password.

The remote copy and remote shell command must adhere to the same syntax form as rcp and rsh but may implement an alternate authentication mechanism.

GPFS nodeset configuration

These restrictions apply to the configuration of your GPFS nodeset:

1. You may not configure a GPFS nodeset until you have created your GPFS cluster.
2. The hostname or IP address used for a node must refer to the communications adapter over which the GPFS daemons communicate. Alias interfaces are not allowed. Use the original address or a name that is resolved by the host command to that original address. You may specify a node using any of these forms:

<table>
<thead>
<tr>
<th>Format</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short hostname</td>
<td>k145n01</td>
</tr>
<tr>
<td>Long hostname</td>
<td>k145n01.kgn.ibm.com</td>
</tr>
<tr>
<td>IP address</td>
<td>9.119.19.102</td>
</tr>
</tbody>
</table>

3. A node may belong to only one GPFS nodeset at a time.
4. A nodeset identifier can be at most eight alphanumeric characters, including the underscore character. The identifier cannot be a reserved word such as AVAIL, vsd, rpd, hacmp, or lc and it cannot be the number zero. The nodeset identifier cannot be changed once it is set.
5. Before creating a GPFS nodeset you must first verify that all of the nodes to be included in the nodeset are members of the GPFS cluster (see the mmlscluster command).
6. All nodes in a GPFS nodeset must belong to the same GPFS cluster.
7. The combined amount of memory to hold inodes, control data structures, and the stat cache is limited to 50% of the physical memory.

Starting GPFS

These restrictions apply to starting GPFS:

1. DO NOT start GPFS until it is configured.
2. Quorum must be met in order to successfully start GPFS.
3. You must have root authority to issue the mmstartup command.
4. You may issue the mmstartup command from any node in the GPFS cluster.

GPFS file system configuration

These restrictions apply to configuring your GPFS file system:

1. A GPFS file system may only be accessed from a single nodeset.
2. Your NSDs must be created via the mmcrnsd command prior to creating your file system.
3. If the disks within the file system are attached to an NSD server, the server must be a member of the same nodeset as the file system. To determine the nodeset of an NSD server, first issue the mmlsnsd command then issue the mmlsnode command.
4. All disks within a file system must be of the same type. They may be either SAN-attached to all nodes in the nodeset or attached to an NSD server. Disk support cannot be mixed.
5. File system names must be unique across GPFS nodesets and cannot be an existing entry in /dev.
6. The maximum number of file systems supported is 32.
7. The maximum level of indirection is 3.
8. As of the shipment of version 1.3 of GPFS for Linux, the largest supported file system size is 9 TB. For the latest supported file system size, see the Frequently Asked Questions at [www.ibm.com/servers/eserver/clusters/software/gpfs.html](http://www.ibm.com/servers/eserver/clusters/software/gpfs.html).

9. The maximum number of files within a file system cannot exceed the architectural limit of 256 million.

10. The maximum number of disks in a GPFS file system is 1024. The actual number of disks in your file system may be constrained by products other than GPFS which you have installed. Refer to your individual product documentation.

11. The maximum value for pagepool is 1300 MB per node.

12. The maximum block size supported is 1024 KB. If you choose a block size larger than 256 KB (the default), you must run `mmchconfig` to change the value of maxblocksize to a value at least as large as BlockSize.

13. The maximum replication value for both data and metadata is 2.

14. The value for BlockSize cannot be changed without recreating the file system.

15. The value for NumNodes cannot be changed after the file system has been created.

16. If the `mmcrfs` command is interrupted for any reason, you must use the `-v no` option on the next invocation of the command.

17. The `mmconfig` command may only be run once. Any changes to your GPFS configuration after the command has been issued, must be made by using the `mmchconfig` command.

18. When changing both maxblocksize and pagepool, these conventions must be followed or the command will fail:
   - When increasing the values, pagepool must be specified first.
   - When decreasing the values, maxblocksize must be specified first.

---

**GPFS cluster administration**

These restrictions apply to administering your GPFS cluster:

1. You must have root authority to run the `mmaddcluster`, `mmdelcluster`, `mmchcluster`, and `mmlscluster` commands.

2. A node may only belong to one GPFS cluster at a time.

3. When adding a node to a GPFS cluster, it must be available for the `mmaddcluster` command to be successful.

4. Should the GPFS cluster have been defined with a secondary network, any additional nodes added to the cluster must also have a secondary network defined. To determine the network definitions for your cluster, issue the `mmlscluster` command.

5. GPFS communication within a GPFS cluster must use the same network type across all nodes. The primary network type may be either Myrinet or Ethernet, but not a combination thereof. Likewise, the secondary network type may be either Myrinet or Ethernet, but not a combination thereof.

6. The `PrimaryServer` and, if specified, the `SecondaryServer` must be available for the `mmaddcluster`, `mmdelcluster`, and `mmlscluster` commands to be successful.

7. The `mmchcluster` command, when issued with either the `-p` or `-s` option, is designed to operate in an environment where the current `PrimaryServer` and, if specified, the `SecondaryServer` are not available. When specified with any other options, the servers must be available for the command to be successful.

8. A node being deleted cannot be the primary or secondary GPFS cluster data server unless you intend to delete the entire cluster. Verify this by issuing the `mmlscluster` command. If a node to be deleted is one of the servers and you intend to keep the cluster, issue the `mmchcluster` command to assign another node as the server before deleting the node.
GPFS nodeset administration

These restrictions apply to administering your GPFS nodeset:

1. The nodes being added to the nodeset must belong to the GPFS cluster. Issue the `mmlscluster` command to display the available nodes or add nodes to the cluster by issuing the `mmaddcluster` command.

2. Before you can delete a node, you must issue the `mmshutdown` command to unmount all of the GPFS file systems and stop GPFS on the node to be deleted.

3. When a node is deleted from a GPFS nodeset, its entry is not automatically deleted from the nodeset configuration. Instead the node is only marked as deleted. This allows nodes to be deleted without having to stop GPFS on all nodes. Such deleted nodes are not a factor when calculating quorum. They are also available to the `mmaddnode` and `mmconfig` commands for inclusion into another GPFS nodeset. If you want to remove any deleted node entries from the nodeset configuration, you must use the `-c` option on the `mmdelnode` command. The GPFS daemon must be stopped on all of the nodes in the nodeset, not just the ones being deleted. This can be done when the node is deleted or anytime later.

4. If single-node quorum is enabled, nodes cannot be added to or deleted from a nodeset without stopping the GPFS daemon on both nodes.

5. Disks associated with a file system are specified on the `mmcrfs` command, as is the nodeset to which the file system belongs. Therefore, the nodes being designated as the PrimaryServer and, if specified, the BackupServer on the `mmcrnsd` command, must be members of the GPFS nodeset specified on the `mmcrfs` command. Verify this by issuing the `mmlsnode` command.

6. If the node being deleted is either a primary or backup NSD server node, you must first issue the `mmchnsd` command.

GPFS file system administration

The following restrictions apply to file system administration:

1. Root authority is required to perform all GPFS administration tasks except those with a function limited to listing GPFS operating characteristics or modifying individual user file attributes.

2. In order to use new function (see "What’s new" on page xi), you must change the file system format by issuing the `mmchfs` command with the `-V` option.

3. When using `rcp` and `rsh` for remote communication, a properly configured `.rhosts` file must exist in the root users home directory, normally `/root`, on each node in the GPFS cluster. If you have designated the use of a different remote communication program on either the `mmcrcluster` or the `mmchcluster` command, you must ensure:
   a. Proper authorization is granted to all nodes in the GPFS cluster.
   b. The nodes in the GPFS cluster can communicate without the use of a password.

   The remote copy and remote shell command must adhere to the same syntax form as `rcp` and `rsh` but may implement an alternate authentication mechanism.

4. In order to run `mmfsck` off-line to repair a file system, you must unmount your file system.

5. When replacing quota files with either the `-u` or the `-g` option on the `mmcheckquota` command:
   - The quota files must be in the root directory of the file system.
   - The file system must be unmounted.

6. Quorum must be maintained when adding or deleting nodes from your GPFS nodeset.

7. You must unmount the file system on all nodes before deleting it.

8. You must unmount a file system on all nodes before moving it to a different nodeset.
Commands may be run from various locations within your system configuration. Use this information to ensure the command is being issued from an appropriate location and is using the correct syntax (see the individual commands for specific rules regarding the use of that command):

1. Commands which may be issued from any node in the GPFS cluster running GPFS:

   **Note:** If the command is intended to run on a nodeset other than the one you are on, you must specify the nodeset using the `-C` option.
   
   - `mmaddnode`
   - `mmchconfig`
   - `mmerfs`
   - `mmstartup`
   - `mmshutdown`

2. Commands which require that `Device` be the first operand and may be issued from any node in the GPFS cluster running GPFS:

   - `mmadddisk`
   - `mmchdisk`
   - `mmchfs`
   - `mmchmgr`
   - `mmdefragfs`
   - `mmeldisk`
   - `mmedfs`
   - `mmdfs`
   - `mmfsck`
   - `mmlsdisk`
   - `mmlsfs`
   - `mmlsmgr`

   Either `Device` or `NodesetId` must be specified.
   
   - `mmrestripefs`
   - `mrpldisk`

3. Commands which require GPFS to be running on the node from which the command is issued:

   - `mmcheckquota`
   - `mmdefedquota`
   - `mmdefquotaoff`
   - `mmdefedquotaon`
   - `mmedquota`
   - `mmlsquota`
   - `mmquotaoff`
   - `mmquotaon`
   - `mmrepquota`

4. Commands which require the file system be mounted on the GPFS nodeset from which the command is issued:

   - `mmchattr`
   - `mmdelacl`
   - `mmeditacl`
   - `mmgetacl`
   - `mmlsatrr`
5. Commands which may be issued from any node in the GPFS cluster where GPFS is installed:

- mmputacl
- mmaddcluster
- mmchcluster
- mmchnsd
- mmconfig
- mmcrcluster
- mmcrnsd
- mmdelcluster
- mmdelnsd
- mmiscluster
- mmlsconfig
- mmlsnode
- mmlsnsd
- mmstartup

---

**Disk administration in your GPFS file system**

These restrictions apply to administering the disks in your GPFS file system:

1. The maximum number of disks in a GPFS file system is 1024.
   
   The actual number of disks in your file system may be constrained by products other than GPFS which you have installed. Refer to your individual product documentation.

2. The largest disk size supported is 1 TB.

3. All disks within a file system must be of the same type. They may be either SAN-attached to all nodes in the nodeset or attached to an NSD server. Disk support cannot be mixed.

4. Disks associated with a file system are specified on the `mmcrfs` command, as is the nodeset to which the file system belongs. Therefore, the nodes being designated as the `PrimaryServer` and, if specified, `BackupServer` on the `mmcrnsd` command must be members of the GPFS nodeset specified on the `mmcrfs` command. Verify this by issuing the `mmlsnode` command.

5. The `mmchnsd` command may only be used to change, add, or delete NSD servers. You must use the `mmchdisk` command to change the disk usage and failure group for an NSD.

6. You cannot run `mmfsck` on a file system that has disks in a **down** state.

7. A disk remains suspended until it is explicitly resumed. Restarting GPFS or rebooting the nodes does not restore normal access to a suspended disk.

8. A disk remains down until it is explicitly started. Restarting GPFS or rebooting the nodes does not restore normal access to a down disk.

9. All disks attached to a given adapter should be in the same failure group, see the *General Parallel File System for Linux*: Concepts, Planning, and Installation Guide and search on *Recoverability* considerations.

10. You cannot protect your file system against disk failure by mirroring data. You must use replication or RAID devices to protect your data (see *General Parallel File System for Linux*: Concepts, Planning, and Installation Guide and search on recoverability considerations).

11. Before deleting a disk use the `mmdel` command to determine whether there is enough free space on the remaining disks to store the file system.

12. Disk accounting is not provided at the present time.

13. After migrating to a new level of GPFS, before you can use an existing network shared disk, which was not part of any GPFS file system at the time of migration, you must:
a. Export the network shared disk
b. Recreate the network shared disk
c. Add the network shared disk to a file system

**LAPI**

These restrictions apply when LAPI is the communication protocol for your nodeset:

1. All nodes in the nodeset must have the same communications protocol set. There is no coexistence between LAPI and TCP/IP.
2. GPFS only communicates via TCP or UDP over the Myrinet switch. The default is TCP. To communicate over UDP, select LAPI (the `mmconfig` command) or change to LAPI (the `mmchconfig` command) as the communication protocol for your GPFS nodesets.

**Communicating file accessing patterns**

These restrictions apply when using the `gpfs_fcntl` library calls:

1. The value of the total length of the header data structure, `gpfsFcntlHeader_t`, cannot exceed the value of `GPFS_MAX_FCNTL_LENGTH` as defined in the header file, `gpfs_fcntl.h`. The current value of `GPFS_MAX_FCNTL_LENGTH` is 64K bytes.
2. The value of the `fcntlReserved` field of the header data structure, `gpfsFcntlHeader_t`, must be set to zero.
3. The value of the `fcntlVersion` field of the header data structure `gpfsFcntlHeader_t`, must be set to the current version number of the `gpfs_fcntl()` library call, as defined by `GPFS_FCNTL_CURRENT_VERSION` in the header file `gpfs_fcntl.h`. The current version number is one.
4. For the `gpfsMultipleAccessRange_t` hint, up to `GPFS_MAX_RANGE_COUNT`, as defined in the header file `gpfs_fcntl.h`, blocks may be given in one multiple access range hint. The current value of `GPFS_MAX_RANGE_COUNT` is eight. Depending on the current load, GPFS may initiate prefetching of some or all of the blocks.
5. The `gpfsCancelHints_t` hint may only cancel the `gpfsMultipleAccessRange_t` hint. This directive may not cancel other directives.
6. Because an application-level `read` or `write` may be split across several agents, Posix `read` and `write` file atomicity is not enforced while in data shipping mode.
7. A file in data shipping mode cannot be written through any file handle that was not associated with the data shipping collective through a `gpfsDataShipStart_t` directive.
8. Calls that are not allowed on a file that has data shipping enabled:
   - `chmod`
   - `fchmod`
   - `chown`
   - `fchown`
   - `link`
9. The `gpfsDataShipStart_t` directive can only be cancelled by a `gpfsDataShipStop_t` directive.
10. For the `gpfsDataShipMap_t` directive, the value of `partitionSize` must be a multiple of the number of bytes in a single file system block.

**System configuration**

1. GPFS requires invariant network connections. The port on a particular IP address must be a fixed piece of hardware that is translated to a fixed network adapter and is monitored for failure. Topology Services should be configured to heartbeat over this invariant address (see the General Parallel File System for Linux®: RSCT Guide and Reference).
2. GPFS communication within a GPFS cluster must use the same network type across all nodes. The primary network type may be either Myrinet or Ethernet, but not a combination thereof. Likewise, the secondary network type may be either Myrinet or Ethernet, but not a combination thereof.

3. Should any node in the GPFS cluster have been defined with a secondary network, all nodes in the cluster must also have a secondary network defined.

4. GPFS only communicates via TCP or UDP over the Myrinet switch. The default is TCP. To communicate over UDP, select LAPI (the `mmconfig` command) or change to LAPI (the `mmchconfig` command) as the communication protocol for your GPFS nodesets.
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AIX cluster environment. The AIX cluster environment is based on the use of either the RSCT subsystem of AIX 5L (GPFS cluster type rpd) or the HACMP/ES program product (GPFS cluster type hacmp).

block utilization. The measurement of the percentage of used subblocks per allocated blocks.

cluster. A loosely-coupled collection of independent systems (nodes) organized into a network for the purpose of sharing resources and communicating with each other (see "GPFS cluster" on page 118).

configuration manager. The GPFS node that selects file system managers and determines whether quorum exists. The oldest continuously operating node in the file system group as monitored by Group Services, is automatically assigned as the configuration manager.

control data structures. Data structures needed to manage file data and metadata cached in memory. This includes hash tables and link pointers for finding cached data, lock states and tokens to implement distributed locking, as well as various flags and sequence numbers to keep track of updates to the cached data.

disk descriptor. A disk descriptor defines how a disk is to be used within a GPFS file system. Each descriptor must be in the form (second and third fields reserved):

DiskName:::DiskUsage:FailureGroup

Where DiskName is the name of the disk. This must be the network shared disk name. DiskUsage tells GPFS whether data, metadata, or both are to be stored on the disk. The FailureGroup designation indicates to GPFS where not to place replicas of data and metadata. All disks with a common point of failure should belong to the same failure group. Since GPFS does not place replicated information on disks in the same failure group, the availability of information is ensured even in the event of disk failure.

disposition. The session to which a data management event is delivered. An individual disposition is set for each type of event from each file system.

disk leasing. Disk leasing is a capability of the GPFS program product to interface with storage devices. Specifically, disk leasing provides control of access from multiple host systems which is useful in recovery situations. To access a storage device which is configured to use disk leasing, a host must register using a valid lease. In the event of a perceived failure, another host system may preempt that access using that valid lease which will result in the storage device not honoring attempts to read or write data on the device until the pre-empted system has re-registered. Software conventions exist in GPFS which only allow a pre-empted system to re-register after the recovery situation has been addressed. Disk leasing is activated if any disk in the file system is not using SCSI-2 reserve.

domain. (1) A set of network resources (such as applications and printers, for example) for a group of users. A user logs in to the domain to gain access to the resources, which could be located on a number of different servers in the network. (2) A group of server and client machines that exist in the same security structure. (3) A group of computers and devices on a network that are administered as a unit with common rules and procedures. Within the Internet, a domain is defined by its Internet Protocol (IP) address. All devices that share a common part of the IP address are said to be in the same domain.

failover. The assuming of server responsibilities by the node designated as backup server, when the primary server fails.

failure group. A collection of disks that share common access paths or adaptor connection, and could all become unavailable through a single hardware failure.

file system manager. There is one file system manager per file system, which provides the following services for all the nodes using the file system:

1. Processes changes to the state or description of the file system. These include:
   • Adding disks
   • Changing disk availability
   • Repairing the file system
2. Controls which regions of disks are allocated to each node, allowing effective parallel allocation of space.
3. Controls token management.
4. Controls quota management.
fragment. The space allocated for an amount of data (usually at the end of a file) too small to require a full block, consisting of one or more subblocks (one thirty-second of block size).

G

GPFS cluster. A subset of existing cluster nodes defined as being available for use by GPFS file systems. The GPFS cluster is created via the \texttt{mmcrcluster} command. GPFS nodesets and file systems are subsequently created after the \texttt{mmcrcluster} command has been issued.

GPFS cluster data. The GPFS configuration data, which is stored on the primary and secondary GPFS cluster data servers as defined on the \texttt{mmcrcluster} command.

GPFS portability layer. The interface to the GPFS for Linux proprietary code is an open source module which each installation must build for its specific hardware platform and Linux distribution. See General Parallel File System for Linux®: Concepts, Planning, and Installation Guide and search on GPFS portability layer.

H

HACMP environment. The operation of GPFS based on the High Availability Cluster Multi-Processing for AIX/Enhanced Scalability (HACMP/ES) program product. This environment is defined on the \texttt{mmcrcluster} command by specifying a cluster type of \texttt{hacmp}.

I

IBM Virtual Shared Disk. The component of PSSP that allows application programs executing on different nodes access a raw logical volume as if it were local at each node. In actuality, the logical volume is local at only one of the nodes (the server node).

inode. The internal structure that describes an individual file. An inode contains file size and update information, as well as the addresses of data blocks, or in the case of large files, indirect blocks that, in turn, point to data blocks. One inode is required for each file.

J

journalized file system (JFS). IBM's journalized file system technology, currently used in IBM enterprise servers, is designed for high-throughput server environments, key to running intranet and other high-performance e-business file servers. See http://oss.software.ibm.com/developer.opensource/jfs/

K

Kernel Low-Level Application Programming Interface (KLAPI). KLAPI provides reliable transport services to kernel subsystems that have communication over the SP Switch.

L

Low-Level Application Programming Interface (LAPI). LAPI is an IBM communication protocol design for the efficient exchange of messages in a packet switched network. It provides both reliable and efficient notification of message completion. It is optimized for networks where dropped packets are rare. On a Linux operating system LAPI is supported over a UDP/IP socket interface and performs similarly to the TCP/IP protocol.

logical volume. A collection of physical partitions organized into logical partitions all contained in a single volume group. Logical volumes are expandable and can span several physical volumes in a volume group.

Logical Volume Manager (LVM). Manages disk space at a logical level. It controls fixed-disk resources by mapping data between logical and physical storage, allowing data to be discontiguous, span multiple disks, replicated, and dynamically expanded.

loose cluster environment. The operation of GPFS based on the Linux operating system. This environment is defined on the \texttt{mmcrcluster} command by specifying a cluster type of \texttt{lc}.

M

management domain. A set of nodes configured for manageability by the Clusters Systems Management (CSM) product. Such a domain has a management server that is used to administer a number of managed nodes. Only management servers have knowledge of the whole domain. Managed nodes only know about the servers managing them; they know nothing of each other. Contrast with "peer domain" on page 119.

metadata. Data structures that contain access information about file data. These might include inodes, indirect blocks, and directories. These data structures are used by GPFS but are not accessible to user applications.

metanode. There is one metanode per open file. The metanode is responsible for maintaining file metadata integrity. In almost all cases, the node that has had the file open for the longest period of continuous time is the metanode.

mirroring. The creation of a mirror image of data to be preserved in the event of disk failure.
multi-node quorum. The type of quorum algorithm used for GPFS nodesets of 3 nodes or more. This is defined as one plus half of the number of nodes in the GPFS nodeset.

multi-tailing. Connecting a disk to multiple nodes.

N

Network File System (NFS). A distributed file system that allows users to access files and directories located on remote computers and treat those files and directories as if they were local. NFS allows different systems (UNIX or non-UNIX), different architectures, or vendors connected to the same network, to access remote files in a LAN environment as though they were local files.

node descriptor. A node descriptor defines how a node is to be used within GPFS.

In a Linux environment, each descriptor for a GPFS cluster must be in the form:

primaryNetworkNodeName::secondaryNetworkNodeName

primaryNetworkNodeName
The host name of the node on the primary network for GPFS daemon to daemon communication.

designation
Currently unused and specified by the double colon ::

secondaryNetworkNodeName
The host name of the node on the secondary network, if one exists.

You may configure a secondary network node name in order to prevent the node from appearing to have gone down when the network is merely saturated. During times of excessive network traffic if a second network is not specified, there is the potential for the RSCT component to be unable to communicate with the node over the primary network. RSCT would perceive the node as having failed and inform GPFS to perform node recovery.

In all environments, each descriptor for a GPFS nodeset must be in the form:

NodeName[::manager|client]

Where NodeName is the hostname or IP address of the adapter to be used for GPFS daemon communications. The optional designation specifies whether or not the node should be included in the pool of nodes from which the file system manager is chosen. The default is not to have the node included in the pool.

node number. The node number is generated and maintained by GPFS as the GPFS cluster is created and as nodes added to or deleted from the GPFS cluster.

nodeset. A GPFS nodeset is a group of nodes that all run the same level of GPFS code and operate on the same file systems. You have the ability to define more than one GPFS nodeset in the same GPFS cluster.

Network Shared Disks (NSDs). The GPFS function that allows application programs executing at different nodes of a GPFS cluster to access a raw logical volume as if it were local at each of the nodes. In actuality, the logical volume is local at only one of the nodes (the server node).

P

peer domain. A set of nodes configured for high availability by the RSCT configuration manager. Such a domain has no distinguished or master node. All nodes are aware of all other nodes, and administrative commands can be issued from any node in the domain. All nodes also have a consistent view of the domain membership. Contrast with “management domain” on page 118.

persistent reserve. Persistent reserve is a capability of the ANSI SCSI-2 architecture for interfacing with storage devices. Specifically, persistent reserve provides control of access from multiple host systems which is useful in recovery situations. To access a storage device which is configured to use persistent reserve, a host must register using a unique key. In the event of a perceived failure, another host system may preempt that access using that unique key which will result in the storage device not honoring attempts to read or write data on the device until the pre-empted system has re-registered. Software conventions exist in GPFS which only allow a pre-empted system to re-register after the recovery situation has been addressed. Contrast with “disk leasing” on page 117.

primary GPFS cluster data server. In a GPFS cluster, this refers to the primary GPFS cluster data server node for the GPFS configuration data.

PSSP cluster environment. The operation of GPFS based on the PSSP and IBM Virtual Shared Disk program products.

Q

quorum. The minimum number of nodes that must be running in order for the GPFS daemon to start.

For all nodesets consisting of three or more nodes, the multi-node quorum algorithm applies defining quorum as one plus half of the number of nodes in the GPFS nodeset.
For a two node nodeset, the **single-node quorum** algorithm can be applied allowing the GPFS daemon to continue operation despite the loss of the peer node.

**quota.** The amount of disk space and number of inodes assigned as upper limits for a specified user or group of users.

**quota management.** In a quota-enabled configuration, the file system manager node automatically assumes the quota management responsibilities whenever GPFS is started. Quota management involves the allocation of disk blocks to the other nodes writing to the file system and comparison of the allocated space to quota limits at regular intervals.

**Redundant Array of Independent Disks (RAID).** A set of physical disks that act as a single physical volume and use parity checking to protect against disk failure.

**recovery.** The process of restoring access to file system data when a failure has occurred. This may involve reconstructing data or providing alternative routing through a different server.

**replication.** The practice of creating and maintaining multiple file copies to ensure availability in the event of hardware failure.

**RSCT peer domain.** See "peer domain" on page 119.

**SSA.** Serial Storage Architecture. An expanded storage adapter for multi-processor data sharing in UNIX-based computing, allowing disk connection in a high-speed loop.

**SCSI.** Small Computer Systems Interface. An adapter supporting attachment of various direct-access storage devices.

**secondary GPFS cluster data server.** In a GPFS cluster, this refers to the backup server node for the GPFS configuration data (see "GPFS cluster data" on page 118).

**session failure.** The loss of all resources of a data management session due to the failure of the GPFS daemon on the session node.

**session node.** The node on which a data management session was created.

**single-node quorum.** In a two node nodeset, use of the single-node quorum algorithm allows the GPFS daemon to continue operating in the event only one node is available. Use of this quorum algorithm is not valid if more than two nodes have been defined in the nodeset. This applies only in either an AIX cluster or Linux environment where disks are SAN-attached to all nodes in the nodeset.

**source node.** The node on which a data management event is generated.

**stripe group.** The set of disks comprising the storage assigned to a file system.

**striping.** A method of writing a file system, in parallel, to multiple disks instead of to single disks in a serial operation.

**subblock.** The smallest unit of data accessible in an I/O operation, equal to one thirty-second of a data block.

**token management.** A system for controlling file access in which each application performing a read or write operation is granted exclusive access to a specific block of file data. This ensures data consistency and controls conflicts.

Token management has two components: the token manager server, located at the file system manager node, and the token management function on each node in the GPFS nodeset. The token management server controls tokens relating to the operation of the file system. The token management function on each node, including the file system manager node, requests tokens from the token management server.

**twin-tailing.** Connecting a disk to multiple nodes

**virtual file system (VFS).** A remote file system that has been mounted so that it is accessible to the local user. The virtual file system is an abstraction of a physical file system implementation. It provides a consistent interface to multiple file systems, both local and remote. This consistent interface allows the user to view the directory tree on the running system as a single entity even when the tree is made up of a number of diverse file system types.

**virtual shared disk.** See "IBM Virtual Shared Disk" on page 118.

**virtual node (vnode).** The structure which contains information about a file system object in a virtual file system.
This bibliography contains references for:

- **GPFS publications**
- **RSCT publications**
- **IBM RedBooks**
- **Useful Web sites**
- **Non-IBM publications** that discuss parallel computing and other topics related to GPFS

All IBM publications are also available from the IBM Publications Center at [www.ibm.com/shop/publications/order](http://www.ibm.com/shop/publications/order)

### GPFS publications

You may download, view, search, and print the supporting documentation for the GPFS program product in the following ways:

1. In PDF format:
   - From the IBM Publications Center at [www.ibm.com/shop/publications/order](http://www.ibm.com/shop/publications/order)


To view the GPFS PDF publications, you need access to either the Adobe Acrobat Reader or the xpdf package available with the Red Hat® Linux distribution. The Acrobat Reader is freely available for downloading from the Adobe web site at [www.adobe.com](http://www.adobe.com). Since the GPFS documentation contains cross-book links, if you choose to download the PDF files they should all be placed in the same directory and the files should not be renamed.

To view the GPFS HTML publications, you need access to an HTML document browser such as Netscape. An index file into the HTML files ([index.html](http://index.html)) is provided when downloading the tar file of the GPFS HTML publications. Since the GPFS documentation contains cross-book links, all files contained in the tar file should remain in the same directory.

In order to use the GPFS man pages the **gpfs.docs** RPM must first be installed (see the **General Parallel File System for Linux®: Concepts, Planning, and Installation Guide**).

The GPFS library includes:

- **General Parallel File System for Linux®: Concepts, Planning, and Installation Guide** GA22-7844 (PDF file name am4ins30.pdf)
- **General Parallel File System for Linux®: Administration and Programming Reference** SA22-7843 (PDF file name am4adm30.pdf)
- **General Parallel File System for Linux®: Problem Determination Guide**, GA22-7842 (PDF file name am4pdg30.pdf)
- **General Parallel File System for Linux®: RSCT Guide and Reference** SA22-7854 (PDF file name am4rcr30.pdf)

### Reliable Scalable Cluster Technology publications

GPFS does not produce a separate RSCT messages guide as it does a Guide and Reference. You can download the RSCT related documentation from the web at [www.ibm.com/servers/eserver/clusters/library](http://www.ibm.com/servers/eserver/clusters/library):

- **RSCT for Linux: Guide and Reference**, SA22-7892
- **RSCT for Linux: Messages**, GA22-7894
Redbooks

IBM's International Technical Support Organization (ITSO) has published a number of redbooks. For a current list, see the ITSO Web site at www.ibm.com/redbooks

- Implementing Fibre Channel Attachment on the ESS, SG24-6113
- Configuring and Implementing the IBM Fibre Channel RAID Storage Server, SG24-5414
- SuSE Linux Integration Guide for IBM xSeries and Netfinity, SG24-5863-01
- Installing Red Hat Linux 5.2 on Netfinity Servers, REDP0010
- Linux on IBM Netfinity Servers: A Collection of Papers, SG24-5994-00
- Netfinity and TurboLinux Integration Guide, SG24-5862-00
- Netfinity and SuSE Linux Integration Guide, SG24-5863-00
- Netfinity and Red Hat Linux Server Integration Guide, SG24-5853-00
- Netfinity and Caldera OpenLinux Integration Guide, SG24-5861-00
- RSCT Group Services: Programming Cluster Applications, SG24-5523-00
- RS/6000 High Availability Infrastructure, SG24-4838-00

Whitepapers


IBM @server pSeries white papers at www.ibm.com/servers/eserver/pseries/library/wp_systems.html

Clustering technology white papers at www.ibm.com/servers/eserver/pseries/library/wp_clustering.html

AIX white papers at www.ibm.com/servers/aix/library/wp_aix.html


Useful Web sites

Linux at IBM at www.ibm.com/software/is/mp/linux/software

Clusters at IBM www.ibm.com/eserver/clusters

GPFS at www.ibm.com/servers/eserver/clusters/software/gpfs.html


Red Hat at www.redhat.com/

SuSE at www.suse.com/

Myrinet at www.myri.com/

Fibre Channel at www.fibrechannel.com/
Non-IBM publications

Here are some non-IBM publications that you may find helpful:

- Foster, I., *Designing and Building Parallel Programs*, Addison-Wesley, 1995.
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