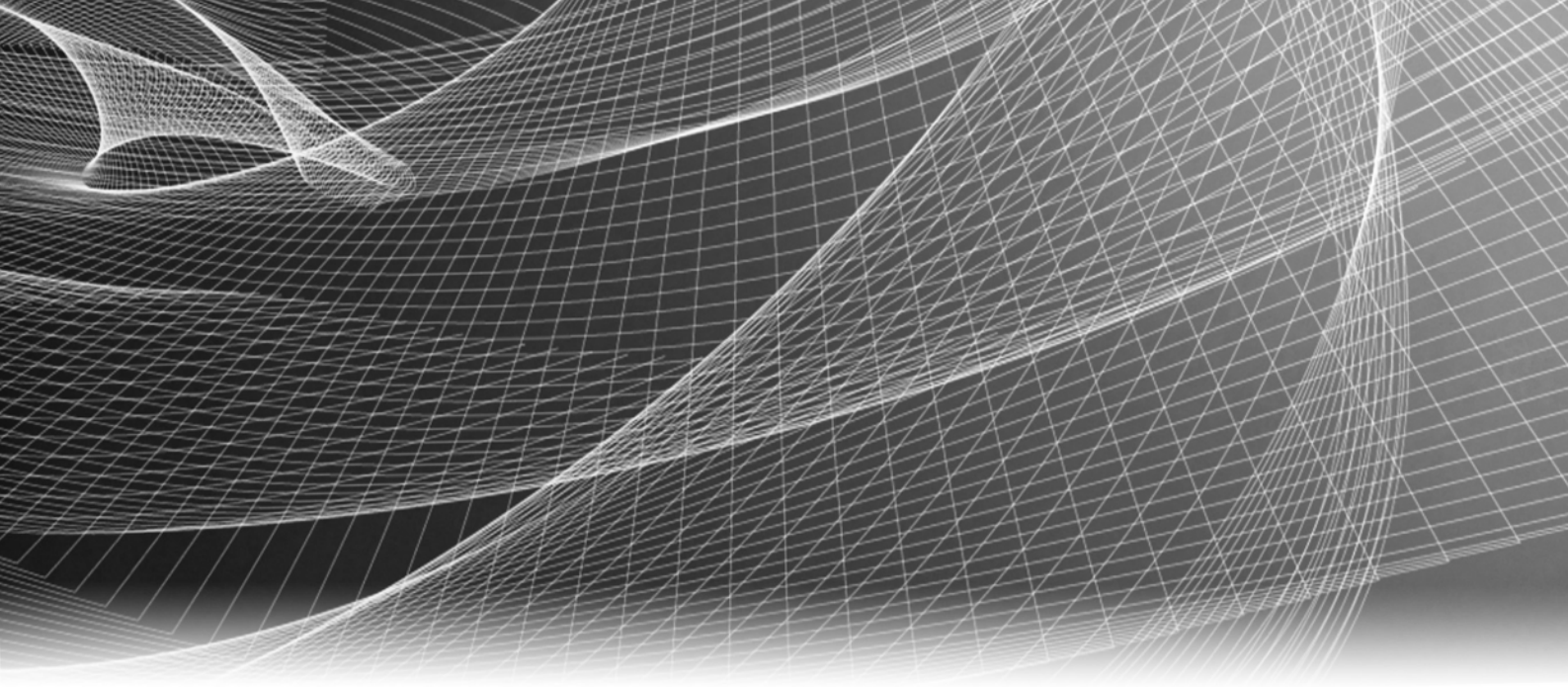

EMC® Atmos™ Installable File System (IFS)

Installation and Upgrade Guide

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CONTENTS

PREFACE

As part of an effort to improve its product lines, EMC periodically releases revisions of its software and hardware. Therefore, some functions described in this document might not be supported by all versions of the software or hardware currently in use. The product release notes provide the most up-to-date information on product features.

Contact your EMC representative if a product does not function properly or does not function as described in this document.

Note: This document was accurate at publication time. New versions of this document might be released on the EMC online support website. Check the EMC online support website to ensure that you are using the latest version of this document.

Purpose

This document describes how to install, configure, and upgrade the EMC Atmos Installable File System (IFS).

Audience

This document is intended for the users responsible for installing, configuring, and upgrading the Atmos IFS client.

Related documentation

The EMC Atmos documentation set includes the following titles:

- *EMC Atmos Release Notes*
- *EMC Atmos Administrator's Guide*
- *EMC Atmos Programmer's Guide*
- *EMC Atmos System Management API Guide*
- *EMC Atmos Security Configuration Guide*
- *EMC Atmos CAS Programmer's Guide*
- *EMC Atmos CAS API Reference Guide*
- *EMC Atmos Installable File System (IFS) Installation and Upgrade Guide*
- *EMC Atmos online help*
- *EMC Atmos Series Open Source License and Copyright Information*
- *EMC Atmos Series Open Source License and Copyright Information for GPLv3*

Conventions used in this document

EMC uses the following conventions for special notices:

Note: A note presents information that is important, but not hazard-related.

IMPORTANT

An important notice contains information essential to software or hardware operation.

Typographical conventions

EMC uses the following type style conventions in this document:

Normal	Used in running (nonprocedural) text for: • Names of interface elements, such as names of windows, dialog boxes, buttons, fields, and menus • Names of resources, attributes, pools, Boolean expressions, buttons, DQL statements, keywords, clauses, environment variables, functions, and utilities • URLs, pathnames, filenames, directory names, computer names, links, groups, service keys, file systems, and notifications
Bold	Used in running (nonprocedural) text for names of commands, daemons, options, programs, processes, services, applications, utilities, kernels, notifications, system calls, and man pages Used in procedures for: • Names of interface elements, such as names of windows, dialog boxes, buttons, fields, and menus • What the user specifically selects, clicks, presses, or types
Italic	Used in all text (including procedures) for: • Full titles of publications referenced in text • Emphasis, for example, a new term • Variables
`Courier`	Used for: • System output, such as an error message or script • URLs, complete paths, filenames, prompts, and syntax when shown outside of running text
`Courier bold`	Used for specific user input, such as commands
`Courier italic`	Used in procedures for: • Variables on the command line • User input variables
< >	Angle brackets enclose parameter or variable values supplied by the user
[ ]	Square brackets enclose optional values
|	Vertical bar indicates alternate selections — the bar means “or”
{ }	Braces enclose content that the user must specify, such as x or y or z
...	Ellipses indicate nonessential information omitted from the example

Where to get help

EMC support, product, and licensing information can be obtained as follows:

Product information - For documentation, release notes, software updates, or information about EMC products, go to EMC Online Support at:

`https://support.emc.com`

Technical support - Go to EMC Online Support and click Service Center. You will see several options for contacting EMC Technical Support. Note that to open a service request, you must have a valid support agreement. Contact your EMC sales representative for details about obtaining a valid support agreement or with questions about your account.

Your comments

Your suggestions will help us continue to improve the accuracy, organization, and overall quality of the user publications. Send your opinions of this document to:

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CHAPTER 1
Overview

This chapter includes the following topics:

About the Atmos installable file system

The Atmos installable file system (IFS) client bundles the Atmos client libraries into a software package that allows a Linux server to communicate to the Atmos system by directly mounting a specific Tenant:Subtenant namespace on the Linux server as a standard mount point. This configuration allows applications to access Atmos objects through a traditional file system interface from outside the Atmos cloud via IP-based communications. Atmos IFS clients do not use the standard Atmos web service UIDs or shared secrets.

Figure 1 shows an Atmos deployment that includes Atmos IFS clients and a firewall.

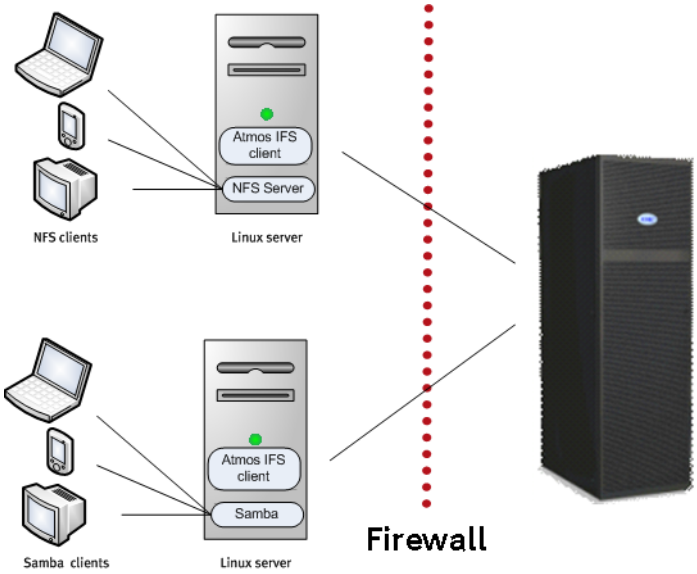


Figure 1 Atmos deployment with Atmos IFS clients

An Atmos deployment with the Atmos IFS client is comprised of the following components:

- **Linux server**— The server where you install the Atmos IFS client rpm. This machine might be outside of a firewall. The Linux server can be running on hardware or on a virtual machine. It can act as a Samba server or NFS server. See "Supported Linux servers" on page 11 for information about the supported platforms.
- **Atmos** — The Atmos RMG that the IFS client is configured to connect to. It might be running on hardware or it might be Atmos software running on VMware.

You should consider using the Atmos IFS client when you have existing applications that do not have Web Services interfaces (REST or SOAP), but you still want to create and use user metadata to trigger Atmos policies. Atmos IFS client users typically have:

- Limited Web Services programming experience.
- Strong Linux support experience.
- Limited CIFS or Windows Active Directory support.

Atmos supports two versions of Atmos IFS client software: one can be exported as NFS (Atmos IFS/NFS) and the other cannot (Atmos IFS). The Atmos IFS client package that supports NFS includes NFS in its name.

Supported Linux servers

Table 1 lists the Linux operating systems on which you can install the Atmos IFS client software.

Table 1 Supported Linux servers

Atmos version	Linux OS	Can run Atmos IFS	Can run Atmos IFS/NFS	Can export Windows via Samba
1.3.x	RHEL 5 (32 and 64-bit)	Yes	Yes	Yes
1.4.x	RHEL 5 (32 and 64-bit)	Yes	Yes	Yes
2.0.x	RHEL 5 (32 and 64-bit)	Yes	Yes	Yes
2.1.x	RHEL5 (32 and 64-bit)	Yes	Yes	Yes
	RHEL6.0 (64-bit)	Yes	No	No
	SLES11 (64-bit)	Yes	No	No
	Ubuntu (64-bit)	Yes	No	No

See the *Atmos Release Notes* for details about the supported Linux OS.

Mounts

The Atmos IFS client mounts at the subtenant level — it requires that you supply the tenant and subtenant ID at configuration time. It does not use web service UIDs or shared secrets. You can mount:

- Only to /mnt/mauifs/
- Multiple instances of the same subtenant's object space on multiple Atmos IFS clients so that multiple clients can write to same directories.

To change the mounted subtenant on a given system, you can rerun the Atmos IFS client configuration commands described in"Atmos IFS and IFS/NFS client service command reference" on page 30.

Permissions

Access to files on the Atmos IFS client mount follow Linux ACL rules — this means that root and other system users may have access to files.

Atmos objects stored via the Web Service namespace interface are visible to Atmos IFS clients mounted to same subtenant namespace.

Policy interaction

The policies that apply to a subtenant also apply to the objects manipulated through the Atmos IFS client mount point even though the access is Linux-based.

- User metadata is stored as an extended attribute so you create and set user metadata using the setfattr command. For example:

  ```
  # setfattr -n user -v me test
  ```

- For retention and expiration
  - Root cannot delete an object if retention is set and has not expired.
  - You can change expiration using extended the attribute command “setfattr”, but you must follow the date format exactly (xsd:dateTime).
  - Only the object name and file name are stored in metadata, not the object’s directory or path.
  - You cannot use directory and/or path as the policy trigger.
  - Files are expired but directories are not — this means that directory structures will not disappear.

CHAPTER 2
Installing the Atmos IFS client software

This chapter describes how to install and configure Atmos IFS client software on a Linux server. It includes the following topics:

Atmos must be installed and configured before you can install and configure the Atmos IFS client software.

Prerequisites

Obtaining the Atmos IFS client software

Atmos supports two versions of Atmos IFS client software. Each version can be installed on the Linux servers described in Table 1 running on hardware or on virtual machines running on VMware. The package names follow the pattern described in Table 2.

Table 2 Atmos IFS client software package naming pattern

Component	Description	Package name pattern
Atmos IFS/NFS	Can be exported as NFS	atmos-nfs-version.build.rpm
Atmos IFS	Cannot be exported as NFS	atmos-ifs-version.build.rpm

To download the Atmos IFS client software, go to EMC Online Support at:
`https://support.emc.com`

Note: Some IFS kits are packaged within the complete Atmos software download distributions, and some IFS kits are packaged as separate downloads.

Setting up the Linux servers to run the Atmos IFS client software

To support the Atmos IFS client software, Linux servers must have the following software and settings:

SE Linux

IF SE Linux is enabled, it will block the mount or usage of the Atmos IFS client software — so if it is present on the Linux server, it must be disabled.

To determine if SE Linux is enabled, log in to the Linux server as root, then type one of the following commands:

Command	Result
`# cat /selinux/enforce`	If the value is 0, it is disabled. If it is not present, then SE Linux is not installed, and no further action is require.
`# cat /etc/selinux/config`	Look for "SELINUX=disabled". If it is not present, then SE Linux is not installed, and no further action is required.

If it is enabled, you can disable it permanently by changing the value in the /etc/selinux/config file to disabled. For example:

```
# vi /etc/selinux/config (Set SELINUX to `disabled')
# reboot
```

To disable it temporarily (until you reboot the Linux server), use this command:

```
# echo 0 > /selinux/enforce
```

Filesystem in User Space (FUSE)

Atmos IFS client running on certain Linux platforms require that a FUSE module be installed on the Linux server. The version of FUSE depends on the version of the Atmos IFS client software you plan to install.

Table 3 FUSE requirements per Linux platform

Linux OS	Requires FUSE?
RHEL5.5	Yes
RHEL 6	No
SLES11	No
Ubuntu	No

Atmos IFS/NFS client software

The Atmos IFS/NFS client software version (atmos-nfs-version.build.rpm) requires an Atmos-specific FUSE module called kmod-fuse. There are two versions of this customized module in the Atmos IFS kit:

- For 32-bit machines use kmod-fuse.version.build.i686.rpm.
- For 64-bit machines use kmod-fuse.version.build.x86_64.rpm.

The standard FUSE module cannot be present on the Linux server. If one is currently installed, you must remove it. But EMC suggests that you determine how this Atmos requirement fits into your overall application deployment strategy before removing the FUSE module.

To determine if the standard FUSE module is present, follow this procedure:

1. Log in to the Linux server as root.
2. Execute this command:

```
# "lsmod | grep fuse"
```

If the standard fuse module is present, the output displays "fuse".

FUSE cannot be removed until any applications that use it are stopped.

To unload (remove) the FUSE module if it is present, follow this procedure:

1. Log in to the Linux server as root.
2. Execute this command:

```
# "rmmod fuse"
```

Note: If you have another application that is using this FUSE module, the command fails.

Atmos IFS client software (without NFS)

The Atmos IFS client software version that cannot be exported as NFS (atmos-ifs-version.build.rpm) requires FUSE version 2.7.4.

To determine if the standard FUSE module is present, follow this procedure:

1. Log in to the Linux server as root.
2. Execute this command:

```
# "lsmod | grep fuse"
```

If the standard fuse module is present, the output displays "fuse".

SAMBA

If IFS running on your platform supports exporting the file system to a Windows client, SAMBA must be installed on the Linux server. To check your platform's support, see Table 1.

Performance settings

Linux kernel buffers

For better performance, EMC recommends that you update the Linux kernel buffers space for each Atmos TCP socket. In the /etc/sysctl.conf, the values are:

```
net.core.rmem_max = 4194304
net.core.wmem_max = 4194304
```

To check whether these values are set:

```
# cat /proc/sys/net/core/rmem_max
#cat /proc/sys/net/core/wmem_max
```

If they are not set use the text editor of your choice to add these settings, then save the file. Rerun the cat command to verify that the values were set correctly. When you are done editing the file, run the following command:

```
# sysctl -p
```

Note: The sysctl command configures kernel parameter at runtime without rebooting the system. As an alternative, you could reboot the system.

Firewall Considerations

If your Atmos IFS client configuration includes a firewall between Linux server where you install the Atmos IFS client software and the Atmos server, make sure the Linux server's TCP keepalive timeout is less than the firewall's TCP timeout.

The Linux server's TCP keepalive is defined in the Linux kernel. It is set to 7200 seconds (2 hours) by default. If your firewall times out connections sooner than 7200 seconds, you can override the Linux kernel default by adding the net.ipv4.tcp_keep_alive_time to /etc/sysctl.conf (on the Linux server running the Atmos IFS client software), and by specifying a value that is less than the firewall timeout. For example:

```
net.ipv4.tcp_keepalive_time=1200
```

After you add this parameter, run this command (on the Linux server running the Atmos IFS client software) to make the change take effect:

```
# sysctl -p
```

Note: The sysctl command configures kernel parameter at runtime without rebooting the system. As an alternative, you could reboot the system.

Run this command on the Linux server running the Atmos IFS client software to verify the change:

```
# sysctl -a | grep tcp_keepalive_time
```

Platform specific requirements

RHEL6 — Kernel changes

You might encounter a problem with the RHEL memory defragmenter if you are running a RHEL6 with a 2.6.32 kernel (and possibly other similar kernels). One indication is if you see a message like the following (in /var/log/messages or in the output of the dmesg command):

```
khugepaged blocked more than xxx seconds
```

You can work around the problem, if by disabling the memory fragmenter. You can use the following commands to disable it temporarily (until the next reboot):

```
# echo 'never' > /sys/kernel/mm/redhat_transparent_hugepage/defrag
# echo 'no' >
   /sys/kernel/mm/redhat_transparent_hugepage/khugepaged/defrag
```

To disable it permanently, you can append the same lines to end of the rc.local file, then reboot.

```
For example:
#!/bin/sh
#
# This script will be executed *after* all the other init scripts.
# You can put your own initialization stuff in here if you don't
# want to do the full Sys V style init stuff.

touch /var/lock/subsys/local
echo 'never' > /sys/kernel/mm/redhat_transparent_hugepage/defrag
echo 'no' >
   /sys/kernel/mm/redhat_transparent_hugepage/khugepaged/defrag
```

RHEL6 — Software requirements

To install IFS on RHEL6, you must install the following version of OpenSSL:

- openssl098e-0.9.8e-17.el6.x86_64.rpm

Atmos requirements

Atmos software

Each version of Atmos works only with a specific version of Atmos IFS software. This means that each time Global Services upgrades Atmos or installs an Atmos Service Pack, you must also upgrade to the corresponding IFS client software.

For a standard release, the Atmos IFS package must be the same build and version number as the Atmos ISO. However, for an RPQ or service pack installation, the build and version numbers might not match. The RPQ or service pack will contain the correct software to install.

You also need to know if your system has ACDP installed or if any changes have been made to the Atmos network via an engineering approved RPQ. Work with your EMC Global Services representative to obtain this information.

Atmos ports

Table 4 lists the Atmos ports that must be open for TCP so the Atmos IFS client running on the Linux server can communicate with the Atmos services.

Table 4 Atmos ports that must be open

Port or port range	Description
389	Metadata Location Service
10301	Storage Service
10303	Resource Manager
10307	Metadata Location Service
10401-1040n	Metadata service — the range depends on the number of metadata service drives configured per node
10601-1060n	Remote metadata services — the range depends on the number of metadata service drives configured

Atmos IFS client configuration details

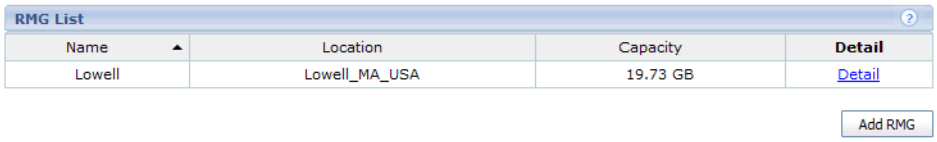
During the IFS installation procedure, you are prompted for details about the Atmos configuration. Be prepared to provide the following details:

Table 5 Atmos IFS client information worksheet

Component	Field	Your Value
Linux server	IP address	
	Login credentials	
RMG	Location — The location of the RMG that is geographically closest to the Linux server where you are installing the Atmos IFS software. **Hint:** To find the location, navigate to the RMG Summary page of the system administration GUI.	
	Tenant ID and Subtenant ID The unique identifiers for the tenant:subtenant namespace you want to mount.	Tenant ID:_____ Subtenant ID: _____
	Node IP addresses The IP addresses of the two nodes running the Resource Manager Service (RMS) in the RMG whose location you are specifying. **Hint:** To locate the IP addresses, go to the RMG Summary page. In the Node List area of the page find the node names ending in -001 and -002, and note the IP addresses of both.	Node-001 IP: _____ Node -002 IP _____

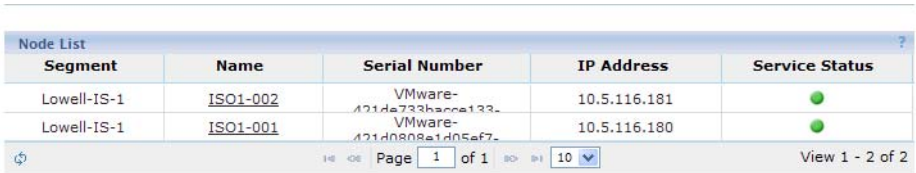
To find the **location** information:

1. Log in to the Atmos system management GUI as a SysAdmin user.
2. Navigate to the **RMG Summary** page for the Atmos RMG that contains the nodes you are configuring for use with IFS. In this example, the location is Lowell_MA_USA.



To find the node IP addresses:

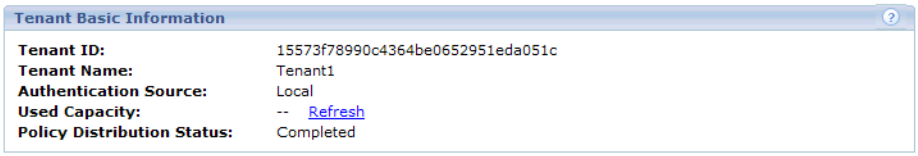
1. Log in to the Atmos system management GUI as a SysAdmin user.
2. Navigate to the **RMG Summary** page for the Atmos RMG that contains the nodes you are configuring for use with IFS, then click the **Detail** link to access the **Node List**.



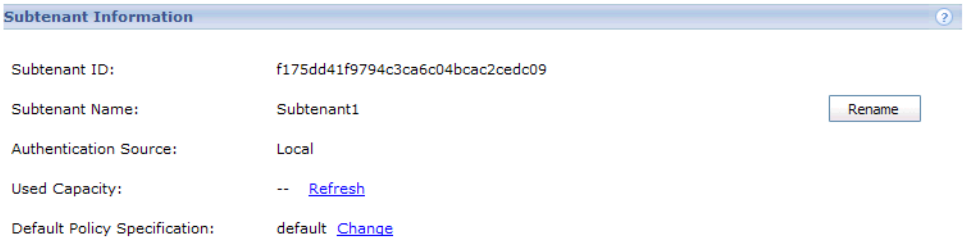
3. Note the IP Address of the first two nodes. In this example, they are IS01-001 and IS01-002.

To find the Tenant ID/Subtenant ID:

1. Log in to the Atmos Tenant Dashboard as the TenantAdmin user.



2. Write down the number in the **Tenant ID** field.
3. To obtain the Subtenant ID, click the edit icon in the **Action** column that corresponds to the Subtenant you want to use. The Subtenant ID displays at the top of the Subtenant Information page.



Network considerations

If the Atmos network been modified via an approved engineering RPQ, then you must discuss this with your EMC Global Services representative before performing the Atmos IFS installation and configuration.

Installing the Atmos IFS and IFS/NFS client software

To install the Atmos IFS client software on a Linux server, perform the following steps:

1. Log in to the Linux server as root.
2. Copy the Atmos RPM (and kmod-fuse module if necessary) to the /root directory of your Linux server.

3. Install the Atmos file-system software by running one of the commands described below:

   To install the Atmos IFS client software (without NFS support), run these commands from the /root directory:

Table 6

Linux OS	Machine	Command
RHEL5.5	32-bit	`rpm -ihv atmos-ifs-version.build.i386.rpm`
RHEL5.5, RHEL6.0 and SLES11	64-bit	`rpm -ihv atmos-ifs-version.build.x86_64.rpm`
Ubuntu	64-bit	`dpkg -i atmos-ifs-version-build.x86_64.deb`

   To install the Atmos IFS client software (with NFS support), run these commands from the /root directory to install both the Atmos FUSE module and the IFS rpm.

Linux OS	Machine	Software	Command
RHEL5.5	32-bit	Atmos FUSE module	`rpm -ivh kmod-fuse.version.build.i686.rpm`
		IFS with NFS	`rpm -ihv atmos-nfs-version.build.i386.rpm`
	64-bit	Atmos FUSE module	`rpm -ivh kmod-fuse.version.build.x86_64.rpm`
		IFS with NFS	`rpm -ihv atmos-nfs-version.build.x86_64.rpm`

   You will see a message like the following when the command completes:

```
# Preparing... ########################################### [100%]
   1:atmos-ifs ########################################### [100%]
```

4. Start the mauifs configuration script, by running this command:

```
# service mauifs configure
```

5. Complete the mauifs configuration by responding to the prompts using the data you gathered in Table 5, “Atmos IFS client information worksheet,” on page 19.

```
Enter IFS client location [boston]:
Enter Tenant ID [e6f16aec04a54ccfaed1c3cb0e507d13]:
Enter SubTenant ID [e6f16aec04a54ccfaed1c3cb0e507d13]:
Enable logging of client loghook(Y/[N])?:n
   Logging of client loghook is disabled.
Enter RMS IP Addresses/Hostnames separated by spaces:
   Getting Atmos Information from 10.32.73.65 ...
password:

mauifs is configured successfully.
```

Prompt	What to enter
Enter IFS client location [boston]	Specify the location of the RMG you recorded in Table 5, "Atmos IFS client information worksheet," on page 19.
Enter Tenant ID	Specify the Tenant ID you recorded in Table 5, "Atmos IFS client information worksheet," on page 19.
Enter SubTenant ID	Specify the Subtenant IDTable 5, "Atmos IFS client information worksheet," on page 19.
Is the data network configured on Atmos nodes?'	In Atmos 1.4.x versions, you will see this prompt. Type **Yes**, if the Atmos public (eth1) network has been modified so that the data and management networks use different IP addresses, otherwise, type **No**.
Enable logging of client loghook	Specify **Yes** when your Atmos installation also includes the Atmos Cloud Delivery Platform (ACDP). Specify **No** when your Atmos installation does not include ACDP.
RMS IP Addresses/Hostname	Specify the RMS IP address/hostnames you recorded in Table 5, "Atmos IFS client information worksheet," on page 19.
Continue connection	Type **Yes**
ifsadmin password	Type the password which is **ifsadmin** (by default). This account is a limited access account specifically for setting up mauifs clients.

You will see a message like the following when the configuration succeeds:

```
hosts                                        100%  689     0.7KB/s   00:00
rmslist.xml                                  100%  961     0.9KB/s   00:00
comm_network_cfg.xml                         100% 2347     2.3KB/s   00:00
Validating Atmos IFS client configuration ...
Atmos IFS client is configured successfully.                 [  OK  ]
```

If the Atmos IFS client software that you installed does not allow you to export NFS, go to step 7 .

6. To export NFS, you must change the value of the EnableNfsExport entry in the /etc/maui/mauifs_cfg.xml file from off (the default) to on. The default entry looks like this:

   ```
   <entry key="EnableNfsExport" value="off"/>
   ```

   Change it to:

   ```
   <entry key="EnableNfsExport" value="on"/>
   ```

7. Start the mauifs service:

   ```
   # service mauifs start
   ```

8. Test the mount point and confirm that the directory (dir1) and file (file1) were created with access and owner privileges, for example:

   ```
   # cd /mnt/mauifs
   ```

```
# mkdir dir1
# cd dir1
# touch file1
# ls -l
total 0
-rw-r--r--  1 root root  0  Sep 11 15:02 /mnt/mauifs/dir1/file1
```

9. You can safely remove the test file (file1) and the directory (dir1) once you have confirmed the test has completed successfully. For example:

```
[root@localhost mauifs]# rm file1
[root@localhost mauifs]# rmdir dir1
[root@localhost mauifs]# ls -l
total 0
```

CHAPTER 3
Administering Atmos IFS clients

This chapter includes the following topics:

Reconfiguring Atmos IFS and IFS/NFS

You might need to reconfigure the mauifs service if:

- The IP address of an Atmos node changes — The IFS client communicates with Atmos via the IP addresses you specified when you configured the mauifs service. If any of those IP addresses change, the IFS client will no longer be able to communicate with Atmos. You can easily update the IP addresses that the IFS client uses by reconfiguring the service to use the new IP addresses.
- You want to configure the Atmos IFS client for a different subtenant namespace.
- You are upgrading the Atmos IFS client from version 1.4.0 to a higher version.

The reconfigure operation requires that you stop the mauifs service. When you stop the mauifs service, the IFS client (and any Samba shares mapped to Windows clients) are disconnected from the Atmos cloud.

Before you begin, complete an Atmos IFS client information worksheet with the new details. See Table 5 on page 19.

To reconfigure IFS, rerun the service mauifs configure command, by following these steps:

1. Log in to the Linux server (where the Atmos IFS client software is installed) as root.
2. Stop the mauifs service (if it is running):

   ```
   # service mauifs stop
   ```

3. Reconfigure the service by running this command:

   ```
   # service mauifs configure
   ```

4. Complete the mauifs configuration by responding to the prompts using the new configuration values you gathered for the Atmos IFS client information worksheet.
5. Start the mauifs service by using this command:

   ```
   # service mauifs start
   ```

6. You can verify that the configuration was successful by going to the /mnt/mauifs directory and creating a directory and a file, for example:

   ```
   # cd /mnt/mauifs
   # mkdir dir2
   # cd dir2
   # touch file2
   ```

7. Confirm that the directory and file (in this example, dir2 and file2) were created with access and owner privileges:

   ```
   # ls -l
   total 0
   -rw-r--r-- 1 root root 0 Sep 11 15:02 /mnt/mauifs/dir2/file2
   ```

8. You can safely remove the test file (file2) and the directory (dir2) once you have confirmed the test has completed successfully. For example:

   ```
   [root@localhost mauifs]# rm file2
   Mounting the Atmos File System as Read-Only 27
   Administering Atmos IFS clients
   [root@localhost mauifs]# rmdir dir2
   [root@localhost mauifs]# ls -l
   ```

```
total 0
```

Mounting the Atmos File System as Read-Only

You can mount the Atmos file system by using the -r option in the mount command. This operation requires that you stop the mauifs service. When you stop the mauifs service, the IFS client (and any Samba shares mapped to Windows clients) are disconnected from the Atmos cloud.

Follow these steps:

1. Stop mauifs:

   ```
   # service mauifs stop
   ```

2. Start mauifs in read-only mode:

   ```
   # /usr/local/maui/bin/mauifs /mnt/mauifs --cfg
   /etc/maui/mauifs_sys.xml --prop
   /etc/maui/mauifs_cfg.xml -r
   ```

3. To verify that the system is mounted as read-only, type this command:

   ```
   # touch /mnt/mauifs/new
   ```

   You should see the following:

   ```
   touch:cannot touch `/mnt/mauifs/new':Read-only file system
   ```

Configuring Samba access to the Linux server

Atmos supports the Samba security levels of user, share, and Active Directory. For more information on configuring Samba security levels and Samba and Active Directory, see the documentation on the Samba Web site (http:/wiki.samba.org).

The following example shows how to export a share called atmos for the /mnt/mauifs directory, which is the top-level Atmos directory. For this example the security level is set to user. The read and write access is intended for a user named atmos_user whose password is atmos_password.

If you intend to use Active Directory, you must synchronize your Atmos NTP server with your Active Directory server.

1. Log in to the Linux server (where you installed IFS) as root.
2. Edit the smb.conf file, and create a share called atmos for the /mnt/mauifs directory.

   For example (using the vi editor):

   ```
   vi /etc/samba/smb.conf
   ```

   Enter the following lines to the bottom of the file:

   ```
   [atmos_system]
   comment = Temporary file space
   path = /mnt/mauifs/
   read only = no
   writable = yes
   public = yes
   ```

3. Save and exit the file.

4. Create a Linux user called atmos_user whose password is atmos_password:

   ```
   # useradd atmos_user -p atmos_password
   ```

5. Start SAMBA services:

   ```
   # service smb start
   ```

   You see output like the following:

   ```
   Starting SMB services:[ OK ]
   Starting NMB services:[ OK ]
   ```

6. Add the SAMBA user:

   ```
   #smbpasswd -a atmos_user
   ```

   You will be prompted to add the password. (This is the same password you specified above when you created the linux user named atmos_user).

   ```
   New SMB password:atmos_password
   Retype new SMB password:atmos_password
   ```

   You will get the following output:

   ```
   Added user atmos.
   ```

7. Open the mauifs directory to non-root users:

   ```
   # chmod 777 /mnt/mauifs
   ```

Map the share to a drive on a Windows system

1. Log in to a Windows machine as a user.
2. Open a DOS window, and at the DOS prompt, type:

   ```
   C:\>net use * \\linux-client\atmos_system atmos_password
   /user:atmos_user
   ```

   Where linux-client is the IP address or name of the Linux server where you installed Atmos IFS. To assign a specific Windows drive letter, replace * above with drive-letter: (the drive letter, followed by a colon). You will get output like this:

   ```
   Drive T: is now connected to \\linux-client\atmos_system
   ```

   The command completed successfully.

   The drive letter is listed in the output only if you specified it in the input.

3. Test the share:

   ```
   C:\>t:
   T:\>echo fff > test
   T:\>dir
   ```

   You will get output like the following:

   ```
   Volume in drive T is atmos
   Volume Serial Number is 6C2E-0171
   06/23/2008 10:25 AM <DIR> .
   07/22/2008 10:16 PM <DIR> ..
   06/24/2008 01:54 PM <DIR> mauiws
   07/23/2008 01:20 PM6 test
   1 File(s)6 bytes
   ```

```
3 Dir(s)0 bytes free
```

Refreshing IFS configuration when adding storage capacity

This section is only for Atmos Version 2.0.1 and higher

You must refresh your IFS configuration when you add new nodes, RMGs, or install segments to your Atmos system. Coordinate this activity with the EMC Global Services field representative that is adding the capacity to your Atmos system. They will inform you when to perform the Atmos IFS refresh procedure. To refresh Atmos IFS client connections to the Atmos system, follow these steps:

1. Log in to the Linux server as root.
2. Refresh the Atmos IFS client connections, by executing the following command:

```
# service mauifs refresh

Getting Atmos Information from 10.5.116.186 ...
The authenticity of host '10.5.116.186 (10.5.116.186)' can't be
established.
RSA key fingerprint is
21:55:b2:36:84:04:f9:88:36:0c:4a:f1:27:70:83:42.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '10.5.116.186' (RSA) to the list of known
hosts.
Password:
hosts 100% 1483 1.5KB/s 00:00
rmslist.xml 100% 2157 2.1KB/s 00:00
comm_network_cfg.xml 100% 2402 2.4KB/s 00:00
```

Removing Atmos IFS and IFS/NFS software

When you remove the Atmos IFS client software, applications that used this Atmos IFS client are no longer able to connect to Atmos. The data committed to the Atmos system through IFS is not removed from the Atmos system after the IFS software is removed.

To remove the Atmos IFS client software from the Linux server, follow these steps:

1. Log in to the Linux server as root.
2. Stop the Atmos service:

   ```
   # service mauifs stop
   ```

   This command fails if there are any applications or users accessing the data on the Atmos system through this mount point.
3. Uninstall and clean up Atmos IFS software.

   IFS (without NFS support), use these commands:

Linux OS	Machine	Command
RHEL5.5	32-bit	`rpm -e atmos-ifs`
RHEL5.5, RHEL6, SLES11	64-bit	
Ubuntu	64-bit	`dpkg -P atmos-ifs`

IFS (with NFS support), install both the Atmos FUSE module and the IFS rpm.

Linux OS	Machine	Software	Command
RHEL 5.5	32-bit 62-bit	Atmos FUSE module	`rpm -e kmod-fuse`
		IFS with NFS	`rpm -e atmos-nfs`

4. You can confirm that the IFS software has been removed from the system, you can use commands like the following:

```
# rpm -qa | grep atmos
# rpm -qa | grep fuse
```

Atmos IFS and IFS/NFS client service command reference

After you install the Atmos IFS client rpm, you need to start the mauifs service on the Linux server. It is this service that manages the interaction with the Atmos cloud. You can use the mauifs service commands to start, stop, and configure the mauifs service. The mauifs command has this syntax:

```
# service mauifs [start|stop|force-stop|restart|status|configure]
```
and

```
# service mauifs refresh [atmos_ifs_conf_account_password]
   [atmos_ifs_conf_port]
```

- **start** — Starts the mauifs service if it is not running.
- **stop** — Stops the mauifs service if it is running. This command fails if there are any applications or users accessing the data on the Atmos system through this mount point.
- **force-stop** — Forces the mauifs service to stop.
- **restart** — Stops a running mauifs service, then starts it.
- **status** — Displays the current state of the service (running or stopped).
- **configure**— Configures or reconfigures the mauifs service. Provides a command-line wizard that walks you through the Atmos IFS client configuration steps. The mauifs service cannot be running when you configure it. After you configure or reconfigure the service, you have to start or restart it.
- **refresh** — Connects to the Atmos host specified during configuration and obtains updated configuration information. Use this command if you have added capacity (RMG, IS, or expansion kits) to the Atmos system that the IFS client is connected to.

Table 7 provides example of these commands.

Table 7 Atmos IFS client service command examples

Task	Example

To start the service	`# service mauifs start`
	`Starting mauifs... [  OK  ]`
	
	What you see if the service is already started:
	`# service mauifs start`
	`Starting mauifs... Error: mauifs already running  [FAILED]`

To stop the service if it is running	`# service mauifs stop`
	`Shutting down mauifs, check if NFS/CIFS is configured`
	`Shutting down mauifs  [  OK  ]`
	
	If the service is already stopped:
	`# service mauifs stop`
	`Shutting down mauifs, check if NFS/CIFS is configured`
	`Shutting down mauifs  [FAILED]`

To check the status	`# service mauifs status`
	
	If the service is running:
	`mauifs (pid  2040) is running...`
	
	If the service is not running:
	`# service mauifs status`
	`mauifs is stopped`

To restart the service if it is running	`# service mauifs restart`
	`Shutting down mauifs, check if NFS/CIFS is configured`
	`Shutting down mauifs  [  OK  ]`
	
	`Starting mauifs...  [  OK  ]`

To configure or reconfigure the service	`# service mauifs configure`
	
	You are prompted for the following (these values are described in the sections where you perform this command):
	`Enter IFS client location [boston]:`
	`Enter Tenant ID [e6f16aec04a54ccfaed1c3cb0e507d13]:`
	`Enter SubTenant ID [e6f16aec04a54ccfaed1c3cb0e507d13]:`
	`Enable logging of client loghook(Y/[N])?:n`
	`Logging of client loghook is disabled.`
	`Enter RMS IP Addresses/Hostnames separated by spaces: 10.32.73.65`
	`Getting Atmos Information from 10.32.73.65 ...`
	`password:`
	
	The mauifs service cannot be running when you configure it. After you configure it, you have to start it.

To refresh the configuration information	`# service mauifs refresh ifsadmin 22`
	`Getting Atmos Information from 10.5.116.248 ...`
	`Password:`
	`hosts  100% 1707  1.7KB/s  00:00`
	`rmslist.xml  100% 2185  2.1KB/s  00:00`
	`comm_network_cfg.xml  100% 2440  2.4KB/s  00:00`

Troubleshooting

If you experience any difficulties administering IFS within your Linux environment, contact EMC Technical Support or your local account team for guided assistance.

Connection refused error

Symptom

You are using Atmos IFS, and you are able to successfully configure and start the mauifs service, but you get a connection refused error when you try to access /mnt/mauifs.

This problem might occur if you installed Atmos IFS/NFS on the Linux server first, then installed the Atmos IFS without NFS on the same Linux server later.

Workaround

Perform this procedure to recover the environment by reloading the FUSE module:

1. Determine if kmod-fuse is installed on the client, by running this command:

   ```
   # rpm -qa|grep kmod
   ```

   The following output indicates that it is present:

   ```
   kmod-fuse-1.0-1
   ```

2. If kmod-fuse is present, remove it by using this command:

   ```
   # rpm -e kmod-fuse-1.0-1
   ```

3. Stop the mauifs service, by running this command:

   ```
   # service mauifs stop
   ```

2. Run this command to obtain the fuse module name.

   ```
   # modinfo fuse
   ```

   For example:

   ```
   # modinfo fuse
   filename:       /lib/modules/2.6.18-194.el5/kernel/fs/fuse/fuse.ko
   alias:          char-major-10-229
   license:        GPL
   description:    Filesystem in Userspace
   author:         Miklos Szeredi <miklos@szeredi.hu>
   srcversion:     A9DF3EAB6325F572A4B1B92
   depends:
   vermagic:       2.6.18-194.el5 SMP mod_unload gcc-4.1
   module_sig:
   883f3504ba0377978ccfeaa942826a1126d5f0a0bc6258e3d6365c5f60cf3fa57f5
   488763ba87a70a0ccff767681a0f17d446e542e2c0f4aedc8f5bb
   ```

3. Write down the filename, for example:

   ```
   filename:       /lib/modules/2.6.18-194.el5/kernel/fs/fuse/fuse.ko
   ```

4. Run this command to remove the fuse module from the kernel:

   ```
   # rmmod fuse
   ```

5. Run this command to reload the FUSE module. Use the file name you obtained earlier in this procedure:

   ```
   # insmod <filename>
   ```

   For example:

   ```
   # insmod /lib/modules/2.6.18-194.el5/kernel/fs/fuse/fuse.ko
   ```

5. Start the mauifs service by running this command:

   ```
   # start mauifs
   ```

CHAPTER 4
Configuring ACDP to meter IFS

This chapter contains the following topics:

Overview

Atmos does not enable metering on IFS servers by default. This procedure enables IFS metering, installs rsyslog and the Flume agent, and updates configuration files on the ACDP nodes and customer IFS servers.

Prerequisites

- The Java Runtime Environment (JRE) with a minimum Java version of 1.6.0_24 must be installed on IFS servers before beginning this procedure.
- The servers must have the atmos-ifs rpm package installed and be connected to the Atmos host before proceeding.

Enabling metering on the IFS server

Complete the following steps to enable metering on Linux servers where IFS is installed.

1. Login as root to the IFS server.
2. Enable IFS metering by manually modifying the following lines in /etc/maui/mauifs_cfg.xml from:

   ```
   <entry key="AccessMethod" value="unknown" />
   <entry key="enableMetering" value="false"/>
   ```

   to

   ```
   <entry key="AccessMethod" value="ifs" />
   <entry key="enableMetering" value="true"/>
   ```

Installing rsyslog on the IFS server

Complete the following steps to verify that the correct rsyslog version is installed on the IFS server:

1. Verify that rsyslog (version 3.22 or higher) is installed on the IFS host as shown in the following example:

   ```
   # rpm -q rsyslog
   rsyslog-3.22.1-3.el5_6.1
   ```

2. If rsyslog is not installed, install rsyslog (version 3.22 or higher) on the IFS server.

Installing a flume agent on the IFS server

Complete the following steps to install a flume agent on the IFS server:

1. Copy cdp.repo from /etc/yum.repos.d/ on any ACDP node into /etc/yum.repos.d/ on the IFS server.
2. 2. Install the flume agent using yum:

   ```
   # yum -y install cdp-flume
   ```

Modifying configuration files on ACDP nodes and the IFS server

Complete the following steps to update configuration files on the ACDP nodes and the IFS server:

1. Copy the Configuration.xml from /opt/cloudcommon/conf/ on any ACDP node into /opt/cloudcommon/conf/ on the IFS server.
2. Edit the /opt/cloudcommon/conf/Configuration.xml by adding the hostname of the IFS server to the “name=agent” line for the “flume” component name in all ACDP nodes and the IFS server.

Note: This step must be completed for the configuration.xml file on each ACDP node and the IFS server.

   For example, if the host name of the IFS server is acct149.spudco.com, the edited line might look like this:

```
- <component name="flume">
- <properties>
<property encrypt_key="" encrypt="false"
value="acc2.spudco.com,CLST1-001,CLST1-002,acct149.spu
dco.com" name="agent" />
```

3. Run /opt/cloudcommon/flume/bin/config.sh on both the Flume master node and the IFS server.

Note: Determine the node running the Flume master service by using the ACDP Site Details page (https://‹IP address of System Management Node›/sysmgmt) to display the services running on each ACDP node; the Flume master service runs on the ACDP Metering node.

Verifying the configuration

Complete the following steps to verify that metering statistics are being collected from the IFS server:

1. Open the Flume master GUI page (http://‹IP of Flume master›:35871/flumemaster.jsp).
2. Verify that the Flume status is ACTIVE on the IFS server.
3. Check the metering statistics through the portal or API to verify that IFS operations are being metered.

CHAPTER 5
Upgrading Atmos 1.4.1 (and higher) IFS clients

You must upgrade your existing Atmos IFS client software whenever EMC Global Services upgrades the associated Atmos system. This chapter describes how to perform an Atmos IFS client software upgrade. It includes the following topics:

Note: The upgrade operation stops the mauifs service. When the mauifs service is stopped, the Atmos IFS client (and any Samba shares mapped to Windows clients) are disconnected from the Atmos cloud.

Prerequisites

Before starting the upgrade:

- Obtain the Atmos IFS client software that corresponds with the Atmos version you are upgrading to.

  Atmos supports two versions of Atmos IFS client software. The package names follow the pattern described in the following table.

Component	Description	Package name pattern
Atmos IFS/NFS	Can be exported as NFS	atmos-nfs-version.build.‹rpm|deb›
Atmos IFS	Cannot be exported as NFS	atmos-ifs-version.build.‹rpm|deb›

- Complete the "Atmos IFS client information worksheet" on page 19 because it is necessary to reconfigure the system as part of the upgrade process.
- Coordinate the Atmos IFS client upgrade schedule with the EMC Global Services field representative that is performing the Atmos upgrade. They will inform you when to perform this Atmos IFS client upgrade procedure.

Upgrade the Atmos IFS or IFS/NFS client software

Perform the software upgrade in coordination with your EMC Global Services representative.

1. When instructed to do so, copy the Atmos IFS or IFS/NFS client software to the /root directory of your Linux server.
2. Stop the mauifs service by running the following command on the Linux server:

   ```
   # service mauifs stop
   Shutting down mauifs, check if NFS/CIFS is configured
   Shutting down mauifs                                       [  OK  ]
   ```

3. If you are running the IFS/NFS variant perform this step; otherwise go to Step 4:

   a. Stop the kmod-fuse module, then remove it by running the following commands:

   ```
   # rmmod kmod-fuse
   # rpm -e kmod-fuse
   ```

   b. Install the new kmod-fuse module by running the command for your linux platform:

Linux OS	Machine	Command
RHEL5.5	32-bit	`# rpm -ivh kmod-fuse-<version.build>.i686.rpm`
	64-bit	`# rpm -ivh kmod-fuse-<version.build>.x86_64.rpm`

   The output of the command looks like this:

   ```
   Preparing...                ##################[100%]
   1:kmod-fuse                 ##################[100%]
   ```

4. Install the new IFS client, by running the following command from the /root directory:

```
# rpm –Uvh atmos-new-version
```

5. If you are upgrading from version 2.0.x, 2.1.0, or 2.1.0 SP1 to a higher version, you must run the two sed commands in this step. If you are upgrading any other version, skip to Step 6.

   a. Run this sed command first:

```
# sed -n -e '/<?xml version/p' -e '/<!-- __CR__/,/__CR__ -->/p' -e '/<maui:properties/,/>/p'
-e '/..*key=\"tenantId\".*value=\"[^\"]*\"\/>.*/p' -e
'/..*key=\"subtenantId\".*value=\"[^\"]*\"\/>.*/p' -e '/<\/maui:properties>/p'
/etc/maui/mauifs_cfg.xml > /etc/maui/mauifs_identity.xml
```

   The sed command produces no output, but you can test whether the command completed successfully by using the echo $? command. A return code of 0 indicates the sed command completed successfully.

```
# echo $?
```

   b. If the previous sed command succeeded, run this sed command. If the command did not succeed, contact your field service representative:

```
# sed -i.bak -e '/SupportMultiSubtenancyExposing/d' -e
's/\(..*key=\"securedClient\".*value=\"\)[^\"]*\(\"\/\>.\)*/\1'false'\2/' -e 's/<!--.*-->//g'
-e '/<!-- __CR__/,/__CR__ -->/p' -e '/<!--/,/-->/d' /etc/maui/mauifs_cfg.xml
```

   The sed command produces no output, but you can test whether the command completed successfully by using the echo $? command. A return code of 0 indicates the sed command completed successfully.

```
# echo $?
```

6. Restart the mauifs service, by running this command:

```
#service mauifs restart

Shutting down mauifs, check if NFS/CIFS is configured
Shutting down mauifs                                       [  OK  ]

Starting mauifs...                                         [  OK  ]
```

7. Notify the EMC Global Services representative performing the Atmos upgrade that this step is complete. Do not continue with this procedure until notified by the EMC Global Services representative performing the Atmos upgrade.

Determine if you need to update the version.xml file

The version.xml file defines the version of the protocol used by Atmos components. For the IFS client, it enables protocol-level backward compatibility during the upgrade process. To ensure a stable system once the upgrade is complete, the value in version.xml must match the value of the Atmos release version. Refer to “IFS client version compatibility settings” in the *Atmos Release Notes* for a list of the version.xml settings per Atmos release. Review this list and work with your EMC field representative to determine if you need to complete the procedure described in “Update the version.xml file”, next.

Update the version.xml file

When the EMC Global Service representative performing the upgrade of your Atmos system instructs you to do so, perform the following procedure on the Linux server where you installed the Atmos IFS client software:

1. Change the version.xml file so that it matches the Atmos version that is currently running on your Atmos system (the version you upgraded to), by using this command:

   ```
   # sed -i s/<upgrade-source-version>/<upgrade-target-version>/
   /etc/maui/version.xml
   ```

   For example, if you upgraded from Atmos version 2.0.3 to Atmos version 2.1.0 SP2, then the command would look like this:

   ```
   # sed -i s/203/210.2/ /etc/maui/version.xml
   ```

2. Use the following commands to complete the upgrade:

   ```
   # cd /mnt/mauifs
   # setfattr -n user.maui.upgrade -v true /mnt/mauifs
   ```

3. Notify the EMC Global Services representative that you have completed this step.