AFS 3.4a README

Audience	AFS administrators who have a thorough understanding of AFS and UNIX.
Purpose	To list additional ports supported, explain defect fixes, and detail the installation of AFS on HP-UX 10 systems.
Production Notes	Text Emacs (UNIX text editor)
Research	Discussion with the developers and installation of AFS on an HP-UX 10 system.

SECTION 1: INTRODUCTION

This release of AFS 3.4a includes defect fixes and support for several additional ports. The following sections list the additional ports supported, explain defect fixes, and detail the installation of AFS on HP-UX 10 systems.

SECTION 2: PORTS

AFS 3.4a provides additional support for the following ports:

```
Solaris 2.5 (sun4x_55)
OSF3.2c     (alpha_osf32c)
SGI 5.3 MP  (sgi_53)
AIX 4.1 MP  (rs_aix41)
```

AFS 3.4a also provides support for the following ports as a Beta release:

```
HP-UX 10.01 (hp700_ux100 and hp800_ux100)
SGI 6.1     (sgi_61)
```

SECTION 3: SYSTEM NAME AND CPU AND OPERATING SYSTEM TYPE

sun4x_55	Sun SPARCstation IPC and other models (with kernel architecture "sun4c," "sun4d," "sun4m," and "sun4u") running Solaris 2.5 with single and multiple processors
hp700_ux100	Hewlett-Packard 9000 Series 700 running HP-UX 10 with single and multiple processors
hp800_ux100	Hewlett-Packard 9000 Series 800 running HP-UX 10 with single and multiple processors
alpha_osf32c	DEC AXP system running Digital UNIX (formerly DEC OSF/1) version 3.2c with single and multiple processors
sgi_53	Silicon Graphics system running IRIX 5.3 with single and multiple processors
sgi_61	Silicon Graphics system running IRIX 6.1 with single and multiple processors
rs_aix41	IBM RS/6000 running AIX 4.1 with single and multiple processors

To install AFS on all additional ports except HP-UX 10, follow the instructions in the AFS Installation Guide and the AFS 3.4a Release Notes.

SECTION 4: HP-UX 10 INSTALLATION

Certain instructions for installing AFS on an HP-UX machine differ from the instructions in the AFS Installation Guide. This README provides only the instructions that replace directions in the AFS Installation Guide. The following table includes the sections in the AFS Installation Guide that are replaced and directs you to either the AFS Installation Guide or this README as appropriate. To install AFS on an HP-UX machine, follow the instructions in the AFS Installation Guide, with the following exceptions:

AFS INSTALLATION GUIDE	REFER TO
Section 2.6	README SECTION 6
Section 2.6.1	README SECTION 6a and 6c

Section 2.6.2	README SECTION 6b and 6c
Section 2.6.3	Follow the instructions in this section that explain how to set up AFS partitions on HP Series 800 systems that use logical volumes.
Section 2.6.4	README SECTION 7
Section 3.1.2.3	For each step, follow the instructions below:
Step 1	README SECTION 6, 6a or 6b, 6c
Step 2	Follow the instructions in this step.
Step 3	Follow the instructions in this step that explain how to set up AFS partitions on HP Series 800 systems that use logical volumes.
Step 4	Ignore this step.
Step 5	README SECTION 7
Step 6	Follow the instructions in this step.
Section 4.2.3	README SECTION 6
Section 4.2.3.1	README SECTION 6a and 6c
Section 4.2.3.2	README SECTION 6b and 6c
Section 5.4	README SECTION 8
Section 5.5	README SECTION 8

SECTION 5: DEFECT FIXES

3.4-7147-revert.fileserver.ftruncate

The added functionality that allowed users to extend the length of files with the truncate system call causes the file server to crash. This functionality has been removed. You can no longer extend the length of a file with the truncate system call. Transarc plans to implement this functionality in the future.

3.4-7281-solaris-xlater-performance

Solaris only: Previously, Solaris NFS translator machines experienced significant performance problems. The performance has been improved.

3.4-7298-afsd-shutdown

Solaris only: Previously, Solaris machines were hanging on shutdown. Now, Solaris machines do not hang on shutdown in most circumstances. Further work is being done to fix the remaining occurrences. The correction will be available in the next patch tree release.

3.4-7299-bad-srvaddr-removal
~~~~~~~~~~~~~~~~~~~~~~~~~~~~

When an AFS 3.4 file server was rebooted with a changed list of IP addresses, AFS 3.4 clients crashed. In some cases, clients crashed when an AFS 3.4 file server was rebooted, even without changed IP addresses. AFS clients no longer crash when upgraded servers are rebooted.

3.4-7251-vlserver.fix.register.addrs
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

When a file server registered IP addresses in the VLDB, it occasionally passed the same address more than once. This fix eliminates duplicate IP addresses. The file server no longer passes the same IP address more than once.

3.4-7256-fs.storebehind.core.dumps.when.not.su
~~~~~~

The -allfiles switch on the fs storebehind command requires superuser privileges. Previously, a core dump occurred if a user without superuser privileges issued the fs storebehind command with the -allfiles switch. This fix prevents the core dump. Now, AFS displays only the message that the user does not have the required access rights to issue the fs storebehind command with the -allfiles switch.

3.4-7163-server.pref.zero
~~~~~~~~~~~~~~~~~~~~~~~~~

A multihomed file server has multiple interfaces, each with its own IP address. When an AFS client issued the fs setserverprefs command for a file server, the file server successfully initialized its primary interface but failed to initialize its remaining interfaces. This caused the preference for the remaining interfaces to be set to 0 (zero), which indicated to the client that the interfaces did not exist. If the server's primary interface became unavailable, the client could not access the alternate interfaces to obtain a replicated version of a volume.

This problem has been corrected. Now, when a client issues the fs setserverprefs command for a multihomed file server, all interfaces for that file server are initialized to the indicated preference. If the primary interface becomes unavailable, the client can access the alternate interfaces to obtain a replicated version of a volume.

3.4-7199-nfs.translator.panic.in.lookup
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Previously, if a system administrator exported /afs twice when attempting to allow NFS clients to access the information in /afs, an NFS translator machine failed to link properly to the second export of /afs. As a result, when a user tried to look at something in AFS, using ls or cd, for example, the NFS client panicked. NFS clients now link properly to a second export of /afs and no longer panic when users try to look at something in /afs.

3.4-7359-aix41.salvager.gets.wrong.data.for.inode
~~~~~~

AIX only: Previously, problems in the salvager program caused the salvager to report missing inodes if an administrator configured disk partitions with anything other than the default fragment size. This resulted in data loss or failure to salvage the partition. The salvager no longer reports missing inodes when an administrator configures disk partitions with something other than the default fragment size. Note that the v3fshelper program has been correct for every release of AIX 4.1.

3.4.7346-client.close.disables.fetch
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

AFS anticipates and prefetches the next chunk of data needed by the user. Previously, if a client read and closed one chunk of data before AFS finished fetching the next chunk, the client's cache manager occasionally filled the second chunk with nulls. The cache manager no longer fills the chunk with nulls; it correctly fetches the data.
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

3.4-7138-vos.examine.fails.when.vol.missing
~~~~~~

Previously, vos examine failed to retrieve all read-only volume information if it encountered a single unavailable read-only volume. Now, vos examine continues to search for the remaining read-only volumes and reports information correctly.

3.4-7249-fileserver.register.ip.addrs.on.each.restart
~~~~~~

The maximum number of IP addresses allowed per machine is 15. Previously, if a machine had more than 15 IP addresses, AFS did not register any of them. This fix enables AFS to register the first 15 IP addresses. Now, if a machine has more than 15 IP addresses, AFS displays a message stating that it can register only 15 addresses.

Note that previous documentation stated that file servers could register a maximum of 16 addresses. That documentation was incorrect. The maximum number of IP addresses allowed per machine is 15.

Also, you no longer have to delete the /usr/afs/local/sysid file to force file servers to reregister their IP addresses. Now, file servers register their IP addresses each time they are rebooted.

3.4-7302-govt.rights.message
~~~~~~~~~~~~~~~~~~~~~~~~~~~

Conforming to government regulations, Transarc has included a government disclaimer at the beginning of each executable, afsd and bosserver.

3.4-7048-aix413.fine.grain.rx.locks
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

AIX only: AFS now supports fine grain locking on the network layer of the AFS client. Fine grain locking is installed to deal effectively with the multithreaded kernel of the AIX platform. The benefit of fine grain locking is a modest performance gain.

3.4-7184-vos.release.can.time.out
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Previously, a vos release to AFS 3.3 file servers using AFS 3.4 vos code occasionally timed out if there were 3 or more read-only volumes. Vos release no longer times out when it encounters 3 or more read-only volumes.

3.4-5445-failed.calls.update.vol.RWtime
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Previously, when a file with a link count greater than 1 was overwritten, AFS failed to remove the file. Now, AFS successfully removes overwritten files.

3.4-7337-hp.getaddr.failure
~~~~~~~~~~~~~~~~~~~~~~~~~~

HP-UX only: Previously, multihomed file servers registered incorrect IP addresses or only some IP addresses. Now, multihomed file servers register all correct IP addresses.

3.4-7393-zero-length-addrlist
~~~~~~~~~~~~~~~~~~~~~~~~~~~~

A VLDB was corrupted so that a server entry for a particular volume appeared to have no valid IP addresses. Clients accessing that volume crashed. The client has been modified to handle this type of corrupt data in the VLDB.

3.4-7286-ubik.error.message.did.not.byte.swap.addr
~~~~~~

Ubik servers synchronize with each other by sending files back and forth. Previously, when one ubik server failed to receive a file, it printed an error message that reported the wrong IP address of the other ubik server. Now, the ubik server reports the correct IP address.
~~~~~~

3.4-7244.break.bulk.status.callbacks

In AFS, a client can use the bulk status RPC to retreive the status for more than one file at a time. Previously, file servers failed to break callbacks on files whose status had been retrieved by a client using this RPC. As a result, the client would not see updates to the affected files made by other clients. File servers now break callbacks on these files.

SECTION 6: GETTING STARTED ON HP-UX SYSTEMS

To load AFS into the kernel on HP-UX systems, choose one of two methods:

- Dynamic loading using Hewlett-Packard's kload program (proceed to SECTION 6a: USING KLOAD ON HP-UX SYSTEMS).
- Building a new kernel (proceed to SECTION 6b: BUILDING AFS INTO THE KERNEL ON HP-UX SYSTEMS).

If you are installing a file server, continue by creating partitions for storing AFS volumes and replacing the standard fsck program with an AFS-safe version.

SECTION 6a: USING KLOAD ON HP-UX SYSTEMS

The kload program is the dynamic kernel loader provided by Hewlett-Packard for HP-UX 10 systems. For a machine to remain an AFS machine, kload must run each time the machine boots. You can invoke kload automatically in the machine's initialization scripts.

To invoke kload:

Step 1: The first time you install AFS on a machine, copy the kernel extensions to /opt/dce/ext.

Note: The standard location for AFS kernel extensions is the directory /usr/vice/etc/dkload.

```
# cd /opt/dce/ext

# cp /usr/vice/etc/dkload/libafs.o afs.ext

# cp /usr/vice/etc/dkload/libafs.nonfs.o afs.nonfs.ext
```

Step 2: Invoke kload.

```
If the machine's kernel does not include support for NFS
server functionality, you must substitute afs.nonfs for
afs in the command line below.

# kload afs
```

Step 3: To invoke kload automatically at reboot, install the initialization script provided by Transarc for HP-UX 10 systems. See SECTION 6c: INSTALLING THE INITIALIZATION SCRIPT for instructions.

SECTION 6b: BUILDING AFS INTO THE KERNEL ON HP-UX SYSTEMS

Step 1: Follow the kernel building instructions in SECTION 8 of this README.

Step 2: Move the existing kernel on the local machine to a safe location.

```
# mv /stand/vmunix /stand/vmunix.save
```

Step 3: Move the new kernel into /stand/vmunix.

```
# mv /stand/vmunix_test /stand/vmunix
```

Step 4: To start using the new kernel, reboot the machine.

```
# shutdown -r
```

Step 5: Install the initialization script provided by Transarc for HP-UX 10 systems. See SECTION 6c: INSTALLING THE INITIALIZATION SCRIPT for instructions.

SECTION 6c: INSTALLING THE INITIALIZATION SCRIPT

On System-V based machines such as HP-UX 10, whether you have built AFS into the kernel or used a dynamic loader such as kload, you must install the initialization script and ensure that kload is invoked properly at each reboot. Follow these steps to install the initialization script.

Step 1: Verify that the local /usr/vice/etc/dkload directory contains rc.afs.

Step 2: Copy rc.afs from /usr/vice/etc/dkload to the HP-UX 10 initialization files directory (generally, /sbin/init.d). Make sure the initialization script is executable and link it to the two locations where HP-UX 10 expects to find it.

```
# cd /sbin/init.d

# cp /usr/vice/etc/dkload/rc.afs afs

# chmod 555 afs

# ln -s ../init.d/afs /sbin/rc0.d/K66afs

# ln -s ../init.d/afs /sbin/rc3.d/S14afs
```

SECTION 7: REPLACING fsck ON HP-UX SYSTEMS

Never run the standard fsck program on an AFS file server machine. Standard fsck discards the files that make up AFS volumes on the partitions associated with the /vicepx directories because they are not standard UNIX directories. In this step, you replace standard fsck with a modified fsck provided by Transarc. It properly checks both AFS and standard UNIX partitions.
To repeat:

NEVER RUN THE STANDARD VENDOR-SUPPLIED fsck PROGRAM ON AN AFS FILE SERVER MACHINE. IT DISCARDS AFS VOLUMES.

You can verify that the correct AFS version of fsck is running.
The AFS version of fsck displays the following banner:

[Transarc AFS (R) 3.4 fsck]

Step 1: Move standard fsck to a save file, install the AFS-modified fsck ("vfsck") to the standard location, and link standard fsck to it.

```
# mv /sbin/fs/hfs/fsck /sbin/fs/hfs/fsck.orig

# cp /usr/afs/bin/vfsck /sbin/fs/hfs/vfsck

# ln -s /sbin/fs/hfs/vfsck /sbin/fs/hfs/fsck
```

Step 2: Proceed to Section 2.12 (page 2-40) of the AFS Installation Guide if you are installing your first file server machine or Section 3.1.3 (page 3-27) if this is not your first file server machine.

SECTION 8: BUILDING KERNELS ON HP-UX SYSTEMS

Step 1: Copy the AFS kernel modules libafs.a and libafs.nonfs.a from the distribution directory to /etc/conf/lib. The standard directory in which AFS kernel modules are loaded is /usr/afs/sys. They are also accessible in /usr/afsws/root.client/bin.

```
# cd /etc/conf/lib

# cp /usr/afs/bin/libafs.a .

# cp /usr/afs/bin/libafs.nonfs.a .
```

Step 2: Add entries for AFS to /stand/system.

To /stand/system, add "afs" right after "cdfs" so that the result looks like the following:

```
      .
      .
    cdfs
    afs
      .
      .
```

Step 3: Add entries for AFS to /etc/conf/master.d/core-hpux.

To /etc/conf/master.d/core-hpux, add the following AFS references in the indicated places.

Note: If the kernel does not include support for NFS server functionality, substitute entries including libafs.a with libafs.nonfs.a.

The result should look like the following:

```
. . .
. . .
*fileset NFS-RUN libnfs.a
nfs             nfsc             10      100     -1      -1
afs             afsc             10      100     -1      -1
. . .
. . .
* filesystem
ufs             libufs.a
nfs             libnfs.a
cdfs            libcdfs.a
lofs            libhp-ux.a
afs             libafs.a
$$$
. . .
. . .
libufs.a        1
libnfs.a        0
libcdfs.a       0
libpfo.a        0
libhp-ux.a      1
libafs.a        0
$$$
. . .
. . .
```

Step 4: Working in /etc/conf, compile the kernel. The resulting kernel, created as /stand/vmunix_test, is suitable for (and must run on) both AFS clients and file server machines of this system type.

Change directories to /etc/conf.

```
# cd /etc/conf
```

Compile the kernel.

```
# config system
```