

# **Tru64 UNIX Best Practice**

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## **Defragmenting an AdvFS Domain**

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**Product Version:                    Tru64 UNIX**

This Best Practice describes when and how to defragment an AdvFS domain for the Tru64 UNIX operating system.



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## Defragmenting an AdvFS Domain

The `defragment` utility consolidates free space in a domain. Defragmenting benefits both read and write processes. A defragmented file can be read more quickly than one that is not.

As files grow, contiguous space on disk often is not available to accommodate new data, so files become fragmented; that is, they contain more file extents. File fragmentation can reduce system performance because more I/O is required to read or write a file. The `defragment` utility decreases the amount of file fragmentation but may be time consuming to run.

Defragmentation is an iterative, two-step process that operates on the domain:

1. Files are moved out of a region to create an area with contiguous unallocated space.
2. Fragmented files are written into a region that has more contiguous space making them less fragmented.

In addition to making files contiguous so that the number of file extents is reduced, defragmenting a domain often makes the free space on a disk more contiguous so files that are created later will also be less fragmented.

See the Tru64 UNIX Best Practices Web page for more information about Best Practices documentation.

### Is This Best Practice Right for You?

Not all Best Practices apply to all configurations, so you must be sure that defragmentation is appropriate for your system and circumstances. Run the `defragment` utility only when administratively necessary.

To determine the amount of fragmentation in your domain, run the `defragment` utility with the `-v` and `-n` options. The aggregate I/O performance will give you an idea of the efficiency of your configuration.

To determine the amount of fragmentation of a single file, run the `showfile` utility with the `-x` option to show the extents. If you then decide to defragment the file, see *Alternative Practices*.

There is no benefit to running `defragment` on the following:

- Any system, such as a mail server, that contains mostly files smaller than 8 kilobytes. (Files less than one page in length will not have any extents.)
- Any system not experiencing performance-related problems due to excessive file fragmentation. In many cases even a large, fairly fragmented file will incur no noticeable performance penalty.

It is difficult to specify the load that running the `defragment` utility will place on a system. The time it takes to defragment a domain depends on:

- The number and size of files in the domain.
- The amount of free space available.
- The activity of the system.
- The configuration of your domain. A domain consisting of several small volumes is faster to defragment than one consisting of a single large volume.

Accessing files during the defragmentation process can, particularly if your files are large, increase the interactive response time. For other ways to decrease file fragmentation, see *Alternative Practices*.

To use this Best Practice, you must meet the requirements described in the following table before you can defragment your domain:

Requirement	Description
Operating System	All supported versions of the operating system.
Impact on Availability	Defragmentation may slow the system. It is a good idea to run <code>defragment</code> at times of low file system activity.
Privileges	You must be root user to run this process.
Configuration	All filesets in the domain must be mounted.
Space Needed	A minimum free space of 1% of the total space or 5 megabytes per volume (whichever is less) must be available.
AdvFS Utilities	You must license AdvFS Utilities if you use a defragmentation alternative that requires the <code>migrate</code> , the <code>addvol</code> , or the <code>rmvol</code> command.

## Before You Begin

Before you defragment a domain, you must understand some background information.

If you plan to balance your domain, run the `balance` utility before you defragment. Balancing files after defragmenting may undo some defragmentation and free space consolidation.

We recommend that you defragment when there is low activity on the domain.

If no backups or other domain-wide operations have been done for more than three months, we recommend (but do not require) that you run the `verify` utility before you defragment. This will alert you to any latent metadata problems.

You can improve the efficiency of the defragment process by deleting unneeded files in the domain before running the `defragment` utility.

Aborting the defragment process does not damage the file system. Files that have been defragmented remain in their new locations.

## Applying the Best Practice

Before you defragment a domain, be sure to follow the recommendations in *Before You Begin*.

If you have run the `defragment` utility with the `-v` and `-n` options and have determined that it is necessary to defragment the domain, you can do so with the SysMan “Defragment an AdvFS Domain,” the AdvFS GUI, or, from the command line you can enter the `defragment` command:

```
# defragment <domain_name>
```

If desired, set the `-t` (time) option to limit the duration of the process and the `-v` option for verbose mode. If the process stops before defragmentation is complete, your file system is not damaged.

To access the `defragment` reference page, see the Tru64 UNIX publications page for your version of the operating system.

## Verifying Success

After you apply the Best Practice for Defragmenting an AdvFS Domain, you can verify whether it was successful by doing the following:

- Run the `defragment` command with the `-v` and `-n` options to examine the amount of fragmentation remaining in the domain.
- Run the `showfile` command with the `-x` option to display the number of extents in a named file.

To access the `defragment` and `showfile` reference pages, see the Tru64 UNIX publications page for your version of the operating system.

## Troubleshooting

If you determine that the Best Practice was not successful, as described in *Verifying Success*, use the following table to identify and solve problems:

Problem	Possible Solutions
Defragmentation is slowing the system.	Stop the process. Determine if defragmentation is necessary (see <i>Is This Best Practice Right for You?</i> ). If only a few files are fragmented, defragment these (see <i>Alternative Practices</i> ). If you must defragment the whole domain, run the process at a time of low system activity.
Not enough space for the <code>defragment</code> utility to complete.	Delete unnecessary files; move fileset(s) to another domain, add additional volumes.

## Alternative Practices

Although this Best Practice is the recommended method for defragmenting a domain, if your system does not meet the requirements described in *Is This Best Practice Right for You?*, you can use an alternative method.

If you have the hardware resources, you can add a volume with the `addvol` command and then remove the volume containing the domain with the `rmvol` command. Removing the volume will migrate the domain to the new volume and the files in it will be defragmented as part of the migration.

There are two ways to reduce the fragmentation of a single file when it is not feasible to defragment the domain:

1. Use the `migrate` utility to move the file to another volume. This is most effective when the destination volume has a lot of space.
2. Back up and restore a file. This defragments it as much as possible.
  - a. Back the file up with the `vdump` command.

- b. Delete or rename it.
- c. Create a new empty file.
- d. Restore the data with the `vrestore` command.

To access the `migrate`, `vdump`, and `vrestore` reference pages, see the Tru64 UNIX publications page for your version of the operating system.

## Comments and Questions

We value your comments and questions on the information in this document. Please mail your comments to us at this address:

`best_practices@zk3.dec.com`

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