# DiskWipe

**Version 302**

# Reference

**08. December 2006**

greenHouse
Software & Consulting
Karl-Heinz Weber
Heinrichstraße 12
D-45711 Datteln/Horneburg

Printed: 12/8/2006 3:21 PM

# Contents

## Product Overview

DiskWipe is a product of GreenHouse Software & Consulting.
DiskWipe erases the free space on a volume by overwriting it with pattern.
In case the disk does not contain any file, DiskWipe erases the entire disk space.
The pattern value, as well as the number of write rounds can be configured.

DiskWipe is optimized to minimize the performance impact to the system. Instead of using the Clear-on-Purge option, it perform the WRITE operations itself, where the user can define the number of disk I/Os per second to be executed.

DiskWipe is developed and tested on an S7000 running G06.29.
It comes in two flavors:

1. TAL version (file code 100)
2. pTAL version (file code 700)

A code 800 version will be available mid December 2006, when GreenHouse gets its NS1000 delivered.

The software is tested on various systems.

***** Warning *****

**Running DiskWipe on volume $SYSTEM may cause massive performance problems for the entire system, as long as the tool is active.**

**Running it on any other volume just makes that volume busy!**

**DiskWipe does NOT touch existing files.**

**To erase a complete volume, purge all files, before using DiskWipe.**

Replacing small disk volumes with bigger ones is a nice task:
Tandem is happy, because they sold disk drives to you, and you are happy because you have (much) more disk space, or faster drives.
This is true especially when migrating to a new platform, e.g. Itanium.

The question is: What happens to the information on the 'old' disk drives?
A FORMAT or LABEL command does not erase the disks contents!
Setting the Clear-on-Purge does only work for existing file, not for the disks free space!

DiskWipe is the solution: It erases the disks free space and ensures, that no data is left on a volume (except the directory, and in case SAFEGUARD is running, the SAFE-Subvol).

**Command syntax**

[run] DISKWIPE [/IN <pattern>,OUT <report>,NOWAIT/]-H[ELP] | <$vol> [,<option>]

where

| | |
|---|---|
| <pattern> | optional IN file<br>is an EDIT type file, containing the erase pattern, and the number of allowed disk I/Os per second. |
| <report> | optional<br>Defines the OUT file, to which DiskWipe writes its log information.<br>Supports all file types, except EDIT type files. |
| -H[ELP] | causes DiskWipe to display a brief help screen. |
| $vol | defines the volume(s) to be erased;<br>wildcards are supported, e.g. $DSM*.<br>For maximum performance it is suggested, to use one DiskWipe process per volume. This allows a parallel wipe action on multiple disks. |
| option | is one of: |
| NUMROUNDS <num> | number of wipe rounds.<br>Valid numbers are: 1 .. 4, and the key word DOD<br>DOD causes seven rounds with these pattern:<br>0,255,0,255,0,255,246<br>Default is: 1 |
| NUMWRITES <num> | number of disk I/Os per second<br>Valid numbers are 1 .. 100<br>Default is: 100, which is the maximum. |
| DCOM | keyword; when present causes DISKWIPE to execute DCOM on the volume to be erased BEFORE it is erased. |

| | |
|---|---|
| REBUILDDFS | keyword; when present causes DISKWIPE to execute the SCF CONTROL $vol,REBUILDDFS command before the free space is erased, and when it is erased. |

## Used erase strategy

1. Fill up the volume in question with as many temporary files as possible, until the volume is full. To really fill up the entire space, different extent sizes are used.
   Temporary files are used because they are much easier to manage: They are automatically purged when they are closed.

2. IN is <u>not</u> supplied:
   Depending on the user supplied attributes the following steps are performed:

| | |
|---|---|
| 2.1. REBUILDDFS present: | execute the SCF CONTROL $vol,REBUILDDFS command |
| 2.2. DCOM present: | execute DCOM $vol |
| 2.3. <num> missing or = 1 | fill all temporary files with %B0000000000000000<br>purge all temporary files |
| 2.4. <num> = 2 | fill all temporary files with %B1111111111111111<br>fill all temporary files with %B0000000000000000<br>purge all temporary files |
| 2.5. <num> = 3 | fill all temporary files with %B1010101010101010<br>fill all temporary files with %B0101010101010101<br>fill all temporary files with %B0000000000000000<br>purge all temporary files |
| 2.6. <num> = 4 | fill all temporary files with %B1010101010101010<br>fill all temporary files with %B0101010101010101<br>fill all temporary files with %B1111111111111111<br>fill all temporary files with %B0000000000000000<br>purge all temporary files |
| 2.7 DOD | fill all temporary files with %B0000000000000000<br>ill all temporary files with %B1111111111111111<br>fill all temporary files with %B0000000000000000<br>ill all temporary files with %B1111111111111111<br>fill all temporary files with %B0000000000000000<br>ill all temporary files with %B1111111111111111<br>fill all temporary files with %B0000000000000000<br>ill all temporary files with %B1111111111111111<br>fill all temporary files with %B1111011011110110<br>purge all temporary files |

3. The number of disk write operations can be defined through the NUMWRITES count.
   The smaller the number, the less impact has the operation on the volume on which the file resides.

   2.7. REBUILDDFS present: execute the SCF CONTROL $vol,REBUILDDFS command

4. IN is supplied:
   The user defined erase pattern are read from the IN file.
   The number of pattern defines the number of erase rounds as well.
   Beside defining the erase pattern, the number of writes per second can be set.
   A typical IN file looks like this:

```
!
! The user of DISKWIPE can define the wipe pattern to be used.
! The values are in the range of:
! 0 .. 255                 (decimal)
! %H00 .. %HFF             (hexa decimal)
! %O0 .. %O377             (octal)
! %B00000000 .. %B11111111 (binary)
! The number of defined pattern also defines the number of erase rounds.
! The maximum number is: 100.
! In the example below, it is four:
%B10101010
255
%B01010101
0
!
! Beside defining the erase pattern, which is implicitly the number of
! rounds, the number of disk writes per second can be defined.
! Valid numbers are 1 .. 100.
! 100 makes DISKWIPE run at maximum IO speed.
!
WRITESPERSECOND 100
```

   WRITESPERSECOND overwrites a possibly supplied NUMWRITES value.
   DCOM as well as REBUILDDFS are not supported when IN is used.

## Installation

DiskWipe is a stand-alone program, and does not need to become installed.
Make sure, that these three files are in the same location:

1. DISKWIPE (program)
2. WIPETOK (EDIT type LicenseToken file)
3. PATTERN (EDIT type file with user defined erase pattern)

## Security Settings

- Both files should be owned by SUPER.SUPER.
- The GUARDIAN security should be set to: OOGO, or to an equivalent SAFEGUARD ACL.
- The WIPETOK file should be secured to: AOOO, or an equivalent SAFEGUARD ACL.
- The PATTERN file should be secured to: GOOO, or the equivalent SAFEGUARD ACL

## DiskWipe Considerations

- To successfully run the DiskWipe tool, the user **must** be a member of the SUPER group.
- To successfully execute the DCOM and REBUILDDFS features of DiskWipe, the user must have execution rights on DCOM and SCF, else their execution is skipped.
- Running DiskWipe on a volume causes massive performance problems for the drive in question, because it is filled up with temporary files. This causes any new file space allocation on the volume to fail with error 43 until DiskWipe is done.
- Running DISKWIPE on $SYSTEM causes a MASSIVE performance problem for the ENTIRE system as long as the tool runs.
- The execution time of DiskWipe varies depending on
  - the free space
  - the disk type
  - the number of wipe rounds
  - the number of disk I/Os per second

  and can take even hours.
  In other words: Be patient when DiskWipe is running!
- The user is kept informed about the wipe status by displaying the wipe round (see the example below).
- It is highly recommended to use the DCOM option, when erasing the free space on a volume: This makes the wipe process much more effective.
- To erase an entire volume, perform these steps:

  1. Make sure you saved all data from the volume in question.

  2. Edit a file named PATTERN and define
     - the erase pattern
     - the number of disk I/Os per second

  3. LOGON to SUPER.SUPER

  4. Stop the volume to be erased with SCF:
     ```
     SCF STOP DISK $vol
     ```

  5. Initialize the volume:
     ```
     SCF INITIALIZE DISK $vol
     ```

  6. Start the volume:
     ```
     SCF START DISK $vol
     ```

  7. Run DISKWIPE:
     ```
     DISKWIPE /IN <pattern>,OUT <log>,NOWAIT/$vol
     ```

- To prevent DiskWipe from being started for a volume more than once, a small file is created in the location of DiskWipe, and named W<vol-to-be-wiped>.
  e.g.
  DiskWipe resides on: `$SYSTEM.WIPE`
  The volume to be wiped is: `$DSMSCM`
  The used file name is: `$SYSTEM.WIPE.WDSMSCM`
  This file is kept open as long as DiskWipe is running on this volume. The file is purged when the operation is finished.

## Erasing the free space on a volume

DiskWipe does NOT touch exiting files, but the available free space only.
To erase the entire free space, perform these steps:

1. Make sure there is no disk space allocating activity in progress.
2. Logon to SUPER.SUPER
3. Compress the directory:
   ```
   FUP RELOAD $vol.SYS00.DIRECTRY,DEALLOCATE
   ```
4. To get the fastest wipe, run DISKWIPE:
   ```
   DISKWIPE $vol,DSAP,REBUILDDFS [,NUMROUNDS nn][,NUMWRITES nn]
   ```
   Use the available options to decrease the performance impact (NUMWRITES), and the quality of the erase (NUMRONDS).

## Erasing an entire volume and all its files

DiskWipe does NOT touch exiting files, but available free space only.
To erase the **entire** disk, perform these steps:

1. Make sure you saved all data from the volume in question.
2. Edit a file named PATTERN and define
   - the erase pattern
   - the number of disk I/Os per second
3. LOGON to SUPER.SUPER
4. Stop the disk using SCF:
   ```
   SCF STOP DISK $vol
   ```
5. Initialize the disk:
   ```
   SCF INITIALIZE DISK $vol
   ```
6. Start the disk:
   ```
   SCF START DISK $vol
   ```
7. Run DISKWIPE:
   ```
   DISKWIPE /IN <pattern>,OUT <log>,NOWAIT/$vol
   ```

## Performance

A typical DiskWipe on an S7000 with 8 GB internal disk drives shows this load (data from Offender):

```
\BEECH     13:32:11 -  7 Nov  2006, Interval -  0:00:05
Cpu Avg         |ssssi                    26 %
Cpu  0  S7K     |sssssssssi               47 %
Cpu  1  S7K     |u                         5 %
                | + + + + + + + + + + |
                0   20  40  60  80  100
Process Pri             Program                  busy %     Tot Cpu      Elapsed
 0,288  220 P  255,255 $SCRATCH                    16 %     0:15:01      4:48:47
 0,295  220 P  255,255 $SCRATCH                    12 %     0:11:54      4:48:46
 0,304  220 P  255,255 $SCRATCH                    11 %     0:11:05      4:48:36
 1,350  168    255,255 $GHS1.WIPE.DISKWIPE         4 %     0:00:03      0:01:23
```

The DiskWipe program itself does not bring much load (4% in the above screen shot), but it enforces the disk process of the volume in question ($SCRATCH) to work with maximum load.

DiskWipe uses a write sequence, which was developed by the High Performance Research Center (HPRC). It ensures the best throughput possible.

## Pattern IN file

Beside using the pre-defined erase pattern, the user can define them in an IN file.
Below is the delivered default PATTERN file. Change it according to your requirements.

```
!
!                DISKWIPE - Pattern file
!
!
! Used when given to DISKWIPE as the IN file:
!
!   [run] DOSKWIPE /IN <this-file>[,OUT ...][,NOWAIT]/
!
!
! The user of DISKWIPE can define the wipe pattern to be used.
! Wipe pattern values are in the range of:
! 0 .. 255                 (decimal)
! %H00 .. %HFF             (hexa decimal)
! %O0 .. %O377             (octal)
! %B00000000 .. %B11111111 (binary)
! The number of defined pattern also defines the number of erase rounds.
! The maximum number is: 100.
! In the example below, four pattern = four wipe rounds are defined:
! %B10101010, %B11111111, %B01010101, %B00000000
!

%B10101010
255
%B01010101
0

!
! Beside defining the erase pattern - which is implicitly the number of
! wipe rounds - the number of disk writes per second can be defined.
! Valid numbers are 1 .. 100.
! 100 makes DISKWIPE run at maximum IO speed.
!

WRITESPERSECOND 100
```

## Example

The free space on volume $SCRATCH was erased with seven wipe rounds:

```
DISKWIPE (301) - T7172G06 - (30Nov2006)   System \BEECH, running NSK G06
Copyright (c) GreenHouse Software & Consulting 1999,2003,2004,2006
This copy of DISKWIPE is licensed to: GreenHouse Software & Consulting
Using standard pattern.
Pattern to be used:   %H00, %O000, %B00000000, 000
                      %HFF, %O377, %B11111111, 255
                      %H00, %O000, %B00000000, 000
                      %HFF, %O377, %B11111111, 255
                      %H00, %O000, %B00000000, 000
                      %HFF, %O377, %B11111111, 255
                      %HF6, %O366, %B11110110, 246
Disk I/Os per second: 90

Wiping volume: \BEECH.$SCRATCH
Wipe started: 04Dec2006, 10:20:10

Creating wipe type files:
           File             EXTSize  NumEXT    File Size
\BEECH.$SCRATCH.#0000000     2,048     256   1,073,741,824
\BEECH.$SCRATCH.#0000001     2,048      32     134,217,728
\BEECH.$SCRATCH.#0000006       128       1         262,144
\BEECH.$SCRATCH.#0000008        64       1         131,072
\BEECH.$SCRATCH.#0000011        16       1          32,768
\BEECH.$SCRATCH.#0000013         8       2          32,768
\BEECH.$SCRATCH.#0000015         4       1           8,192
\BEECH.$SCRATCH.#0000017         2       1           4,096
\BEECH.$SCRATCH.#0000019         1       1           2,048

Number of wipe type files: 9
Number of bytes to wipe:   1,208,432,640
Number of wipe rounds:     7

Executing:  DSAP \BEECH.$SCRATCH

Disk Space Analysis Program -- T9543G08 - (19JUN06)
(C)2002 Compaq (C)2004 Hewlett Packard Development Company, L.P.

Volume $SCRATCH is logical device 120
Device type is 3, subtype 42 ( 4608-3 -- 8837MB )

     4,315,357 pages (2048 bytes) on volume
 8,837,851,136 bytes on volume


Summary of space use on $SCRATCH

           0 free pages in 0 extents (0.0%).

   4,314,345 allocated pages in 20 files in 7,547 extents (99.9%).

      37,888 unused pages in 3 files (0.8%).

      37,888 deallocatable extent pages in 3 files (0.8%).

No SQL views.


Space Allocation Consistency Analysis:
```

```
No space allocation anomalies.


Media Failure Analysis:

Primary disk has no unspared defective sector(s).
Mirror disk is down or not configured.
DSAP for \BEECH.$SCRATCH done

Pass 1 of 7 in progress with pattern: %H00   ***
File:             \BEECH.$SCRATCH.#0000000
Bytes to write:   1,073,741,824
Started:          04Dec2006, 10:20:15
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      18,725
Done:             04Dec2006, 10:26:11
Bytes written:    1,073,741,824
Bytes per second: 3,159,162
Elapsed time:     5:56 minutes

File:             \BEECH.$SCRATCH.#0000001
Bytes to write:   134,217,728
Started:          04Dec2006, 10:26:11
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      2,341
Done:             04Dec2006, 10:26:56
Bytes written:    134,217,728
Bytes per second: 3,150,221
Elapsed time:     0:44 minutes

File:             \BEECH.$SCRATCH.#0000006
Bytes to write:   262,144
Started:          04Dec2006, 10:26:56
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      5
Done:             04Dec2006, 10:26:56
Bytes written:    262,144
Bytes per second: 2,734,423
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000008
Bytes to write:   131,072
Started:          04Dec2006, 10:26:56
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      3
Done:             04Dec2006, 10:26:56
Bytes written:    131,072
Bytes per second: 2,394,615
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000011
Bytes to write:   32,768
Started:          04Dec2006, 10:26:56
Max. WRITE size:  32,768
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:26:56
Bytes written:    32,768
Bytes per second: 956,456
Elapsed time:     0:00 minutes
```

```
File:             \BEECH.$SCRATCH.#0000013
Bytes to write:   32,768
Started:          04Dec2006, 10:26:56
Max. WRITE size:  32,768
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:26:56
Bytes written:    32,768
Bytes per second: 563,533
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000015
Bytes to write:   8,192
Started:          04Dec2006, 10:26:56
Max. WRITE size:  8,192
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:26:56
Bytes written:    8,192
Bytes per second: 717,561
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000017
Bytes to write:   4,096
Started:          04Dec2006, 10:26:56
Max. WRITE size:  4,096
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:26:56
Bytes written:    4,096
Bytes per second: 180,924
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000019
Bytes to write:   2,048
Started:          04Dec2006, 10:26:56
Max. WRITE size:  2,048
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:26:56
Bytes written:    2,048
Bytes per second: 108,804
Elapsed time:     0:00 minutes

First wipe round took:     0:06:41
Estimated wipe time:       0:46:49
End of wipe expected at: 04Dec2006, 11:07:05

Pass 2 of 7 in progress with pattern: %HFF   ***
File:             \BEECH.$SCRATCH.#0000000
Bytes to write:   1,073,741,824
Started:          04Dec2006, 10:26:56
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      18,725
Done:             04Dec2006, 10:32:56
Bytes written:    1,073,741,824
Bytes per second: 3,128,984
Elapsed time:     5:59 minutes

File:             \BEECH.$SCRATCH.#0000001
Bytes to write:   134,217,728
Started:          04Dec2006, 10:32:56
Max. WRITE size:  57,344
Num. WRITE pipes: 2
```

```
Num. WRITEs:      2,341
Done:             04Dec2006, 10:33:41
Bytes written:    134,217,728
Bytes per second: 3,105,947
Elapsed time:     0:45 minutes

File:             \BEECH.$SCRATCH.#0000006
Bytes to write:   262,144
Started:          04Dec2006, 10:33:41
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      5
Done:             04Dec2006, 10:33:42
Bytes written:    262,144
Bytes per second: 2,351,634
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000008
Bytes to write:   131,072
Started:          04Dec2006, 10:33:42
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      3
Done:             04Dec2006, 10:33:42
Bytes written:    131,072
Bytes per second: 2,041,910
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000011
Bytes to write:   32,768
Started:          04Dec2006, 10:33:42
Max. WRITE size:  32,768
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:33:42
Bytes written:    32,768
Bytes per second: 1,088,366
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000013
Bytes to write:   32,768
Started:          04Dec2006, 10:33:42
Max. WRITE size:  32,768
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:33:42
Bytes written:    32,768
Bytes per second: 709,882
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000015
Bytes to write:   8,192
Started:          04Dec2006, 10:33:42
Max. WRITE size:  8,192
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:33:42
Bytes written:    8,192
Bytes per second: 678,456
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000017
Bytes to write:   4,096
Started:          04Dec2006, 10:33:42
```

```
Max. WRITE size:  4,096
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:33:42
Bytes written:    4,096
Bytes per second: 156,436
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000019
Bytes to write:   2,048
Started:          04Dec2006, 10:33:42
Max. WRITE size:  2,048
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:33:42
Bytes written:    2,048
Bytes per second: 112,711
Elapsed time:     0:00 minutes

Pass 3 of 7 in progress with pattern: %H00   ***
File:             \BEECH.$SCRATCH.#0000000
Bytes to write:   1,073,741,824
Started:          04Dec2006, 10:33:42
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      18,725
Done:             04Dec2006, 10:39:43
Bytes written:    1,073,741,824
Bytes per second: 3,112,816
Elapsed time:     6:01 minutes

File:             \BEECH.$SCRATCH.#0000001
Bytes to write:   134,217,728
Started:          04Dec2006, 10:39:43
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      2,341
Done:             04Dec2006, 10:40:29
Bytes written:    134,217,728
Bytes per second: 3,059,211
Elapsed time:     0:46 minutes

File:             \BEECH.$SCRATCH.#0000006
Bytes to write:   262,144
Started:          04Dec2006, 10:40:29
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      5
Done:             04Dec2006, 10:40:30
Bytes written:    262,144
Bytes per second: 2,394,740
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000008
Bytes to write:   131,072
Started:          04Dec2006, 10:40:30
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      3
Done:             04Dec2006, 10:40:30
Bytes written:    131,072
Bytes per second: 2,424,352
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000011
Bytes to write:   32,768
```

```
Started:          04Dec2006, 10:40:30
Max. WRITE size:  32,768
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:40:30
Bytes written:    32,768
Bytes per second: 1,925,346
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000013
Bytes to write:   32,768
Started:          04Dec2006, 10:40:30
Max. WRITE size:  32,768
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:40:30
Bytes written:    32,768
Bytes per second: 701,849
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000015
Bytes to write:   8,192
Started:          04Dec2006, 10:40:30
Max. WRITE size:  8,192
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:40:30
Bytes written:    8,192
Bytes per second: 638,941
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000017
Bytes to write:   4,096
Started:          04Dec2006, 10:40:30
Max. WRITE size:  4,096
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:40:30
Bytes written:    4,096
Bytes per second: 170,421
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000019
Bytes to write:   2,048
Started:          04Dec2006, 10:40:30
Max. WRITE size:  2,048
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:40:30
Bytes written:    2,048
Bytes per second: 109,789
Elapsed time:     0:00 minutes

Pass 4 of 7 in progress with pattern: %HFF   ***
File:             \BEECH.$SCRATCH.#0000000
Bytes to write:   1,073,741,824
Started:          04Dec2006, 10:40:30
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      18,725
Done:             04Dec2006, 10:46:38
Bytes written:    1,073,741,824
Bytes per second: 3,060,091
Elapsed time:     6:07 minutes
```

```
File:             \BEECH.$SCRATCH.#0000001
Bytes to write:   134,217,728
Started:          04Dec2006, 10:46:38
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      2,341
Done:             04Dec2006, 10:47:24
Bytes written:    134,217,728
Bytes per second: 3,055,107
Elapsed time:     0:46 minutes

File:             \BEECH.$SCRATCH.#0000006
Bytes to write:   262,144
Started:          04Dec2006, 10:47:24
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      5
Done:             04Dec2006, 10:47:24
Bytes written:    262,144
Bytes per second: 2,485,086
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000008
Bytes to write:   131,072
Started:          04Dec2006, 10:47:24
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      3
Done:             04Dec2006, 10:47:24
Bytes written:    131,072
Bytes per second: 1,989,216
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000011
Bytes to write:   32,768
Started:          04Dec2006, 10:47:24
Max. WRITE size:  32,768
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:47:24
Bytes written:    32,768
Bytes per second: 1,468,804
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000013
Bytes to write:   32,768
Started:          04Dec2006, 10:47:24
Max. WRITE size:  32,768
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:47:24
Bytes written:    32,768
Bytes per second: 734,386
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000015
Bytes to write:   8,192
Started:          04Dec2006, 10:47:24
Max. WRITE size:  8,192
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:47:24
Bytes written:    8,192
Bytes per second: 676,585
Elapsed time:     0:00 minutes
```

```
File:             \BEECH.$SCRATCH.#0000017
Bytes to write:   4,096
Started:          04Dec2006, 10:47:24
Max. WRITE size:  4,096
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:47:24
Bytes written:    4,096
Bytes per second: 180,090
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000019
Bytes to write:   2,048
Started:          04Dec2006, 10:47:24
Max. WRITE size:  2,048
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:47:24
Bytes written:    2,048
Bytes per second: 83,081
Elapsed time:     0:00 minutes

Pass 5 of 7 in progress with pattern: %H00   ***
File:             \BEECH.$SCRATCH.#0000000
Bytes to write:   1,073,741,824
Started:          04Dec2006, 10:47:24
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      18,725
Done:             04Dec2006, 10:53:24
Bytes written:    1,073,741,824
Bytes per second: 3,132,343
Elapsed time:     5:59 minutes

File:             \BEECH.$SCRATCH.#0000001
Bytes to write:   134,217,728
Started:          04Dec2006, 10:53:24
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      2,341
Done:             04Dec2006, 10:54:08
Bytes written:    134,217,728
Bytes per second: 3,156,277
Elapsed time:     0:44 minutes

File:             \BEECH.$SCRATCH.#0000006
Bytes to write:   262,144
Started:          04Dec2006, 10:54:08
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      5
Done:             04Dec2006, 10:54:08
Bytes written:    262,144
Bytes per second: 2,539,874
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000008
Bytes to write:   131,072
Started:          04Dec2006, 10:54:08
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      3
Done:             04Dec2006, 10:54:09
```

```
Bytes written:    131,072
Bytes per second: 2,142,428
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000011
Bytes to write:   32,768
Started:          04Dec2006, 10:54:09
Max. WRITE size:  32,768
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:54:09
Bytes written:    32,768
Bytes per second: 1,850,381
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000013
Bytes to write:   32,768
Started:          04Dec2006, 10:54:09
Max. WRITE size:  32,768
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:54:09
Bytes written:    32,768
Bytes per second: 707,281
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000015
Bytes to write:   8,192
Started:          04Dec2006, 10:54:09
Max. WRITE size:  8,192
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:54:09
Bytes written:    8,192
Bytes per second: 898,434
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000017
Bytes to write:   4,096
Started:          04Dec2006, 10:54:09
Max. WRITE size:  4,096
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:54:09
Bytes written:    4,096
Bytes per second: 180,105
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000019
Bytes to write:   2,048
Started:          04Dec2006, 10:54:09
Max. WRITE size:  2,048
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 10:54:09
Bytes written:    2,048
Bytes per second: 109,599
Elapsed time:     0:00 minutes

Pass 6 of 7 in progress with pattern: %HFF   ***
File:             \BEECH.$SCRATCH.#0000000
Bytes to write:   1,073,741,824
Started:          04Dec2006, 10:54:09
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      18,725
```

```
Done:              04Dec2006, 11:00:04
Bytes written:     1,073,741,824
Bytes per second:  3,164,142
Elapsed time:      5:55 minutes

File:              \BEECH.$SCRATCH.#0000001
Bytes to write:    134,217,728
Started:           04Dec2006, 11:00:04
Max. WRITE size:   57,344
Num. WRITE pipes:  2
Num. WRITEs:       2,341
Done:              04Dec2006, 11:00:49
Bytes written:     134,217,728
Bytes per second:  3,153,943
Elapsed time:      0:44 minutes

File:              \BEECH.$SCRATCH.#0000006
Bytes to write:    262,144
Started:           04Dec2006, 11:00:49
Max. WRITE size:   57,344
Num. WRITE pipes:  2
Num. WRITEs:       5
Done:              04Dec2006, 11:00:49
Bytes written:     262,144
Bytes per second:  2,387,129
Elapsed time:      0:00 minutes

File:              \BEECH.$SCRATCH.#0000008
Bytes to write:    131,072
Started:           04Dec2006, 11:00:49
Max. WRITE size:   57,344
Num. WRITE pipes:  2
Num. WRITEs:       3
Done:              04Dec2006, 11:00:49
Bytes written:     131,072
Bytes per second:  2,679,121
Elapsed time:      0:00 minutes

File:              \BEECH.$SCRATCH.#0000011
Bytes to write:    32,768
Started:           04Dec2006, 11:00:49
Max. WRITE size:   32,768
Num. WRITE pipes:  1
Num. WRITEs:       1
Done:              04Dec2006, 11:00:49
Bytes written:     32,768
Bytes per second:  2,008,636
Elapsed time:      0:00 minutes

File:              \BEECH.$SCRATCH.#0000013
Bytes to write:    32,768
Started:           04Dec2006, 11:00:49
Max. WRITE size:   32,768
Num. WRITE pipes:  1
Num. WRITEs:       1
Done:              04Dec2006, 11:00:49
Bytes written:     32,768
Bytes per second:  707,165
Elapsed time:      0:00 minutes

File:              \BEECH.$SCRATCH.#0000015
Bytes to write:    8,192
Started:           04Dec2006, 11:00:49
Max. WRITE size:   8,192
```

```
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 11:00:49
Bytes written:    8,192
Bytes per second: 616,871
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000017
Bytes to write:   4,096
Started:          04Dec2006, 11:00:49
Max. WRITE size:  4,096
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 11:00:49
Bytes written:    4,096
Bytes per second: 194,527
Elapsed time:     0:00 minutes

File:             \BEECH.$SCRATCH.#0000019
Bytes to write:   2,048
Started:          04Dec2006, 11:00:49
Max. WRITE size:  2,048
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 11:00:49
Bytes written:    2,048
Bytes per second: 111,332
Elapsed time:     0:00 minutes

Pass 7 of 7 in progress with pattern: %HF6   ***
File:             \BEECH.$SCRATCH.#0000000
Bytes to write:   1,073,741,824
Started:          04Dec2006, 11:00:49
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      18,725
Done:             04Dec2006, 11:06:44
Bytes written:    1,073,741,824
Bytes per second: 3,173,437
Elapsed time:     5:54 minutes
File purged.

File:             \BEECH.$SCRATCH.#0000001
Bytes to write:   134,217,728
Started:          04Dec2006, 11:06:44
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      2,341
Done:             04Dec2006, 11:07:29
Bytes written:    134,217,728
Bytes per second: 3,159,510
Elapsed time:     0:44 minutes
File purged.

File:             \BEECH.$SCRATCH.#0000006
Bytes to write:   262,144
Started:          04Dec2006, 11:07:29
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      5
Done:             04Dec2006, 11:07:29
Bytes written:    262,144
Bytes per second: 3,103,895
Elapsed time:     0:00 minutes
File purged.
```

```
File:             \BEECH.$SCRATCH.#0000008
Bytes to write:   131,072
Started:          04Dec2006, 11:07:29
Max. WRITE size:  57,344
Num. WRITE pipes: 2
Num. WRITEs:      3
Done:             04Dec2006, 11:07:29
Bytes written:    131,072
Bytes per second: 2,516,874
Elapsed time:     0:00 minutes
File purged.

File:             \BEECH.$SCRATCH.#0000011
Bytes to write:   32,768
Started:          04Dec2006, 11:07:29
Max. WRITE size:  32,768
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 11:07:29
Bytes written:    32,768
Bytes per second: 1,008,297
Elapsed time:     0:00 minutes
File purged.

File:             \BEECH.$SCRATCH.#0000013
Bytes to write:   32,768
Started:          04Dec2006, 11:07:29
Max. WRITE size:  32,768
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 11:07:29
Bytes written:    32,768
Bytes per second: 908,603
Elapsed time:     0:00 minutes
File purged.

File:             \BEECH.$SCRATCH.#0000015
Bytes to write:   8,192
Started:          04Dec2006, 11:07:30
Max. WRITE size:  8,192
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 11:07:30
Bytes written:    8,192
Bytes per second: 390,451
Elapsed time:     0:00 minutes
File purged.

File:             \BEECH.$SCRATCH.#0000017
Bytes to write:   4,096
Started:          04Dec2006, 11:07:30
Max. WRITE size:  4,096
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 11:07:30
Bytes written:    4,096
Bytes per second: 569,397
Elapsed time:     0:00 minutes
File purged.

File:             \BEECH.$SCRATCH.#0000019
Bytes to write:   2,048
Started:          04Dec2006, 11:07:30
Max. WRITE size:  2,048
```

```
Num. WRITE pipes: 1
Num. WRITEs:      1
Done:             04Dec2006, 11:07:30
Bytes written:    2,048
Bytes per second: 97,879
Elapsed time:     0:00 minutes
File purged.

Wipe on volume \BEECH.$SCRATCH done.
Elapsed time:   0:47:14
Wipe successfully finished at: 04Dec2006, 11:07:30
```

# Index