IEEE P1003.2a Draft 8 – December 1991

5.8 `df` — Report free disk space

5.8.1 Synopsis

`df [−kP]` [*file* ...]

5.8.2 Description

The `df` utility shall write the amount of available space for file systems on which the invoking user has appropriate read access. File systems shall be specified by the *file* operands; when none are specified, information shall be written for all file systems. The format of the default output from `df` is unspecified, but all space figures shall be reported in 512-byte units, unless the `−k` option is specified. This output shall contain at least the file system names and amount of available space on each of these file systems.

5.8.3 Options

The `df` utility shall conform to the utility argument syntax guidelines described in 2.10.2.

The following options shall be supported by the implementation:

`−k` Use 1024-byte units, instead of the default 512-byte units, when writing space figures.

`−P` Produce output in the format described in 5.8.6.1.

5.8.4 Operands

The following operand shall be supported by the implementation:

file A pathname of a file within the hierarchy of the desired file system. If a file other than a FIFO , a regular file, or a directory is specified, the results are unspecified. Otherwise, `df` shall write the amount of free space in the file system containing the specified *file* operand.

5.8.5 External Influences

5.8.5.1 Standard Input

None.

5.8.5.2 Input Files

None.

5.8.5.3 Environment Variables

The following environment variables shall affect the execution of `df`:

LANG This variable shall determine the locale to use for the locale categories when both **LC_ALL** and the corresponding environment variable (beginning with **LC_**) do not specify a locale. See 2.6.

LC_ALL This variable shall determine the locale to be used to override any values for locale categories specified by the settings of **LANG** or any environment variables beginning with **LC_**.

LC_CTYPE This variable shall determine the locale for the interpretation of sequences of bytes of text data as characters (e.g., single- versus multibyte characters in arguments).

LC_MESSAGES This variable shall determine the language in which messages should be written.

5.8.5.4 Asynchronous Events

Default.

5.8.6 External Effects

5.8.6.1 Standard Output

When both the `−k` and `−P` options are specified, the following header line shall be written (in the POSIX Locale):

`"Filesystem 1024-blocks Used Available Capacity Mounted on\n"` 8

When the `−P` option is specified without the `−k` option, the following header line shall be written (in the POSIX Locale):

`"Filesystem 512-blocks Used Available Capacity Mounted on\n"` 8

The implementation may adjust the spacing of the header line and the individual data lines so that the information is presented in orderly columns.

The remaining output with `−P` shall consist of one line of information for each specified file system. These lines shall be formatted as follows:

`"%s %d %d %d %d%% %s\n"`, *<file system name>*, *<total space>*,
<space used>, *<space free>*, *<percentage used>*, *<file system root>*

In the following list, all quantities expressed in 512-byte units (1024-byte when `-k` is specified) shall be rounded up to the next higher unit. The fields are:

<*file system name*> The name of the file system, in an implementation-defined format.

<*total space*> The total size of the file system in 512-byte units. The exact meaning of this figure is implementation defined, but should include <*space used*>, <*space free*>, plus any space reserved by the system not normally available to a user.

<*space used*> The total amount of space allocated to existing files in the file system, in 512-byte units.

<*space free*> The total amount of space available within the file system for the creation of new files by unprivileged users, in 512-byte units. When this figure is less than or equal to zero, it shall not be possible to create any new files on the file system without first deleting others, unless the process has appropriate privileges. The figure written may be less than zero.

<*percentage used*> The percentage of the normally available space that is currently allocated to all files on the file system. This shall be calculated using the fraction

<*space used*> /(<*space used*> + <*space free*>)

expressed as a percentage. This percentage may be greater than 100 if <*space free*> is less than zero. The percentage value shall be expressed as a positive integer, with any fractional result causing it to be rounded to the next highest integer.

<*file system root*> The directory below which the file system hierarchy appears.

5.8.6.2 Standard Error

Used only for diagnostic messages.

5.8.6.3 Output Files

None.

5.8.7 Extended Description

None.

5.8.8 Exit Status

The `df` utility shall exit with one of the following values:

0 Successful completion.

>0 An error occurred.

5.8.9 Consequences of Errors

Default.

5.8.10 Rationale. *(This subclause is not a part of P1003.2a)*

Usage, Examples

The following example writes ''portable'' information about the `/usr` file system:

```
df -P /usr
```

Assuming that `/usr/src` is part of the `/usr` file system, the following will do the same as the previous example:

```
df -P /usr/src
```

On most historical systems, the ''name of the file system, in an implementation-defined format'' will be the special file on which the file system is mounted.

History of Decisions Made

The behavior of `df` with the `−P` option is the default action of the 4.2BSD `df` utility. The uppercase `−P` was selected to avoid collision with a known industry extension using `−p`.

Existing `df` implementations vary considerably in their default output. It therefore was necessary to describe the default output in a loose manner to accommodate all known existing implementations, and to add a portable option (`−P`) to provide information in a portable format.

The use of 512-byte units was retained because it is historical practice and to maintain compatibility with `ls` and other utilities in the base standard and the UPE. This does not mandate that the file system itself be based on 512-byte blocks. The `−k` option was added as a compromise measure. It was agreed in the working group that 512 was the best default unit because of its complete historical consistency on System V (versus the mixed 512/1024 usage on BSD systems), and that a `−k` option to switch to 1024-byte units was a good compromise. Users who prefer the more logical 1K quantity can easily alias `df` to `df -k` without breaking many historical scripts relying on the 512-byte units.

It was suggested that `df` and the various related utilities be modified to access a **BLOCKSIZE** environment variable to achieve consistency and user acceptance. Since this is not existing practice on any system, it is left as an interesting area for system extensions and will be re-evaluated in a future revision if it is widely implemented.

5.9 du — Estimate file space usage

5.9.1 Synopsis

`du [ −a | −s ] [−kx] [`*file* `... ]`

5.9.2 Description

The `du` utility, by default, shall write to standard output the size of the file space allocated to, and the size of the file space allocated to each subdirectory of, the file hierarchy rooted in each of the specified files. The size of the file space allocated to a file of type directory shall be defined as the sum total of space allocated to all files in the file hierarchy rooted in the directory plus the space allocated to the directory itself.

When `du` cannot stat [see *stat* () in POSIX.1 {8} 5.6.2] files, or stat or read directories, it shall report an error condition and the final exit status shall be affected. Files with multiple links shall be counted and written for only one entry. The directory entry that is selected in the report is unspecified. By default, file sizes shall be written in 512-byte units, rounded up to the next 512-byte unit.

5.9.3 Options

The `du` utility shall conform to the utility argument syntax guidelines described in 2.10.2.

The following options shall be supported by the implementation:

`−a` In addition to the default output, report the size of each file not of type directory in the file hierarchy rooted in the specified file. Regardless of the presence of the `−a` option, nondirectories given as *file* operands shall always be listed.

`−k` Write the files sizes in units of 1024 bytes, rather than the default 512-byte units.