ls

Command

list file and directory names and attributes

SYNOPSIS

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ls [**-AabCcdFfghikLlmnopqRrstux1**] [**-timeout** *seconds*] [**-X** *attr*] [*pathname*...]

DESCRIPTION

ls lists files and directories. If the *pathname* is a file, **ls** displays information on the file according to the requested options. If the *pathname* is a directory, **ls** displays information on the files and subdirectories therein. You may obtain information on a directory itself using the **-d** option.

If you do not specify any options, **ls** displays only the file name(s). When **ls** sends output to a pipe or a file, it writes one name per line; when it sends output to the terminal, it uses the **-C** (multi-column) format.

Options

-A
: lists all entries including those starting with periods (`.`), but excluding any `.` or `..` entries.

-a
: lists all entries including those starting with a period (`.`).

-b
: displays non-printable characters as octal bytes with the form *ooo*.

-C
: puts output into columns, sorted vertically; this is the default output format to the terminal.

-c
: uses the creation time of the file for sorting (**-t**) or displaying (**-l**).

-d
: does not display the contents of named directories, but show information on the directories themselves.

-F
: puts a `/` after each directory name, a `*` after every executable file, a `|` after every FIFO file, a `@` after every symbolic link and a = after every socket.

Note:
Windows systems do not support FIFO files or sockets (as files) and consider all files that are not directories or symbolic links to be executable files. This option of the **ls** utility labels the files and directories display accordingly.

-f
: enables the **-a** option and disables the **-C**, **-g**, **-l**, **-n**, **-o**, **-r**, **-s**, and **-t** options. For each argument that is a directory, all directory entries are listed in the same order they are retrieved from the system (POSIX-compliant and UNIX systems only).

-g
: displays only the group ID numbers (on 7/2008R2/8/2012/10/2016, POSIX-compliant and UNIX systems).

-h
: displays file sizes using more human-friendly units. Units used are:

`B`	Bytes
`KB`	Kilobytes
`MB`	Megabytes
`GB`	Gigabytes
`TB`	Terabytes
`PB`	Petabytes
`EB`	Exabytes

When this option is specified, each file size is displayed using the most appropriate unit and is rounded to two decimal places.

-i
: displays inode numbers along with file names (only on systems that support inode numbers, such as POSIX-compliant and UNIX systems).

-k
: displays size in kilobytes instead of blocks when specified with the **-s** option. If the **-s** option is not specified, this option has no effect.

-L
: follows symbolic links.

Note:
Symbolic links are only available on 7/2008R2/8/2012/2016 systems with the NTFS file system.

-l
: displays permissions, links, owner, group, size, time, name; see *Long Output Format*.

-m
: displays names in single line, with commas separating names.

-n
: displays user ID and group IDs as numbers instead of names.

-o
: displays only the user ID of owner (POSIX-compliant and UNIX systems only).

-p
: puts `/` after directory names.

-q
: displays non-printable characters as `?`.

-R
: lists subdirectories recursively.

-r
: sorts in reverse of usual order; you can combine this with other options that sort the list.

-s
: displays size in blocks (after the inode number, but before other information). If the **-k** option is also specified, the size is displayed in kilobytes instead.

-t
: sorts entries by time. By default, this option sorts the output by the modification times of files. You can change this with the **-c** and **-u** options.

-timeout *seconds*
: specifies the number of seconds that **ls** has to complete the operation before timing out and issuing an error. *seconds* is given in seconds.

-u
: uses the last access time for sorting (**-t**) or displaying (**-l**).

-X *attr*
: displays extended security attributes under Windows. This option turns on the **-l** (long listing) option. The *attr* argument is a string containing some of these characters:

Character	Meaning
A	file attributes in verbose format
a	file attributes in terse format
D	verbose file Discretionary Access Control Entries (7/2008R2/8/2012/10/2016 only)
d	terse file Discretionary Access Control Entries (7/2008R2/8/2012/10/2016 only)

If both **A** and **a** or both **D** and **d** are in *attr*, **ls** uses the last one given on the command line. See *Extended Attribute Descriptions*.

-x
: puts output into columns sorted across the rows.

-1
: forces single column output.

Note:
When you specify options that are mutually exclusive (for example, **-c** and **-u**), the option that appears last on the command line is used.

Long Output Format

The output from **ls -l** summarizes all the most important information about the file on one line. If the specified *pathname* is a directory, **ls** displays information on every file in that directory (one file per line). It precedes this list with a status line that indicates the total number of file system blocks (512 byte units) occupied by the files in that directory. Here is a sample of the output along with an explanation.

```
-rw-rw-rw- 1 root   dir 104 Dec 25 19:32 file
```

The first character identifies the file type:

`-`	Regular file
`b`	Block special file
`c`	Character special file
`d`	Directory
`l`	Symbolic link
`n`	Network file
`p`	FIFO
`s`	Socket

The next nine characters are in three groups of three; they describe the permissions on the file. The first group of three describes owner permissions; the second describes group permissions; the third describes other (or *world*) permissions. Because Windows systems do not support group and other permissions, these are copies of the owner's permissions. Characters that may appear are:

`r`	Permission to read file
`w`	Permission to write to file
`x`	Permission to execute file
`a`	Archive bit is on (file has not been backed up)
`c`	Compressed file
`s`	System file
`h`	Hidden file
`t`	Temporary file

On Windows systems, most of the permissions shown are artificial, with no real meaning. The `w` bit is set according to the `ReadOnly` attribute, and the `rx` bits are always set on.

You can change some permissions with the **chmod** command.

After the permissions comes the number of links to the file.

Next comes the name of the owner of the file or directory. On file systems that don't support 7/2008R2/8/2012/10/2016 security, the owner name cannot be determined and the owner ID number is displayed instead. Under 7/2008R2/8/2012/10/2016 the name of the owner of a file is displayed if the file's `SID`s can be obtained and if these `SID`s have an associated name in the `SAM` database. If the file has a `SID` associated with it, but the name of the `SID` cannot be determined, then the value of the `SID` is displayed. (This can happen when the current user is not in the domain that was used when the file was created.) If the file does not have a `SID` (for example, if it is on a non-NTFS file system), or if the file security information cannot be accessed because the file is locked by another process, then the user name appears as `<unavail>`.

Note:
When a listed file is owned by the local computer, the owner is displayed as *computer_name*\ where *computer_name* is the name of the local computer.

Then comes the name of the group that owns the file or directory. On Windows systems, the same rules are followed for the group name as for the owner name.

Following this is the size of the file, expressed in bytes.

After this comes a date and time. For a file, this is the time that the file was last changed; for a directory, it is the time that the directory was created. The **-c** and **-u** options can change which time value is used. If the date is more than six months old or if the date is in the future, the year is shown instead of the time.

The last item on the line is the name of the file or directory.

Extended Attribute Descriptions

On 7/2008R2/8/2012/10/2016 systems, **ls** supports the **-X** option, which displays the extended attributes of the file(s). This description is shown beneath the long output format already described.

For **ls -X A** or **ls -X a**, the display format is:

`Attributes:` *attributelist*

where *attributelist* is a comma-separated list of one or more of:

Verbose	Terse
`Archive`	`A`
`Compressed`	`C`
`Directory`	`D`
`Encrypted`	`E`
`Hidden`	`H`
`Normal`	`N`
`Offline`	`O`
`ReparsePoint`	`R`
`ReadOnly`	`RO`
`Sparse`	`SP`
`System`	`S`
`Temporary`	`T`

For **ls -X D** or **ls -X d**, the display format is:

`ACE:` *perm usergrpname ace_flags accessmode*

where:

perm
: is one of `Allow` or `Deny`.

usergrpname
: is the user or group name as taken from the 7/2008R2/8/2012/10/2016 Security Access Manager registry. Any spaces embedded in the name are replaced by + characters.

ace_flags
: is a comma-separated list of the flags for Discretionary Access Control Entities:

Verbose	Terse
`ContainerInheritAce`	`CIA`
`FailedAccessAceFlag`	`FAAF`
`InheritOnlyAce`	`IOA`
`NoPropagateInheritAce`	`NPIA`
`ObjectInheritAce`	`OIA`
`SuccessAccessAceFlag`	`SAAF`

If no flags are set, **ls** displays a single **-**. `ACE` stands for Access Control Entry; for more information, see your 7/2008R2/8/2012/10/2016 system documentation.

accessmode
: is the set of access permissions (if `Allow` is displayed) or restrictions (if `Deny` is displayed) for this ACE. These can be any or none of the following:

Verbose	Terse	Note
`Read`	`R`	Read file data or list directory entries
`Write`	`W`	Write file data or create new file in directory
`eXecute`	`X`	Execute a file or traverse a directory
`Append`	`A`	Append data to a file or add subdirectory
`DeleteChild`	`DC`	For a directory, delete entries in directory
`ReadEa`	`RE`	Read extended attributes
`WriteEa`	`WE`	Write extended attributes
`ReadAttr`	`RA`	Read attributes
`WriteAttr`	`WA`	Write attributes
`Delete`	`D`	Delete access
`ReadControl`	`RC`	Read access to the owner, group, and discretionary access control list (ACL) of the security descriptor
`WriteDac`	`WD`	Write access to the owner, group, and discretionary access control list (ACL) of the security descriptor
`takeOwnership`	`O`	Write access to the owner
`Synchronize`	`S`	Synchronize access

ENVIRONMENT VARIABLES

COLUMNS
: contains the terminal width in columns. **ls** uses this value to determine the number of output columns to write using the **-C** option.

TK_NTLINKS_OFF
: MKS Toolkit supports hard links under 7/2008R2/8/2012/10/2016 on NTFS file systems. There is a slight loss of performance for this support. If you do not require hard link support, you should set and export the environment variable ***TK_NTLINKS_OFF*** to disable this support.

TK_NTSECURITYINFO_OFF
: MKS Toolkit supports 7/2008R2/8/2012/10/2016 security information on NTFS file systems. There is a slight loss of performance for this support. If you do not require any security information, you should set and export the environment variable ***TK_NTSECURITYINFO_OFF*** to disable this feature.

TK_NTSECURITYINFO_SID_TERSE
: Under 7/2008R2/8/2012/10/2016, files having an associated `SID`, whose name cannot be determined, display the value of the `SID` instead. `SID` values are usually very large. You should set and export the ***TK_NTSECURITYINFO_SID_TERSE*** which causes all `SID` values to be shortened by replacing all the subauthority values, except the last one, with the string **-...-**.

TK_USE_CURRENT_LOCALE
: When set, this environment variable causes months and days of the week to be displayed as defined in the current locale. By default, PTC MKS Toolkit utilities display months and days of the week in English.

TZ
: contains the time zone to be used when displaying date and time strings. On 7/2008R2/8/2012/10/2016, PTC MKS Toolkit uses the built-in timezone support, and you should not set the ***TZ*** environment variable.

DIAGNOSTICS

Possible exit status values are:

0
: Successful completion.

1
: Failure due to any of the following:

— out of memory
— inability to find a file's information
— too many directories
— file/directory not found

2
: Failure due to an invalid command line option.

File or directory "*name*" is not found
: The requested file or directory does not exist.

Cannot allocate memory for sorting
: To sort its output, **ls** needs to allocate memory; this message says that there was not enough memory for the sorting operation.

Too many directory entries in "*dir*"
: This message only appears when **ls** runs out of dynamically allocated memory.

PORTABILITY

POSIX.2. *x*/OPEN Portability Guide 4.0. All UNIX systems. Windows 7. Windows Server 2008 R2. Windows 8. Windows Server 2012. Windows 10. Windows Server 2016.

On Windows systems, **ls** treats files and directories marked with the *hidden* attribute like POSIX and UNIX file names beginning with **.** (period).

On Windows systems, ls -a on the root of a partition (e.g. ls -a c:/) will behave in the Windows way and not enumerate and not display dot (`.`) and dot-dot (`..`) directories.

The **-A**, **-b**, **-f**, **-g**, **-h**, **-L**, **-m**, **-n**, **-o**, **-p**, **-s**, **-X**, and **-x** options are extensions to the POSIX and XPG.4 standard.

The **-X** option is specific to the 7/2008R2/8/2012/10/2016 version of **ls**.

AVAILABILITY

PTC MKS Toolkit for Power Users
PTC MKS Toolkit for System Administrators
PTC MKS Toolkit for Developers
PTC MKS Toolkit for Interoperability
PTC MKS Toolkit for Professional Developers
PTC MKS Toolkit for Professional Developers 64-Bit Edition
PTC MKS Toolkit for Enterprise Developers
PTC MKS Toolkit for Enterprise Developers 64-Bit Edition

SEE ALSO

Commands:
: **chmod**, **lc**

Miscellaneous:
: **security**, **stat**