

Princeton University

COS 217: Introduction to Programming Systems

Linux File/Directory Permissions

Classes of File/Directory Users

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|---------------|--|
| Owner | A file/directory has an owner . A file/directory's owner is the user who created it. A file/directory's owner can issue <code>chmod</code> commands to change its permissions. |
| Group | A file/directory has a group . A group is a set of users. The owner of the file/directory can issue <code>chgrp</code> commands to change a file/directory's group to any other group of which the owner is a member. |
| Others | Others are everyone else! |

File Permissions

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| Read | If a file has read permissions for its owner, its group, or others, then its owner, its group, or others can <i>examine</i> the contents of a file (via <code>cat</code> , <code>more</code> , <code>less</code> , <code>xxd</code> , <code>emacs</code> , etc.). |
| Write | If a file has write permissions for its owner, its group, or others, then its owner, its group, or others can <i>change</i> the contents of that file (via <code>emacs</code> , etc.). |
| Execute | If a file has execute permissions for its owner, its group, or others, then its owner, its group, or others can <i>execute</i> that file as a command. It makes sense to give a file execute permissions if and only if it contains executable code: executable binary code, a Bash shell script, a Python script, etc. |

Directory Permissions

Think of a directory as a table containing file/directory names. Some common permission combinations:

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|------------|--|
| --x | The directory's owner, group, or others can <i>search</i> the table. That is, they can <code>cd</code> to the directory, read from existing files/directory in the directory, and write to existing files/directories in the directory. But they cannot discover the names of the files/directories in the directory (via <code>ls</code>), create new files/directories in the directory, delete existing files/directories from the directory, or change the names of files in the directory. |
| r-x | In addition to <code>--x...</code> The directory's owner, group, or others can <i>read</i> the table. That is, they can discover the names of the files/directories in the directory (via <code>ls</code>). |
| -wx | In addition to <code>--x...</code> The directory's owner, group, or others can <i>write</i> to the table. That is, they can create new files/directories in the directory, delete existing files/directories from the directory, and rename files/directories in the directory |
| rwX | The directory's owner, group, or others can perform any operation on the table. That is, they can use the directory however they want. |