Command line user management

ACCESS PERMITTED!

Linux is a multiuser system: many users can work at the same machine at the same time on separate accounts. In this month's column, we take a close look at how to create and manage Linux user accounts from the command line. BY HEIKE JURZIK

Multiuser systems neatly separate individual user workspaces. You can save your own files by assigning appropriate access privileges. The typical Unix/Linux paradigm of having a separate account for administrative tasks (*root*) helps prevent the possibility of user errors that might otherwise take down the whole system.

The system administrator, *root*, is the boss of the whole system; a user needs root privileges to run the commands for setting up and managing user accounts that we will be looking at in this article. After discussing the most important configuration files, we will take an in-depth look at the *useradd*, *usermod*, and *userdel* tools, which allow us to create, manage, and delete accounts.

Multiple Users

A quick look at the */etc/passwd* file (Figure 1) tells you all about the user accounts on your system. Besides bona fide accounts, you will also notice entries for users such as *lp* or *mail*, the so-called pseudo-users created by the system to assign specific rights for specific files and directories to specific system processes. Generally speaking, the entries in */etc/passwd* look like this:

```
petronella:x:1002:1002:↩
Petronella Huhn,,,,↩
Test-Account:↩
/home/petronella:/bin/bash
```

Command Line

Although GUIs such as KDE or GNOME are useful for various tasks, if you intend to get the most out of your Linux machine, you will need to revert to the good old command line from time to time. Apart from that, you will probably be confronted with various scenarios where some working knowledge will be extremely useful in finding your way through the command line jungle.

The colon-separated fields, contain the following entries:

- Username: The name the user will type to log on to the system.
- Password: This is where the encrypted password used to be, but defaults to an *x* on most systems, indicating that the password is stored in the */etc/shadow* file. If the field is empty, the user can log on without providing a password.
- UID: Every user in Linux is uniquely identified by a number or UID ("User Identifier"). The root user is assigned the number 0; 1 through 99 are typically reserved for system accounts.
- GID: Every user is a member of one or multiple groups, which are identified by so-called GIDs ("Group Identifier").
- Additional information: A description of the user, which can comprise multiple words (this is typically the

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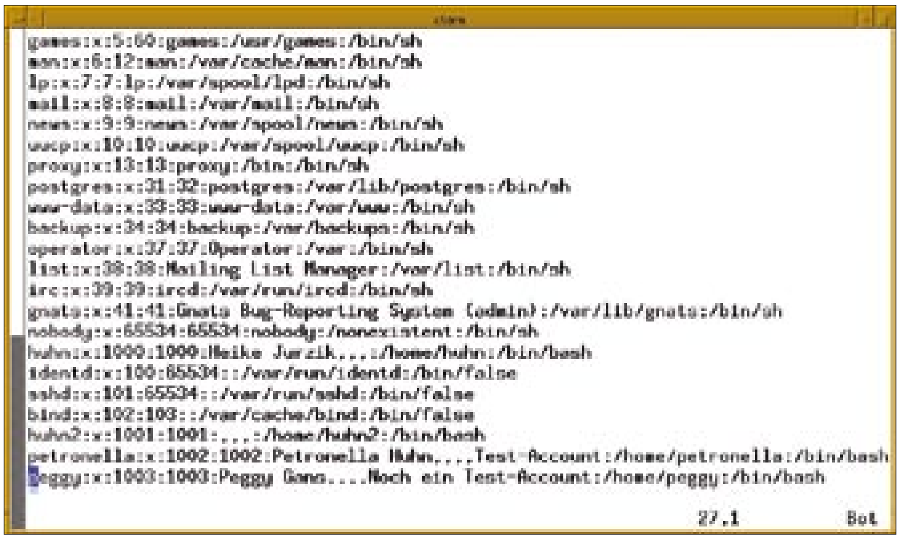

```
games:x:5:60:games:/usr/games:/bin/sh
man:x:6:12:man:/var/cache/man:/bin/sh
lp:x:7:7:lp:/var/spool/lpd:/bin/sh
mail:x:8:8:mail:/var/mail:/bin/sh
news:x:9:9:news:/var/spool/news:/bin/sh
uucp:x:10:10:uucp:/var/spool/uucp:/bin/sh
proxy:x:13:13:proxy:/bin:/bin/sh
postgres:x:31:32:postgres:/var/lib/postgres:/bin/sh
www-data:x:33:33:www-data:/var/www:/bin/sh
backup:x:34:34:backup:/var/backups:/bin/sh
operator:x:37:37:Operator:/var:/bin/sh
list:x:38:38:Mailing List Manager:/var/list:/bin/sh
irc:x:39:39:ircd:/var/run/ircd:/bin/sh
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/bin/sh
nobody:x:65534:65534:nobody:/nonexistent:/bin/sh
huhn:x:1000:1000:Heike Jurzik,,,:/home/huhn:/bin/bash
identd:x:100:65534::/var/run/identd:/bin/false
sshd:x:101:65534::/var/run/sshd:/bin/false
bind:x:102:103::/var/cache/bind:/bin/false
huhn2:x:1001:1001:,,,:/home/huhn2:/bin/bash
petronella:x:1002:1002:Petronella Huhn,,,,Test-Account:/home/petronella:/bin/bash
peggy:x:1003:1003:Peggy Gans,,,,Noch ein Test-Account:/home/peggy:/bin/bash

                                                             27,1          Bot
```

Figure 1: The /etc/passwd file has details of the system users.

user's first and family names, a telephone number or a room number, etc.).

- Home directory: For "normal" users, the home directory is typically */home/username*; pseudo-users often have a working directory (*/var/spool/lpd* for the printer daemon user, *lp*, for example).
- Shell: The command line interpreter to launch when the user logs on to the system (typically */bin/bash*).

Passwords in the Shadow

As I mentioned previously, modern systems tend to use shadow passwords. Shadow passwords enhance the security of the system by removing the encrypted password entries from */etc/passwd*, which is globally readable, and placing them in */etc/shadow* instead. (The shadow file is only readable for the administrator.) The shadow password feature also stores information on the last password change and offers users a control mechanism for changing their passwords.

The lines in */etc/shadow* also have colon-separated fields. These colon-separated fields store the following information:

- Username: The username (just like in */etc/passwd*).
- Password: the encrypted password. This field cannot be empty, and this means that pseudo-users such as *lp* will have an entry with an asterisk "*". To temporarily disable an account, all you need to do is prefix the password entry with an exclamation mark.
- Last change: the date of the last password change, measured in days since the epoch, 01.01.1970.
- Min. / Max. age: how old a password has to be before the user can or has to change it.
- Warning: how many days before the password expires should the user be warned of the event?
- Grace: how long the user will be allowed to work after his or her password expires before the account is disabled.
- Validity: the date when the password expires (specified in days after the epoch, 01.01.1970).
- Empty: The last field is reserved.

Note that only the first two entries for the username and password are mandatory; all the other fields are optional. Thus, an entry might look like this:

```
petronella:$1$RXbNLkU8⮐
$XULLOGFVs6LTxmSRqCS.P/:⮐
12872:0:99999:7:::
```

The Basic Framework

When you are creating an account, it makes sense to assign a few default values to every user. Besides creating a home directory, you might want to add a few configuration files (for the shell, for example). Most systems allow you to give users a basic framework specified in the */etc/skel* (for skeleton) directory.

While Debian Linux only stores a few hidden configuration files (for various shells) in the skeleton directory, Suse Linux adds a number of files and folders. Most tools that help admins add new user accounts automatically copy the content of */etc/skel* to the new user's home directory and assign matching permissions.

If you decide to manually add a user account by editing the */etc/passwd* and */etc/shadow* files, make sure you create a new home directory, copy the content of the skeleton directory to the new home directory, and modify the permissions as appropriate:

```
mkdir /home/newuser
cp -r /etc/skel /home/newuser
chown -R newuser:users ⮐
/home/newuser
```

To include the subdirectories below */etc/skel*, make sure you set the *-r* flag for recursive copying, and the *-R* flag for recursive permission changes, when you run the *cp* and *chown* commands.

users is the default group for new users with most distributions; if this is not the case for your distribution, you will need to replace the *users* entry with the correct group name.

Getting Explicit with useradd

If all that manual work is too confusing or too time-consuming for your liking, *useradd* is a fast command line tool that can give you a hand. The various Linux distributions install versions with different parameters. But don't worry: we will be pointing out the differences wherever they are relevant to the information in this article. Typing *useradd* or *useradd -help* gives you a parameter list.

Every new account needs a User Identifier (UID), which you can define by setting the *-u UID* flag. Make sure the UID is unique for each user – if you attempt to assign the same user ID twice, *useradd* will protest. If you omit the user ID, *useradd* will determine the highest UID in the normal user range and increment that number by 1.

You can also specify the *-g* parameter to set a primary GID. If you need to make the user a member of any other groups, add the *-G* flag and the appropriate group numbers. The */etc/group* file tells you which groups exist on your system and which GIDs these groups have. Let's assume you want to add the new account to the *users* group (e.g., GID 100), and additionally to the *cdrom* group, which has a GID of 24. The following options would do the trick: *-g 100 -G 24*.

By default *useradd* chooses a home directory name to reflect the username associated with the account. To explicitly specify a different home directory, you need to specify the *-d directory* option. The *-m* parameter tells *useradd* to create the home directory if the home directory does not exist, and to copy the skeleton directory from */etc/skel* to the new home directory. *-c* allows you to add some information for the user – note that you will need to put this information in quotes if the information contains blanks. The command line might look like this:

```
useradd peggy -u 501 ↩
-g 100 -m -s ↩
/bin/bash -c "Peggy Goose"
```

Your next step would be to type *passwd peggy* and set a password for the new user.

Defaults

Default settings make *useradd* even quicker. The defaults can include details of groups, home directories, and the skeleton; the big advantage for you as the administrator is that you can leave out all these details at the command line, assuming you want to keep the defaults.

To discover the defaults for *useradd* on Debian Linux and Fedora Core, run the tool with the *-D* option:

```
debian# useradd -D
GROUP=100
HOME=/home
INACTIVE=-1
EXPIRE=
SHELL=
SKEL=/etc/skel
```

Suse Linux 9.2 calls this option *--show-defaults*. Suse uses the defaults to specify other groups to which new accounts are added:

```
suse# useradd --show-defaults
...
GROUPS=video,dialout
```

If you want *useradd* to use the defaults for a new account, you can simply type something like *useradd <new_account>*. Note that some Linux distributions expect you to specify the *-m* option if you want to create a home directory and copy the tree below */etc/skel* to it.

There are a couple of approaches to changing the defaults. You could fire up your editor and modify */etc/default/useradd*, or you could use the command line to define the values by specifying them as parameters. Different distributions take different approaches to this problem. Users with Debian or Fedora can change the *useradd* defaults at the command line by setting the *-D* parameter. Let's assume you need to define a different default shell. In this case, you would type:

```
# useradd -D -s /bin/csh
```

The syntax for specifying a different location for home directories is similar (*-D -b /home2*), as is the command for specifying a different default group (*-D -g 101*).

On Suse Linux, you again need to specify *--save-defaults* rather than the *-D* flag. Note that this option will not work for the full set of defaults, but only for the skeleton directory (as in *--save-defaults -k /etc/my_skel*) and the shell (e.g., *--save-defaults -s /bin/csh*). The parameters for modifying the home directory or GIDs mentioned in the manpage are missing in versions 2.6.90 (Suse 9.2) and 2.6.96 (Suse 9.3), but you could always modify */etc/default/useradd* as a workaround.

Modifying an Account

The *usermod* tool allows you to modify account properties for a user account. *usermod* uses functions and parameters similar to those of *useradd*. For example, the following line would give a user a different shell:

```
usermod -s /bin/csh huhn
```

The next time the user *huhn* logs on to the system, he or she will be given a different shell.

One of *usermod*'s most practical features is its ability to disable user accounts. Debian administrators who wish to disable a user account (temporarily) without actually deleting the account, can type the following command:

```
usermod -L huhn
```

Again, note that, in Suse 9.2, this option is described in the manpage but not actually implemented. A quick look at the */etc/shadow* file tells us that the account really is disabled, as the password hash now starts with an exclamation mark:

```
huhn:!MjBhdgr.6XkE6:↩
12575:0:99999:7:::
```

This entry will effectively prevent user *huhn* from logging on to the system. To re-enable the account, type:

```
usermod -U huhn
```

Goodbye User!

It is just as easy to delete user accounts as it is to create them. The tool you need for deleting user accounts is *userdel*. There is one condition: the user you will be deleting cannot be logged on to the system, or have processes running, at the time you delete the account. Assuming this is not the case, you can remove the account by typing *userdel peggy*. If you want to remove the home directory at the same time, specify the *-r* parameter to tell *userdel* to remove Peggy's personal data.

Conclusions

Although most distributions have convenient GUI-based user management tools, the command line is a much faster way to make changes if you know what you're doing. Once you have gotten used to the syntax of *useradd*, *usermod*, and *userdel*, user management tasks require only a few seconds. ■

THE AUTHOR

Heike Jurzik studied German, Computer Science and English at the University of Cologne, Germany. She discovered Linux in 1996 and has been fascinated with the scope of the Linux command line ever since. In her leisure time you might find Heike hanging out at Irish folk sessions or visiting Ireland.