



BRAINWARE UNIVERSITY

BNCSC202

CLASS NOTES

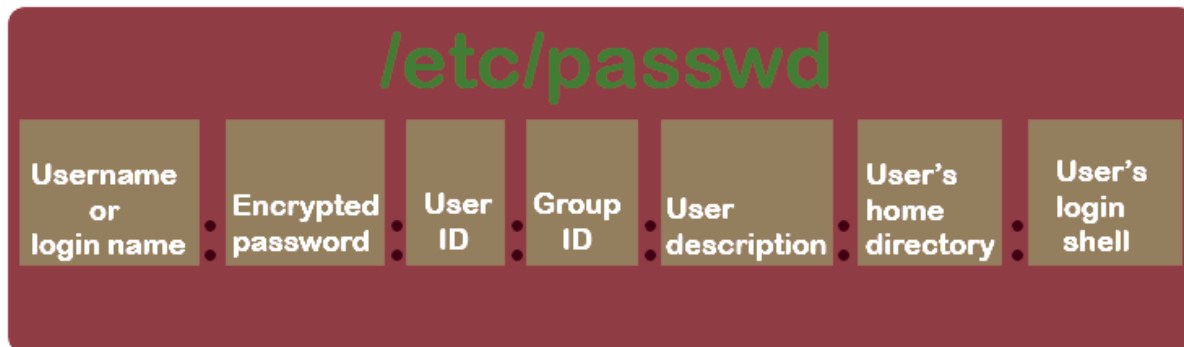
Linux Administration-I

Module II: Users and Group Management

Part II

The information about `/etc/passwd` file:

The `/etc/passwd` file is a text file in Linux and Unix-like operating systems that contains information about the users on the system. Each line of the file represents a single user and contains seven fields separated by a colon (:) character. The fields are:



1. username: The name of the user account.
2. password: This field is used to store the encrypted password for the user account. In modern systems, this field is typically set to "x" which means that the password is stored in the `/etc/shadow` file.
3. user ID (UID): A unique numerical identifier for the user account.
4. group ID (GID): A numerical identifier for the primary group that the user belongs to.
5. user information: A field that can be used to store additional information about the user, such as their full name.
6. home directory: The path to the user's home directory.
7. shell: The path to the user's default shell program.

An example of an entry in the `/etc/passwd` file might look like this:

```
john:x:1001:1001:John Doe:/home/john:/bin/bash
```

In this example, the user "john" has a UID of 1001, a GID of 1001, and their home directory is located at `/home/john`. The user's default shell is `/bin/bash`.

The `/etc/passwd` file is readable by all users, but is only writable by the root user. It is important to keep the file secure and to keep the permissions set correctly, as any user can use the information in this file to try and gain access to the system.



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The information about /etc/shadow

The /etc/shadow file is a text file in Linux and Unix-like operating systems that contains information about the user accounts on the system, specifically the password hashes. Each line of the file represents a single user and contains nine fields separated by a colon (:) character. The fields are:



1. username: The name of the user account.
2. password: This field is used to store the encrypted password for the user account. The password is usually hashed using the SHA-256 or SHA-512 algorithm.
3. last password change (date): The date of the last time the user's password was changed.
4. Minimum days between password change: The number of days after which the user must change their password.
5. Maximum days between password change: The number of days after which the user must change their password or the account will be locked.
6. Number of days before password change to warn user: The number of days before a password expires that the user will be warned to change it.
7. Number of days after which account is disabled: The number of days after a password expires that the user's account will be locked.
8. The number of days since Jan, 1, 1970, since the account has been disabled.
9. Reserved field, usually left empty.

An example of an entry in the /etc/shadow file might look like this:

```
john:$6$salt$encryptedHash:17098:0:99999:7:::
```

In this example, the user "john" has an encrypted password hash that starts with \$6\$, indicating it is a SHA-512 algorithm. The field "17098" indicates that the last password change was on 17098 days ago and the field "0" indicates that the user must change their password after 0 days.

The /etc/shadow file is readable only by the root user and is used to store the password hashes for all the users in the system, thus it is important to keep the file secure and to keep the permissions set correctly, as any user with access to the file can use the information to try and gain access to the system by cracking the password hashes.



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The Information about /etc/groups:

The /etc/groups file is a text file in Linux and Unix-like operating systems that contains information about the groups on the system. Each line of the file represents a single group and contains four fields separated by a colon (:) character. The fields are:

1. Group name: The name of the group.
2. Group password: This field is used to store the encrypted password for the group, this field is rarely used and usually left blank.
3. Group ID (GID): A unique numerical identifier for the group.
4. User list: A list of the users who are members of the group, separated by commas.

An example of an entry in the /etc/groups file might look like this:

```
users:x:100:john,jane,bob
```

In this example, the group "users" has a group ID of 100 and is made up of three members: "john", "jane", and "bob".

The /etc/groups file is readable by all users and is used to store the group information for all the groups in the system, thus it is important to keep the file secure and to keep the permissions set correctly, as any user with access to the file can use the information to gain access to resources that are restricted to certain groups. The group information is used by the system to determine access permissions for files, directories, and other resources, as well as for user management tasks such as adding or removing users from groups.

The Information about /etc/login.defs File:

The /etc/login.defs file is a configuration file in Linux and Unix-like operating systems that contains settings for the user and group account management system, specifically for the programs that handle account creation and management such as adduser and useradd.

This file contains various parameters that control the behavior of these programs, including:

- The minimum and maximum values for user and group IDs.
- The default values for new user and group accounts, such as the default home directory and shell.
- The location of the various files and directories used by the account management system, such as the passwd and shadow files.
- The encryption method used for storing passwords.

An example of an entry in the /etc/login.defs file might look like this:

```
PASS_MAX_DAYS 90
```

```
PASS_MIN_DAYS 7
```

```
PASS_WARN_AGE 14
```

This example shows that the maximum number of days that a password can be valid is 90 days, the minimum number of days before a password can be changed is 7 days and the number of days of warning before a password expires is 14 days.



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As suggested earlier, User ID (UID) and Group ID (GID) numbers for regular users and groups start at 500. Since Linux supports UID and GID numbers above 4 billion (actually, up to 2^{32}), the maximum UID and GID numbers of 60000 as defined in the `/etc/login.defs` file may seem strange. However, it leaves higher numbers available for other authentication databases, such as those associated with LDAP and Microsoft Windows (via Samba). As suggested by the directives, `UID_MIN` specifies the minimum UID, `UID_MAX` specifies the maximum UID, and so on:

`UID_MIN 500`

`UID_MAX 60000`

`GID_MIN 500`

`GID_MAX 60000`

Normally, when the `useradd` command is run to create a new user, it automatically creates home directories as well, which is confirmed by the following directive:

`CREATE_HOME yes`