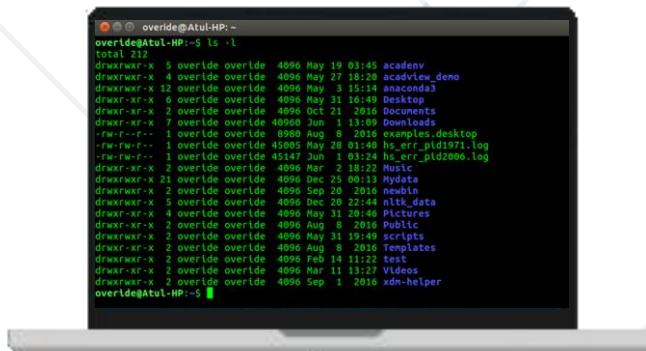


Linux and Linux Shell

Users and Groups, Environment Variables and SSH



SoftUni Team
Technical Trainers



SoftUni



Software University

<https://about.softuni.bg>

Have a Question?

sli.do

#Dev-Ops

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Users and Groups

Manage Users and Groups

- Users file (**/etc/passwd**)

```
root:x:0:0:root:/root:/bin/bash
```

```
...
```

```
madmin:x:1000:1000:M.Admin:/home/madmin:/bin/bash
```

```
...
```

1

2

3

4

5

6

7

1

Username (login)

2

Password placeholder

3

User ID

4

Group ID

5

Comment (full name, phone, etc.)

6

Home directory

7

User shell

- Groups file (**/etc/group**)

```
root:x:0:
```

```
...
```

```
wheel:x:10:madmin 4
```

```
...
```

```
madmin:x:1000:
```

```
... 1 2 3
```

1 Group name

2 Password placeholder

3 Group ID

4 Group members



Access Rights

Users, Groups and Permissions in the File System

Access Rights in the Linux File System

```
[root@vmi937769 softunisites]# ls -al
total 112
drwx--x--x 26 softunisites softunisites 4096 Feb 13 23:17 .
drwx--x--x 17 root          root          4096 Jan 23 14:36 ..
lrwxrwxrwx  1 softunisites softunisites   38 Jan  7 23:28 access-logs -> /etc/apache2/
drwxr-x---  7 softunisites nobody        4096 Mar 25 03:33 conf.softuni.bg
drwxr-xr-x  3 softunisites softunisites  4096 Feb 13 23:17 .cpaddons
drwx----- 6 softunisites softunisites  4096 Mar 27 01:03 .cpanel
drwxr-x---  6 softunisites nobody        4096 Mar 25 03:33 fest.softuni.bg
```

Group

Owner

Access Rights

read / write / execute

File Permissions and Octal Masks

Owner's permissions

File type

drwxr-xr-x

Everyone else

Group permissions

Permissions	Octal Mask	Description
-----	000	No permissions
rw-rw-rw-	666	Everyone read + write
rwxr-xr-x	755	Owner full access, others read + execute
rwxrwxrwx	777	Everyone read, write, and execute

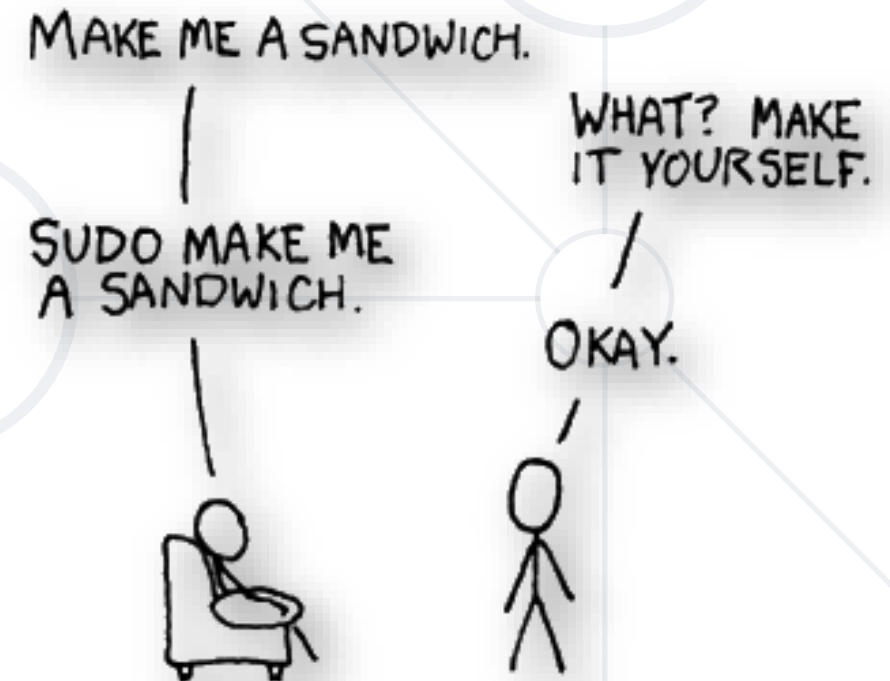
Access Rights

	Read	Write	Execute
Files	Allow a user to view the contents of a file	Allow a user to modify and delete the file	Allow a user to execute a file (the user must also have read permission)
Directories	Allow a user to view the names of files in a directory	Allow a user to delete the directory, modify its contents and modify the contents of files that the user can read	Allow a user to access, or traverse into, a directory and access metadata about files in it

SUDO (SuperUser DO) Configuration

- **sudo** is used to access restricted files and operations
 - Controls **who** can do **what** and from **where**
- Temporarily allows **ordinary users** to **perform administrative tasks**
 - Without logging in as the root user

```
sudo [command]
```



- Execute a command as **another user**

Execute commands as another user

```
user@host:~$ sudo -u testuser whoami
```

Switch to a user

```
user@host:~$ sudo su testuser
```

Switch to a user with a login shell

```
user@host:~$ su - testuser
```

Execute a single command as root

```
user@host:~$ sudo chmod +x hello.txt
```

- Change the permissions of a file or directory for all types of users
 - Operations modify the user or file level permissions

```
chmod [operations] [file/directory name]
```

- Change file owner and group

```
chown [options] [owner][:group] file
```

- Change group ownership

Can be replaced with "."

```
chgrp [options] group file
```



Live Demo

Getting to Know the Console



Environment Variables

- **Environment variables** == **dynamic** variables used by the Linux shell
 - Provide config settings to Linux apps
 - They follow the **<NAME>=<VALUE>** formatting
 - They are case-sensitive
 - By convention environment variable names use **CAPITAL_LETTERS**

```
$ env
DOCKER_VERSION=20.10.17
CHARSET=UTF-8
HOSTNAME=node2
DOCKER_TLSENABLE=false
COMPOSE_VERSION=2.6.1
DOCKER_BUILDX_VERSION=0.8.2
PWD=/root
```


- List all environment variables

```
env  
printenv
```

- Print a single environment variable

```
printenv HOME  
echo $HOME
```

- Sets a new environment variable

```
export VAR=VALUE
```



Live Demo

Getting to Know Environment Variables



Secure Shell (SSH)

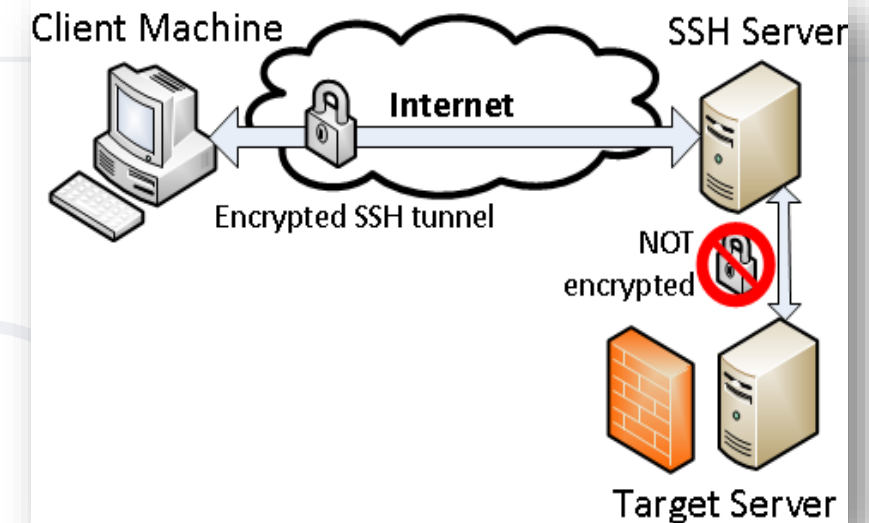
Connecting to Remote Linux Machine

SSH (Secure Shell)

- **Secure Shell (ssh)** allows connecting to a remote machine's console

```
ssh 192.168.0.28 -l root
```

```
$ ssh 192.168.0.28 -l root
#####
#                               #
#           WARNING!!!!        #
# This is a sandbox environment. Using personal credentials   #
# is HIGHLY! discouraged. Any consequences of doing so are   #
# completely the user's responsibilities.                      #
#                                                             #
# The PWD team.                                               #
#####
[node1] (local) root@192.168.0.28 ~
$ exit
logout
Connection to 192.168.0.28 closed.
[node2] (local) root@192.168.0.27 ~
$
```





Processes

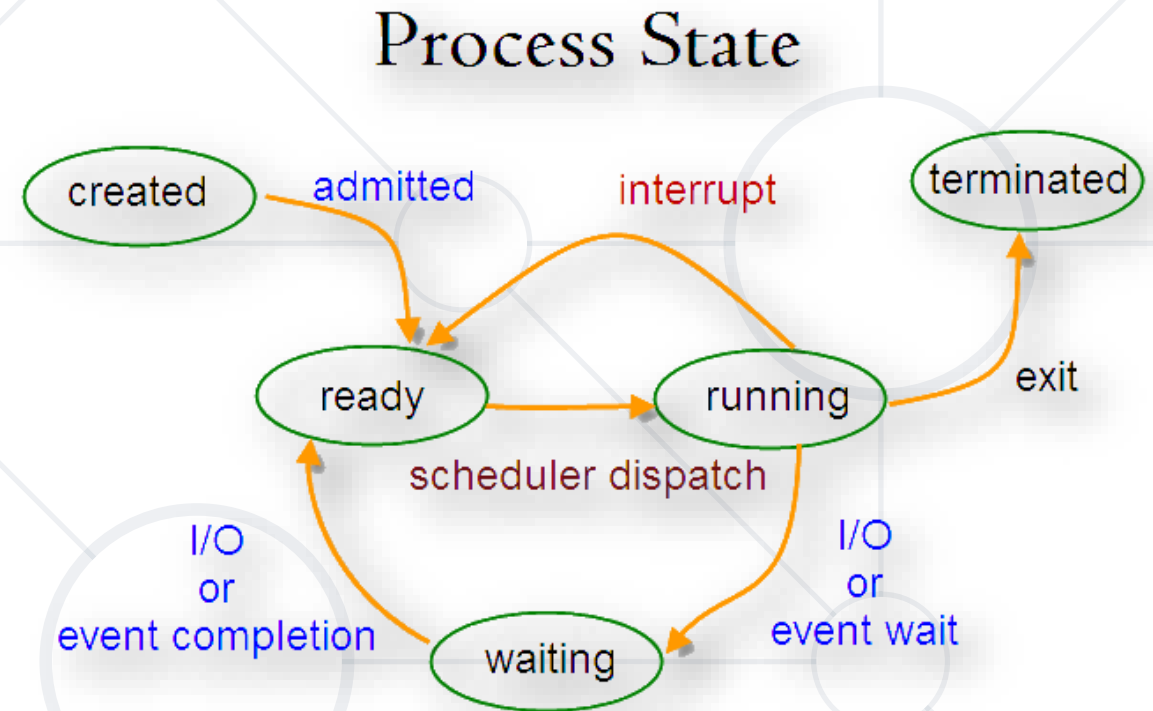
Monitoring and Management

- **Process**

- **Running a program** with its own address space

- **Job**

- **Interactive program** that doesn't detach
- It can be suspended with **[Ctrl]+[Z]**
- It can execute in the foreground or background mode



- Display status of jobs

```
jobs [options] [jobspec]
```

- Report a snapshot of the current processes

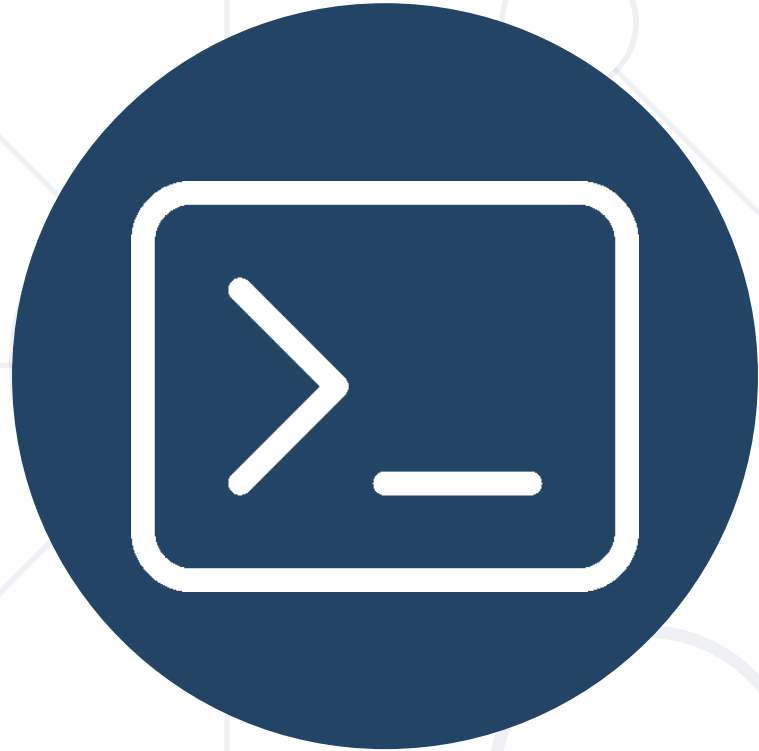
```
ps [options]
```

- Send a signal to a job or process

```
kill [options] pid | jobspec
```

- Kill processes by name

```
killall [options] process
```



More Linux Commands

- **apt** provides a high-level command line interface for the package management system

```
apt install <package>
```

- Download package information from all configured sources

```
apt update
```

- Install available upgrades of all packages, currently installed on the system, from the configured sources

```
apt upgrade
```

- **wget** == free utility for non-interactive download of files from the Web

```
wget [options] URL
```

- **curl** == tool for transferring data from or to a server

```
curl [options] URL
```



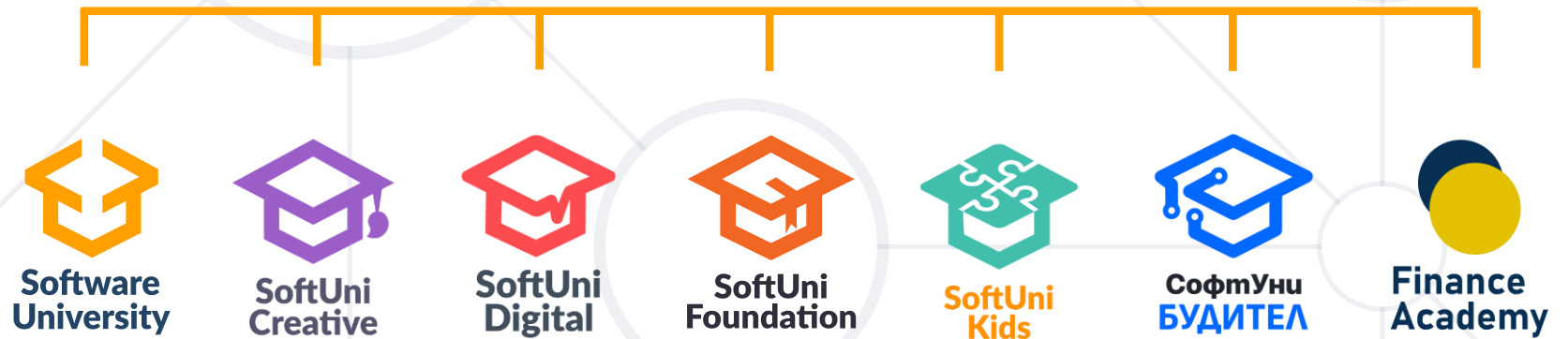
Live Demo

Getting Help

- **Users and Groups**
 - **Access Rights**
- **Environmental variables**
 - Dynamic named variables
- **Linux commands**
 - Used to interact with the system



Questions?



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