Linux and Linux Shell
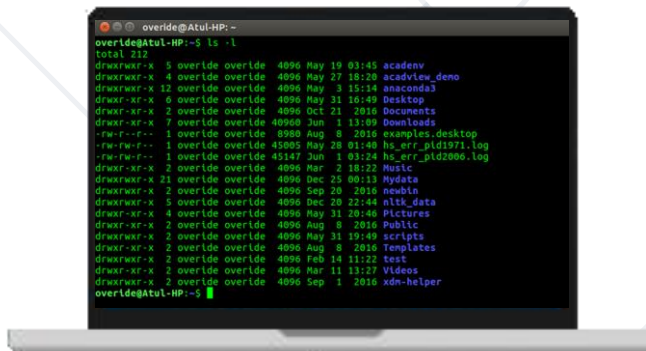
Users and Groups, Environment Variables and SSH

SoftUni Team

Technical Trainers

Software University

Software University

sli.do

#Dev-Ops

Table of Contents

Users and Groups

Manage Users and Groups

Users in Linux

- 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 in Linux

- 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 / **w**rite / **ex**ecute

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]
```
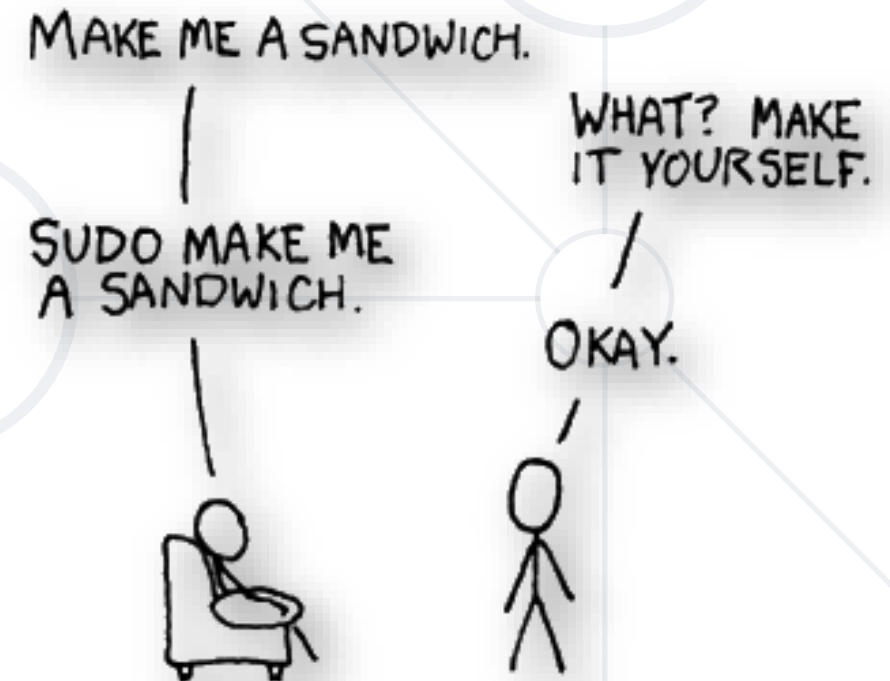
sudo

- 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

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

- Change file owner and group

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

Can be replaced with "**.**"

- Change group ownership

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

Live Demo

Getting to Know the Console

Environment Variables

Linux 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
```

Commands

- 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

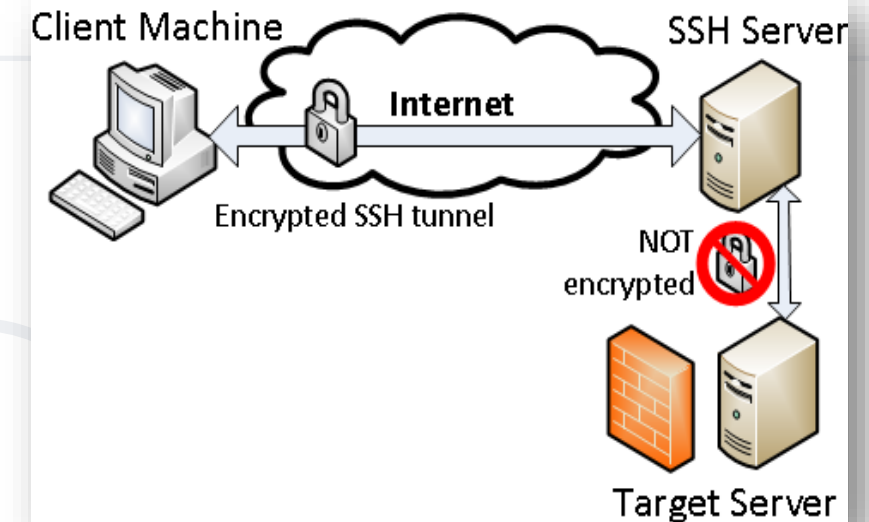Getting to Know Environment Variables

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
```
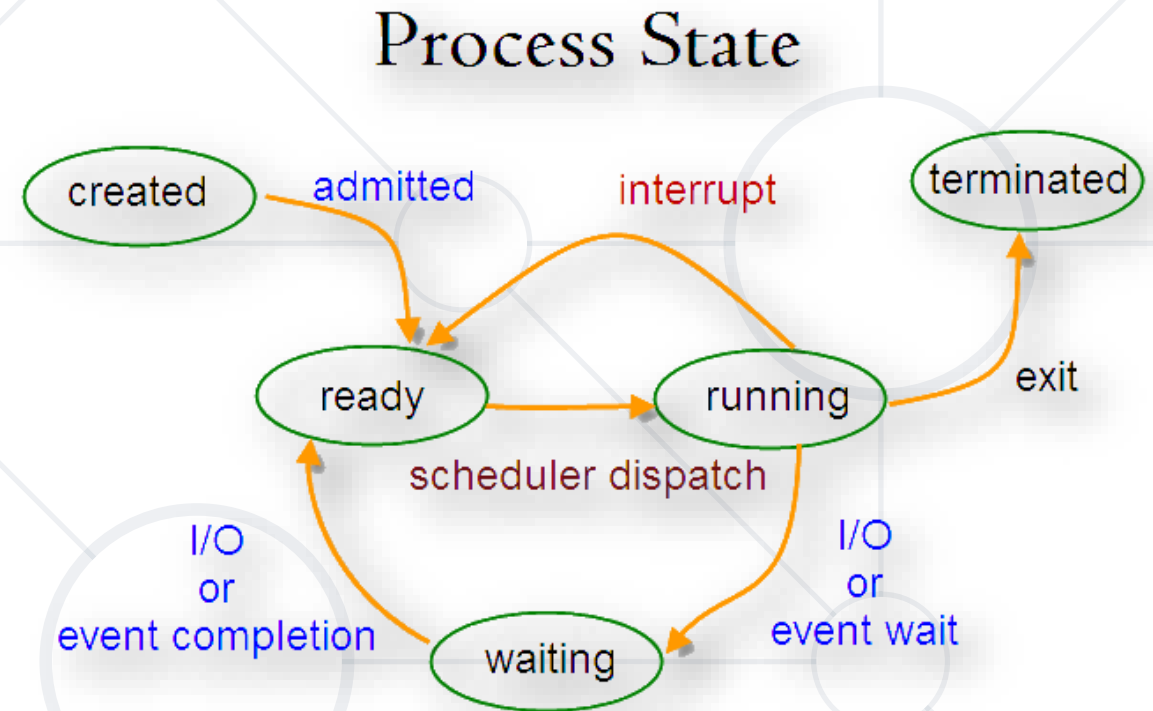
Processes

Monitoring and Management

Processes and Jobs

- **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

Commands

- Display status of jobs

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

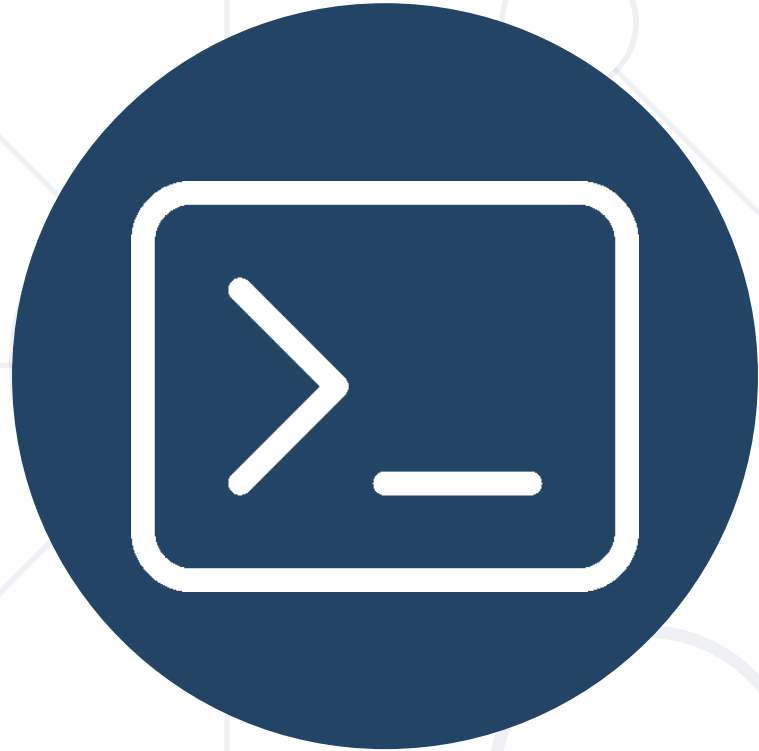- Report a snapshot of the current processes

```
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

- **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
```

Data Fetching

- **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
```
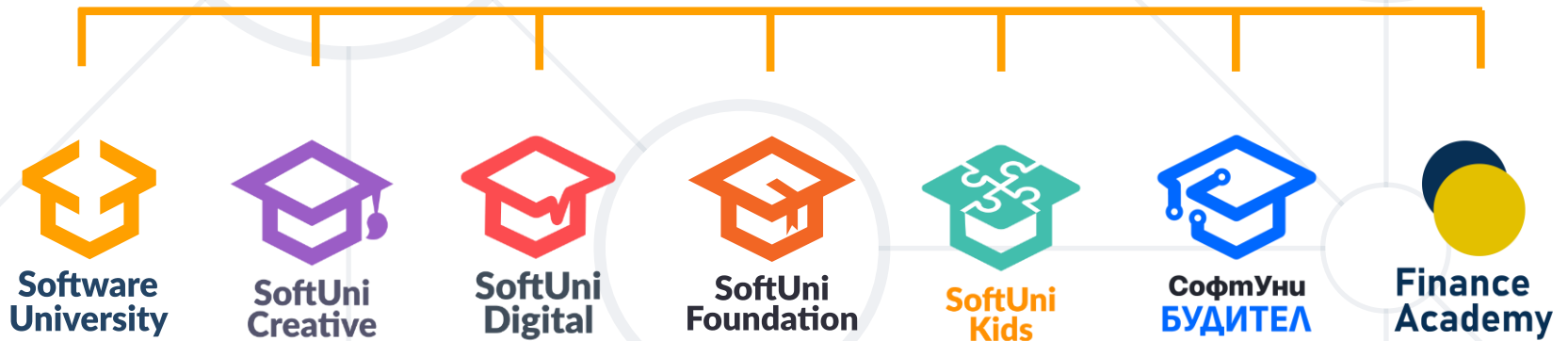
Live Demo

Getting Help

Summary

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

Questions?

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