



Linux Plus

for

AWS and DevOps

Session - 5

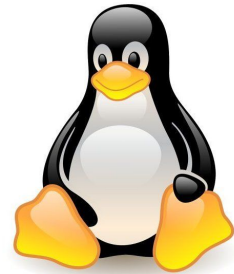


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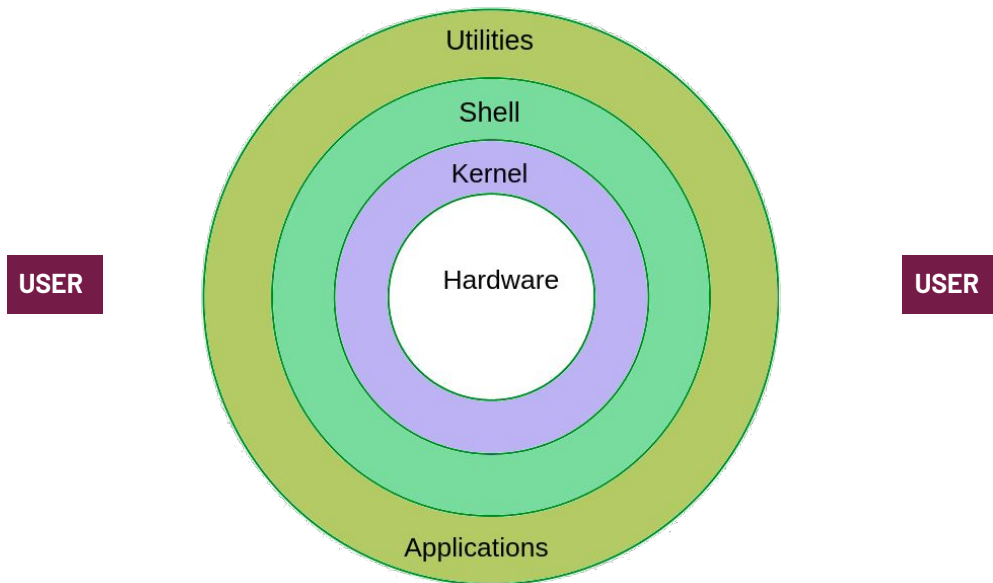


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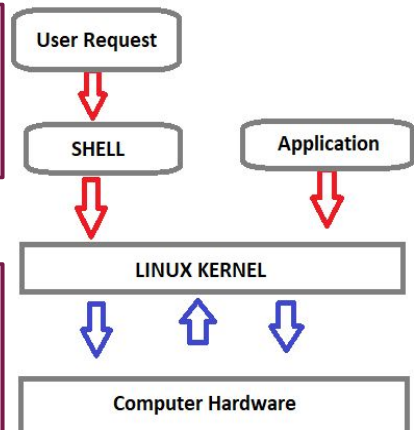
Components of Linux



What is SHELL?

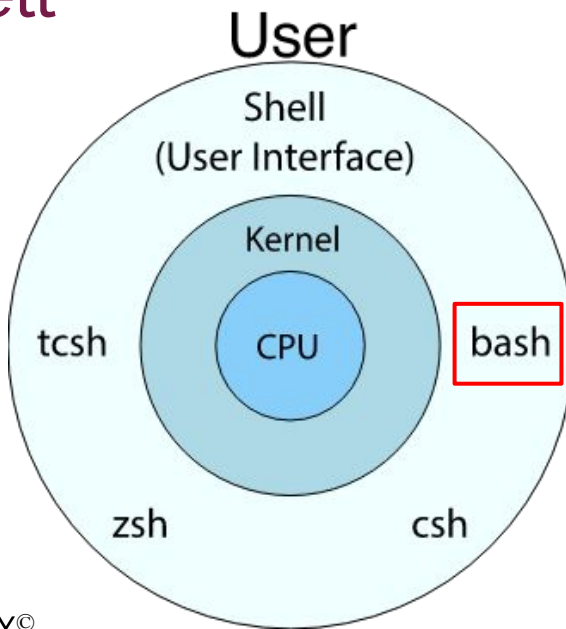
Shell is a **program** that **receives** the user's **commands** and **gives** them to the **operating system** to **process** and displays the output.

The standard Linux shell is both a **command-line interpreter** and a **programming language**.





Shell



SH



Bourne-Again SHell



Shell

- 1 Bash : Bourne Again shell**
The standard GNU shell, intuitive and flexible
- 2 ksh : Korn shell**
A superset of the Bourne shell
- 3 csh : C shell**
The syntax of this shell resembles that of the C programming language
- 4 tcsh: TENEX C shell**
A Superset of the common C shell, enhancing user-friendliness and speed
- 5 zsh : Z Shell**
An extended Bourne shell with a large number of improvements, including some features of Bash, ksh, and tcsh.



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LINUX@BASH-PROMPT:~\$ ■

EXAMPLE OF BASH PROMPT	PS1='\'u@h:w\\$ '
PS1 - shell prompt variable	\u - the username of the current user
\h - the hostname up to the first `.`	\w - the current working directory
\\$ - if the effective UID is 0 (root / superuser), a #, otherwise a \$	

LINUXCONFIG.ORG



► The Bash prompt

- A prompt is text or symbols used to represent the system's readiness to perform the next command.
- **PS1** variable stands for "Prompt String One" and represents the primary prompt string.

user@host:~\$



The Bash prompt

BASH prompt can be easily changed by modifying bash `PS1` variable.

```
clarus-linux@professor: /home
clarus-linux@professor:/home/ahmet$ cd ..
clarus-linux@professor:/home$ echo $PS1
\[ \e]0;\u@h: \w\a\]${debian_chroot:+($debian_chroot)}\[ \033[01;32m\]\u@\h\[ \033[00m\]:\[ \033[01;34m\]
\w\[ \033[00m\]\$
clarus-linux@professor:/home$ backup=$PS1
clarus-linux@professor:/home$ echo $backup
\[ \e]0;\u@h: \w\a\]${debian_chroot:+($debian_chroot)}\[ \033[01;32m\]\u@\h\[ \033[00m\]:\[ \033[01;34m\]
\w\[ \033[00m\]\$
clarus-linux@professor:/home$ PS1="\[ \033[1;35m\]\u@\[ \033[1;36m\]\h:\[ \033[1;32m\]\w\[ \033[1;37m\]\$ "
clarus-linux@professor:/home$
clarus-linux@professor:/home$
clarus-linux@professor:/home$ PS1=$backup
clarus-linux@professor:/home$
clarus-linux@professor:/home$
clarus-linux@professor:/home$ Nice Work![]
```



The Bash prompt

Bash prompt can be customized by using special characters. Here is the most used characters and their meaning.

Special Character	Explanation
\d	The date in "Weekday Month Date" format (e.g., "Sun Apr 12")
\h	the hostname up to the first `.'
\H	the hostname
\s	the name of the shell, the basename of \$0 (the portion following the final slash)
\t	the current time in 24-hour HH:MM:SS format
\T	the current time in 12-hour HH:MM:SS format
\@	the current time in 12-hour am/pm format
\u	the username of the current user

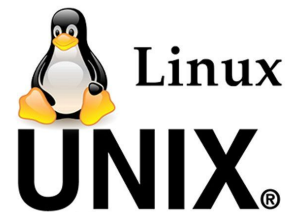
The Bash prompt

Bash prompt can be customized by using special characters. Here is the most used characters and their meaning.

Special Character	Explanation
\v	the version of bash (e.g., 2.00)
\V	the release of bash, version + patch level (e.g., 2.00.0)
\w	the current working directory
\W	the basename of the current working directory
!\	the history number of this command

Homework

How can we make permanent our changes in PS1





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Shell Scripts



Shell Scripts

What is Shell Scripting?

Shell Scripting is an open-source computer program designed to be run by the Unix/Linux shell which could be one of the following:

- The Bourne Shell
- The C Shell
- The Korn Shell
- The GNU Bourne-Again Shell



Shell Scripts

What is Shell Scripting?

- Typical activities that can be done in a shell, such as file manipulation, program execution, and printing text, can also be done with the shell script.
- Lengthy and repetitive sequences of commands can be combined into a single script that can be stored and executed anytime.



Shell Scripts

```
clarus-linux@professor: ~  
clarus-linux@professor:~$ vim class.sh  
clarus-linux@professor:~$ chmod +x class.sh  
clarus-linux@professor:~$ ./class.sh  
Hello World!  
clarus-linux@professor:~$
```

```
clarus-linux@professor: ~  
#!/bin/bash  
  
echo "Hello World!"  
  
~  
~  
~  
"class.sh" 5L, 35C
```

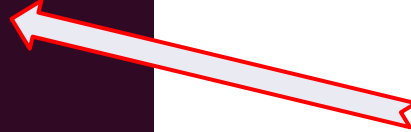
Shebang (#!)



Shell Scripts

```
clarus-linux@professor: ~  
clarus-linux@professor:~$ vim class.sh  
clarus-linux@professor:~$ chmod +x class.sh  
clarus-linux@professor:~$ ./class.sh  
Hello World!  
clarus-linux@professor:~$
```

```
clarus-linux@professor: ~  
#!/bin/bash  
  
echo "Hello World!"  
  
~  
~  
~  
~  
"class.sh" 5L, 35C
```



chmod



Shell Scripts

```
clarus-linux@professor: ~  
clarus-linux@professor:~$ vim class.sh  
clarus-linux@professor:~$ chmod +x class.sh  
clarus-linux@professor:~$ ./class.sh  
Hello World!  
clarus-linux@professor:~$
```

```
clarus-linux@professor: ~  
#!/bin/bash  
  
echo "Hello World!"  
  
~  
~  
~  
~  
"class.sh" 5L, 35C
```



./



▶ Shell Scripts

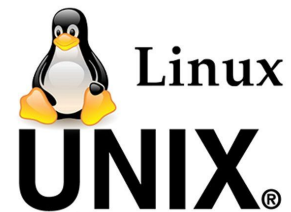
```
clarus-linux@professor: ~  
#!/bin/bash  
  
echo "Hello World"  
date  
echo "Waov i learnt one more thing!"  
~  
~  
5,36 All
```

```
clarus-linux@professor: ~$ vi test.sh  
clarus-linux@professor: ~$  
clarus-linux@professor: ~$  
clarus-linux@professor: ~$  
clarus-linux@professor: ~$ chmod +x test.sh  
clarus-linux@professor: ~$
```



▶ Exercise 1

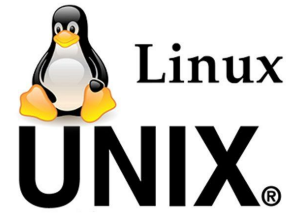
1. Create a script named: **“my-first-script.sh”**
It should print: **“This is my first script.”**
2. Make the script executable.
3. Execute the script.



▶ Homework



Create an environment that you don't need to provide “./” before your scripts while executing them.



▶ Variables



- A variable is pointer to the actual data. The shell enables us to create, assign, and delete variables.
- The name of a variable can contain only letters (a to z or A to Z), numbers (0 to 9) or the underscore character (_) and beginning with a letter or underscore character.
- The reason you cannot use other characters such as !, *, or - is that these characters have a **special meaning for the shell**.

```
$VARIABLE=value
$echo $VARIABLE
value
$
$my_var=my_value
$echo $my_var
my_value
$
$my-var=my-value
my-var=my-value: command not found
$
$myvar?=my-value
myvar?=my-value: command not found
```

Variables

variable=value

This is one of those areas where formatting is important. Note there is **no space** on either side of the equals (=) sign. We also leave off the \$ sign from the beginning of the variable name when setting it.

```
samplendir=/etc
ls $samplendir
```

```
$ myvar='Hello World'
$ echo $myvar
Hello World
$ newvar="More $myvar"
$ echo $newvar
More Hello World
$ newvar='More $myvar'
$ echo $newvar
More $myvar
$
```

Console input

read [variable-name]

```
#!/bin/bash
echo "Enter your name: "
read name
echo Hello $name
```

```
[ec2-user@ip-172-31-36-108 ~]$ ./run.sh
Enter your name:
Raymond
Hello Raymond
[ec2-user@ip-172-31-36-108 ~]$
```



Console input

read

```
#!/bin/bash
```

```
read -p "Enter Your Name: " username  
echo "Welcome $username!"
```

```
#!/bin/bash
```

```
read -s -p "Enter Password: " pswd  
echo $pswd
```

```
#!/bin/bash
```

```
read -sp "Enter Password: " pswd  
echo $pswd
```

```
#!/bin/bash
```

```
echo What cars do you like?
```

```
read car1 car2 car3
```

```
echo Your first car was: $car1  
echo Your second car was: $car2  
echo Your third car was: $car3
```



Command Line Arguments

\$0 - The name of the Bash script.

\$1 - \$9 - The first 9 arguments to the Bash script.

\$# - How many arguments were passed to the Bash script.

\$@ - All the arguments supplied to the Bash script.

\$? - The exit status of the most recently run process.

\$\$ - The process ID of the current script.

\$USER - The username of the user running the script.

\$HOSTNAME - The hostname of the machine the script is running on.

\$SECONDS - The number of seconds since the script was started.

\$RANDOM - Returns a different random number each time it is referred to.

\$LINENO - Returns the current line number in the Bash script.





Command Line Arguments



Simple Arithmetic

expr command **print** the value of expression to **standard output**.

expr item1 operator item2

let is a builtin function of Bash that helps us to do simple arithmetic. It is similar to **expr** except instead of printing the answer **it saves the result to a variable**.

let <arithmetic expression>

We can also evaluate arithmetic expression with double parentheses.

\$((arithmetic expression))



Arithmetic Expressions

expr item1 operator item2

```
#!/bin/bash
first_number=8
second_number=2

echo "SUM="`expr $first_number + $second_number`
echo "SUB="`expr $first_number - $second_number`
echo "MUL="`expr $first_number \* $second_number`
echo "DIV="`expr $first_number / $second_number`
```

```
$ chmod +x cal.sh
$ ./cal.sh
SUM=10
SUB=6
MUL=16
DIV=4
```



Arithmetic Expressions

let [expression]

```
#!/bin/bash

number1=8
number2=2

let total=number1+number2
let diff=number1-number2
let mult=number1*number2
let div=number1/number2

echo "Total = $total"
echo "Difference = $diff"
echo "Multiplication = $mult"
echo "Division = $div"
```

```
$ ./run.sh
Total = 10
Difference = 6
Multiplication = 16
Division = 4
```


“num++” “++num” “num--” “--num”

```
#!/bin/bash
```

```
number=10  
let new_number=number++  
echo "Number = $number"  
echo "New number = $new_number"
```

```
number=10  
let new_number=--number  
echo "Number = $number"  
echo "New number = $new_number"
```

```
[ec2-user@ip-172-31-91-206 ~]$ ./run.sh  
Number = 11  
New number = 10  
Number = 9  
New number = 9  
[ec2-user@ip-172-31-91-206 ~]$
```

Arithmetic Expressions

`$((Expression))`

`((Expression))`

```
#!/bin/bash
```

```
number1=8  
number2=2
```

```
echo "Total = $((number1+number2))"
```

```
((total=number1+number2))  
echo "Total = $total"
```

```
[ec2-user@ip-172-31-91-206 ~]$ ./run.sh  
Total = 10  
Total = 10  
[ec2-user@ip-172-31-91-206 ~]$
```



▶ Exercise 1

1. Ask user to enter two numbers to variables **num1** and **num2**.
2. Calculate the total of 2 numbers.
3. Print the **total** number and increase it by 1.
4. Print the new value of the **total** number.
5. Subtract **num1** from the **total** number and print result.
6. Change the **num1** and **num2** variables to be passed from the **Command line arguments** instead of receiving them from the user



Students, write your response!

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Do not remove this bar

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▶ Exercise 2

1. Create a script named **calculate.sh**:
 - Create a variable named **base_value** with default value of **5**
 - Request another number from user and assign it to **user_input** variable
 - Add **user_value** to the **base_value** and assign it to **total** variable
 - Print **total** to the screen with the message "**Total value is:** "
2. Make the script executable.
3. Execute the script.



Students, write your response!

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Do not remove this bar

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THANKS!

Any questions?