

Scientific and Technical Computing: SMR3821

Introduction to Linux shell environment.

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Linux Command Line basic tools & File Operations



CLI tools and File operations

Linux - Shell Tools: AWK



awk

AWK is a command-line utility that is designed for text processing and typically used as a data extraction and reporting tool.

- it is a tool for manipulating data and generating reports
- it is a filter and can scan files line by line
- Splits each input line into fields
- Compares input line/fields to pattern and perform action on matches

Syntax & Structure

```
awk [options] 'selection_criteria action' input-file > output
```

Linux - Shell Toosl: Awk Practice

1 With Ref to

>: Output Redirect to new file

>>: Output Redirect and append to file

Extracting the first columns of the data file the

```
1 ~ $ awk '{ print $1}' data_output.dat > log0.txt
```

Outcome of awk command

```
#  
#  
#Step  
0.000000  
1.000000  
2.000000  
3.000000  
4.000000  
...  
...
```

You can redirect the output of one command as the input of awk

```
1 ~ $ cat data_output.dat | awk '{ print $1}' > log1.txt
```

Both files, log0.txt and log1.txt should contain the same output:

Linux - Shell Toosl: Awk Practice

> Output Redirect to new file
| Redirect output as a Pipe

>> Output Redirect and append to file

Awk asumes a space as the field separator or delimiter **log.txt**

The field separator or delimiter can be changed by using the flag **-F**

awk **-F** 'selection_criteria {action}' input-file > output

Eg. To get the users or username in a given linux system, we can extract it form /etc/passwd using ":"

```
1 ~ $ cat /etc/passwd | awk -F ":" '{ print $1}' > users.txt
```

Outcome of awk command

```
systlog  
_apt  
tss  
uidd  
tcpdump  
...  
...
```

You can also decide to print multiple columns

```
1 ~ $ cat /etc/passwd | awk -F ":" '{ print $1 " " $3}' > users.txt
```

Linux - Shell Toosl: Awk Practice

Field separators for both **delimeer field** and **Output Field** can be predefined

awk 'BEGIN{FS=":"; OFS="-"} selection_criteria {action}' input-file > output

Eg. To separate the output by tab spaces:

/etc/passwd using ":"

```
~ $ cat /etc/passwd | awk 'BEGIN{FS=":"; OFS="\t"} '{ print $1, $3}' > users.txt
```

Outcome of awk command

syslog 104

__apt 105

tss 106

uuuid 107

tcpdump 108

...

...

Linux - Shell Toosl: Awk Practice

AWK can accept regular expressions to aid filtering

awk 'BEGINFS=":"; OFS="-" selection_criteria {action}' input-file > output

Eg. To get names starting with "ic" from /etc/passwd :

```
1 ~ $ cat /etc/passwd | awk 'BEGIN{FS=":"; OFS="\t"} /^ic/ '{  
    print $1, $3}' > users.txt
```

Outcome of awk command

ictptutor 1000

ictpuser 1001

Linux - Shell Tools: Awk Practice

AWK can take let you do some arithmetics

awk 'BEGINFS=":"; OFS="-" selection_criteria {action}' input-file >
output

Eg. To divide all values of column 1 by 2.0 :

```
1 ~ $ awk '{ print $1/2.0 }' data_output.dat
```

Outcome of awk command

```
2  
2  
2  
2  
...  
...
```


Linux - Shell Toosl: Awk Practice

AWK can accept logicals and conditional statements

awk 'BEGINFS=":"; OFS="-" selection_criteria {action}' input-file >
output

Eg. To extract running processes with bash names starting with "ic" from /etc/passwd :

```
1 ~ $ ps -ef | awk '{ if($NF == "bash") print $0 }'
```

Outcome of awk command

```
ictpuser 9331 9323 0 Oct25 pts/0 00:00:01 bash
```

Linux - Shell Tools: sed



sed

SED (Stream Editor) is a compact programming language for parsing and transforming text.

- Line Stream matching and extraction
- input is file
- Supports regular expressions
- Supports piping

Syntax & Structure

```
sed [options] [SCRIPT] input-file ...> output
```

Linux - Advance Shell Tools & Programs



End of Advanced Shell Tools & Programs

Thank you ...