Unix Sed Tutorial: Advanced Sed Substitution Examples

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This article is part of the on-going Unix Sed Tips and Tricks series.

In our previous sed articles we learned — sed printing, sed deletion, sed substitute , sed file write, and sed multiple commands.

In this article, let us review some interesting workarounds with the “s” substitute command in sed with several practical examples.

I. Sed Substitution Delimiter

As we discussed in our previous post, we can use the different delimiters such as @ % | ; : in sed substitute command.

Let us first create path.txt file that will be used in all the examples mentioned below.

Example 1 – sed @ delimiter: Substitute /opt/omni/lbin to /opt/tools/bin

When you substitute a path name which has '/', you can use @ as a delimiter instead of '/'. In the sed example below, in the last line of the input file, /opt/omni/lbin was changed to /opt/tools/bin.


```
$ sed 's@/opt/omni/lbin@/opt/tools/bin@g' path.txt
/usr/kbos/bin:/usr/local/bin:/usr/jbin/:/usr/bin:/usr/sas/bin
/usr/local/sbin:/sbin:/bin/:/usr/sbin:/usr/bin:/opt/omni/bin:
/opt/tools/bin:/opt/omni/sbin:/root/bin
```

Example 2 – sed / delimiter: Substitute /opt/omni/lbin to /opt/tools/bin

When you should use '/' in path name related substitution, you have to escape '/' in the substitution data as shown below. In this sed example, the delimiter '/' was escaped in the REGEXP and REPLACEMENT part.

```
$ sed 's/\/opt\/omni\/lbin/\/opt\/tools\/bin/g' path.txt
/usr/kbos/bin:/usr/local/bin:/usr/jbin/:/usr/bin:/usr/sas/bin
/usr/local/sbin:/sbin:/bin/:/usr/sbin:/usr/bin:/opt/omni/bin:
/opt/tools/bin:/opt/omni/sbin:/root/bin
```

Example 1 – sed & Usage: Substitute /usr/bin/ to /usr/bin/local

```
$ sed 's@/usr/bin@&/local@g' path.txt
/usr/kbos/bin:/usr/local/bin:/usr/jbin/:/usr/bin/local:/usr/sas/bin
/usr/local/sbin:/sbin:/bin/:/usr/sbin:/usr/bin/local:/opt/omni/bin:
/opt/omni/lbin:/opt/omni/sbin:/root/bin
```

In the above example '&' in the replacement part will replace with /usr/bin which is matched pattern and add it with /local. So in the output all the occurrance of /usr/bin will be replaced with /usr/bin/local

Example 2 – sed & Usage: Match the whole line

& replaces whatever matches with the given REGEXP.

```
$ sed 's@^.*$@<<<&>>>@g' path.txt
<<</usr/kbos/bin:/usr/local/bin:/usr/jbin/:/usr/bin:/usr/sas/bin>>>
<<</usr/local/sbin:/sbin:/bin/:/usr/sbin:/usr/bin:/opt/omni/bin:>>>
<<</opt/omni/lbin:/opt/omni/sbin:/root/bin>>>
```

In the above example regexp has "^.*$" which matches the whole line. Replacement part <<<&>>> writes the whole line with <<< and >>> in the beginning and end of the line respectively.

III. Grouping and Back-references in Sed

Grouping can be used in sed like normal regular expression. A group is opened with "\(" and closed with "\)".Grouping can be used in combination with back-referencing.

Back-reference is the re-use of a part of a Regular Expression selected by grouping. Back-references in sed can be used in both a Regular Expression and in the replacement part of the substitute command.

```
/opt/omni/lbin
```

In the above example, \(\/[^:]*\) matches the path available before first : comes. \1 replaces the first matched group.

Example 2: Multigrouping

In the file path.txt change the order of field in the last line of the file.

```
$ sed '$s@\([^:]*\):\([^:]*\):\([^:]*\)@\3:\2:\1@g' path.txt
/usr/kbos/bin:/usr/local/bin:/usr/jbin:/usr/bin:/usr/sas/bin
/usr/local/sbin:/sbin:/bin:/usr/sbin:/usr/bin:/opt/omni/bin:
/root/bin:/opt/omni/sbin:/opt/omni/lbin
```

In the above command $ specifies substitution to happen only for the last line.Output shows that the order of the path values in the last line has been reversed.

Example 3: Get the list of usernames in /etc/passwd file

This sed example displays only the first field from the /etc/passwd file.

```
$sed 's/\([^:]*\).*/\1/' /etc/passwd
root
bin
daemon
adm
lp
sync
shutdown
```

Example 4: Parenthesize first character of each word

This sed example prints the first character of every word in paranthesis.

Example 5: Commify the simple number.

Let us create file called numbers which has list of numbers. The below sed command example is used to commify the numbers till thousands.

```
$ cat  numbers
1234
12121
3434
123

$sed 's/\(^\|[^0-9.]\)\([0-9]\+\)\([0-9]\{3\}\)/\1\2,\3/g' numbers
1,234
12,121
3,434
123
```


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