Eighty-One Linux Commands – You must learn

Every Linux administrator should learn these commands

Prepared for:
Public

Prepared by:
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How to Use this Guide

🔑 Marked as key points, important points and examination points to remember

1. About Author

Ankam Ravi Kumar has more than 10+ years of experience in Information Technology Operations and production support streams. He served more than 5 companies in his career and still continuing.

We provide server and data center related services from purchasing of underlying hardware to provisioning the applications.

Solid industry experience in Infrastructure Management/Customer Support/Operations and Training Domains. I love to help people by sharing my knowledge and skills. I always believe "Power is gained by Sharing Knowledge not hoarding it".

- Operating System Management Such has Linux Different Flavors, Red hat, Fedora, Ubuntu, AIX, Solaris and Windows
- Enterprise Server Management
- Installing and configuring Blade Servers
- Core Storage Management Dell-EMC, IBM and NetApp
- Database Management MSSQL, POSTGRESQL, MariaDB and MySQL
- Process Management ITIL
- Virtualization management RHEV, vSphere, VMware, KVM, Hyper-V and XEN
- Backup and Recovery Management NetVault, Commvault and Symantec Backup Exec
- Application Server Management and Storage Cluster Management
- Data Center Management and Hosting Solutions
- Programming Languages such as PHP and HTML
- Scripting Languages Shell, Perl and Python
- Cloud administration AWS, Azure and GCP

Specialized in managing and building the Teams for IT services delivery and Service Support, Training and Operations in both smaller and larger companies. Rich experience and strong exposure in IT Infrastructure & Data Center Management.

Implementation of monitoring solutions for Enterprise, Using Tools Nagios, NagiosXI, Cacti, Solarwinds and LogicMonitor.

2. Command line rules

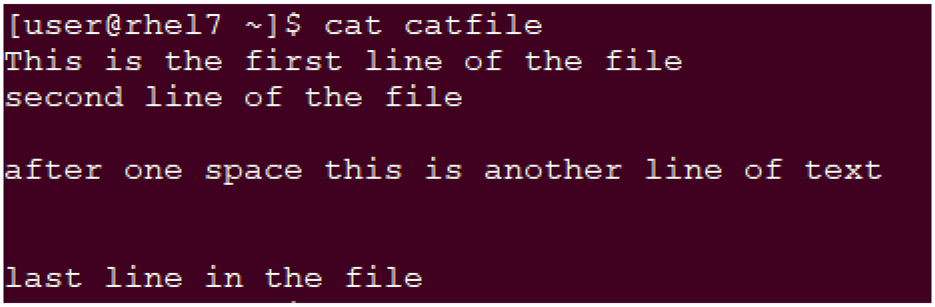
Must follow rules throughout this guide

- All commands must always in small case
- Command options Small / Capital letters
- Between the command name and the options that may be available with the command there must always be a space or a tab, for example, ls –l. Here is the command whereas –l is the option and the two been separated by space. The option is usually proceed by a minus (-) sign. The option available with a command are often known as switches
- If you have typo in command (wrongly typed) DO NOT EXECUTE simply terminate by pressing CTRL+C or CTRL+Z, which may lead to data loss or system crash.
    - Example: `rm -rf /* .txt` instead of `rm -rf /*.txt` It looks same however there is an single space after *(star) which will delete entire data from system
- Best practice is to open single SSH window for single server (PuTTY by default). (SSH to multiple hosts from single host is a bad idea). Real time scenario is instead of rebooting DEV server rebooted PROD server (looking at window name it was DEV host name), which diverted to loss of business for few hours.

3. cat - command to see file content

Concatenate files and print on the standard output. Cat command used to see the content of text files. Cat is a core utility, which comes along with Operating System installation no need to install separately.

Syntax: `cat <Options> <File Name>`



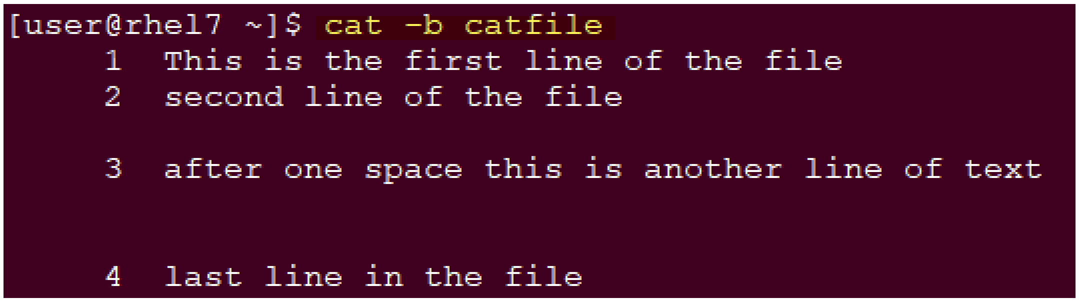
```
[user@rhel7 ~]$ cat catfile
This is the first line of the file
second line of the file

after one space this is another line of text


last line in the file
```

Without any options cat can show the content of text file, example shown above screenshot.

`-b, --number-nonblank`: number nonempty output lines, overrides –n



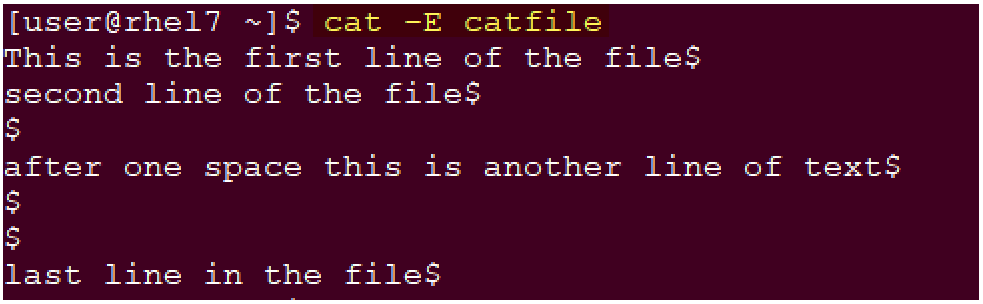
```
[user@rhel7 ~]$ cat -b catfile
     1  This is the first line of the file
     2  second line of the file

     3  after one space this is another line of text


     4  last line in the file
```

Using –b option cat command will show the content with numbered lines, excluding blank lines.

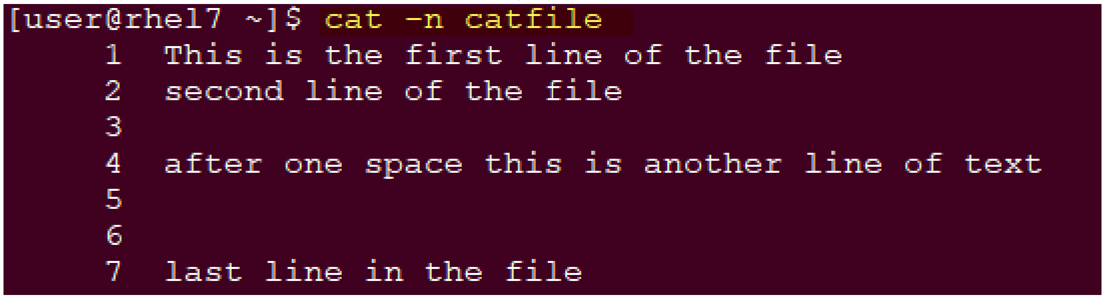
`-E, --show-ends`: display $ at end of each line



```
[user@rhel7 ~]$ cat -E catfile
This is the first line of the file$
second line of the file$
$
after one space this is another line of text$
$
$
last line in the file$
```

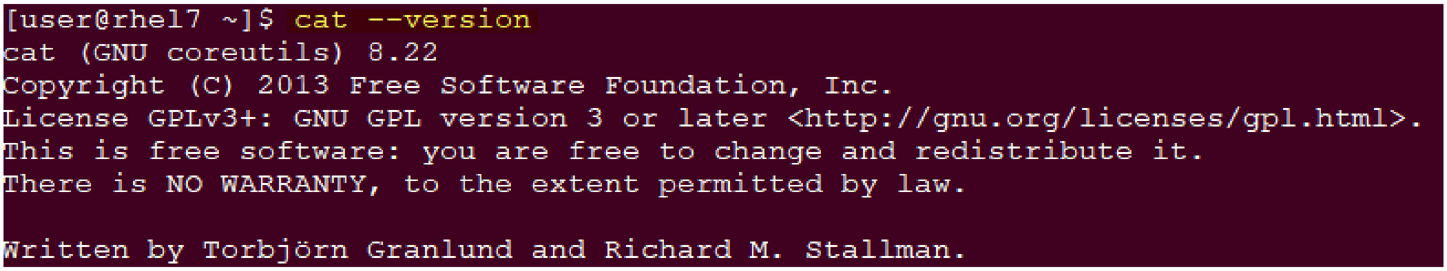
Option capital E will add $ (dollar sign) to end of the line including empty lines

`-n, --number`: number all output lines



```
[user@rhel7 ~]$ cat -n catfile
     1  This is the first line of the file
     2  second line of the file
     3
     4  after one space this is another line of text
     5
     6
     7  last line in the file
```

Add numbers to all the lines including empty lines using option –n cat command



```
[user@rhel7 ~]$ cat --version
cat (GNU coreutils) 8.22
Copyright (C) 2013 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>.
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Written by Torbjörn Granlund and Richard M. Stallman.
```

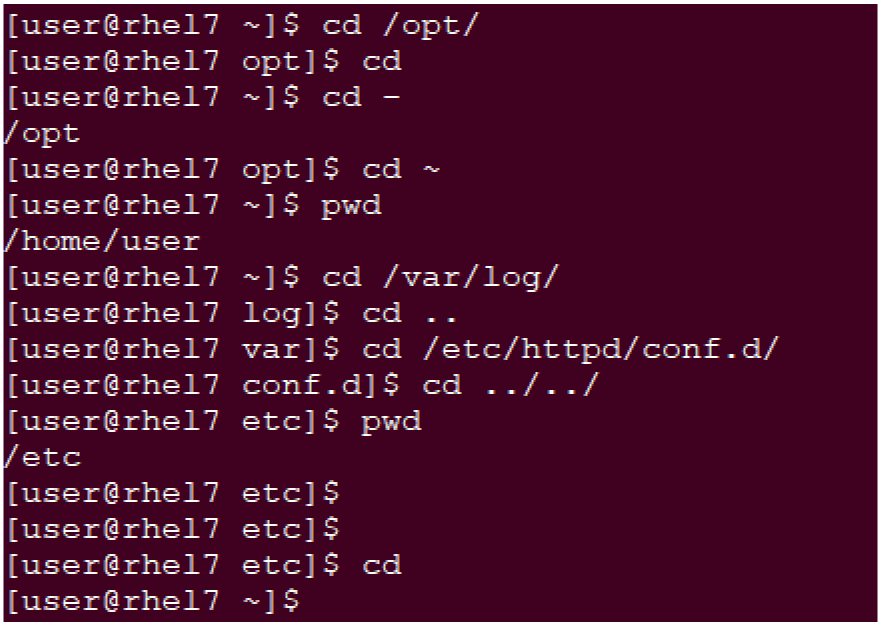
Current version 8.22. All above options will work properly as shown in examples. Please check if version change options may change.

There are many options cat command has however above are the options most useful.

4. cd – Change directory path

Change the current directory to dir. The variable HOME is the default dir. By default when you type cd without options, it will go back to HOME path.

Syntax: `cd <Options> <DIRPATH>`

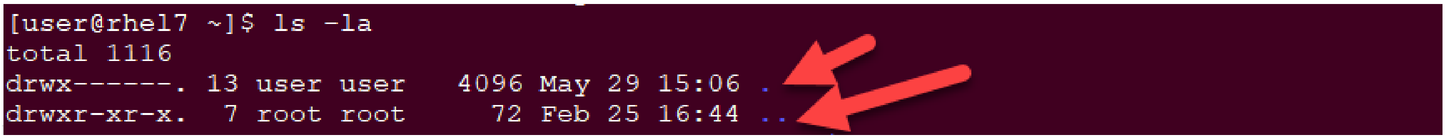


```
[user@rhel7 ~]$ cd /opt/
[user@rhel7 opt]$ cd
[user@rhel7 ~]$ cd -
/opt
[user@rhel7 opt]$ cd ~
[user@rhel7 ~]$ pwd
/home/user
[user@rhel7 ~]$ cd /var/log/
[user@rhel7 log]$ cd ..
[user@rhel7 var]$ cd /etc/httpd/conf.d/
[user@rhel7 conf.d]$ cd ../../
[user@rhel7 etc]$ pwd
/etc
[user@rhel7 etc]$
[user@rhel7 etc]$
[user@rhel7 etc]$ cd
[user@rhel7 ~]$
```

Before jumping into the cd command and its options, you have to know about absolute path and relative path.

1. Absolute path or Full path points to the location exactly regardless of current directory. In simple terms absolute paths always start with (/) slash
2. Relative path or shortcut path. Relative path starts from some given working directory, avoiding the need to provide the full path.
   Example: I am in /var directory if I want to change path to `/var/log/` no need to provide full path just `cd log/` do the job.

(Tilde)~ = $HOME or user home directory path, when you type cd ~ wherever your jump back to user home path

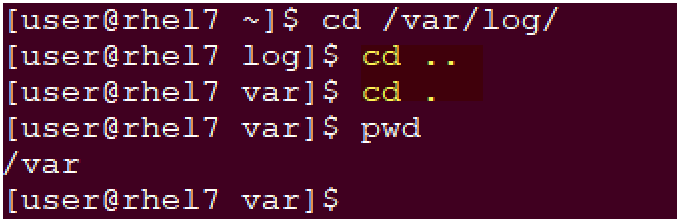


```
[user@rhel7 ~]$ ls -la
total 1116
drwx------. 13 user user   4096 May 29 15:06 .
drwxr-xr-x.  7 root root     72 Feb 25 16:44 ..
```

In every directory path there are two hidden directories will be available which are. (Dot) and.. (Dot dot).

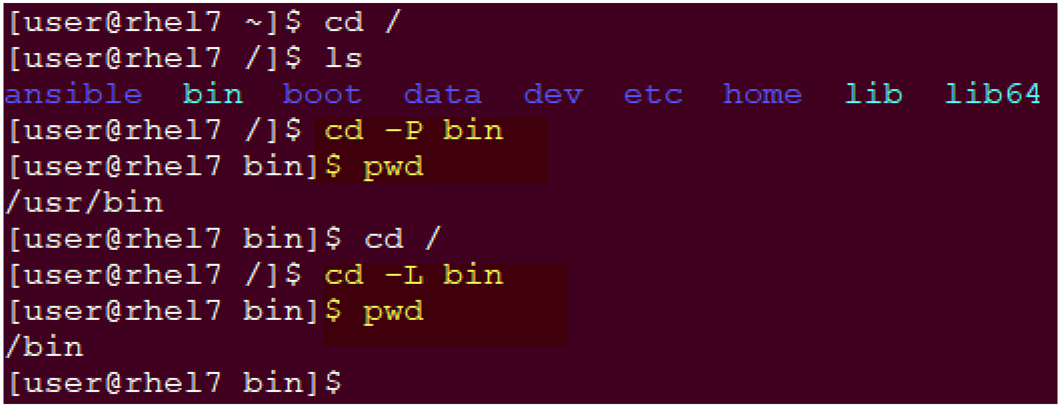
Single dot means **current directory**

Two dots means its **parent directory**



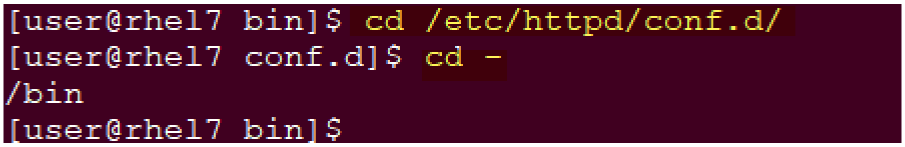
```
[user@rhel7 ~]$ cd /var/log/
[user@rhel7 log]$ cd ..
[user@rhel7 var]$ cd .
[user@rhel7 var]$ pwd
/var
[user@rhel7 var]$
```

If you have symbolic links, you want to change to its original path not symbolic links then use –P along with cd command



```
[user@rhel7 ~]$ cd /
[user@rhel7 /]$ ls
ansible  bin  boot  data  dev  etc  home  lib  lib64
[user@rhel7 /]$ cd -P bin
[user@rhel7 bin]$ pwd
/usr/bin
[user@rhel7 bin]$ cd /
[user@rhel7 /]$ cd -L bin
[user@rhel7 bin]$ pwd
/bin
[user@rhel7 bin]$
```

`cd -` You will go back to previous directory path. An argument of - is equivalent to $OLDPWD



```
[user@rhel7 bin]$ cd /etc/httpd/conf.d/
[user@rhel7 conf.d]$ cd -
/bin
[user@rhel7 bin]$
```

That is about cd command

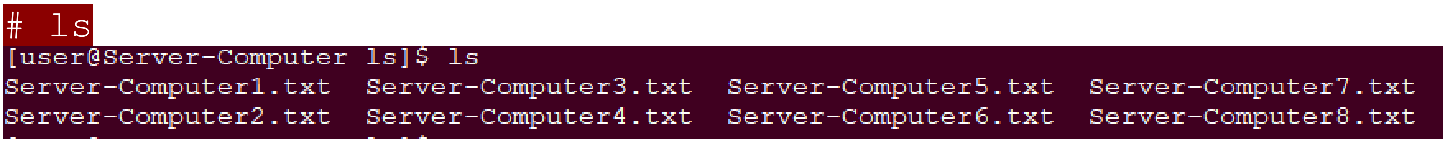
5. ls command – listing files and directories

ls command used to list information about the FILEs (the current directory by default). Sort entries alphabetically if none of -cftuvSUX nor –sort is specified

Syntax: `ls [options] arguments`

Listing current directory content - You can list out all files and directories in current path using ‘ls’ without hidden directories

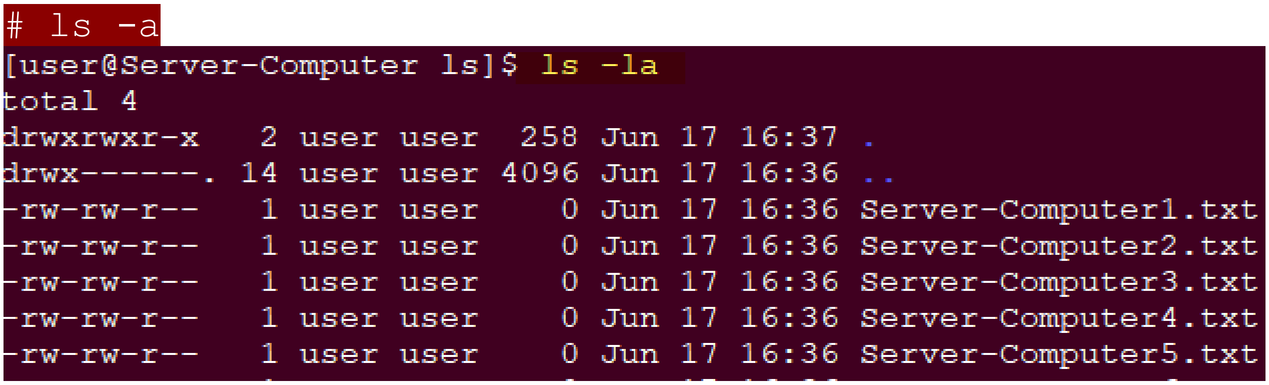
```
# ls
```



```
[user@Server-Computer ls]$ ls
Server-Computer1.txt  Server-Computer3.txt  Server-Computer5.txt  Server-Computer7.txt
Server-Computer2.txt  Server-Computer4.txt  Server-Computer6.txt  Server-Computer8.txt
```

Listing including hidden files - default ls command will not list hidden objects, to see the hidden objects you have to use option ‘-a’

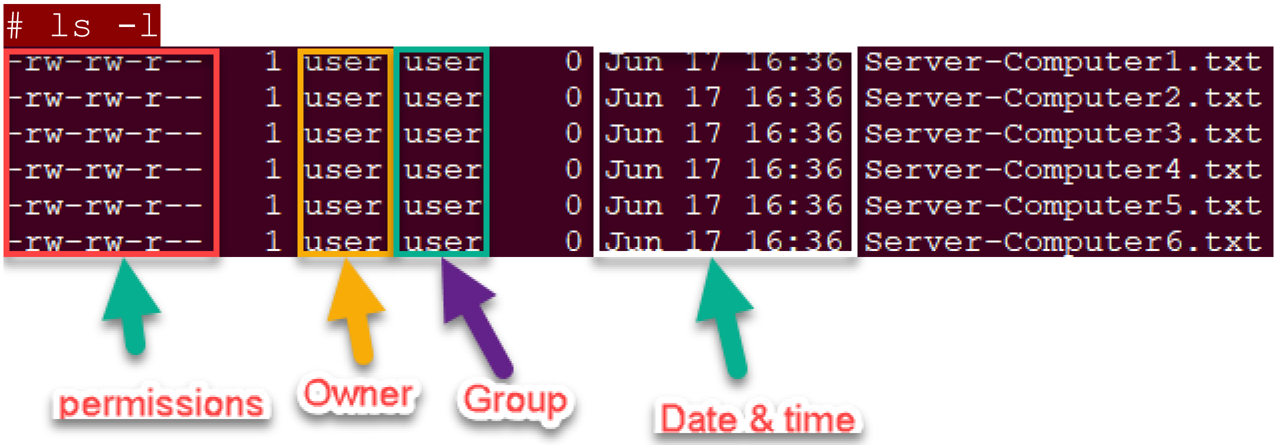
```
# ls -a
```



```
[user@Server-Computer ls]$ ls -la
total 4
drwxrwxr-x   2 user user  258 Jun 17 16:37 .
drwx------. 14 user user 4096 Jun 17 16:36 ..
-rw-rw-r--   1 user user    0 Jun 17 16:36 Server-Computer1.txt
-rw-rw-r--   1 user user    0 Jun 17 16:36 Server-Computer2.txt
-rw-rw-r--   1 user user    0 Jun 17 16:36 Server-Computer3.txt
-rw-rw-r--   1 user user    0 Jun 17 16:36 Server-Computer4.txt
-rw-rw-r--   1 user user    0 Jun 17 16:36 Server-Computer5.txt
```

Long list (it display detailed info) - when you use ‘ls’ command it will list files & directories without their permissions, owner, group and other details, ‘-l’ option will display owner, group, others, Size and time, which is called as long list.

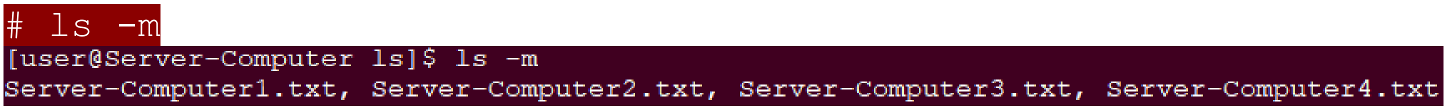
```
# ls -l
```



```
-rw-rw-r--   1 user user    0 Jun 17 16:36 Server-Computer1.txt
-rw-rw-r--   1 user user    0 Jun 17 16:36 Server-Computer2.txt
-rw-rw-r--   1 user user    0 Jun 17 16:36 Server-Computer3.txt
-rw-rw-r--   1 user user    0 Jun 17 16:36 Server-Computer4.txt
-rw-rw-r--   1 user user    0 Jun 17 16:36 Server-Computer5.txt
-rw-rw-r--   1 user user    0 Jun 17 16:36 Server-Computer6.txt
```

List files & directories separated by comma - if there is a requirement that we have to list all the files and directories separated by comma and import to CSV file '-m' is the best option to use

```
# ls -m
```



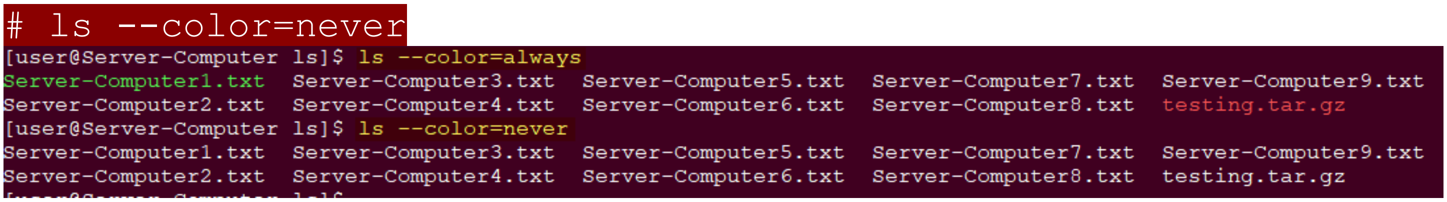
```
[user@Server-Computer ls]$ ls -m
Server-Computer1.txt, Server-Computer2.txt, Server-Computer3.txt, Server-Computer4.txt
```

List remote directory files & directories with & without color – list remote directory content with color and without color below is the example

```
ls --color=always
```

Without color, here all the files and directories will display in block color

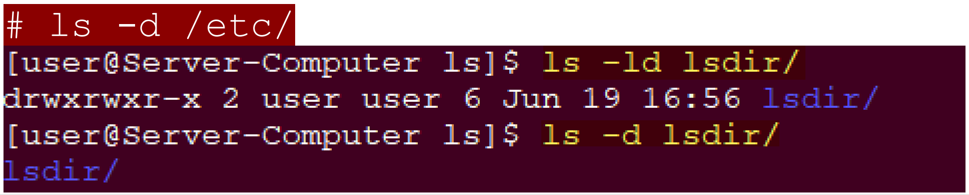
```
# ls --color=never
```



```
[user@Server-Computer ls]$ ls --color=always
Server-Computer1.txt  Server-Computer3.txt  Server-Computer5.txt  Server-Computer7.txt  Server-Computer9.txt
Server-Computer2.txt  Server-Computer4.txt  Server-Computer6.txt  Server-Computer8.txt  testing.tar.gz
[user@Server-Computer ls]$ ls --color=never
Server-Computer1.txt  Server-Computer3.txt  Server-Computer5.txt  Server-Computer7.txt  Server-Computer9.txt
Server-Computer2.txt  Server-Computer4.txt  Server-Computer6.txt  Server-Computer8.txt  testing.tar.gz
[user@Server-Computer ls]$
```

List only directory using option ‘-d’ - option ‘-d’ will display only directory path without its content

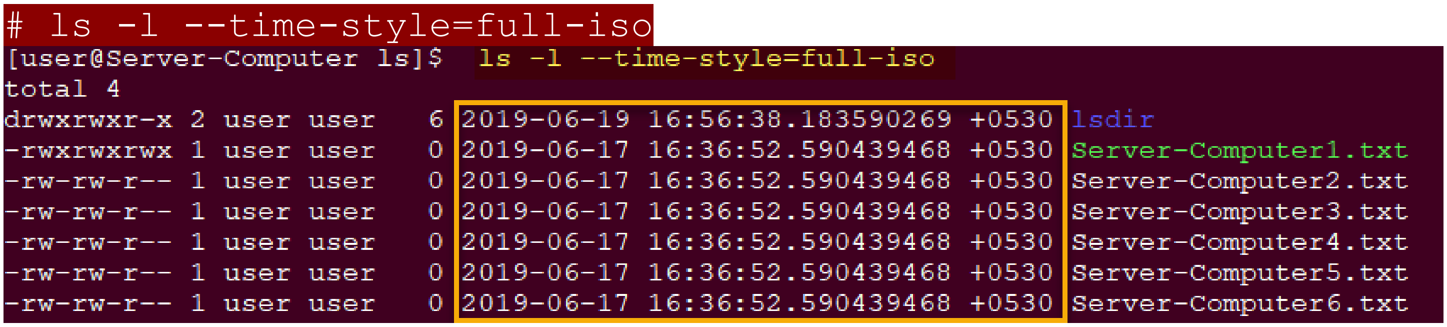
```
# ls -d /etc/
```



```
[user@Server-Computer ls]$ ls -ld lsdir/
drwxrwxr-x 2 user user 6 Jun 19 16:56 lsdir/
[user@Server-Computer ls]$ ls -d lsdir/
lsdir/
```

List files & directories detailed time stamp - As we can see above `-l` option, which will provide long, output, but time stamp is not detail (Example: no year), by following below example it will provide time stamp details including time zone and seconds

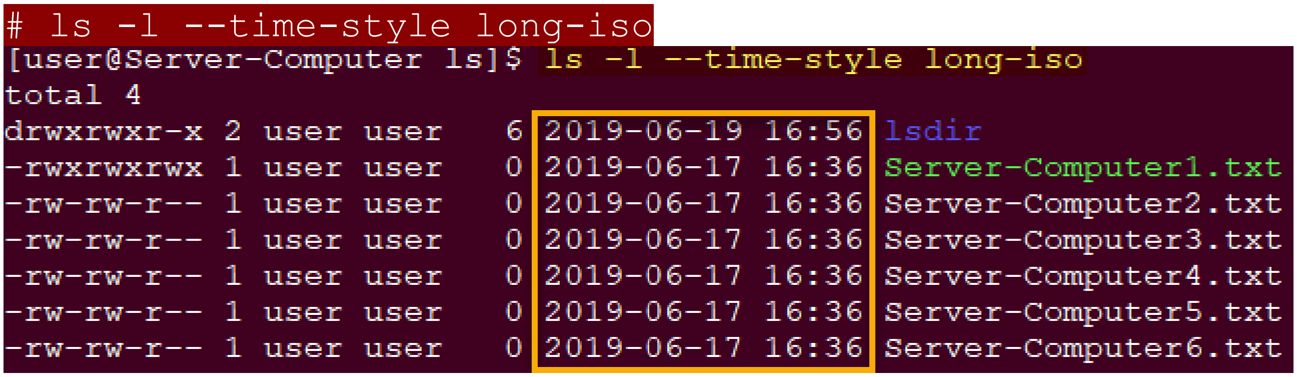
```
# ls -l --time-style=full-iso
```



```
[user@Server-Computer ls]$  ls -l --time-style=full-iso
total 4
drwxrwxr-x 2 user user   6 2019-06-19 16:56:38.183590269 +0530 lsdir
-rwxrwxrwx 1 user user   0 2019-06-17 16:36:52.590439468 +0530 Server-Computer1.txt
-rw-rw-r-- 1 user user   0 2019-06-17 16:36:52.590439468 +0530 Server-Computer2.txt
-rw-rw-r-- 1 user user   0 2019-06-17 16:36:52.590439468 +0530 Server-Computer3.txt
-rw-rw-r-- 1 user user   0 2019-06-17 16:36:52.590439468 +0530 Server-Computer4.txt
-rw-rw-r-- 1 user user   0 2019-06-17 16:36:52.590439468 +0530 Server-Computer5.txt
-rw-rw-r-- 1 user user   0 2019-06-17 16:36:52.590439468 +0530 Server-Computer6.txt
```

Display files and directories its time stamp as “YY-MM-DD HH:MM” - No need to think a lot to list files and directories with Year-Month-Date Hours and Minutes format

```
# ls -l --time-style long-iso
```



```
[user@Server-Computer ls]$ ls -l --time-style long-iso
total 4
drwxrwxr-x 2 user user   6 2019-06-19 16:56 lsdir
-rwxrwxrwx 1 user user   0 2019-06-17 16:36 Server-Computer1.txt
-rw-rw-r-- 1 user user   0 2019-06-17 16:36 Server-Computer2.txt
-rw-rw-r-- 1 user user   0 2019-06-17 16:36 Server-Computer3.txt
-rw-rw-r-- 1 user user   0 2019-06-17 16:36 Server-Computer4.txt
-rw-rw-r-- 1 user user   0 2019-06-17 16:36 Server-Computer5.txt
-rw-rw-r-- 1 user user   0 2019-06-17 16:36 Server-Computer6.txt
```

List objects its time stamp as “MM-DD HH:MM” List all files & directories with date format YY-MM-DD HH:MM

```
# ls -l --time-style iso
```

Display files & directories with customized time stamp format - Here in this option we can mention date command options to customize time stamp as required

```
# ls -l --time-style="+%Y-%m-%d %H:%M:%S"
```

Note: refer `man date` command for more options

List Only Group Name without User name (Owner)

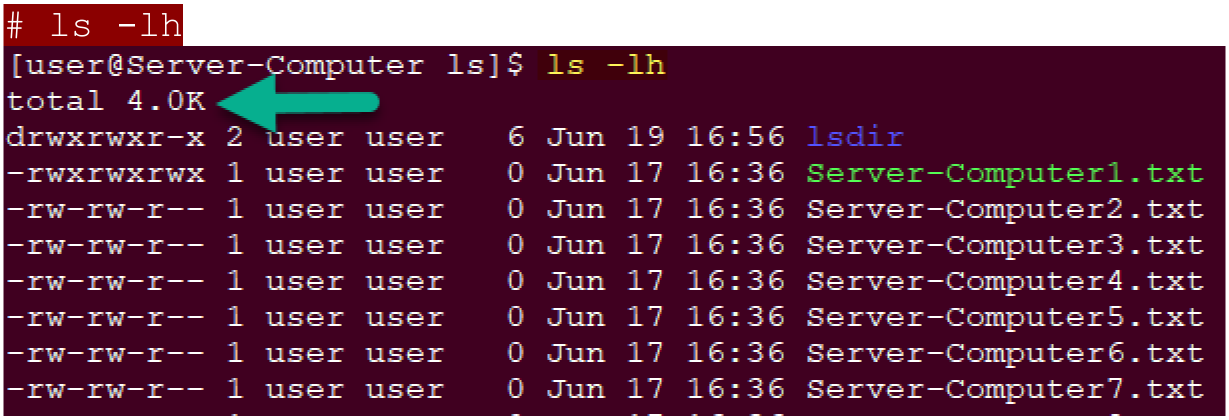
```
# ls -lg
```

List Only Owner Name without Group Name - ls command will list only user name (owner name) excluding group details we have to use '-G' option along with option '-l' option

```
# ls -lG
```

List files & directories in human readable format - ls command will give you a nice human readable format of ls command output use option '-lh'

```
# ls -lh
```



```
[user@Server-Computer ls]$ ls -lh
total 4.0K
drwxrwxr-x 2 user user   6 Jun 19 16:56 lsdir
-rwxrwxrwx 1 user user   0 Jun 17 16:36 Server-Computer1.txt
-rw-rw-r-- 1 user user   0 Jun 17 16:36 Server-Computer2.txt
-rw-rw-r-- 1 user user   0 Jun 17 16:36 Server-Computer3.txt
-rw-rw-r-- 1 user user   0 Jun 17 16:36 Server-Computer4.txt
-rw-rw-r-- 1 user user   0 Jun 17 16:36 Server-Computer5.txt
-rw-rw-r-- 1 user user   0 Jun 17 16:36 Server-Computer6.txt
-rw-rw-r-- 1 user user   0 Jun 17 16:36 Server-Computer7.txt
```

List assigned inode number of files and directories - we can also list the inode numbers of files and directories using option '-i'

```
# ls -i
```

Files & directories, directories should append with / (slash) - To append the directories with / (slash) we have to use option `'-p'`. If you observe below example output all the directories ended with / (slash).

```
# ls -p
a anaconda-ks.cfg  b  c  dir1/  dir2/  initial-setup-ks.cfg
```

Print files & directory names in quoted format - As we can list the files and directories using ls command, file names will be printed as in quotes format using `-Q` option

```
# ls -lQ
# ls -Q
```

Sort the list by time stamp- you can sort the files and directories by its time, this option will list old time stamp below newer up, which is most useful option to know new files

```
# ls -lt
```

Print in reverse - as above example prints output old files below and newer files up. using '-r' option print in reverse way, old first and new last

```
# ls -ltr
```

List recursively - using option '-R' you can list files and directories in recursively

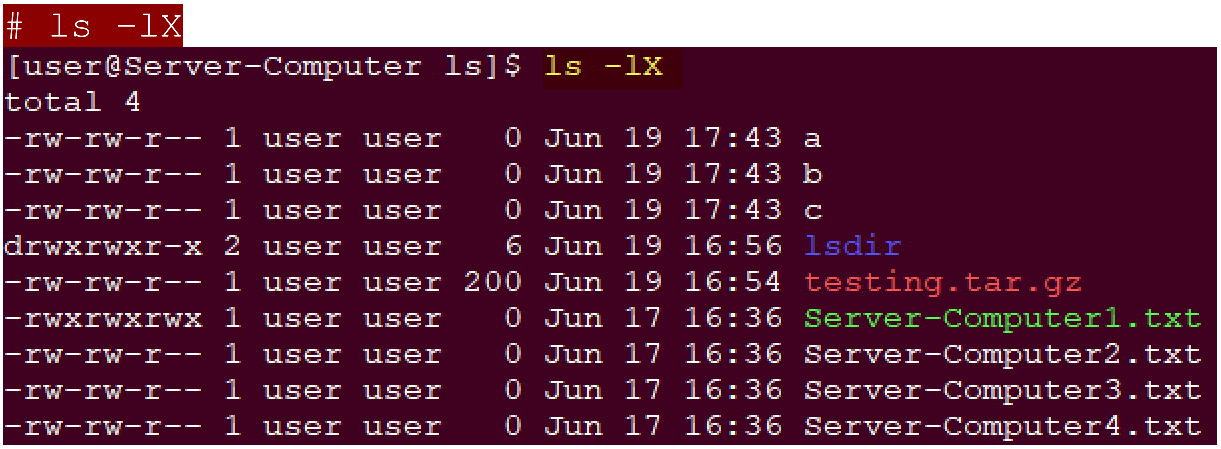
```
# ls -R
```

Print the allocated size of each file, in blocks, using option '-S' you can sort by file size

```
# ls -lS
```

Sort by alphabetical order – List files alphabetical order you have to use -X option

```
# ls -lX
```



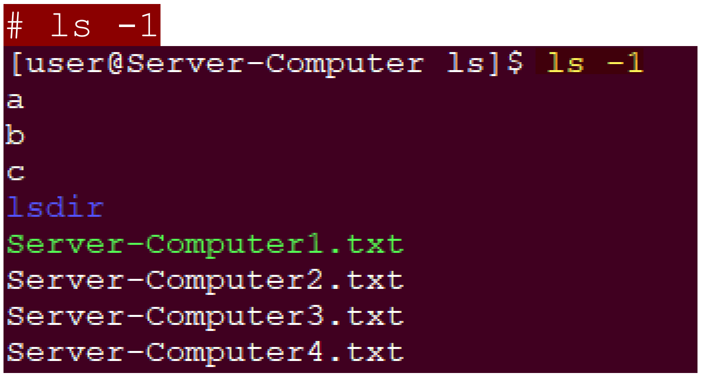
```
[user@Server-Computer ls]$ ls -lX
total 4
-rw-rw-r-- 1 user user   0 Jun 19 17:43 a
-rw-rw-r-- 1 user user   0 Jun 19 17:43 b
-rw-rw-r-- 1 user user   0 Jun 19 17:43 c
drwxrwxr-x 2 user user   6 Jun 19 16:56 lsdir
-rw-rw-r-- 1 user user 200 Jun 19 16:54 testing.tar.gz
-rwxrwxrwx 1 user user   0 Jun 17 16:36 Server-Computer1.txt
-rw-rw-r-- 1 user user   0 Jun 17 16:36 Server-Computer2.txt
-rw-rw-r-- 1 user user   0 Jun 17 16:36 Server-Computer3.txt
-rw-rw-r-- 1 user user   0 Jun 17 16:36 Server-Computer4.txt
```

List with tab space- ls command default will display file space as eight columns, using -T we can print with more tab space in between files

```
# ls -T1
```

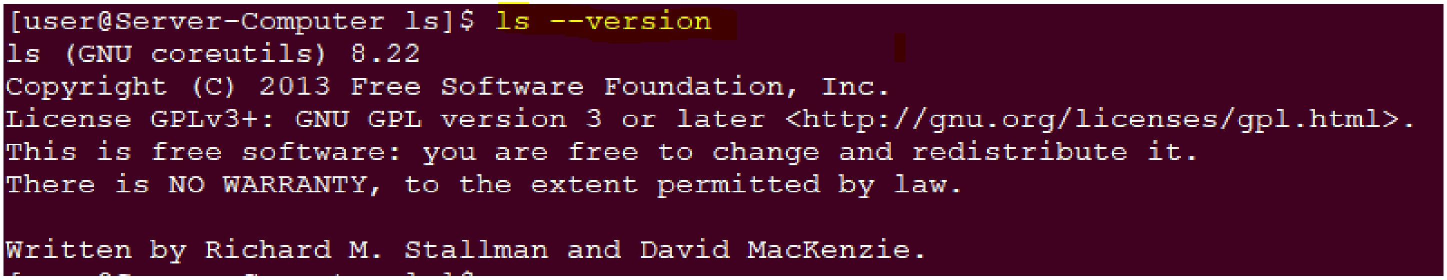
Print file names in one row - using option -1 (numeric number 1)

```
# ls -1
```



```
[user@Server-Computer ls]$ ls -1
a
b
c
lsdir
Server-Computer1.txt
Server-Computer2.txt
Server-Computer3.txt
Server-Computer4.txt
```

Let us know the ls command version details and author details



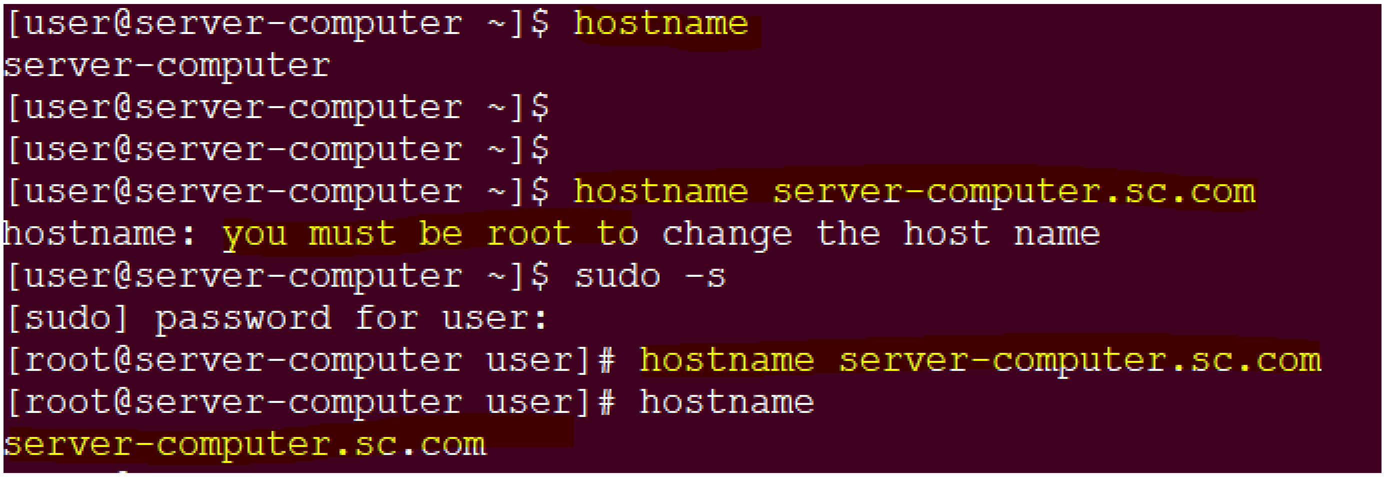
```
[user@Server-Computer ls]$ ls --version
ls (GNU coreutils) 8.22
Copyright (C) 2013 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>.
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Written by Richard M. Stallman and David MacKenzie.
```

6. hostname & hostnamectl commands

Hostname command used to display the system's DNS name, and to display or set its host name or NIS domain name.

```
# hostname
```



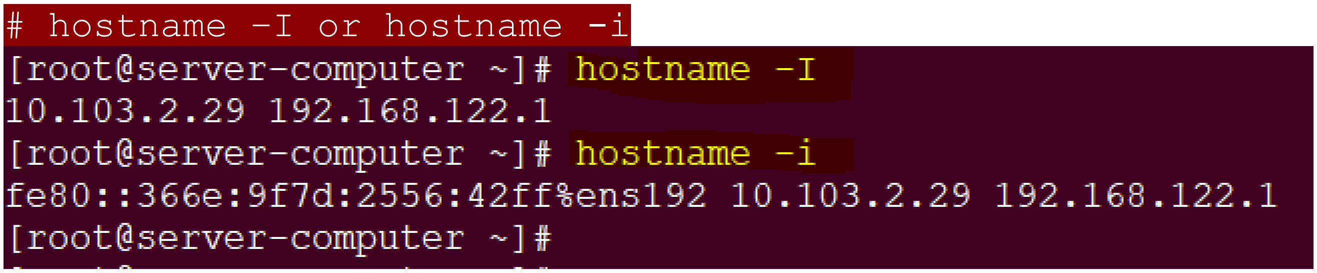
```
[user@server-computer ~]$ hostname
server-computer
[user@server-computer ~]$
[user@server-computer ~]$
[user@server-computer ~]$ hostname server-computer.sc.com
hostname: you must be root to change the host name
[user@server-computer ~]$ sudo -s
[sudo] password for user:
[root@server-computer user]# hostname server-computer.sc.com
[root@server-computer user]# hostname
server-computer.sc.com
```

```
# hostname HOSTNAME.DOMAIN.NAME
```

```
# hostname -A
server-computer.sc.com server-computer.sc.com
```

-A is the option to display host short name and FQDN (Fully Qualified Domain Name)

```
# hostname -I or hostname -i
```



```
[root@server-computer ~]# hostname -I
10.103.2.29 192.168.122.1
[root@server-computer ~]# hostname -i
fe80::366e:9f7d:2556:42ff%ens192 10.103.2.29 192.168.122.1
[root@server-computer ~]#
```

Hostname –I or I will provide you with host IP address of all interfaces

```
# hostname -y
nisdomain
```

-y is the option, which will display the NIS domain name, if your host is part of NIS client

Hostnamectl is the command works in latest versions only. Older OS like RHEL 5/6 hostnamectl command is not available.

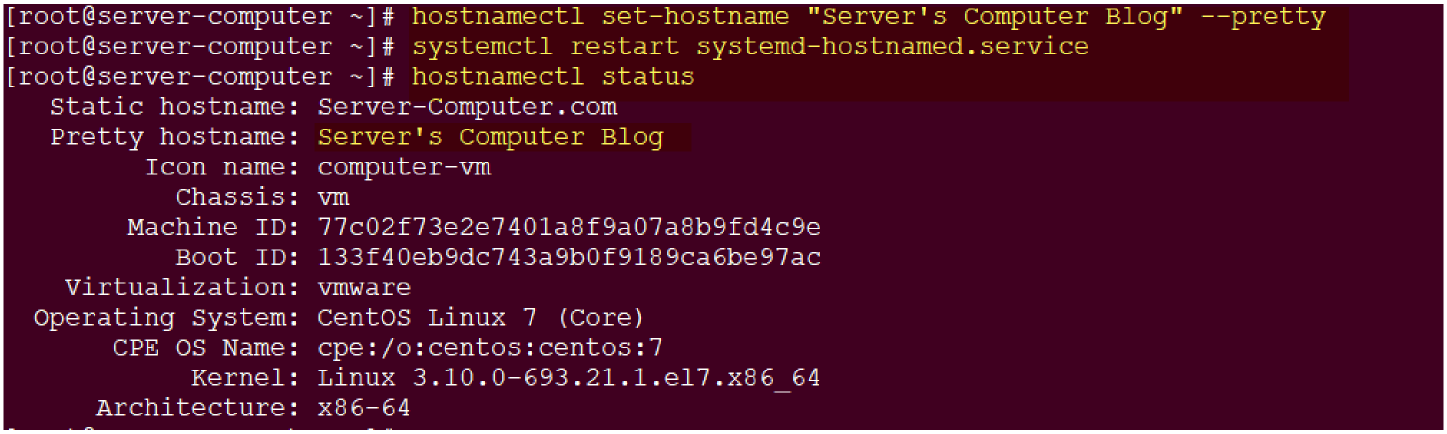
Hostnamectl command also similar like hostname command, however, which has little more options to set hostname. Hostnamectl used to query and change the system hostname and related settings.

This tool distinguishes three different hostnames:

- Pretty – used to set fancy name like "Ravi's Computer". Pretty will accept special characters
- Transient – will get a host name from network configuration and assign to host.
- Static – Assign hostname, which will overwrite transient name. Special characters are not allowed

To add host name as pretty use below commands

```
# hostnamectl set-hostname "Server's Computer Blog" --pretty
# systemctl restart systemd-hostnamed.service
# hostnamectl status
```



```
[root@server-computer ~]# hostnamectl set-hostname "Server's Computer Blog" --pretty
[root@server-computer ~]# systemctl restart systemd-hostnamed.service
[root@server-computer ~]# hostnamectl status
   Static hostname: Server-Computer.com
   Pretty hostname: Server's Computer Blog
         Icon name: computer-vm
           Chassis: vm
        Machine ID: 77c02f73e2e7401a8f9a07a8b9fd4c9e
           Boot ID: 133f40eb9dc743a9b0f9189ca6be97ac
    Virtualization: vmware
  Operating System: CentOS Linux 7 (Core)
       CPE OS Name: cpe:/o:centos:centos:7
            Kernel: Linux 3.10.0-693.21.1.el7.x86_64
      Architecture: x86-64
```

```
# hostnamectl set-hostname Server-Computer.com -static
```

Note: To effect host name immediately restart systemd-hostnamed service

7. nslookup command

Nslookup is a program to query Internet domain name servers. Nslookup has two modes: interactive and non-interactive.

Interactive: This mode allows the user to query name servers for information.
Non-Interactive: This mode used to print just the name and requested information for a host or domain

```
[user@Server-Computer ~]$ nslookup google.com
Server:         192.168.2.10
Address:        192.168.2.10#53

Non-authoritative answer:
Name:   google.com
Address: 172.217.166.110

[user@Server-Computer ~]$ nslookup 8.8.8.8
Server:         192.168.2.10
Address:        192.168.2.10#53

Non-authoritative answer:
8.8.8.8.in-addr.arpa    name = dns.google.

Authoritative answers can be found from:

[user@Server-Computer ~]$ nslookup corp.ads.server-
computer.com
Server:         192.3.2.192
Address:        192.3.2.192#53

Name:   corp.ads.server-computer.com
Address: 192.3.2.11
Name:   corp.ads.server-computer.com
Address: 192.23.2.192
Name:   corp.ads.server-computer.com
Address: 192.34.0.12
```

Using nslookup, you can check server/computer name using IP address. In the same way, you can get IP address of the host using host name.

8. dig command – troubleshooting DNS services

dig (domain information groper) is a flexible tool for interrogating DNS name servers.

9. 40 Linux Commands – Video tutorial

1. arp command
2. alias command
3. at command
4. awk command
5. cut command
6. bc command – calculator
7. cal command to see calendar
8. cat command in detailed
9. cd command – switch between directories
10. chage command – to check user password policy details
11. Protect files from accidental deletion
12. change group ownership of files & directories
13. chmod command most important
14. change ownership of files & directories
15. tr command
16. copy files & directories
17. crontab with ultimate examples
18. cpio command
19. curl command – crawl website data
20. date command – mostly used command
21. dd command – backup important data & performance testing
22. df command – disk space check
23. dig command – troubleshoot DNS issues
24. diff command – compare two files or more
25. Check file & directory size - du
26. expr command – mostly used in shell scripting for math's
27. fdisk utility
28. file command
29. find command – to search anything within server
30. free command – to check memory usage
31. Write strict firewall rules – firewall-cmd
32. grep command – powerful use for log analyzing
33. head and tail commands

34. history command
35. hostname & hostnamectl
36. id command
37. Ifconfig for older versions of Linux