??????

Home ??

???? Home ??

?? User ? Home ????????????????????????

??????????????

```
cd /home
cp -a user1/ user1_new/
```

??????????????

```
cd /home
cp -a user1/.[^.]* user1_new/
```

???????? Home ??

```
sudo mkhomedir_helper bob
```

?

```
cp -r /etc/skel /home/bob
chown -R bob.bob /home/bob
chmod 0700 /home/bob
```

??? /home ????????

> ❝ Answer: ?(?)????????? SELinux ?????????? SELinux ?????????

```
# ls -ld /home
drwxr-xr-x. 2 root root 4096 Mar 28  2017 /home
```

```
# ls -Zd /home
drwxr-xr-x.  root root system_u:object_r:home_root_t:s0 /home
```

???????

?????? share_test??? team ??????????????

```
groupadd team
mkdir /worktmp/share_test
chgrp team /worktmp/share_test
chmod 2775 /worktmp/share_test
usermod -aG team i04181
```

?? PATH

PATH ?????? bin ??

~/.bashrc :

```
# Custom PATH
case :$PATH: in
    *:/home/$USER/bin:*) ;;
    *) PATH=/home/$USER/bin:$PATH ;;
esac
```

```
[ -z "$(sed -n '\@/usr/local/bin@p' <<< $PATH)" ] && PATH=/usr/local/bin:$PATH
```

Custom Prompt

```
# Kali-like Custom PROMPT
PS1="\[\033[38;5;209m\]┌──[\[\033[38;5;141m\]\u\[\033[38;5;209m\]@\[\033[38;5;105m\]\h\[\033[3
8;5;231m\]:\w\[\033[38;5;209m\]]\[\033[33m\]\$(GIT_PS1_SHOWUNTRACKEDFILES=1
GIT_PS1_SHOWDIRTYSTATE=1
__git_ps1)\[\033[00m\]\n\[\033[38;5;209m\]└─\\[\033[38;5;209m\]$\[\033[37m\] "
```

Solution: __git_ps1 command not found

```
curl -o ~/.git-prompt.sh
https://raw.githubusercontent.com/git/git/master/contrib/completion/git-prompt.sh
echo 'source ~/.git-prompt.sh' >> ~/.bashrc
```

?? Zombie ??(defunct)

One may deal with zombie processes in any one of the following ways:

- Fix the parent process to make it execute `wait(2)` on child process exit
- Kill the parent process of the zombie
- Reboot system
- Ignore it

?? zombie processes

```
ps aux |grep "defunct"
ps aux |grep Z

# How many Zombie process running on your server
ps aux | awk {'print $8'}|grep -c Z

# List the PID of Zombie
ps aux | awk '{ print $8 " " $2 }' | grep -w Z
```

Kill zombie process

```
# find the parent process list
pstree -paul

kill -9 <PARENT-PID>
```

RHEL Documents:

- What_is_a_zombie_(defunct)_process.pdf
- How_to_kill_Zombie_Defunct_process.pdf

?? & Auditing ??

```
# Parse /var/log/secure
grep "authentication failure" /var/log/secure | awk '{ print $13 }' | cut -b7-  | sort | uniq
-c

# Login failed attempts
lastb -F
lastb -F <username>
```

Check Linux Login History

```
#!/bin/bash
#Filename: intruder_detect.sh
#Description: Check Linux Login History
AUTHLOG=/var/log/secure

if [[ -n $1 ]];
then
  AUTHLOG=$1
  echo Using Log file : $AUTHLOG
fi

# Collect the failed login attempts
FAILED_LOG=/tmp/failed.$$.log
egrep "Failed pass" $AUTHLOG > $FAILED_LOG

# Collect the successful login attempts
SUCCESS_LOG=/tmp/success.$$.log
egrep "Accepted password|Accepted publickey|keyboard-interactive" $AUTHLOG > $SUCCESS_LOG

# extract the users who failed
failed_users=$(cat $FAILED_LOG | awk '{ print $(NF-5) }' | sort | uniq)

# extract the users who successfully logged in
success_users=$(cat $SUCCESS_LOG | awk '{ print $(NF-5) }' | sort | uniq)
# extract the IP Addresses of successful and failed login attempts
failed_ip_list="$(egrep -o "[0-9]+\.[0-9]+\.[0-9]+\.[0-9]+" $FAILED_LOG | sort | uniq)"
success_ip_list="$(egrep -o "[0-9]+\.[0-9]+\.[0-9]+\.[0-9]+" $SUCCESS_LOG | sort | uniq)"

# Print the heading
printf "%-10s|%-10s|%-10s|%-15s|%-15s|%s\n" "Status" "User" "Attempts" "IP address" "Host"
"Time range"

# Loop through IPs and Users who failed.

for ip in $failed_ip_list;
do
  for user in $failed_users;
    do
```

```
    # Count failed login attempts by this user from this IP
    attempts=`grep $ip $FAILED_LOG | grep " $user " | wc -l`

    if [ $attempts -ne 0 ]
    then
      first_time=`grep $ip $FAILED_LOG | grep " $user " | head -1 | cut -c-16`
      time="$first_time"
      if [ $attempts -gt 1 ]
      then
        last_time=`grep $ip $FAILED_LOG | grep " $user " | tail -1 | cut -c-16`
        time="$first_time -> $last_time"
      fi
      HOST=$(host $ip 8.8.8.8 | tail -1 | awk '{ print $NF }' )
      printf "%-10s|%-10s|%-10s|%-15s|%-15s|%-s\n" "Failed" "$user" "$attempts" "$ip"  "$HOST"
"$time";
    fi
  done
done

for ip in $success_ip_list;
do
  for user in $success_users;
    do
    # Count successful login attempts by this user from this IP
    attempts=`grep $ip $SUCCESS_LOG | grep " $user " | wc -l`

    if [ $attempts -ne 0 ]
    then
      first_time=`grep $ip $SUCCESS_LOG | grep " $user " | head -1 | cut -c-16`
      time="$first_time"
      if [ $attempts -gt 1 ]
      then
        last_time=`grep $ip $SUCCESS_LOG | grep " $user " | tail -1 | cut -c-16`
        time="$first_time -> $last_time"
      fi
      HOST=$(host $ip 8.8.8.8 | tail -1 | awk '{ print $NF }' )
      printf "%-10s|%-10s|%-10s|%-15s|%-15s|%-s\n" "Success" "$user" "$attempts" "$ip"
"$HOST" "$time";
    fi
  done
```

```
done

rm -f $FAILED_LOG
rm -f $SUCCESS_LOG
```

System Audit

```
# Install Audit
yum install audit
systemctl start auditd

# Authentication Report
# To get authentication report for all the attempts which was made
aureport -au -i | more
# To get authentication report for all the success attempts which was made
aureport -au -i --success | more
# To get authentication report for all the failed attempts which was made
aureport -au -i --failed | more
# To get success login information
aureport -l --success | more
# To get failed login information
aureport -l --failed | more
# To get success login summary report for all the success attempts which was made
aureport -l --success --summary -i | more
```

Check if a RHEL system is vulnerable to a specific CVE

```
# rpm -q --changelog [package-name] | grep [CVE-NUMBER]
rpm -q --changelog openssl | grep CVE-2021-3450
rpm -q --changelog openssl | grep CVE
rpm -q --changelog openssl | grep CVE-2021

# Using yum command
yum install yum-plugin-security
yum update yum
yum updateinfo info --cve CVE-2021-3445
```

Auditd

- AUDITD RECOMMENDED CONFIGURATION ON REDHAT OR CENTOS LINUX FOR SYSTEM AUDITING
- Linux ?? pam_tty_audit ?? SSH ????????????
- Adultd?Linux ?????????????
- The psacct package contains several utilities for monitoring process activities, including ac, lastcomm, accton and sa.

Auditing tool for UNIX/Linux like - Lynis

- https://cisofy.com/
- How to Do Security Auditing of Linux System Using Lynis Tool

rsh

rsh server

```
# install on CentOS 6/7
yum install rsh-server

# Startup the service on CentOS 6
chkconfig rsh on
chkconfig rlogin on
service xinetd reload

# Startup the service on CentOS 7
systemctl start rsh.socket
systemctl start rlogin.socket
systemctl start rexec.socket
systemctl enable rsh.socket
systemctl enable rlogin.socket
systemctl enable rexec.socket
```

strace ????

```
# Trace the command
strace df -h

# Trace the process ID
strace -p 33259
```

```
# Get Summary of Linux Process
strace -c -p 3569

# Print Instruction Pointer During System Call
strace -i df -h

# Show Time of Day For Each Trace Output Line
strace -t df -h

# Print Command Time Spent in System Calls
strace -T df -h

# Trace Only Specific System Calls
strace -e trace=write df -h
strace -p 3569 -e poll
```

?? suspend, hibernation

```
# disable the following systemd targets
sudo systemctl mask sleep.target suspend.target hibernate.target hybrid-sleep.target

sudo systemctl restart systemd-logind.service

# Then reboot the system and log in again
# Verify if the changes have been effected using the command
sudo systemctl status sleep.target suspend.target hibernate.target hybrid-sleep.target

# To re-enable the suspend and hibernation modes, run the command
sudo systemctl unmask sleep.target suspend.target hibernate.target hybrid-sleep.target
```

To prevent the system from going into suspend state upon closing the lid, edit the `/etc/systemd/logind.conf` file.

```
[Login]
HandleLidSwitch=ignore
HandleLidSwitchDocked=ignore
```

???????

lsblk

```
# Check the disks
lsblk

nvme0n1     259:0    0 465.8G  0 disk
├─nvme0n1p1 259:1    0   512M  0 part /boot/efi
└─nvme0n1p2 259:2    0 465.3G  0 part /
nvme1n1     259:3    0 953.9G  0 disk /media/alang/AlangsData

# Check the disks for the details
lsblk --fs

NAME                FSTYPE   LABEL UUID                                   MOUNTPOINT
sda
├─sda1              xfs            7a72d0ab-c234-4ad6-82dd-aa53edff7c78   /boot
└─sda2              LVM2_mem       VqfMLI-x1MU-Ui0R-w2UI-3Qaq-na31-FoNKfL
  ├─rootvg-root     xfs            18817b75-3bd9-4ea7-b1b8-1d71b790ac45   /
  ├─rootvg-swap     swap           efc1e891-3ad9-4f18-8f03-a0d70f26c181   [SWAP]
  └─rootvg-worktmp xfs             2be7fb38-c1cf-4ce0-b4ee-11975ef745b2   /worktmp
sdb                 LVM2_mem       kqHzI1-y8GI-SEkr-jhQn-BYAy-x2Tg-e1jdF3
├─dbvg-db2_home     xfs            f333bfb2-7a82-4bbe-aa20-325efc2febf8   /db2_home
├─dbvg-db2_vol      xfs            5702a9cd-a70e-4f48-9c5d-c29858dbaca2   /db2_vol
└─dbvg-dbtmp        xfs            9dcd5abd-ae6b-428b-b326-cf0c56d534a1   /dbtmp
sr0

# List UUID of disk
lsblk -l -o NAME,FSTYPE,MOUNTPOINT,UUID

NAME FSTYPE MOUNTPOINT UUID
sda
sda1 ext4   /boot      f830a3fa-1f94-42f4-9dca-5b5c077eab66
sda2 ext4   /          dcbdf18c-2fb4-426c-9dac-d13a45b7ebba
sda3 swap   [SWAP]     6f40f01b-e9ed-4092-9c65-1445d92ec9da
sda4 ext4              6df9a3a6-052e-41f3-b15a-cb258db0267f
OVM_SYS_REPO_PART_3600508b1001cbe65c99583659f085b36 (dm-0)
     ext4              6df9a3a6-052e-41f3-b15a-cb258db0267f
sr0

# Check the filesystem for the specified disk
lsblk --fs /dev/sdb
```

```
NAME            FSTYPE   LABEL UUID                                   MOUNTPOINT
sdb             LVM2_mem       kqHzI1-y8GI-SEkr-jhQn-BYAy-x2Tg-e1jdF3
├─dbvg-db2_home xfs            f333bfb2-7a82-4bbe-aa20-325efc2febf8   /db2_home
├─dbvg-db2_vol  xfs            5702a9cd-a70e-4f48-9c5d-c29858dbaca2   /db2_vol
└─dbvg-dbtmp    xfs            9dcd5abd-ae6b-428b-b326-cf0c56d534a1   /dbtmp
```

lshw

```
sudo lshw -short -class disk,volume

H/W path                 Device          Class          Description
=====================================================================
/0/100/14/0/3/4/0.0.0    /dev/sda        disk           Mass-Storage
/0/100/14/0/3/4/0.0.0/0  /dev/sda        disk
```

????

```
wipefs -a /<device-path>
```

last

```
# To check the last ten login attempts, you can pipe it with "head"
last | head -n 10

# using complete usernames and hostnames
last -w

# find the device used by the user
tty

# To find the last login by date,
last --since <date>
last --until <date>
last --since -2days

# find the last bad login attempts
sudo lastb
tail -f -n 100 /var/log/auth.log | grep -i failed
```

```
# find the last SSH logins
tail -f -n 100 /var/log/auth.log | grep -i sshd
sudo journalctl -r -u ssh | grep -i failed

# find last login times for all users
lastlog
lastlog -u <user>
```

????????

```
dmidecode -s system-manufacturer
systemd-detec-virt
virt-what
```

????

```
sudo lshw -short

H/W path                Device          Class          Description
========================================================================
                                        system         NUC8i7HVK
/0                                      bus            NUC8i7HVB
/0/0                                    memory         64KiB BIOS
/0/2f                                   memory         16GiB System Memory
/0/2f/0                                 memory         8GiB SODIMM DDR4 Synchronous
Unbuffered (Unregistered)
/0/2f/1                                 memory         8GiB SODIMM DDR4 Synchronous
Unbuffered (Unregistered)
/0/34                                   memory         256KiB L1 cache
/0/35                                   memory         1MiB L2 cache
/0/36                                   memory         8MiB L3 cache
/0/37                                   processor      Intel(R) Core(TM) i7-8809G CPU @
3.10GHz
/0/100                                  bridge         Xeon E3-1200 v6/7th Gen Core
Processor Host Bridge/DRA
/0/100/1                                bridge         Xeon E3-1200 v5/E3-1500 v5/6th Gen
Core Processor PCIe
/0/100/1/0              /dev/fb0        display        Polaris 22 [Radeon RX Vega M GH]
/0/100/1/0.1                            multimedia     Advanced Micro Devices, Inc.
[AMD/ATI]
```

```
/0/100/1.1                              bridge         Xeon E3-1200 v5/E3-1500 v5/6th Gen
Core Processor PCIe
/0/100/1.1/0                            bus            ASMedia Technology Inc.
/0/100/1.1/0/0          usb3            bus            xHCI Host Controller
/0/100/1.1/0/1          usb4            bus            xHCI Host Controller
...
#
sudo lshw -html > HardwareSummary.html
```

Finding Number of Ram Slots

```
sudo dmidecode -t memory


sudo lshw -class memory
```

?????

```
sudo dmidecode -t 1
sudo dmidecode -t 2
```

BIOS version

```
sudo dmidecode -s bios-version
```

More options

```
sudo lshw -C <option>
```

Option	Description
network	Gets the details of the network hardware devices.
memory	Displays the details of RAM in your system.
storage	Prints details of the storage drives.
system	Gets the details of the motherboard and plug-and-play slots
multimedia	Details of the sound card of your system.
display	Know more about what is powering the display output.
bridge	Displays info about the PCIe bridges.
bus	It will list down buses and their details.
CPU	List the processor details

Inxi

```
# Install
sudo apt-get install inxi

# Check dependencies
inxi --recommends

# Shows Full Linux System Information
inxi -F

# Find Linux Laptop or PC Model Information
inxi -M

# Find Linux CPU and CPU Speed Information
inxi -C

# Find Graphic Card Information in Linux
inxi -G

# Find Audio/Sound Card Information in Linux
inxi -A
```

GUI Tools

```
# HardInfo
sudo apt-get install hardinfo
```

lspci

```
lspci
lspci -v -s <bus number>:<device number>.<function number>
```

lsusb

```
lsusb

# Check a USB device's maximum speed
# Speed vs USB version
# 12M    USB1.0
```

```
# 480M   USB2.0
# 5000M  USB 3.2 Gen 1 (aka USB 3.0)
# 10000M USB 3.2 Gen 2 (aka USB 3.1)
# 20000M USB 3.2 Gen 2x2
#
lsusb -t
```

???????

RedHat/CentOS

```
# RedHat/CentOS 6
yum install make libtool autoconf subversion git cvs wget libogg-devel gcc gcc-c++ pkgconfig

# RedHat/CentOS 7
yum group install "Development Tools"
```

Ubuntu/Debian

```
apt-get install build-essential
```

dd

```
# 備份 MBR
dd if=/dev/hdx of=/path/to/image count=1 bs=512

# 光碟轉成 iso 檔
dd if=dev/cdrom of=/root/cd.iso

# 銷毀硬碟資料
dd if=/dev/urandom of=/dev/hda1

# 備份整個 USB-Flash
dd if=/dev/sdb | gzip > ./my-usb_flash.img.gz

# 還原 USB-Flash
gzip -dc ./my-usb_flash.img.gz | dd of=/dev/sdb
```

```
# 建立一個測試用的大檔案10GB
dd if=/dev/zero of=/path/to/image bs=1G count=10
# NOTE: 新版 Linux 可以改用指令
fallocate -l 1G test.img

# Test network bandwidth between 2 Linux servers
dd if=/nas-mount-point/samplefile of=/dev/null bs=1M count=1024 iflag=direct
dd if=/dev/zero of=/nas-mount-point/samplefile bs=1M count=1024 oflag=direct
# NOTE: the samplefile is greater than 1GB and the RAM is preferably more than 2GB.

# 複製到另一個相同 size 的硬碟
dd if=/dev/hda of=/dev/hdb conv=noerror,sync status=progress

# Quick benchmark test for writing 1GB file
dd if=/dev/zero of=/tmp/delme.dd bs=1024 count=1000000 status=progress
```

cat: ????

```
cat /dev/sda1 > /dev/sdb1
```

history

- Bash History Display Date And Time For Each Command
- How to disable bash shell history in Linux
- Parsing Bash history in Linux
- Linux History Command with Advance Examples

See time stamp in bash history

```
echo 'export HISTTIMEFORMAT="%F %T "' >> ~/.bash_profile
```

Prevent History

```
# Prevent History from Recording Any Executed Command
export HISTSIZE=0

# Prevent History from Storing Certain Strings
export HISTIGNORE="passwd:ftp: "
```

??????

?? Swap ? processes

```
for file in /proc/*/status ; do awk '/VmSwap|Name/{printf $2 " " $3}END{ print ""}' $file;
done | sort -k 2 -n -r | less
```

OOM (Out of Memory) Killer

- Linux Memory Overcommitment and the OOM Killer | Baeldung on Linux

Swap ??

```
# 檢查目前的 swap 配置
free
swapon -s

# 開啟/關閉 swap
swapon /dev/sda3
swapoff /dev/sda3

# 製作一個 swap 系統
mkswap /dev/sda3
```

make-swapfile.sh?1GB

```
#!/bin/bash

dd if=/dev/zero of=/swapfile bs=1024 count=1024k
chown root:root /swapfile
chmod 0600 /swapfile
mkswap /swapfile
swapon /swapfile
echo "/swapfile          swap            swap    defaults        0 0" >> /etc/fstab
sysctl vm.swappiness=10
echo vm.swappiness=10 >> /etc/sysctl.conf
free -h
cat /proc/sys/vm/swappiness
```

Extend the existing SWAP partition:

> “ NOTE: ??? Production ??????????????????????? SWAP partition ???

```
[root@tycitpdb05-a ~]# grep -i swap /etc/fstab
/dev/mapper/rootvg-swap swap                    swap    defaults        0 0

[root@tycitpdb05-a ~]# ls -al /dev/mapper/rootvg-swap
lrwxrwxrwx 1 root root 7 Aug 15 11:49 /dev/mapper/rootvg-swap -> ../dm-1

[root@tycitpdb05-a ~]# swapon -s
Filename                                Type            Size    Used    Priority
/dev/dm-1                               partition       4194300 0       -2

[root@tycitpdb05-a ~]# swapoff -v /dev/mapper/rootvg-swap
swapoff /dev/mapper/rootvg-swap

[root@tycitpdb05-a ~]# lvextend -L16G /dev/rootvg/swap
  Size of logical volume rootvg/swap changed from 4.00 GiB (1024 extents) to 16.00 GiB (4096
extents).
  Logical volume rootvg/swap successfully resized.

[root@tycitpdb05-a ~]# mkswap /dev/rootvg/swap
mkswap: /dev/rootvg/swap: warning: wiping old swap signature.
Setting up swapspace version 1, size = 16777212 KiB
no label, UUID=06aac9ae-9e8c-48bd-9f16-5f3d0c32b31f

[root@tycitpdb05-a ~]# swapon -v /dev/rootvg/swap
swapon /dev/rootvg/swap
swapon: /dev/mapper/rootvg-swap: found swap signature: version 1, page-size 4, same byte order
swapon: /dev/mapper/rootvg-swap: pagesize=4096, swapsize=17179869184, devsize=17179869184
```

xfs ????

- How to Check and Repair XFS Filesystem in RHEL

?? xfs ????

```
sudo mount -a
mount: /data: mount(2) system call failed: Structure needs cleaning.

sudo umount /data

# with '-n' option to perform a dry run
```

```
sudo xfs_repair -n /dev/sdb1
# repair the filesystem
sudo xfs_repair /dev/sdb1
```

xfs ?????

```
# Install the xfsdump
dnf install xfsdump

# Create a full-backup
# -L: for dump session
# -M: for media in drive
# -f: the backup destination
xfsdump -L session_0 -M datapart -f /data/boot.xfsdump /boot

# Create a incremental backup with the level 1
# -l: the backup level (0-9)
xfsdump -l 1 -L session_1 -M datapart -f /data/boot.xfsdump1 /boot

# Restore a full-backup
xfsrestore -f /data/boot.xfsdump /test

# Restore an incremental backup
xfsrestore -r -f /data/boot.xfsdump /test
xfsrestore -r -f /data/boot.xfsdump1 /test
```

Linux Module

- Linux: How to load a kernel module automatically at boot time

????????? (Monito File & Directory)

- Watchman – A File and Directory Watching Tool for Changes
- Watchman - A file watching service | Watchman (facebook.github.io)
- inotify-tools??????????????????Linux 2.6.13 ?????????????????????????????????????? rsync ??? script?
- fswatch - Monitor File and Directory Changes in Linux (tecmint.com)
- AIDE - How to Check Integrity of File and Directory Using “AIDE” in Linux
- Pyinotify

??????

?? A.txt ????? B.txt ????

```
diff A.txt B.txt | grep "^<" | cut -c3-
```

??????

```
# tree
tree dir1
tree dir2

# diff
diff -q /path/to/dir1 /path/to/dir2
diff -q dir1 dir2
diff -qr dir1 dir2
diff -qrs dir1 dir2
```

???????????

```
# tree
tree -dfi --noreport dir1
tree -dfi --noreport dir1 | xargs -I{} mkdir -p "$HOME/Downloads/{}"
tree -a $HOME/Downloads/dir1

# find + xargs
find dir1 -type d
find dir1 -type d | xargs -I{} mkdir -p "$HOME/Documents/{}"
tree -a $HOME/Documents/dir1

# find + exec
find dir1 -type d -exec mkdir -p "$HOME/Desktop/{}" \;
```

?????

- How to check memory utilization and usage in Linux
- How to Accurately Check Memory Consumption of a Process in Linux
- How to Clear RAM Cache and Memory in Linux [Safe Methods]

```
# Using meminfo
cat /proc/meminfo
grep -E --color 'Mem|Cache|Swap' /proc/meminfo
```

- `MemTotal`, Total usable RAM (i.e., physical RAM minus a few reserved bits and the kernel binary code).
- `MemFree`, The sum of LowFree+HighFree.
- `MemAvailable`, (since Linux 3.14) An estimate of how much memory is available for starting new applications, without swapping.
- `Buffers`, Relatively temporary storage for raw disk blocks that shouldn't get tremendously large (20MB or so).
- `Cached`, In-memory cache for files read from the disk (the page cache). Doesn't include SwapCached.
- `SwapCached`, Memory that once was swapped out, is swapped back in but still also is in the swap file.

```
# Using free
free -h
# Repeat printing free command output every N seconds.
free -s 5 -c 10
```

- `total`, Total installed memory
- `used`, Used memory (calculated as total – free – buffers – cache)
- `free`, Unused memory (MemFree and SwapFree in /proc/meminfo)
- `shared`, Memory used mostly by tmpfs (Shmem in /proc/meminfo)
- `buffers`, Memory used by kernel buffers (Buffers in /proc/meminfo)
- `cache`, Memory used by the page cache and slabs (Cached and SReclaimable in /proc/meminfo)
- `buff/cache`, Sum of buffers and cache
- `available`, Estimation of how much memory is available for starting new applications, without swapping.

```
# Using vmstat
vmstat -w
```

- `swapd`, the amount of virtual memory used.
- `free`, the amount of idle memory.
- `buff`, the amount of memory used as buffers.
- `cache`, the amount of memory used as cache.
- `inact`, the amount of inactive memory. (-a option)
- `active`, the amount of active memory. (-a option)
- `si`, Amount of memory swapped in from disk (/s).
- `so`, Amount of memory swapped to disk (/s).

???????

Dash

```
# The filename with -- or -
rm -i -v -- -foo
rm -i -v -- --foo
rm -i -v ./-foo

# The filename with -- and whitespaces
rm -i -v -- '-- My Resume . txt'
rm -i -v -- '/path/to/dir/-- My Resume . txt'
rm -i -v -- "/path/to/dir/-- My Resume . txt"

# Using find
find . -name '--my-FileNameGoes-Here' -delete
find /path/to/directory/ -name '---filename with a white spaces' --delete
```

cp: ???????

```
# □□□□ alias=cp -i□□□□ -f □□□□
yes | cp -r /source /target
```

System Locale

```
# view information about the current installed locale
locale
localectl status

# view more information about an environmental variable
locale -k LC_TIME

# display a list of all available locales
locale -a

# Set System Locale
## Using the commands
## The following command sets LANG to en_IN.UTF-8 and removes definitions for LANGUAGE.
sudo update-locale LANG=LANG=en_IN.UTF-8 LANGUAGE
## Or
```

```
sudo localectl set-locale LANG=en_IN.UTF-8

sudo update-locale LC_TIME=en_IN.UTF-8
## Or
sudo localectl set-locale LC_TIME=en_IN.UTF-8

## Using the profile
vi ~/.bash_profile

LANG="en_IN.utf8"
export LANG
```

????????

1. Preserve File Permissions and Ownership
2. Maintain Symbolic Links
3. Avoid Disruption to Services or Applications
4. File Locking Issues
5. Efficiency in Log Management

```
> access.log
: > access.log
true > access.log
cat /dev/null > access.log
cp /dev/null access.log
dd if=/dev/null of=access.log
echo -n "" > access.log
truncate -s 0 access.log
```

tar ??

- 18 Tar Command Examples on Linux

??????

```
# 1. Switch to single user mode
# NOTE: single mode □□□□□□□□, □□□□ console □□
init 1

# 2. Tar up the whole system
tar zcpvf /backups/fullbackup.tar.gz --directory=/ --exclude=proc --exclude=dev --exclude=sys
```

```
--exclude=boot --exclude=run --exclude=etc/fstab --exclude=backups .

# 3. Once this completes copy the tar file over to the root directory your new machine
# 4. Take a snapshot of your new machine. This way if things go wrong you can revert to the snapshot and try again.
# 5.Extract the tarball on your new machine
cd /
tar -zxvpf /path/to/fullbackup.tar.gz
```

Stress Test

- stress-ng
  - Linux ?? Stress-ng ?? CPU??????? I/O ????????? - Office ?? (officeguide.cc)
  - How to Test CPU and Memory Load with Stress & Stress-ng - Shouts.dev
  - How to Stress Test Your Linux CPU for High Load (tecmint.com)

stress

```
stress --cpu 2 --io 3 --vm 4 --vm-bytes 512M --timeout 10m
```

sysbench

```
# size □□□□ RAM
# max-time □□□
sysbench --test=fileio --file-total-size=10G prepare
sysbench --test=fileio --file-total-size=10G --file-test-mode=rndrw --init-rng=on --max-time=300 --max-requests=0 run
```

?????

```
# with command
command -v <cmd-name>

# with which
which <cmd-name>
```

getent: ??????

```
# The same as 'cat /etc/passwd' and 'cat /etc/shadow'
getent passwd
```

```
getent passwd <user-name>
getent shadow
getent group
getent group <group-name>

# /etc/hosts
getent hosts

# /etc/services
getent services
getent services <service-name>

# /etc/networks
getent networks
```

?? inode ??

XFS

- KB: https://access.redhat.com/solutions/41492
- ????????

```
# 預設值: 25%
# 調整檔案系統空間 30% 儲存 inode
xfs_growfs -m 30 /<mount-point>
```

EXT4/EXT3

- https://www.tecmint.com/increase-disk-inode-number-in-linux/
- ?????????????? inode ???

```
# byte-per-inode: 16384 (by default), 8192, 4096
# 數值愈小; inode 數量愈大
mkfs.ext4 -i <byte-per-inode> /dev/device



# 對於大檔案的使用，可以用以下語法，減小 inode 數量
mkfs.ext4 -T largefile /dev/device
```

sysctl

```
# See current sysctl overrides
sysctl --system

# Apply the changes
sysctl -p /etc/sysctl.d/ipv6.conf

# Check for current settings
sysctl -a
```

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