SysOps [a.k.a DevOps] Intensives

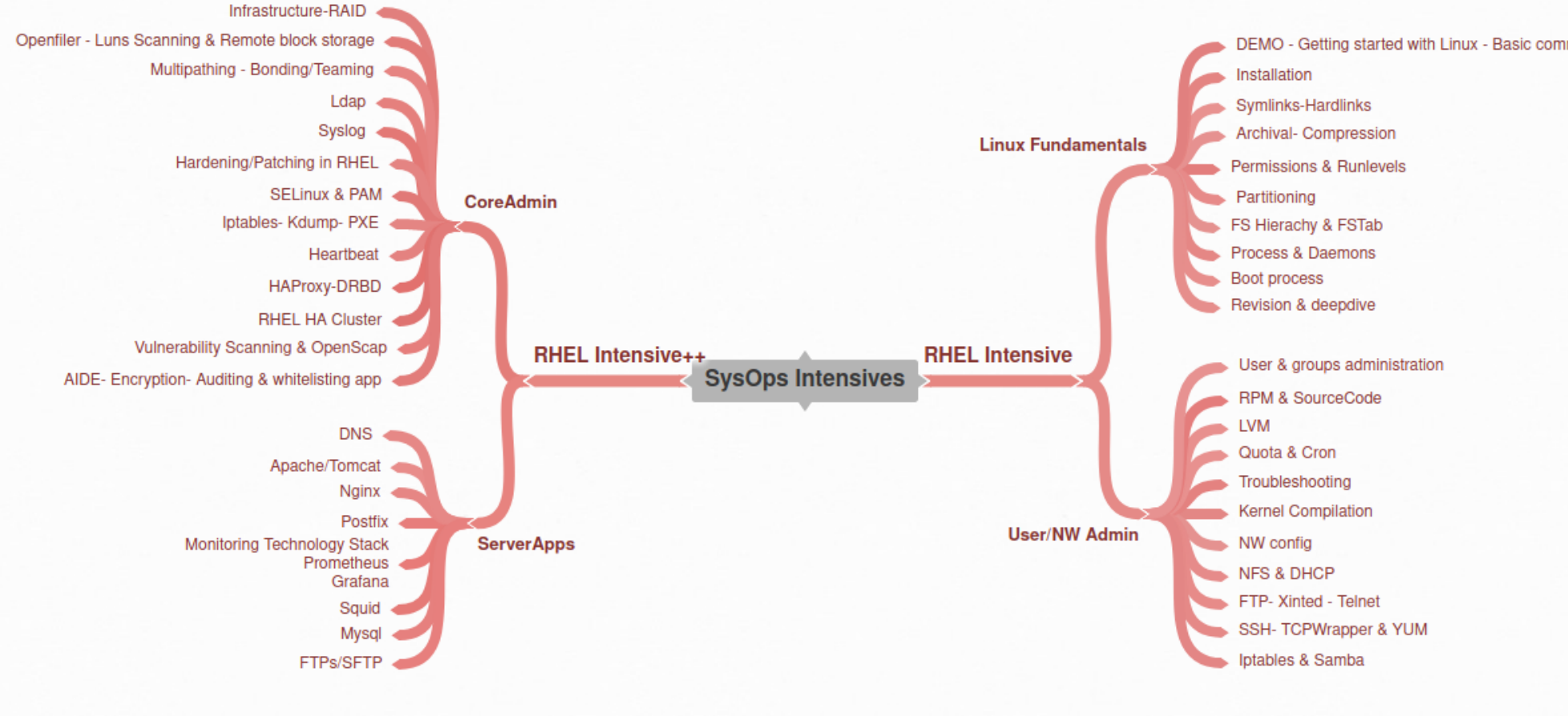
Intensives Overview & Demo

AL NAFI,
Education Benefits all.

Red Hat vs. SysOps Intensives

Red Hat Administrators	SysOps Intensives
Red Hat Certified System Administrator (RHCSA)	RHEL Intensive
Red Hat Certified Engineer (RHCE)	
Red Hat Certified Specialist in Security: Linux	RHEL Intensive++
Red Hat Certified Specialist in Linux Diagnostics and Troubleshooting	
Red Hat Certified Specialist in High Availability Clustering	
Red Hat Certified Specialist in Performance Tuning	

SysOps Intensives Overview



SysOps Intensives Instructor – Kazim Shaikh

Experience:

- SysOps / DevOps. 11+ Years in IT Infrastructure
- Assistant Vice President of Infrastructure
- Student of Al-Nafi IT Professional & Cyber Defense track

Dedication:

- I dedicate this SysOps intensives course to my mother , Rizwana Hasham Shaikh who lived this with me & without whose conditional & total support, none of this would have happened.May Allah elevate Her levels in Jannah

- Above and before all I thank Allah, The Creator and Sustainer of the Universe for giving me the Tawfeeq to deliver SysOps contents. I ask for His forgiveness for my shortcomings and mistakes in this course and for His acceptance of this work.

- I am grateful to Ameer sahab Faisal bhai who formulated the idea of, a SysOps intensives project & offered his guidance at various stages.

Why take SysOps Intensives

- RHEL Intensive & RHEL Intensive++ provides tentatively 3 months long classes, including, but not limited to Linux fundamentals,cli concepts, in-depth core admin tasks, in-depth server/application modules.
- It provides full time Linux system administration opportunity & a start for DevOps ,CloudOps Cyber security paths etc.
- Prerequisites – There are no prerequisites for this course. Howerver, previous sys admin experience on different OS will be beneficial

Demo

Topics:

- Getting started with Linux
- What is Linux & how it became open source
- What we are going to learn- Red Hat concepts
- Development of RHEL – Federo / CentOS project
- Logging into CentOS GNOME env & accessing GNOME terminal
- What are command/Flags- Executing commands using shell
- Topic: Absolute paths & relative paths
- Installation of CentOS on VM virtual box

What is linux & how it became open source

- Linux is not OS. Linux is a kernel & kernel is the heart of OS.
- Unix was the oldest- Linux was invented in 1991 & it is an open source which means source code is free. Application code used in linux is free.
- Who invented open source ? Linux is kernel & kernel is part of open source community under which we get all applications like apache , vlc etc code will be freely available.
- Open source invented 1984/85 by richard stallman before linux invented with name GNU as OS & opensource community.
- Then in 1991 linus torvalds developed linux kernel – kernel version 0.97 in 1991 & he

  gave it to GNU foundation & made this kernel as part of open source community
- And he applied open source license which is GPL [general public license – means free license]
- Linus torvalds also got millennium award in 2012

What we are going to learn – Red Hat !!

- Red hat v1 to v9 was free & from then Red Hat become commercial & they gave the name RHEL – Red Hat Enterprise Linux.
- Which means Red Hat v15 became RHEL 6 , v16 became RHEL 7 , v17 became RHEL 8
- We totally believe in concepts & we will be going deep dive on concepts which can be applied on RHEL 7 & 8
- CentOS is fully open source & mirror copy of Red Hat . Big companies like google, FB, gmail usses centos & not Red Hat as Red Hat is not open source . Ubuntu is also fully open source
- What Red Hat have done is – compiled all free open source application in an OS & giving support as per subscription.

Development of Red Hat- Federo Project

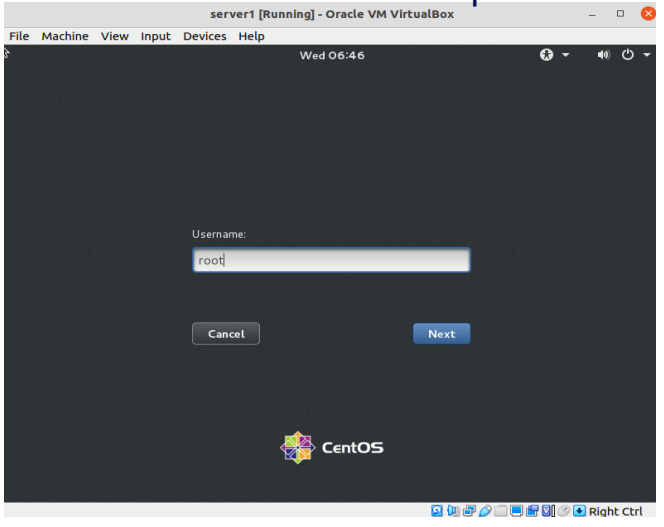
- What is Federo ? Its an OS from Red Hat
- Federo is a free offering from Red Hat
- Red Hat sponsors & integrates open source projects into a community-driven Linux distribution, Federo.Red Hat participates in supporting open source projects & stabilizes the software to ensure that it is ready for LTS & standardization, and integrates it into their enterprise-ready distribution, RHEL.
- Red Hat bases its major releases of RHEL on Federo. RHEL uses subscription based model. This is not a license fee, instead it pays for support , maintenance, updates, security patches & so on.
- CentOS is community driven linux dist derived from much of open source RHEL codebase

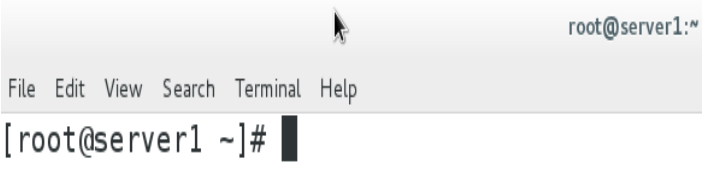
  & other sources. It is free of charge – supported by active user community of volunteers

  that operates independently of Red Hat.

Logging into CentOS GNOME env & accessing GNOME terminal

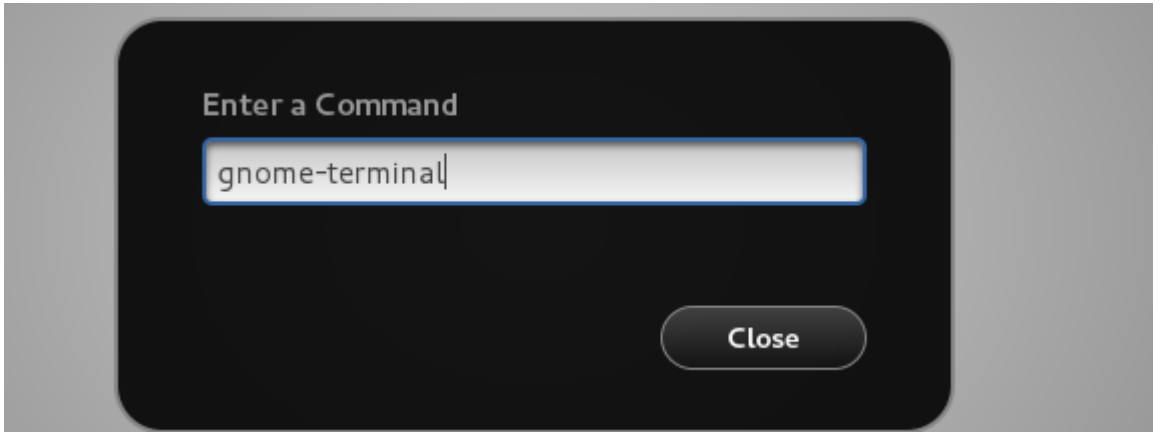
- Login screen – In linux root is the administrator – we will be creating this user while installing
- Root is good or windows administrator account is good ? Upon login, right click & open terminal. Terminals are called emulators – they take input from keyboard give it to shell – shell then processes it & give it back to terminal – terminal then outputs





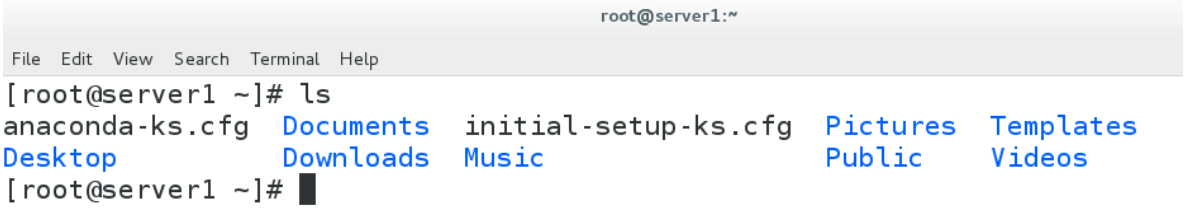
Logging into RHEL GNOME env & accessing GNOME terminal

- This terminal is called Gnome terminal – graphic application
- You can also open gnome terminal by pressing alt+f2 to run application as gnome-terminal just as similar to windows as win+r
- contrl+shift+++ to zoom in gnome terminal – control minus minus for zoom out



What are commands/flags

- Commands are atlast program
- In linux almost commands are developed in C language & then converted in binary. In windows we call it exe & in linux we call it binary.In windows we call it restart & in linux we call it reboot. Windows have registry & in linux no registry but FS hierarchy. Windows have defrag & in linux no defrag because of the way how files are written . So anyways commands are atlast binary file which are kept in some path[location] from where we call them & run it as a command.
- Lets run first command “ls” – do not concentrate on its fullform – instead think from where it came & why it came then only you will become expert. In windows we do double click – in linux same thing we do – by running “ls” command



What are commands/flags

- Lets run second command “df” . df means my computer in windows .How to see how many partitions & mountpoints are there in my system “df -h” h means human readable .

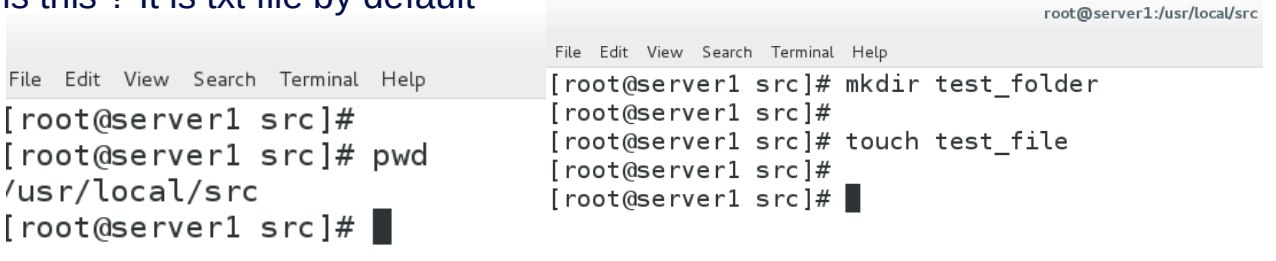
  / , *boot etc are known as partitions. /dev/mapper/* is knows as drivers which we will learn later

- Next command run “date” shows current date. Query for students – how to change date in linux?

```
[root@server1 Desktop]# df -h
Filesystem               Size  Used Avail Use% Mounted on
/dev/mapper/centos-root  2.0G   66M  2.0G   4% /
devtmpfs                 905M     0  905M   0% /dev
tmpfs                    920M  140K  920M   1% /dev/shm
tmpfs                    920M  8.8M  912M   1% /run
tmpfs                    920M     0  920M   0% /sys/fs/cgroup
/dev/mapper/centos-usr   3.9G  3.1G  913M  78% /usr
/dev/mapper/centos-tmp  1014M   34M  981M   4% /tmp
/dev/mapper/centos-home 1014M   36M  979M   4% /home
/dev/mapper/centos-var   3.9G  343M  3.6G   9% /var
/dev/sda1                509M  158M  352M  31% /boot
tmpfs                    184M  8.0K  184M   1% /run/user/42
tmpfs                    184M   24K  184M   1% /run/user/0
[root@server1 Desktop]#
```

What are commands/flags

- Next command “pwd”. In windows it is my computer address path . pwd shows how many folder we are inside.
- Tell me on which location i am ? Your answer should be to run “pwd” . If i am in /*usr*/local/src , can i run df -h ? yes, commands can be run/called from anywhere
- Next command – how to create folder in linux – “mkdir foldername” now navigate to this new folder by cd foldername . To create file in linux – “touch filename” . Where this file is created ? Your answer “pwd” what file is this ? It is txt file by default



What are commands/flags

- Next command – lets delete this file – “rm filename” . Now lets give flags “rf” . Every command will have flags. Command is rm & flag is -rf [r means recursive & f means forcefully. This is the most dangerous command. Please think 10 times when you are running on prodcution system. In linux * means all , same like cntrl+a in windows

  rm -rf /* - this means OS delete – direct termination letter ;)

```
[root@server1 src]# mkdir test_folder
[root@server1 src]#
[root@server1 src]# touch test_file
[root@server1 src]#
[root@server1 src]# rm test_file
rm: remove regular empty file ‘test_file’? yes
[root@server1 src]#
[root@server1 src]# touch test_file_2
[root@server1 src]# rm -rf test_file_2
[root@server1 src]#
```

What are commands/flags

- We learn ls,df,pwd,touch,mkdir – if you want to know short description of commands run “whatis” example “whatis pwd” will show short description. If you want to know manual run “man” example “man pwd” . It will show list of flags than can be used with the command , author information etc
- Lets run “ls” command with “-l” as a flag example “ls -l” which will show properties of filename.
- What is the puprpose of flags ? Every command has flags. Purpose of flag is to differentiate particularize the command . If you want to see how many flags availble for a command type “--help” example “rm --help”
- So three things – “whatis” “man” “--help” when you will use this ? --help to get flag

  details , whatis for short description & man for complete manual

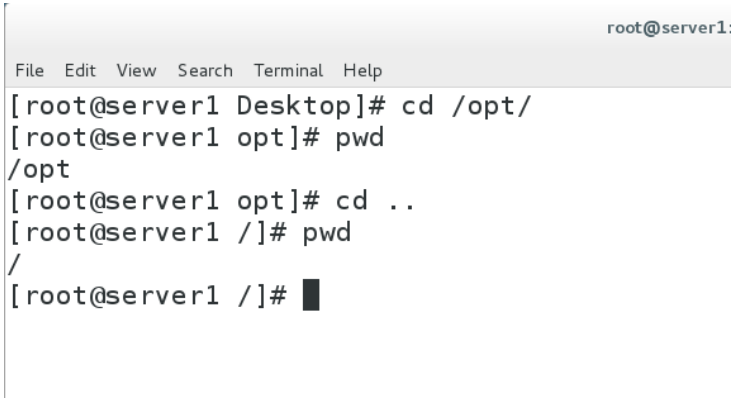
```
File  Edit  View  Search  Terminal  Help
[root@server1 Desktop]#
[root@server1 Desktop]# whatis pwd
pwd (1)              - print name of current/working directory
pwd (1p)             - return working directory name
[root@server1 Desktop]#
```

```
[root@server1 Desktop]# man rm
[root@server1 Desktop]# rm --help
Usage: rm [OPTION]... FILE...
Remove (unlink) the FILE(s).

  -f, --force           ignore nonexistent files and arguments, never prompt
  -i                    prompt before every removal
  -I                    prompt once before removing more than three files, or
                          when removing recursively; less intrusive than -i,
```

Topic: Absolute path & relative path

- Lets learn absolute & relative path topic:
- In linux forward slash (/) as first character means at the top – this is root slash called as father of all partitions
- This is whole & sole slash – everything will be inside this slash. Lets use “cd” command to change directory example “cd /opt”. Can anyone tell how many folders inside i am in ? Its 2 folders – one is / slash & second one opt folder. If i want to go back one level up then “cd ..”



Topic: Absolute path & relative path

- Lets go to opt by running “cd /opt” inside opt create folder test. Navigate to this new folder “cd test” create one folder test2 “mkdir test2” & navigate to test2 by “cd test2” . Now tell me how many folders inside i am ? The first slash is the parent slash & next slashs are only used for folder separation
- Remember i did not used / when i chaged my directory to test & test2 – this is called realtive path
- Path using from partition is called absolute path “cd /*opt*/test/test2” . Path without slash is relative path “cd test”

Installation of CentOS

- We will install RHEL 7 in 7 partitions – what do you mean by partitions ? Data isolation *separation. Like c , d drive these are drive letters also called partitions. If i write data on C where it will go ? C is called accesspoint for partition*HD
- In linux we dont have c,d,e we have /,/boot,/var etc & in linux we dont called accesspoint – we call it mountpoints – we will go in detail in FS hierarchy module.
- 7 partitions is recomended but not necessary – minimum reqired partition to install linux is 1 only which is root – if you install in one partition , will /*boot*,/var will be created ? Yes, it willl be created as

  a directory in one single partition.
- 7 partitions scheme with 15 Gb HD

  /boot 512MB

  / 2GB

  swap – double the RAM

  /var 4GB

  /tmp 1GB

  /usr 4GB

  /home 1GB

Installation of CentOS

- Install in virtualization – what is virtualization ? We can install multiple OS in one machine – advantage cost effective. 10 years ago we used to buy 10 servers in 20lakhs , each server 2 lakhs. When virtualization technology came our work was achived in 2 servers which 4 lakhs . Now we are in cloud computing aws, azure,gcp etc – where cost can reduced to 1 lakh
- Prepare vm first in virtual box – download 4gb ISO from net. During the install select i will install OS later. Customize & create the vm – browse ISO & poweron
- Refer installation document