

Linux course syllabus

Beginner

- Introduction:
 - Unix philosophy: Do One Thing and Do It Well (DOTADIW)
 - How deep is deep enough
 - Style is made of certain conscious choices
 - Issues: Speed(Google), Concentration(Questions), Boundaries(Sysadmin, DevOps, Programmer)
 - Note-taking: Zettelkasten, Second Brain, Obsidian, TiddlyWiki, DokuWiki
 - Update syllabus on the go
 - Linux is a family of open-source Unix-like operating systems based on the Linux kernel, an operating system kernel first released on September 17, 1991, by Linus Torvalds
 - <https://distrowatch.com> : Debian/Ubuntu/RedHat/CentOS/Fedora/ArchLinux/Manjaroi/Mint/Kali/Slackware
 - <http://laxer.com> : Linux News
- Installation
 - Debian
 - amd64 / i386 / netinstall
- A Brief Tour
 - Login / id -u -g / w / who / whoami
 - logout / exit / <ctrl+d>
 - clear / <ctrl+l>
 - reboot / poweroff / halt
 - passwd
 - Virtual Terminals: Alt-F1, Alt-F2, ...
 - Shift-PgUp, Shift-PgDn
 - ssh client / putty
- Files and Directories
 - ls -lha
 - pwd
 - Home Directory
 - file
 - Reuse previous commands
 - Using TAB for completion
 - cd / cd .. / cd - / cd ~
 - mkdir -p / rmdir
 - tree
 - Relative / Absolute Addresses
 - rm -rf
 - cp -rv
 - mv
 - wild cards
 - alias / unalias
 - cat / more / less
 - head / tail -f
 - touch
 - ln -sf
 - man, info
 - whereis, apropos, man -k
 - whatis, makewhatis
 - which, type, enable
 - /usr/share/doc
 - find
 - slocate / updatedb
 - grep
 - ps / kill / killall
 - chown
 - chmod
 - mount / umount / eject , (cdrom, usb) , fstab
 - tar
 - zcat / zless / zgrep
 - unzip / unrar
 - xargs
 - diff
 - date, cal / unix timestamp

- hexdump -C
- Shell Variables (PATH, TMOUT)
- piping / tee
- split
- uptime / free
- top / htop / atop
- vmstat / iostat / iotop
- screen
- md5sum
- wget / curl
- dd
- dos2unix / unix2dos
- hdparm
- Editing text files: vi
 - Command mode(ESC)
 - Insert mode(i)
 - Command line mode(:)
 - :w :q :wq :q! :w filename
 - copy/cut/paste/visual y d p v
 - search forward/backward
 - h j k l \$ 0 G x o A
- Disks and Partitions
 - df -hT
 - fdisk / gdisk
 - LVM / RAID
 - du -hscS
 - ncdu , gdu
- Networking
 - Networking Basics (IP/Netmask/Prefix/Gateway/DNS/Subnet)
 - IP Settings (temporary, permanent) - ifconfig , route -n , dig
 - ip command reference: <http://linux-ip.net/gl/ip-cref/>
 - ping / traceroute / ttl / mtr / fping
 - mii-tool / ethtool / watch
 - IP Forwarding (temporary, permanent)
 - Bonding / etherchannel / Portchannel / LACP
 - Source NAT
 - Static Routing (temporary, permanent)
- User Management
 - useradd -m -s / adduser
 - userdel -r / usermod
 - groupadd / groupmod / groupdel
 - vigr / vipw
 - chage / chgrp / chsh
 - id -u -g
 - whoami / w / last
 - su / sudo / sudoers / visudo
 - /etc/shadow /etc/group
- Process Management
 - pstree pgrep
- Bash Shell
- Filesystem Hierarchy Standard
- Kernel
- Servers and Clients
 - DHCP Server (range, fixed-address)
 - DNS Server - Caching Recursive, stub resolver: bind, unbound, DJBdns(dnscache, tinydns)
 - dnscap, dnscrypt, dnstop
- Essential Commands

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- Package Management: apt, yum, pkgtool, slackpkg, slapt, sbopkg, epkg
- SSH Server / ssh client, putty / scp, winscp / rsync / tunnel / sshfs
- netstat -nlp -tunapo

- NFS: Network Filesystem
- Open-iSCSI
- RFC/BCP: rfc1818
- PPPOE Client / Dialup
- Source code compile
- jdate,jcal
- epkg / encap
- ipcalc
- Cache Server: squid (transparent)
- logrotate / syslog / rsyslog / syslog-ng
- Firewall: Stateless, Statefull
- Filesystem Hierarchy Standard : <https://refspecs.linuxfoundation.org/fhs.shtml> /proc /sys

- echo
- sort / uniq
- basename / dirname
- expand
- paste
- tr
- sleep
- wc -l
- trap
- cut
- bc
- dialog
- expect
- regex / pcre / egrep
- sed: stream editor
- awk
- Web Server: apache, php, lighttpd/ nginx, php-fpm
- Apache: htaccess, htpasswd / Nginx
- openssl / https
- Database Server: mysql, postgres ,redis
- phpmyadmin
- wordpress / drupal / joomla
- MS-SQL: FreeTDS / UnixODBC
- SNMP Server: net-snmp
- Scheduling: crontab / atd / anacron
- smokeping
- ntpdate / ntpd / chronyd / hwclock
- Bandwidthd
- Zabbix
- Cacti
- Nagios
- collectd
- git
- minicom
- Traffic Control: tc, htb, iptables, lartc.org
- Policy Routing: ip rule, ip route, iptables
- Bridge: brctl
- Proxy ARP
- DNS Server - Authoritative, forward-only, master/slave : bind
- Dynamic DNS: ISC DHCP, BIND
- dnsmasq
- Squid: tproxy, wccp
- Super Server / inetd / xinetd
- telnet Server
- tftp Server
- ftp server: pureftpd, proftpd
- ftp client: ncftp, lftp
- Socks Server: dante
- Quagga: OSPF / BGP / RIP / IS-IS
- vrrp / keepalived
- Configuration management: Chef, Puppet, Ansible, SaltStack ,CFEngine
- data-serialization formats: YAML, XML, JSON
- Kernel Upgrade
- Lilo / Grub / Syslinux
- init / systemd / run level / sysV
- ACL / getfacl / setfacl / chattr
- Network Scanning: nmap
- webmin
- mc / ranger
- VLAN management: vconfig
- Bridge: ebtables, arptables, arp, arping

- Network Access Server: Radius Server (freeradius), VPN Server(poptop / pptpd), PPPOE Server
- OpenVPN/ vtund / l2tp/ ipsec / iptunnel
- Dark Web: Tor / Tor-Browser / Tails
- cryptocurrency : Blockchain/mining/ wallet/ Bitcoin, Ethereum
- Samba / openldap / kerberos / SMB,CIFS / NIS
- lxc / docker / kvm / libvirt / xen / qemu
- HAProxy: TCP/HTTP Load Balancer
- varnish
- Kubernetes: automating deployment, scaling, and management of containerized applications
- Perl / CGI
- Python / Django
- Ruby / Rails
- IPv6 / HTTP/2 / QUIC
- Infrastructure as code (IaC): terraform
- Prometheus
- Grafana / Graphite
- ELK: Elasticsearch, Logstash, and Kibana
- Databases: Neo4j Cassandra FluidDB MongoDB OrientDB cloudant (couchdb) Couchbase RethinkDB ArangoDB MarkLogic ClickHouse InfluxDB Druid Snowflake Redshift BigQuery
- Kafka: Distributed Streaming Platform
- Hadoop: distributed processing
- Digital Radio: icecast2 / ices
- Firewalls: iptables / ipset / recent / port-knocking / firewalld, ufw, nftables
- Fluentd: data collector
- Node.js: back-end JavaScript runtime environment
- Load Balancer: Seesaw, LoadMaster, ZEVENET, balance (<https://balance.inlab.net/>), pen (<https://github.com/UlricE/pen>)
- DNS high-availability : PowerDNS dnsmist, OpenBSD relayd
- DRBD: Distributed Replicated Block Device
- VNC: tightvnc, x11vnc
- SELinux

Intermediate

-- Multiple Softwares all beginner topics in depth jump into other distros client X Window dpkg-reconfigure tzdata

stat shred

DNS / Unbound / knot

- Mail Server: Qmail / vpopmail / mysql / dovecot / roundcube / postfix / iredmail / daemontools
 - remote syslog
 - Network Sniffing: tcpdump / ngrep / tcpick
 - MRTG / iptraf / nload / iftop
 - Update / Upgrade OS <https://tldp.org/LDP/GNU-Linux-Tools-Summary/html/index.html>
 - Bash Scripting (variables, for, case, if, functions) <https://www.gnu.org/software/bash/manual/htmlnode/index.html>
 - *Bash Startup Files* : <https://www.gnu.org/software/bash/manual/htmlnode/Bash-Startup-Files.html>
- pwgen

Advanced

- LVS: Linux Virtual Server Cluster / Piranha Configuration Tool
- PHP: CakePHP, Lerevel, CodeIgniter, yii, Zend Framework
- Knot / Slpit Domain scrpting / source reading security / rootkit

Expert

LFS Programming Python C
