RL
crunch it connected

Cheatsheet Packet Tracer/Cisco

Mode Navigation

```
R> enable
```
//enters the Privileged EXEC mode
```
R# configure terminal
```
//enters the global config mode
```
R(config)# interface
<type>/<number>
```
//enters the interface type/number config mode

Example: `interface fa0/1`

Tips and Tricks

```
?
```
//displays all the possible commands in the current mode
```
<tab>
```
//autocompletes the rest of the command
```
do <command>
```
//forces the system to execute a command, without having the privileges
```
<shortcut>
```
//you can execute a command by typing just the first letters of it and press enter
```
<click Fast Forward Time>
```
//increases the time of booting the devices
```
exit
```
//exits the current mode
```
end
```
//exits the current mode and enters the Privileged EXEC mode
```
<CTRL+SHIFT+6>
```
//interrupts the execution of the current command
```
no <command>
```
//cancels the command/ deletes the configuration of that command

Example:
```
en
conf t
int fa0/0
```

Show commands

```
show running-config
```
//view the router's/switch's entire active configuration

```
show ip interface brief
```
//view the available interfaces and their brief parameters (IP, active, etc.)

```
show ip route
```
//view the routing table

```
show mac-address-table
```
//view the CAM table

```
show spanning-tree
```
//view spanning-tree (STP) parameters

```
show VLAN brief
```
//view VLAN parameters

```
show interface VLAN brief
```
//view VLAN's brief parameters on interfaces

Basic commands

#ADD IPs (on router's interfaces)

```
R(config)# interface
<type>/<number>
```
//enters the interface config mode
```
R(config-if)# ip address <IP>
<decimal-MASK>
```
//sets the IP and the mask to the interface
```
R(config-if)# no shutdown
```
//enables the interfaces (brings it up)

Example:
```
int fa0/3
ip add 10.10.10.1 255.255.255.248
no shut
```

Spanning Tree Protocol

```
spanning-tree vlan <vlan-number>
priority <value>
```
//sets the priority <value> of the switch for the STP by vlan

VLAN Configuration
(only on Switch)

#MODE ACCESS (interfaces connected to end-devices)

```
vlan <vlan-number>
```
//creates the VLAN
```
interface <type>/<number>
```
//enters the interface that needs to be configured
```
switchport mode access
```
//sets the access mode
```
switchport access vlan <vlan-
number>
```
//sets the access vlan

Example:
```
vlan 10
int fa0/2
sw mo acc
sw acc vlan 10
```

#MODE TRUNK (interfaces connected to other switches or routers)

```
interface <type>/<number>
```
enters the interface that needs to be configured
```
switchport mode trunk
```
sets the trunk mode
```
swithcport trunk allowed vlan
<vlan-number>/all
```
sets the vlans that are allowed on that link (some vlans or a range or vlans or all vlans)

Example:
```
vlan 10
int fa0/1
sw mo tr
sw tr allowed vlan 10
```
or
```
sw tr allowed vlan all
```
or
```
sw tr allowed vlan range 10-20
```

#MANAGEMENT VLAN (configuration on switch)

```
interface vlan <vlan-number>
```
//enters the VLAN interface
```
ip address <IP> <MASK>
```
//assigns the IP address and mask
```
PC> telnet <IP>
```
//connects to the switch's IP

Example:
```
int vlan 99
ip add 10.10.10.99 255.255.255.0

PC> telnet 10.10.10.99
```

CAM Table

```
mac-address-table static <MAC
address> vlan <vlan-number>
interface <type>/<number>
```
//the MAC address will be stored as static in the CAM table

Example:
```
en
conf t
mac-address-tabel static
0001.6458.8b1a vlan 10 int fa0/1
```

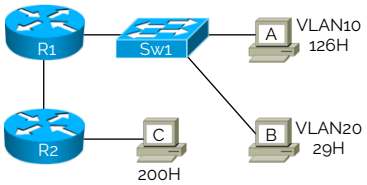
Routing Configuration

```
ip route <destination network>
<destination network's mask>
<next-hop>
```
//sets the route to the destination network through the next-hop

Example:
```
en
conf t
ip route 10.10.10.0 255.255.255.0
192.168.0.1
```

```
ip route 0.0.0.0 0.0.0.0 <next-
hop>
```
//sets the default route: all the packets with unknown destinations will be sent through that next-hop

Subnetting 101



192.168.0.0/22
R1R2 – one network – 2H
VLAN10 – one network – 126H
VLAN20 – one network – 29H
R2C – one network – 200H

- add default gateway and extra 2
- write them in descending order
- find closest power of 2
  - $200+1+2 <= 2^8$
  - $126+1+2 <= 2^8$
  - $29+1+2 <= 2^5$
  - $2+2 <= 2^2$
- the power of 2 represents the mask
  - 32-power -> /mask

Example:
  - power is 6
  - then mask is /26

- R2C
  - 192.168.0.0/24 -> 192.168.0.255/24
- VLAN10
  - 192.168.1.0/24 -> 192.168.1.255/24
- VLAN20
  - 192.168.2.0/27 -> 192.168.2.31/27
- R1R2
  - 192.168.2.32/30 -> 192.168.2.35/30

Cheatsheet Linux - Networking

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VM Setup

http://bit.ly/openstack_rl_tutorial

ssh -o ServerAliveInterval=100 <ldap_user>@fep.grid.pub.ro
//connect to your fep account
ssh -i ~/.ssh/openstack.key student@<IP_masina_virtuala>
//connect to the virtual machine you just created in Openstack

Example: `ssh -o ServerAliveInterval=100 adi.minune@fep.grid.pub.ro`

`ssh -i ~/.ssh/openstack.key student@10.9.24.226`

Tips and Tricks

go [red|green|blue]
//connect to one of the 3 containers
lxc-list
//view the list of containers and their state
rr [red|green|blue]
//reboot one of the 3 containers
<shortcut>
//you can execute a command by typing just the first letters of it and press enter
<CTRL+a> -> <press q>
//exit the console of the container
ping -c <value> <IP>
//test the conectivity between host and <IP> by sending <value> packets

Example: `ping -c 2 10.10.0.1`

Basic commands

#ADD IPs

ip address add <IP>/<MASK> dev <interface>
//sets the IP and the mask to the interface
ip address flush dev <interface>
//resets the interface at the initial configuration
ip link set dev <interface> up
//enables the interface
ip route add default via <IP-default-gateway>
//sets the default gateway
sysctl -w net.ipv4.ip_forward=1
//activates routing/packet forwarding

Example: `ip add add 192.168.0.1/24 dev veth-red`
`ip l s dev veth-red up`
`ip r a default via 10.0.0.1`

Show commands

ip address show dev <interface>
//view the layer 3 (network) configuration of the interface

ip link show dev <interface>
//view the layer 2 (data link) configuration of the interface

ip route show
//view the routing table

ip neighbor show
//view the ARP table

Example: `ip a s dev eth0`
`ip l s dev veth-red`
`ip r s`

Network Services

#REMOTE CONNECTION

ssh <username>@<IP/hostname> -p <port-number>
//connects to <username> at remote <IP/hostname> via ssh on port <port-number>
ssh -l <username> <IP/hostname>
//connects to <username> at remote <IP/hostname> via ssh
ssh-keygen -t rsa
//generates public/private rsa key pair
ssh-copy-id <username>@<IP/hostname>
//copy public key in the remote file for authentication on <username> at <IP/hostname>
telnet <IP/hostname>
//connects to <IP/hostname> via telnet
ftp <IP/hostname>
//connects to <IP/hostname> via ftp
scp -r <username>@<hostname>:<folder>
//downloads <file> from <username> at <hostname> on your local host
scp -r <file> <username>@<hostname>:
//uploads <file> from local host to <username> at <hostname>

#TRAFFIC CAPTURE

netcat
//arbitrary TCP and UDP connections and listens
`-l` listens (server) to connections
`-u` use UDP instead of the default option of TCP
netstat
//prints network connections
`-t` lists TCP connections
`-l` lists services that listen on connections
-u lists UDP connections
dsniff -I <interface>
//captures network traffic and lists credentials when connections end

Example:
`netcat -l 1234`
//server that listens on TCP port 1234
`netstat -tlnp`
//lists the TCP services that listen on port 2024
`dsniff -I eth0`

IPTABLES

iptables -t [table] [-A|-D|-I|-R|-L|-F] [chain] [options] [action]

`-t filter` filtering table (the default table)
`-t nat` altering table
`-t mangle` special altering table

`-A` append rule to chain
`-D` delete rule
`-I <no>` insert as the given rule <no>
`-R` replace rule
`-L` list all rules from given chain
`-F` flush the selected chain

#filter chains:
`INPUT` packets destined to local host
`OUTPUT` packets locally-generated
`FORWARD` packets being routed through the local host

#nat chains:
`PREROUTING` altering packets as soon as they come in
`POSTROUTING` altering packets as they are about to go out
`OUTPUT` altering locally-generated packets before routing

`-d <IP/hostname>` destination option
`-s <IP/hostname>` source option
`-p [tcp|udp|icmp|all|<number>]` protocol option
`-i <input-interface>` input interface option
`-o <output-interface>` output interface option
`--dport <protocol/number>` destination port
`--sport <protocol/number>` source port

#actions:
`-j ACCEPT` let through the packet that matched the options
`-j REJECT` rejects the packet that matched the options
`-j DROP` drops the packet, without sending a notification error
`-j DNAT` available only in the nat table, it specifies that the destination address of the packet should be modified

Example:
`iptables -L FORWARD -n -v`
//view (list) rules and information on the filter table – FORWARD chain

`iptables -A INPUT -p tcp -d 10.10.0.1 –dport 21 -s 20.20.0.1 -j DROP`
//add a rule to block FTP (port 21) from 20.20.0.1 to 10.10.0.1

`iptables -t nat -A PREROUTING -p tcp –dport 22022 -j DNAT –to-destination 10.0.0.1:22`
//add a rule where connections to port 22022 will be redirected to ssh (port 22) of 10.0.0.1