# Solution M4 (@VasAtanasov)

### Solution Details

**CHECK:**

* *VM 1 (Rila):* [*https://courses.zahariev.pro/check.php?20250401102705u1khqDRgJs*](https://courses.zahariev.pro/check.php?20250401102705u1khqDRgJs)
* *VM 2 (Pirin):* [*https://courses.zahariev.pro/check.php?20250401110751A36Rhf9zLr*](https://courses.zahariev.pro/check.php?20250401110751A36Rhf9zLr)

#### Tasks on Rila Host

1. vasil@rila:~$ sudo hostnamectl hostname --pretty 'Rila Station'

2. sudo: unable to resolve host rila.lsa.lab: Name or service not known

3. [sudo] password for vasil:

4. vasil@rila:~$ sudo vim /etc/hosts

5. sudo: unable to resolve host rila.lsa.lab: Name or service not known

6. vasil@rila:~$ sudo vim /etc/hosts

1. Set one of the network cards with static IP **192.168.148.1/24** and connect it to the **same virtual network** as the only card of the other VM

1. vasil@rila:~$ sudo vim /etc/network/interfaces

1. vasil@rila:~$ cat /etc/network/interfaces

2. # This file describes the network interfaces available on your system

3. # and how to activate them. For more information, see interfaces(5).

4.

5. source /etc/network/interfaces.d/\*

6.

7. # The loopback network interface

8. auto lo

9. iface lo inet loopback

10.

11. # The primary network interface

12. allow-hotplug enp0s3

13. iface enp0s3 inet dhcp

14. # This is an autoconfigured IPv6 interface

15. iface enp0s3 inet6 auto

16.

17. # Add the second network interface

18. allow-hotplug enp0s8

19. iface enp0s8 inet static

20. address 192.168.148.1/24

1. vasil@rila:~$ ip a

2. 1: lo: <LOOPBACK,UP,LOWER\_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000

3. link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00

4. inet 127.0.0.1/8 scope host lo

5. valid\_lft forever preferred\_lft forever

6. inet6 ::1/128 scope host noprefixroute

7. valid\_lft forever preferred\_lft forever

8. 2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER\_UP> mtu 1500 qdisc fq\_codel state UP group default qlen 1000

9. link/ether 08:00:27:fb:2c:19 brd ff:ff:ff:ff:ff:ff

10. inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic enp0s3

11. valid\_lft 85263sec preferred\_lft 85263sec

12. inet6 fd00::a00:27ff:fefb:2c19/64 scope global dynamic mngtmpaddr

13. valid\_lft 86291sec preferred\_lft 14291sec

14. inet6 fe80::a00:27ff:fefb:2c19/64 scope link

15. valid\_lft forever preferred\_lft forever

16. 3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER\_UP> mtu 1500 qdisc fq\_codel state UP group default qlen 1000

17. link/ether 08:00:27:ef:38:91 brd ff:ff:ff:ff:ff:ff

18. inet 192.168.148.1/24 brd 192.168.148.255 scope global enp0s8

19. valid\_lft forever preferred\_lft forever

20. inet6 fe80::a00:27ff:feef:3891/64 scope link

21. valid\_lft forever preferred\_lft forever

1. Install and configure **DHCP** with range from **192.168.148.50 – 192.168.148.59**. Make sure that you pass the **8.8.8.8** DNS server as an option as well either on global or subnet level **SSH** service installed and running

1. vasil@rila:~$ sudo apt install -y isc-dhcp-server

2. vasil@rila:~$ sudo vim /etc/dhcp/dhcpd.conf

3. ...

4. option domain-name "Rila";

5. option domain-name-servers 8.8.8.8;

6.

7. subnet 192.168.148.0 netmask 255.255.255.0 {

8. range 192.168.148.50 192.168.148.59;

9. option routers 192.168.148.1;

10. option broadcast-address 192.168.148.255;

11.

12. default-lease-time 600;

13. max-lease-time 7200;

14. }

15. ...

16. vasil@rila:~$ sudo dhcpd -t

17. [sudo] password for vasil:

18. Internet Systems Consortium DHCP Server 4.4.3-P1

19. Copyright 2004-2022 Internet Systems Consortium.

20. All rights reserved.

21. For info, please visit https://www.isc.org/software/dhcp/

22. Config file: /etc/dhcp/dhcpd.conf

23. Database file: /var/lib/dhcp/dhcpd.leases

24. PID file: /var/run/dhcpd.pid

25. vasil@rila:~$ sudo systemctl restart isc-dhcp-server

26. Job for isc-dhcp-server.service failed because the control process exited with error code.

27. See "systemctl status isc-dhcp-server.service" and "journalctl -xeu isc-dhcp-server.service" for details.

28. vasil@rila:~$ sudo vi /etc/default/isc-dhcp-server

29. vasil@rila:~$ sudo systemctl restart isc-dhcp-server

30. vasil@rila:~$ systemctl status isc-dhcp-server

31. ● isc-dhcp-server.service - LSB: DHCP server

32. Loaded: loaded (/etc/init.d/isc-dhcp-server; generated)

33. Active: active (running) since Tue 2025-04-01 12:37:12 EEST; 6s ago

34. Docs: man:systemd-sysv-generator(8)

35. Process: 1089 ExecStart=/etc/init.d/isc-dhcp-server start (code=exited, status=0/SUCCESS)

36. Tasks: 1 (limit: 4653)

37. Memory: 4.3M

38. CPU: 61ms

39. CGroup: /system.slice/isc-dhcp-server.service

40. └─1066 /usr/sbin/dhcpd -4 -q -cf /etc/dhcp/dhcpd.conf

1. vasil@rila:~$ cat /var/lib/dhcp/dhcpd.leases

2. # The format of this file is documented in the dhcpd.leases(5) manual page.

3. # This lease file was written by isc-dhcp-4.4.3-P1

4.

5. # authoring-byte-order entry is generated, DO NOT DELETE

6. authoring-byte-order little-endian;

7.

8. lease 192.168.148.50 {

9. starts 2 2025/04/01 09:42:18;

10. ends 2 2025/04/01 09:52:18;

11. tstp 2 2025/04/01 09:52:18;

12. cltt 2 2025/04/01 09:42:18;

13. binding state active;

14. next binding state free;

15. rewind binding state free;

16. hardware ethernet 08:00:27:18:aa:88;

17. uid "\377'\030\252\210\000\001\000\001/e\324\300\010\000'\215\337S";

18. client-hostname "pirin.lsa.lab";

19. }

20. server-duid "\000\001\000\001/~o\373\010\000'\3578\221";

1. Firewall up and running, and allowing **SSH** connections

1. vasil@rila:~$ sudo apt install ufw

2. vasil@rila:~$ sudo ufw version

3. ufw 0.36.2

4. Copyright 2008-2023 Canonical Ltd.

5. vasil@rila:~$ sudo ufw allow ssh

6. Rules updated

7. vasil@rila:~$ sudo ufw enable

8. Command may disrupt existing ssh connections. Proceed with operation (y|n)? y

9. Firewall is active and enabled on system startup

10. vasil@rila:~$ sudo ufw status verbose

11. Status: active

12. Logging: on (low)

13. Default: deny (incoming), allow (outgoing), deny (routed)

14. New profiles: skip

15.

16. To Action From

17. -- ------ ----

18. 22/tcp ALLOW IN Anywhere

19. 22/tcp (v6) ALLOW IN Anywhere (v6)

20

1. Enabled **NAT** and forwarding functionality, so the internal station can have access to Internet

1. vasil@rila:~$ sudo vim /etc/default/ufw

2. ...

3. DEFAULT\_FORWARD\_POLICY="ACCEPT"

4. ...

1. vasil@rila:~$ sudo vim /etc/ufw/sysctl.conf

2. ...

3. net/ipv4/ip\_forward=1

4. #net/ipv6/conf/default/forwarding=1

5. ...

1. vasil@rila:~$ sudo vi /etc/ufw/before.rules

2. ...

3. # NAT table rules

4. \*nat

5. :POSTROUTING ACCEPT [0:0]

6.

7. # Forward traffic from enp0s8 (internal) through enp0s3 (external).

8. -A POSTROUTING -s 192.168.148.0/24 -o enp0s3 -j MASQUERADE

9.

10. # Don't delete the 'COMMIT' line or these NAT table rules won't be processed

11. COMMIT

12. ...

13. vasil@rila:~$ sudo ufw disable && sudo ufw enable

1. Register the **repos.zahariev.pro** repository *(check for details on* [***https://repos.zahariev.pro***](https://repos.zahariev.pro)*)*

1. vasil@rila:~$ sudo apt-get install software-properties-common

2. vasil@rila:~$ sudo apt-add-repository 'deb https://repos.zahariev.pro/apt stable main'

1. Install the **hello-lsa** package

1. vasil@rila:~$ sudo apt-get update --allow-insecure-repositories && sudo apt-get install hello-lsa

##### Result

1. vasil@rila:~$ wget -q https://courses.zahariev.pro/m4.sh -O - | sudo vm=1 bash

2. \* Working on VM1 Debian-based machine (BIOS) using curl to report

3. \* Testing if the 192.168.148.1 IP address is set ...

4. ... PASS

5. \* Testing for DHCP server installed and running (isc-dhcp-server) ...

6. ... PASS

7. \* Testing the DHCP configuration (/etc/dhcp/dhcpd.conf) ...

8. ... PASS

9. \* Testing for SSH server installed and running ...

10. ... PASS

11. \* Testing if the firewall is running (ufw) ...

12. ... PASS

13. \* Testing if the SSH (22/tcp) is allowed in the firewall ...

14. ... PASS

15. \* Testing if IP forwarding is enabled ...

16. ... PASS

17. \* Testing if repos.zahariev.pro is registered ...

18. ... PASS

19. \* Testing if hello-lsa is installed ...

20. ... PASS

21. \* Testing if the second station got an address via DHCP ...

22. ... PASS

23. {"message":"Your solution report is available here: https:\/\/courses.zahariev.pro\/check.php?20250401102705u1khqDRgJs","status":true}

24.

1. {

2. "homework": {

3. "date": "2025-04-01 13:27:04",

4. "vm": 1,

5. "family": "Debian",

6. "distribution": "Debian GNU/Linux 12 (bookworm)",

7. "module": 4,

8. "tests": [

9. {

10. "id": 1,

11. "name": "Testing if the 192.168.148.1 IP address is set",

12. "result": "PASS"

13. },

14. {

15. "id": 2,

16. "name": "Testing for DHCP server installed and running",

17. "result": "PASS"

18. },

19. {

20. "id": 3,

21. "name": "Testing the DHCP configuration",

22. "result": "PASS"

23. },

24. {

25. "id": 4,

26. "name": "Testing for SSH server installed and running",

27. "result": "PASS"

28. },

29. {

30. "id": 5,

31. "name": "Testing if the firewall is running",

32. "result": "PASS"

33. },

34. {

35. "id": 6,

36. "name": "Testing if the SSH (22/tcp) is allowed in the firewall",

37. "result": "PASS"

38. },

39. {

40. "id": 7,

41. "name": "Testing if IP forwarding is enabled",

42. "result": "PASS"

43. },

44. {

45. "id": 8,

46. "name": "Testing if repos.zahariev.pro is registered",

47. "result": "PASS"

48. },

49. {

50. "id": 9,

51. "name": "Testing if hello-lsa is installed",

52. "result": "PASS"

53. },

54. {

55. "id": 10,

56. "name": "Testing if the second station got an address via DHCP",

57. "result": "PASS"

58. }

59. ]

60. }

61. }

#### Tasks on Pirin Host

1. Make sure that the network adapter is set to get its IP address via **DHCP**

1. vasil@rila:~$ ssh -p 50022 vasil@192.168.148.50

2. The authenticity of host '[192.168.148.50]:50022 ([192.168.148.50]:50022)' can't be established.

3. ED25519 key fingerprint is SHA256:B4UIKVgQBYv7+CIWho77sRlAVGQ8MRrNoBDBAOnBww8.

4. This key is not known by any other names.

5. Are you sure you want to continue connecting (yes/no/[fingerprint])? yes

6. Warning: Permanently added '[192.168.148.50]:50022' (ED25519) to the list of known hosts.

7. vasil@192.168.148.50's password:

8. Linux pirin.lsa.lab 6.1.0-31-amd64 #1 SMP PREEMPT\_DYNAMIC Debian 6.1.128-1 (2025-02-07) x86\_64

9.

10. The programs included with the Debian GNU/Linux system are free software;

11. the exact distribution terms for each program are described in the

12. individual files in /usr/share/doc/\*/copyright.

13.

14. Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent

15. permitted by applicable law.

16. Last login: Tue Apr 1 13:37:02 2025

17. vasil@pirin:~$

1. Create a user **homework** with password **Parolka3** and make it a **sudoer** *(part of the* ***admin****,* ***sudo****, or* ***wheel*** *group, depending on you distribution)*

1. vasil@pirin:~$ sudo useradd homework

2. vasil@pirin:~$ sudo passwd homework

3. New password:

4. Retype new password:

5. passwd: password updated successfully

6. vasil@pirin:~$ sudo usermod -aG sudo homework

1. **SSH** service installed and running but on port **50022** instead of the default (**22**)

1. vasil@pirin:~$ sudo vi /etc/ssh/sshd\_config

2. ...

3. Port 50022

4. ...

1. Firewall up and running, and allowing **SSH** connections

*You* ***can skip*** *this one under Debian (yes, you will see some errors during the checks)*

1. vasil@pirin:~$ sudo apt update && sudo apt install ufw

2. vasil@pirin:~$ sudo ufw allow 50022/tcp

3. Rules updated

4. Rules updated (v6)

5. vasil@pirin:~$ sudo ufw enable

6. Command may disrupt existing ssh connections. Proceed with operation (y|n)? y

7. Firewall is active and enabled on system startup

##### Result

1. vasil@pirin:~$ wget -q https://courses.zahariev.pro/m4.sh -O - | sudo vm=2 bash

2. \* Working on VM2 Debian-based machine (BIOS) using wget to report

3. \* Testing if the second station got an address in the right network ...

4. ... PASS

5. \* Testing if there is a homework user ...

6. ... PASS

7. \* Testing if the homework user has the correct password ...

8. ... PASS

9. \* Testing if the homework user is sudoer ...

10. ... PASS

11. \* Testing for SSH server installed and running ...

12. ... PASS

13. \* Testing for SSH server running on 50022 ...

14. ... PASS

15. \* Testing if the firewall is running (ufw) ...

16. ... PASS

17. \* Testing if the SSH (50022/tcp) is allowed in the firewall ...

18. ... PASS

19. {"message":"Your solution report is available here: https:\/\/courses.zahariev.pro\/check.php?20250401110751A36Rhf9zLr","status":true}

20.

1. {

2. "homework": {

3. "date": "2025-04-01 14:07:49",

4. "vm": 2,

5. "family": "Debian",

6. "distribution": "Debian GNU/Linux 12 (bookworm)",

7. "module": 4,

8. "tests": [

9. {

10. "id": 1,

11. "name": "Testing if the second station got an address in the right network",

12. "result": "PASS"

13. },

14. {

15. "id": 2,

16. "name": "Testing if there is a homework user",

17. "result": "PASS"

18. },

19. {

20. "id": 3,

21. "name": "Testing if the homework user has the correct password",

22. "result": "PASS"

23. },

24. {

25. "id": 4,

26. "name": "Testing if the homework user is sudoer",

27. "result": "PASS"

28. },

29. {

30. "id": 5,

31. "name": "Testing for SSH server installed and running",

32. "result": "PASS"

33. },

34. {

35. "id": 6,

36. "name": "Testing for SSH server running on 50022",

37. "result": "PASS"

38. },

39. {

40. "id": 7,

41. "name": "Testing if the firewall is running",

42. "result": "PASS"

43. },

44. {

45. "id": 8,

46. "name": "Testing if the SSH (50022/tcp) is allowed in the firewall",

47. "result": "PASS"

48. }

49. ]

50. }

51. }

52.