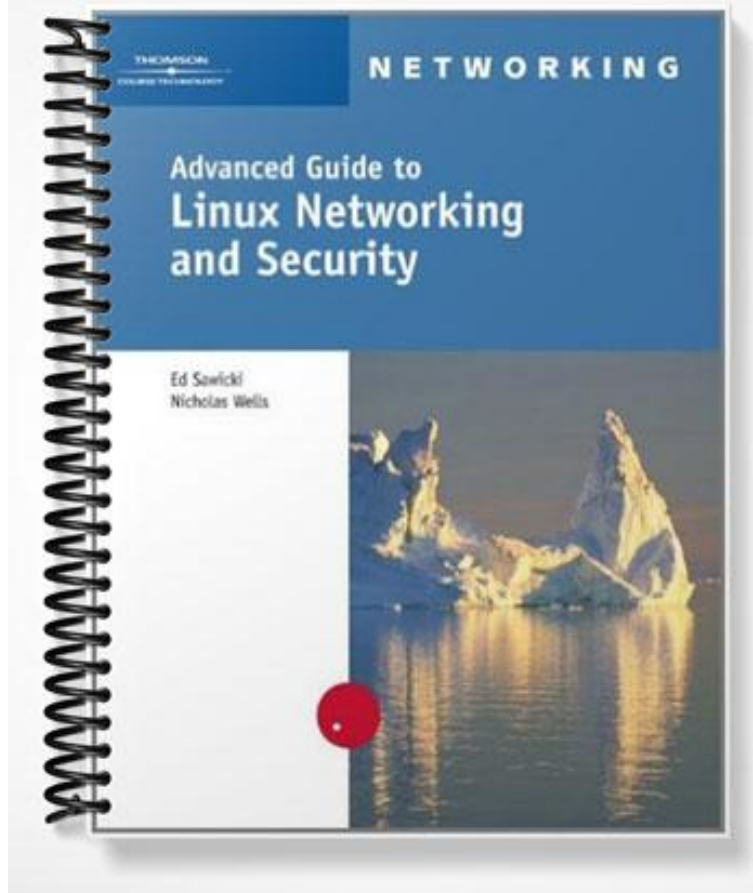
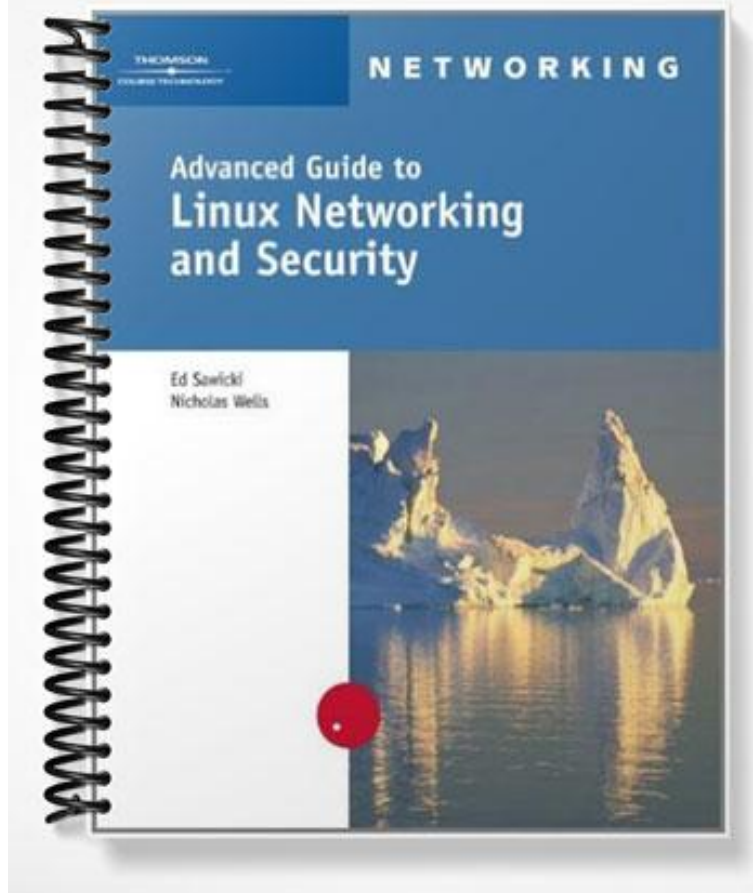


SOLUTIONS MANUAL



SOLUTIONS MANUAL



Chapter 2 Solutions

Review Questions

1. A key advantage of IPX over IP is that:
Answer: a. IPX does not require configuration of a host ID because it uses the network hardware address.
2. Networking devices differ from other Linux devices in that:
Answer: c. Networking devices are not directly visible in the `/dev` subdirectory, but are created on the fly when a networking device module is loaded into the kernel.
3. `Modprobe` is preferable to `insmod` for loading modules because:
Answer: b. `Modprobe` loads any dependent modules automatically before the requested module.
4. From the Hardware tab in Webmin, what is the next step to reconfigure the IP addresses of a network interface?
Answer: a. Choose the Network Configuration icon.
5. Which of the following directories is most likely to contain kernel modules for networking devices?
Answer: d. `/lib/modules/2.4.7-10/kernel/drivers/net`
6. When using Telnet you might refer to VT100 because it is:
Answer: c. The most commonly used terminal emulation standard.
7. In which circumstance would kernel parameters most likely be needed to make a NIC function correctly in Linux?
Answer: a. You are using an older ISA NIC that has a special feature allowing automatic IRQ mapping in software.
8. Explain the difference between the TX packets and TX bytes lines in the output of `ifconfig`.
Answer: The first refers to the number of packets that have been transmitted, the second to the number of bytes transmitted. Each packet contains up to 1500 bytes, though the size is variable.
9. Which is not a valid `ifconfig` command?
Answer: d. `ifconfig eth0 if-up`
10. Which information field is not part of the output of the `route` command?
Answer: b. The MAC address of the interface used to transfer packets to the specified network
11. Which statement is true about the following command?

```
route add -net 192.168.20.0 netmask 255.255.255.0 gw 192.168.10.1 dev eth0
```

Answer: a. It is valid and defines the router that can reach network 192.168.20.0.
12. The PLIP networking device refers to:
Answer: c. Parallel Line Internet Protocol support
13. Distinguish between RARP and InARP.
Answer: RARP is used by a host that needs to find out its own IP address; InARP is used by a host that needs to find out another host's IP address. In both cases the host knows the MAC address of the host whose IP address is sought.
14. You would use the `arp` command to:
Answer: d. View or modify the ARP cache containing hardware address-to-IP address mappings.
15. Scripts such as `/etc/rc.d/init.d/network` and their corresponding data files are used to control networking because:
Answer: c. Using scripts allows flexibility and power in managing multiple interfaces, firewall settings, and peripheral requirements that involve many diverse parts of Linux.
16. The correct device designation for an IP alias to the first Ethernet card is:

Answer: b. `eth0:0`

17. In the Network Configuration Tool (`neat`), the Hardware tab includes:

Answer: a. A list of all networking hardware for which a module is currently installed.

18. The loopback device is assigned the IP address:

Answer: b. `127.0.0.1`

19. IP forwarding is enabled by which command:

Answer: d. `echo 1 > /proc/sys/net/ipv4/ip_forward`

20. Which utility cannot be used to configure network interfaces?

Answer: d. `ping`

21. Telnet is considered dangerous because:

Answer: b. It transmits data—including passwords—without encrypting them, so anyone on the network can see them by using special software.

22. `ping` is used to test networking connections by:

Answer: a. Trying to contact systems that are progressively further from your host to see if any networking problems occur.

23. `Traceroute` is a useful troubleshooting tool because:

Answer: c. It reports each router that a packet passes through to a destination IP address, along with the time needed to reach that router.

24. If you cannot ping a host on a different segment of your local network, you probably wouldn't bother checking:

Answer: d. Whether the `ping` command was subject to fragmentation by the router in trying to reach the other segment.

25. Define what the `Netatalk` package does for a Linux system.

Answer: It allows Macintosh users to have Linux resources accessible on their Mac desktops.

Hands-on Projects

Project 2-1

4. *Answer:* Yes, the neighbor's IP address is shown.

6. *Answer:* No additional entry is shown because you access remote sites via the local network's gateway. The gateway is shown in the list produced by the `arp -a` command.

Project 2-2

5. *Answer:* Not necessarily

6. *Answer:* There are many reasons for circuitous routing, some reasonable, others caused by oversight, laziness, or poor network planning. Most, however, are in the control of your upstream ISPs and can't easily be altered without expensive additions to your own capabilities, or at the least, a number of phone calls to various ISP companies.

Project 2-3

Answer: This project is a procedure that students follow. It does not have a question-and-answer format.

Project 2-4

7. *Answer:* Yes, this card is supported by Linux. The kernel module needed is `eepr100.o`. One caveat is that a bug in the `eepr100` driver prevents use of more than one of these cards simultaneously in one machine. This should not affect situations in which the `eepr100` driver is used by both network cards, but the chipset is different. To determine the chipset on your network card, run the `lspci` command.

Project 2-5

Answer: This project is a procedure that students follow. It does not have a question-and-answer format.

Case Project

1. *Answer:* A basic arrangement will have a hub in each smaller office tying desktop PCs to a server within that office. For the large office (40 users), multiple hubs should be used. A switch might be indicated for the large office as well. The scenario gives little detail about the data users will need to access, and students have not yet learned about the different information services. The idea here is to get students thinking about different ways a network could be set up to meet varying needs. Discussion in class around this case could introduce changes after reviewing some suggested network layouts: “what if” questions to help students realize the consequences of their decisions.

What questions would you ask the managing partner about future growth plans before solidifying your network arrangement?

Answer: You might ask questions about both planned geographic expansion and planned “data” expansion, to know if the network traffic or topologies are expected to change. You might also try to get a feel from the staff as a whole whether network performance has been adequate or not. This would be a basis for pushing to get more money to upgrade the network to make everyone content if necessary.

What contingency plans could you make based on her responses?

Answer: Not a lot can be said here, based on what students have learned in these two chapters. But again, they should be thinking about contingency planning: “If I use the smallest possible solution here, I’ll be stuck if anything new comes up.”

2. *Answer:* These answers will be based on the previous answers the student has given, but will basically be an expansion of the same types of solutions: hubs, switches, routers... A student might introduce larger pieces of equipment, such as a high capacity single, dedicated email server to handle the entire office, where before they thought that several distributed servers would serve best.

Will you need to reconfigure anyone’s IP addresses?

Answer: Ideally, no! If IPX was used, this is not a problem, but good IP planning should also obviate the need to redo anyone’s address. It depends somewhat on the existing setup of the other firm. Again, the idea here is to help students see some consequences of prior decisions.

What about possible packet fragmentation and slow data transfers between offices? What other problems might the Token Ring network pose?

Answer: The key here is noting the downside of tying Ethernet to Token Ring: how fragmentation may affect network performance. Token ring is also much slower than the 100 Mb Ethernet planned for the rest of the office. The student must consider the costs and benefits of upgrading the TX office.

3. *Answer:* Answering these questions centers on creating a single access point or access servers at each office, which in turn depends on factors such as the expected Internet traffic from each one, the types of connections between offices (how fast, how expensive, how full already), the available Internet service at each location, and numerous security issues (which are not addressed in the text until chapter 7 and onward).

What new problems arise because of how you set up the segments and routing?

Answer: If students decided on isolating offices in their previous designs, either to save money, for security, or just for ease of use, then they are more constrained now in that they really can’t use a single Internet access point. This may be fine, depending on various factors mentioned above, but they may not have a choice without significant retooling, which is the important point to see.

Would you have been better off setting things up differently initially if you had known that this requirement would come up, or would it have made things too inefficient in the intervening year?

Answer: This question brings up the continuing balance between current cost/benefit and the cost/benefit we all hope for in anticipating 20/20 foresight!