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Exercise 1, IPv6 Privacy:

IPv6 will be (probably) more persistent and each address contains an interface ID. Isn't this a privacy issue?

Exercise 2, Problems of Internet Core Routing:

Read the article *Towards A New Internet Routing Architecture: Arguments for Separating Edges from Transit Core* by Jen et al. presented at the ACM HotNets 2008 conference.

1. What is the default-free zone and why is it an integral part of the Internet?
2. Discuss the problem of current Internet core routing?
3. Discuss the advantage and disadvantage of provider independent addresses.

Exercise 3, Clarification of Internet Backbone Terminology:

Explain the following terms:

1. Regional Internet Registry (RIR)?
2. Internet Exchange Point (IXP)?
3. Peering in the context of Internet routing?

What are upstream, downstream and transit providers?

Exercise 4, IP layer vs. Ethernet Multicast:

1. A source sends an IP multicast packet. What happens on the data link layer?
Hint: Think about the destination MAC address.
2. Discuss if a switch, a hub, or both can implement *efficient* multicast delivery?
3. When the underlying hardware does not support multicast, IP multicast uses hardware broadcast for delivery. Is there any advantage to using IP multicast over such networks?

Exercise 5, IP layer Multicast:

1. Explain the difference between group management and multicast routing.
2. Discuss why multicast applications do not use TCP as transport protocol.
3. A multicast receiver intends to inform a multicast source about its service requirements (e.g., quality of a transmitted video). Discuss if this is possible?
4. Over 50% of the Internet paths are asymmetric. Discuss why this a problem for multicast delivery in contrast to unicast. *Hint: Think about tree construction and reverse path forwarding.*

Exercise 6, MPLS:

1. Is it possible to conduct an experiment to determine whether your ISP uses MPLS? (assume it is possible to transmit arbitrary packets.)
2. Can traceroute identify the complete path between two hosts including the routers of the MPLS domain?

Exercise 7, BGP Metric:

The Border Gateway Protocol applies the so called *Best Path Algorithm*. Explain how a BGP router determines the route when multiple paths are available.

Exercise 8, BGP and Security:

Watch the video on the following site *YouTube Hijacking: A RIPE NCC RIS case study* and discuss how secure the Border Gateway Protocol is.