Egzamin 2018, pytania i odpowiedzi

Computer Networks (Politechnika Warszawska)

November 7th 2017

ECONE **1st Test** **Group 1**

- There are 17 questions. I will appraise every response from 0 to 1 point.
- You have 45 minutes to complete the test.
- It is not allowed to use any electronic devices (e.g. smartphones, laptops) and paper notes.
- You are allowed to use language dictionaries.
- **Please write concisely and legibly!**

Your first name: …… Your name: ……

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1. Mention the dominant WAN network technologies from 80-ties and 90-ties. X-25, Frame Relay, ATM, IP.
2. When did the Internet appear? I accept two answers: beginning of 1970-ies – Arpanet opened for public usage, beginning of 1980-ies – RFC defining IPv4 and TCP protocols appeared.
3. What was the reason for NAT introduction into the Internet? Shrinking address space of IPv4.
4. What are advantages of network bus topology? Broadcast and multicast are very fast, low cost (one interface per device, no switches), suitable for radio communication.
5. What are advantages of circuit switching? Fixed bandwidth, delays and jitter; in consequence good for real-time applications.
6. What is the reason of packet congestion in computer networks? Incoming packets overflow buffers or collide in a shared transmission medium, causing retransmissions. As a result, there are more and more packets, which block the network.
7. What kind of standards (for computer networks) does IEEE provide? Standard for 1st and 2nd OSI ISO layers.
8. A communication protocol – what is it? A system that realizes a set of rules, which governs cooperation between autonomous entities.
9. List the principal functions of the 3rd OSI ISO layer. Node addressing, flow multiplexing, packet segmentation, concatenation, grouping, regrouping, routing, network and users administration.
10. What is the structure of the MAC-48 address? Individual/group address flag, universal/local address flag, Organizational Unique Identifier, serial number (aka Network Interface Card) or group address.
11. What is the meaning of all 0's IP address in a given sub-network? Unknown source address or default destination.
12. What are the main functionalities of ICMPv4? Self-recovery from errors in the network, connectivity testing, router and subnet advertising.
13. What do the Don't-Fragment and More-Fragment flags in the IP header serve for? DF-flag is used for discovery of Maximum Transfer Unit size. MF-flag set to 0 indicates the last fragment of a given packet; when set to 1 indicates that it isn't the last one (i.e. there are more fragments).
14. What is the aim of interior routing protocols? To find routes inside a given network in an efficient way.
15. What are advantages of multipath routing? Very fast recovery from a link or node failure. Possibility to send data faster via parallel paths.

16. When is static routing a good choice for a given network? In static networks, when energy consumption has to be minimized.
17. What was the reason for introducing the Autonomous Systems? To make the Internet scalable and easier to administer.

November 7th 2017

ECONE **1st Test** **Group 2**

- There are 17 questions. I will appraise every response from 0 to 1 point.
- You have 45 minutes to complete the test.
- It is not allowed to use any electronic devices (e.g. smartphones, laptops) and paper notes.
- You are allowed to use language dictionaries.
- **Please write concisely and legibly!**

Your first name: ……. Your name: ……

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1. Mention the dominant LAN network technologies from 80-ties and 90-ties. Ethernet, Token Ring, LocalTalk, ARCNET.
2. When did the Internet start to be widely used? In the beginning of 1990-ties, thanks to WWW technologies and low access prices.
3. What was the reason for IPv6 creation? Small address space of IPv4 that was an obstacle for Internet expansion.
4. What are advantages of network star topology? It is simple to design and build.
5. What are virtual circuits in the context of packet switching? Virtual circuit switching is a packet switching methodology whereby a route is fixed between the source and the destination before data transmission. It is a service offered by a network operator. The service is extra paid and offers connectivity between remote points in minimum time, due to preprogramed paths known by the switches. There is a special address poll for distinguishing virtual circuits.
6. What network topologies (signal propagation) are congestion resistant? Ring topology.
7. RFCs maintained by IETF – what kind of documents they are? It is free and open form of publication, to convey new concepts, information, or even engineering humor. Some of the RFCs are accepted as Internet Standards.
8. What is the meaning of PDU and SDU in OSI ISO reference model? Protocol Data Unit – a data structure exchanged between peer instances of the same protocol. Service Data Unit – a data structure exchanged between neighboring instances on the same protocol stack.
9. List the principal functions of the 4th OSI ISO layer. Transport addressing (i.e. a process or a service running on a given terminal node), connection quality negotiation (if supported).
10. Are there any special bits in the MAC-48 address structure? Individual/group address flag, universal/local address flag.
11. What is the meaning of all 1's IP address in a given sub-network? Broadcast.
12. Why ICMPv6 had to replace ICMPv4 to support IPv6 networks? ICMP carries IP addresses, which have different length in theses protocols.
13. Why there is no check-sum field in the IPv6 header? To speedup packet processing by routers.
14. What is the aim of exterior routing protocols? To distribute data on available paths via Autonomous Systems to a given IP subnetwork, to enable fulfillment of administration policies (related to financial and security issues) defined by AS owners.

15. What are advantages of hierarchic routing? Enables routing scalability, reduces volume of exchanged routing data, reduces processor and memory consumption by routing processes.
16. When is RIP a good choice for a given network? RIP is a good choice for small and static networks, where low cost of infrastructure is important.
17. What is the aim of the Interior BGP routers? IBGP runs between two BGP routers inside the same AS. It serves as a cache for routing information, providing faster data access for internal routers.