

SISTEMAS E REDES MULTISERVIÇO

Topics for the Written Exams

Chapter 1 - Quality of Service

- Realize the need for QoS on multi-service networks and that the IP alone can not provide - Slide 2
- Know and describe the parameters of QoS - Slides 4 to 10 (in 10 only the first paragraph)
- Realize that there are different QoS needs of each application - Slide 11
- Explain the sequence of QoS steps – Slide 13 + 14 + 18 + 27
- Distinguish Traffic Policing From Traffic Shapping – Slides 18 and 19
- Distinguish the Leaky Bucket and Token Bucket methods – Slides 20 and 21
- Distinguish FQ, PQ and WFQ escalation algorithms and the advantages and disadvantages of each - Slides 27 to 30
- Describe intServ - Slide 35
- Explain the role of the RSVP protocol in IntServ - Slides 37 to 39
- Explain how DiffServ works – Slides 40, 44 and 45
- Compare IntServ and Diffserv - Slides 47 and 48

Chapter 2 - Technologies and QoS on local networks

- Definition and architecture typical of a LAN – slides 2 to 5
- Know that the cables used in LAN's are those of copper twisted pairs and fiber optics (6 and 10)
- Knowing that, in copper cables, category 6 is the current minimum required in a new LAN (slide 9)
- Distinguish the fiber optic cables Multimode and monomode (Slide 11)
- Recognize switch as the concentrator equipment to use in LANs and its functions (slides 14 and 15)
- Recognize the Router as equipment that connects networks (Slide 17)
- Realize that the Ethernet standard has evolved Over time and interpret the nomenclature – slide 19
- Recognize the limitations of wifi networks in performance and safety – Slide 21 and 37
- Know the maximum outputs of Wi-Fi standards 802.11 g, n and ac – Slide 28
- Compare performances of Ethernet and Wifi networks – slide 36 (is ne 19 and 28)
- Know how to sort wep, WPA and WPA2 standards depending on security – Slide 41
- Realize that the implementation of QoS on a LAN is possible and follows the same steps defined in Chapter 1

Chapter 3 - Technologies in access networks

- Describe the architecture of DSL accesses – Slide 7
- Explain what is the contention rate on DSL accesses and their implications – Slide 8
- Understand the limitations due to attenuation in copper cables – Slide 9
- Know that the maximum possible output in ADSL is 24/2Mbps - Slide 12
- Explain why, in a DSL-supported IPTV system, a customer can only have 2 or 3 channels simultaneously and the need to have a box on all TV's – slide 14
- Explain how, in a CATV system, all channels are delivered to the customer and are not necessary the boxes – Slide 16
- Describe the architecture of CATV - Slides 17 to 19
- Describe DOCSIS and the changes that were required in the CATV architecture – slides 20 to 22
- Know the maximum download speeds with DOCSIS 3.0 and 3.1 – Slide 24
- Explain the motivation from the CATV operators to encourage customers to adhere to BOXED IPTV systems – slide 27
- Distinguish the two types of FTTH -> P2P and PON - Slide 31
- Explain the architecture of P2P networks, vantages and disadvantages - Slides 32 to 35
- Explain the architecture of PON networks, vantages and disadvantages - Slides 36 to 41 except 39
- Know the debits and customers per cascade in GPON technology - Slide 42
- Indicate as GPON technology multiplexes tv signals, data/voice and upload on the same fiber to deliver them to customers – Slides 43 and 44
- Know the maximum LTE (4G) debits and the factors that influence it – Slide 55

Chapter 4 - Multimedia Architectures

- Explain the need for compression in video on IP networks – Slide 4
- Explain MPEG's main actions to compress video information – Slide 5
- Realize the fundamentals of VoIP – Slides 7 and 9
- Realize why SIP is used and the advantages over traditional telephony – Slides 10 to 12
- Explain the functions of SDP – Slide 17
- Explain why UDP is typically used in multimedia over IP – Slide 20
- Explain the function of RTP and RTCP protocols to overcome some UDP failures – Slides 21.23 and 24
- Know the advantages of VoIP and the implications on network and security– Slide 25
- Differentiate Unicast from Multicast and explain the advantages of Multicast compared to Unicast - Slides 29 and 30
- Explain the operation of the IGMP protocol and its relationship with the operations done by IPTV boxes - Slides 34 to 40

Chapter 5 - Data Center Architectures, Monitoring and Performance Evaluation

- Describe the functions of a Data Center and his base elements – Slide 3
- Distinguish LAN from SAN - Slide 5
- Describe the servers, their functions and what type they can be – Slide 6
- Recognize that, today, the application servers are virtualized - Slide 11
- Describe what is Virtualization, its components and advantages – Slides 12 to 14 + 16
- Explain what availability is and calculate its value depending on MTBF and MTTR – Slides 30 and 31
- Explain the actions necessary to implement to obtain High Availability in terms of systems energy, network, hardware, backups and SLA – Slides 33 to 37
- Describe the architecture of a Load Balancing system – Slide 39
- Explain the importance of Business Continuity Plan (BCP) and Disaster Recovery (DR) and distinguish the goals of each – Slides 43, 44 and 46
- Explain and apply the concepts of RTO and RPO - slide 46;
- Know that the SNMP architecture is the most common in network monitoring and is non-proprietary – Slide 54
- Know the components of the SNMP monitoring architecture and explain the functions of each component – Slides 55 and 56
- Know that in a 100% Windows architecture, the preferred architecture is WMI - Slide 59

Practical exercises done in classes that may arise in written tests:

- **Exercise sheet #1 - Chapter 1 (QoS)**
 - Exercises 2 and 3;
- **Exercise sheet #3 - Chapter 3 (Access networks)**
 - Exercises 1 to 6;
- **Exercise sheet #4 - Chapter 4 (Multimedia architectures)**
 - Exercises 1 to 3;
- **Exercise sheet #5 - Chapter 5 (Monitoring and evaluation)**
 - Exercises 1 to 4;