UiO / IFI / PUT
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Questions on Load Balancing

1. Say if you agree with the following sentence: "*the traffic patterns in data center networks are quite different from that in traditional Internet*".

2. What is the flow arrival of requests in a data-center?

3. Are most of the flows in cloud data centers short in size?

4. Do you think that due to the special topology and traffic characteristics that arrive at a cloud data-center traditional load balancing algorithms are well suited?

5. What are the reasons for saying that due to the special topology and traffic characteristics, traditional load balancing algorithms are not well suited for the data center environment?

6. Is the algorithm ECMP well adapted to data-center networks? Why?

7. What are the challenges, in addition to topology and traffic, that the design of load balancing mechanism faces when considering data center networks?

8. What are the main objectives of a load balancing mechanism? Be specific about the meaning of each one of the objectives.

9. Architectures could be classified into several categories. Which are these? Say which one consists of.

10. Describe a Fat-Tree architecture.

11. How many pods are there in a k-ary fat-tree? How many ports are there in each switch? Explain in details how I such a fat-tree organized.

12. What is the biggest advantage and the biggest disadvantage of a fat-tree?

13. Is VL2 a Clos-based switch-centric architecture? What layers is this architecture divided into?

14. Describe the VL2 architecture.

15. What is the main advantage of VL2?

16. Consider the CamCube architecture. What category is this? How are the entities organized in this architecture?

17. Does the CamCube architecture reduce the cost of switches and routers?

18. With respect to energy efficiency, how do you characterize the CamCube architecture?

19. What is the main disadvantage of the CamCube architecture?

20. Describe the Bcube architecture.

21. What is the most relevant disadvantage of a Bcube?

22. What is the category of Dcell?

23. What is the main advantage and disadvantage of the Dcell architecture?

24. There are several systematic measurement studies of data center usage operations that allows to characterize the traffic in such data-centers. Which are these ?

25. Data-centers are well known given the energy they spend. There are three major directions to achieve the goal of minimizing such spending. Which are these?

26. Which are the three major consumers in data centers?

27. Do you agree with the following sentence? "*load balancing aims at reducing packet delay, but it can also redirect flows by considering energy-efficient targets*".

28. Do you agree with the following sentence? *"Load balancing mechanisms summarized in this survey aim to balance traffic across links, which can be called link load balancing."*

29. How different is link load balancing from server load balancing?

30. Why does the load balancing algorithms generally propose new heuristic algorithms to solve the problem?

31. What are the four primary objectives of a balancing algorithm?

32. There are mainly two alternatives to reduce energy consumption in data centers. Which alternatives are these?

33. When compared to data center networks, WANS have different properties. Mention two of these.

34. There are three representative traffic scheduling solutions proposed for WANs. What are the names of these solutions?

35. There are several differences between traffic scheduling in wide area networks and in data centers. What differences are these?

36. There are two crucial procedures in a load balancing mechanism. What are these?

37. What are the methods that can be used to collect congestion information?

38. What are the methods that can be used for selecting paths?

39. According to their methods of scheduling flows, existing data center load balancing mechanisms could be broadly classified into two categories. Which categories are these?

40. Describe the following figure.