

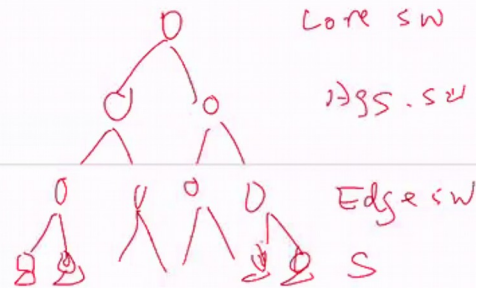
Quizz1

1. Cloud computing can provide very high reliability to customers even if the failure rate of the underlying hardware is not negligible. This is because data can be mirrored at multiple redundant servers and multiple sites.
2. Netflix partnered with Google to start their video stream business.
3. Both Dropbox and CRM belong to SaaS.
4. Since most of data processing, computation and storage are done in the cloud, there should not be much traffic that needs to be carried in the backbone network.
5. 5G networks are expected to be very successful by mainly delivering high bandwidth to meet customers' demands.
6. Access time to a local DRAM on a server is in the order of nano-seconds, same as accessing a DRAM of a server on any other rack.
7. A virtualized evolved packet core (EPC) means a distributed and softwarized EPC.
8. It is better to build a hyperscale datacenter in an urban city so that the latency could be much reduced.
9. Community cloud provisions for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., New York Stock Exchange Cloud).
10. A hypervisor allows multiple VMs to run on a single physical machine and they normally communicate with each other through the physical interface cards.
11. Virtual machines can be consolidated and migrated to other servers to save the power of a data center.
12. It is very important to balance the load of the servers and the transmission links in a datacenter to achieve high performance of cloud computing.

- 1.对
- 2.错, amazon
- 3.对
- 4.错
- 5.错
- 6.错, 后半句错了
- 7.对
- 8.错, 太贵
- 9.对
- 10.错 虚拟的 interface cards
- 11.对
- 12.对

Quizz2

1. Oversubscription occurs in the tradition data center where the bisection bandwidth become more and more as packets moving towards to the higher layer in a data center network hierarchy.
2. Since the 80-20 rule, where 80% traffic remains in the cluster and 20% traffic crosses the clusters, does not hold any longer, we have to have the same bisection bandwidth at each layer of a data center hierarchy.
3. In data center, to accommodate VM migration, it is better to use MAC addresses than IP addresses for VMs.
4. A switch's throughput is proportional to the number of ports of the switch.
5. A switch will usually first transmit delay-sensitive packets but will discard loss-sensitive packets.



6. The throughput of a switch depends on whether the switch is blocking or non-blocking.
7. One of the functions of the framer chip on a line card is frame delineation, i.e., to identify the beginning of Ethernet frames to locate their address.

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8. The number of crosspoints of an $N \times N$ crossbar switch is N^2 , which limits the size of the crossbar switch.
9. When building a $N^2 \times N^2$ switch using many $N \times N$ switch chips, we need a total of $2N^2$ such chips.
10. A switch with a given capacity can often be configured to different numbers of ports with different line transmission rates.

Quizz2

1.✓

2.x

3.✓

4. $7n^3 \times$

5.✓different congestion situation(not circuit switch but package switch)

6.x

7.✓

8.x

9.✓

Switch don't need arp table, because it don't need IP

Switch learning the forwarding table.

Network 101

10.x

11.√

Quizz 3

1. Clos and Fat-tree networks can only have odd number of stages.
2. When designing a packet switch using a Clos network, we can have a higher throughput by using more switch modules in the middle stage to reduce congestion possibility.
3. For a Clos network with N inputs and N outputs, if N connections are given at the same time and they don't have output contention, we can always successfully establish the N connections without any internal blocking.
4. A switch module has n inputs and n outputs. If we want to build a Clos switch with n^3 inputs and n^3 outputs, we need a total of $5n$ modules.
5. For a Clos network using multiple switch modules, each with a size of $n \times n$, there are n paths from any input to any output, increasing fault tolerance and reducing congestion possibility.
6. For a Clos network, any input to any out will always have the same number of hops.
7. Subnet length is always 8 bits after the network address.
8. Devices on the same subnet use a router to reach each other.
9. A device can learn the mapping of IP and MAC addresses by listening to all ARP requests, where an inquiring host will put its IP and MAC addresses in the ARP request.
10. In Cisco's FabricPath, no address learning is required in the Fabric due to a Clos network connection.
11. In Cisco's FabricPath, there are two pairs of MAC addresses for every packet from the server to the edge switch and from the edge switch to the core switch.

1. 错, fattree can be even
2. 对
3. 对 (已经有了所有的输入需求)
4. 错, $5n^2$
5. 对
6. 对
7. 错, 可以自己定义
8. 错, 在 switch
9. 错, 不知道请求者的 IP
10. 错, 不需要知道
11. 错, 只有 edge to core 有两对, 从 host to edge 只有一个

Quizz 4

1. In Cisco's FabricPath, there are two tables for each edge switch, one for routing among the edge switches and one for the mapping of a destination MAC address to an associated edge switch.
2. In Cisco's FabricPath, when an Ethernet frame is sent from a host to another host, it is encapsulated in another Ethernet frame including an edge switch's ID and a core switches' ID.
3. In Cisco's FabricPath, each edge switch will record the mapping of a host MAC address with its associated switch whenever it receives an Ethernet frame with such information available in the header.
4. In PortLand DCN, each virtual machine has an actual MAC address and a pseudo MAC address.
5. The Fabric Manager in PortLand DCN contains a table of a host's IP address and its actual MAC address.
6. The Fabric Manager in PortLand DCN will only be visited for ARP purpose.
7. In PortLand DCN, assuming host A is sending a packet to host B, Host B's pseudo MAC address will be replaced by an edge switch with its actual MAC address when the packet is sent from a core switch.
8. In PortLand DCN, servers need to be changed but the edge switches do not need to be changed.
9. In VL2 DCN, each host has an application-specific IP address (AA) and a location-specific IP address (LA).
10. In VL2 DCN, the agent of a source host will prepare multiple IP addresses, but only one of them is an address-specific IP address.
11. In VL2 DCN, the Directory System stores the mapping of a server's application-specific IP address (AA) to a location-specific IP address (LA) of an edge router.

1. 对
2. 错, another switch ID
3. 错, 只看 destination within the switch
4. 对
5. 错, pseudo address
6. 对
7. 对
8. 错, 相反
9. 错, LA 只给 edge router 的
10. 错, application 只有一个
11. 对

Quizz5

9:58 AM 5th Nov 14

Home Insert Draw Layout Review View

Select Objects

Draw with Touch

1. ☒ Paravirtual mode does not require the host computer to support hardware-assisted virtualization technology, but does require the guest operating system to be modified for the virtualization environment.
2. ☒ Hypervisor can have multiple open virtual switches that could be configured by an SDN controller.
3. ☒ Hadoop distributed file system duplicates data blocks and they can be arbitrarily stored in different nodes to improve the reliability.
4. ☒ When multiple rules in a flow table match with the 5 tuples of an incoming packet, the 5-tuple one on the top position of the table is chosen. (T/F)
5. ☒ When the time to look up a flow entry exceeds the transmission time of a smallest packet, we can use either pipelining or parallelism to do the lookup with a negligible penalty in latency.
6. Three IP subnets A=128.33.192.0/18, B= 128.33.30.0/23 and C=128.33.16.0/20 are stored in a TCAM at locations 0, 1, and 2 with the highest priority at location 0. Please show (Value, Mask), each 32 bits, at
 - a. location 0.
 - b. location 1, and
 - c. location 2.
7. ☒ For Hicut, the more cuts in each dimension, the higher searching speed, but also more storage space. ✓
8. ☒ When using Hicut to implement flow table lookup, the larger the threshold of each leaf node size, the faster to find a flow entry matched with the fields of an incoming packet.

The smaller of the # of nodes / the depth of the nodes

Handwritten diagrams and notes:

- Diagram showing two nodes connected by a line, with "10ms" written above the line.
- Diagram showing a node with "N=3" and "TH=3" written next to it.
- Diagram showing a node with "N=8" written next to it.
- Handwritten binary strings: "10000000000000000000000000000000", "00011100000000000000000000000000", "00010000000000000000000000000000", "11000000000000000000000000000000".
- Handwritten note: "5-tuple".
- Handwritten note: "NY".

Quizz 6

Those highlighted in yellows are true.

1. Both DIFANE and CAB intend to resolve the issue of caching rules from an SDN controller to the limited TCAM space of SDN switches. ✓
2. Wildcard rule dependency issue occurs when cached rules overlap with other rules that have a higher priority but are not cached. ✓
3. For DIFANE, the first packet of a flow will be forwarded to an SDN controller when no matching with any flow entry in an egress switch. ✗
4. For DIFANE, there are three kinds of rules in each switch, and Authority rules are the highest among the three. ✗
5. DIFANE could cause the first packet of flows that was sent to an Authority switch arriving at the egress switch later than other packets of the same flow. ✓
6. DIFANE could adopt the idea of CAB by not splitting the rules to resolve the rule dependency issue. ✓
7. Caching wildcard rules have advantage of rule locality, which could reduce request frequency to the controller. ✓
8. When determining the buckets for CAB, if we want to reduce the number of bucket rules, we should minimize the number of leaf nodes for the HiCut to the all the rules. ✗
9. For CAB, a rule's timeout value is set to the same as that of a bucket that includes the rule and is the first loaded to the TCAM. ✓
10. In CAB's evaluation, the scheme that caches exact match rules has the largest cache miss rate. ✗

latest

Quizz 7

Quiz-7-discussion

Home Insert Draw Layout Review View

Select Objects Draw with Touch

those nighnted in yellows are true.

1. ~~DUET~~ uses switches to resolve the LB scalability issue while using servers to guarantee PCC.
2. Since DUET's forwarding table can only support up to 512 VIPs, we need to use two stages of load balancing to support a large number of DIPs, e.g., a few tens of thousands.
3. When a DIP pool is changes, using ECMP with hashing on flow IDs to find a DIP can possibly violet PCC.
4. ~~Silkroad~~ resolves the PCC issue by using a Connection Table, where flow IDs with wildcard are installed in the match field.
5. ~~Silkroad~~ compresses Connection Table's match field by hashing each flow's 5 tuples and resolves hash collision by sending the packets of new flows and hitting the Connection Table to a CPU.
6. ~~Silkroad~~ uses a version number for each VIP and its main purpose is to reduce the width of the Connection table.
7. Beamer doesn't use a connection table but keeps both old and new DIPs in each bucket to guarantee PCC.
8. A server in the Beamer will direct the packets of new flows carrying both old and new DIPs to the old DIPs. *new*
9. A server's available capacity could be measured with CPU cycles, memory access rates, NIC's link utilization, or the input queue lengths of the NIC. Available capacity of the lowest-utilized resource is reported to a controller.
10. Spotlight chooses a bucket containing DIPs with the same available capacity based on the total available capacity of each bucket and then use ECMP to choose one of the DIPs in that bucket.

Quiz 8

Quiz-8-discussion

Home Insert Draw Layout Review View

Select Objects Draw with Touch

NY: 12/9 (Wed) 8:30-8:40 PM
SH: 12/10 (Thur) 9:30-9:40 AM

Those highlighted in yellows are true.

- ~~1. D3 needs to keep the state of each flow to calculate the allocated rate for each flow.~~
- ~~2. In D3, each source sends data at this rate for a RTT while each data packet sent in this RTT will carry a rate request for the next RTT.~~
- ~~3. In D3, the fair share is equal to (link capacity – total allocated rate) divided by the number of flows.~~
4. pFabric can minimize average flow completion time by scheduling the packets of the shortest remaining flow size.
5. One of the disadvantages of pFabric is its clean-slate approach, requiring the replacement of all switches in the datacenter.
- ~~6. D3 and Barrat can guarantee deadline for flows/tasks but pFabric cannot.~~
7. Task scheduling shows more efficient as compared to scheduling with shortest flow first when tasks contain more flows.
8. Task serialization policies perform better than fair sharing in terms of average completion time and the finish time of each task.
9. FIFO with limited multiplexing is equivalent to fair share when its degree is equal to one and the degree increases for more heavy tasks.
10. In Baraat, tasks priority depends on their arrival time, and the flows of the same task are assigned with the same priority.