1. What are the ways in which we can keep a check on the number of duplicate packets generated due to the Flooding Routing technique?

Flooding is a routing technique by which incoming packets get propagated to every outgoing path, except the very path that the packet come in through. A problem with this technique is that it can generate duplicate packets and cause congestion. According to Costa (2008), we can avoid duplicate packets by:

* Flooding only on paths that make sense, namely not the path that the packet just came in on.
* Forwarding each packet only one time. This requires the router keeping track of the last packet that was sent and then sending the next packet in queue based on a sequence number.
* Using a hop counter. Each packet would only be allowed to hop a certain number of times before it will no longer be passed.

2. Though Flooding is not a very efficient routing method, it still finds use in a number of applications. Name at least 3 such applications you can think of.

Flood Routing may be problematic because it requires a lot of bandwidth. But there are applications where Flooding is still useful (Costa, 2008):

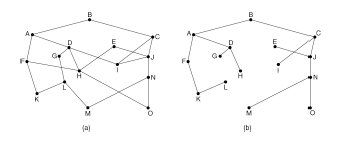
* When we want to broadcast a message to every host on the network, Flooding makes more sense than sending the message to each node individually.
* Since every path is used for transmission, this means the shortest path is used. This means that the transmission is fast.
* Especially in Wireless networks, a message transmitted by one station can be picked up by any other station that is in range.

3. Store and Forward Switches have an advantage over Cut Through Switches. What is it?

Store and Forward Switches have an important advantage over Cut Through Switches: they transmit error free data. For each data frame that it attempts to transmit, the switch will perform the appropriate calculations and compare them to the check data at the end of the frame. If the data is found to be corrupted, the packet will not be sent. Cut Through Switches only flag invalid packets, but continues to transmit them. While this reduces latency in transmitting data, it falls on the receiving node to invalidate and drop the packet (Cisco, n.d.).

4. Very briefly explain the Optimality Principle and the use of Spanning Trees in routing schemes.

Various routing schemes determine the path a packet will take from sender to receiver.**The Optimality Principle** states that whatever path is optimal from sender to receiver must also be the optimal path for any node along that path as well. Using the diagram below as an example, if router J is on the optimal path between I and K, then the optimal path between J and K must be on the same route.

(Pollett, 2007)

A derivative of the optimality principle is that all of the optimal paths leading to a given destination node will form a **Spanning Tree** that is rooted at the destination. The distance along the paths can be measured in terms of the number of hops from sender to receiver. This information is used in routing tables to determine the least costly path from sender to receiver.

5. Create a comparison table ( 4 comparisons) for Bridges, Switches,Routers, Gateways.

**Comparing Network Connecting Devices**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Bridges** | **Switches** | **Routers** | **Gateways** |
| **OSI Layer** | Data Link | Data Link | Network | Transport |
| **Type of Addressing** | MAC address | MAC address | IP Address | IP Address |
| **Internet Capability** | No | No | Yes | Yes |
| **Translates different network technologies** | No | No | No | Yes |

(Kumar, 2011)

References

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