Link State Routing

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Previous Session

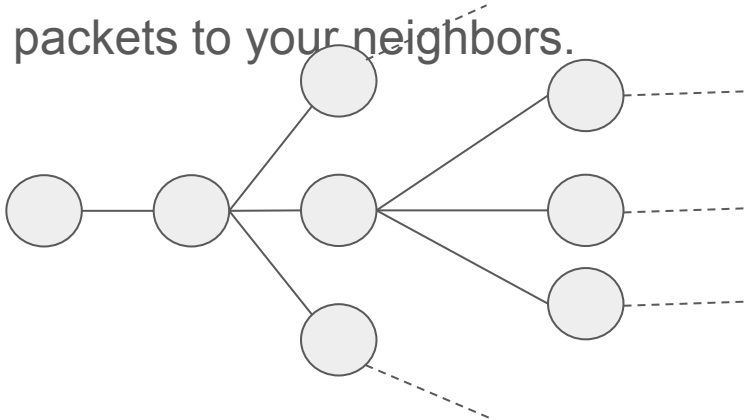
- Distance Vector Routing Algorithm
- Count to Infinity Problem
- Optimization
  - Forwarding the entire path
  - Keeping the infinity small
  - Changing the routing table structure

Link State Routing

- DV was replaced with Link State Routing
- Dynamic Routing.
- Many variants (optimized versions) are used now a days.
- Two Parts of the algorithm
  - Part 1 : Collect the topology information
    - Current Link State of all the links (in terms of cost).
  - Part 2 : Find the best path.
    - Dijkstra algorithm

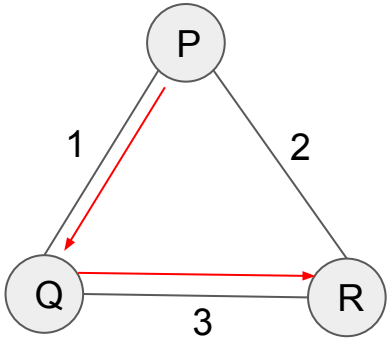
Part 1: Collect the topology Information.

- Best way to collect the information ? *Gossiping !!*
- Each node sends the link state (cost) to its neighbors.
  - Hence, Link State routing.
  - Neighbors will in turn forward the LSP (link state packet) to its neighbors..
  - Start with immediate neighbor nodes.
- Flooding - Flood the packets to your neighbors.



Flooding

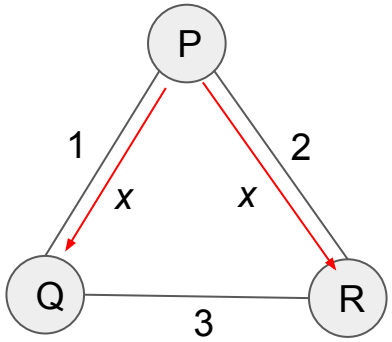
- Gossiping - lots of traffic
- Efficient Flooding - minimizes the number of messages during the flooding.
- Avoid Duplicates
  - Unique IDs for the interface.
  - Maintain state for each ID - Send Flags
    - On which interface packet received and on which interface it should be forwarded.

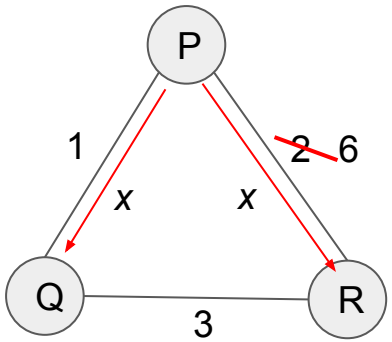


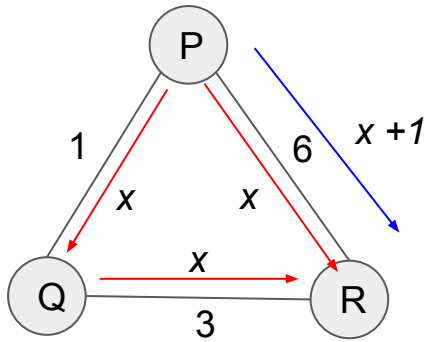
Since Packet is received from P, Do not flood the packet to P

Except incoming interface, flood the packet to all other interfaces.

- New information has to be spread faster than the old information
  - Sequence Number (*seq_num*)
  - Increment the sequence number for new message.



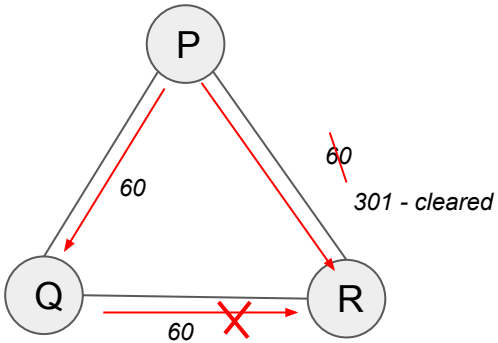


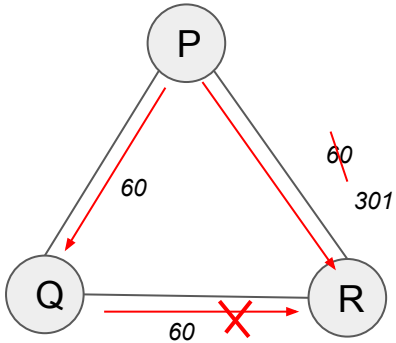


x should be discarded
x + 1 should be considered

- What could be the upper limit for the sequence number ?
  - 1, 2, 3, …….. ?
  - If it wraps around ?
- Use a very large sequence number
  - 32 bit - 1 to 2^{32}
  - If a router generates 1 msg/sec, then when 32 bit number will wrap around ?
  - 136 years !!

- What happens if a sequence no. gets corrupted ?
- Checksum
  - After n seconds sequence number will be cleared.





61 62 63 64 .....

- When to flood ?
  - Periodic Flooding
  - Triggered Flooding
- When the flooding ends,
  - Each node will have complete graph of topology.
  - With the link cost information, Dijkstra algorithm can be used to find the best path.

All Fine ? - No

- Frequent topology change may cause flooding traffic
- Scalable ?
  - Flooding time, processing time, routing table size..