Course: Computer and Communication Networks

Topic: Techniques to Improve QoS

Presentation by

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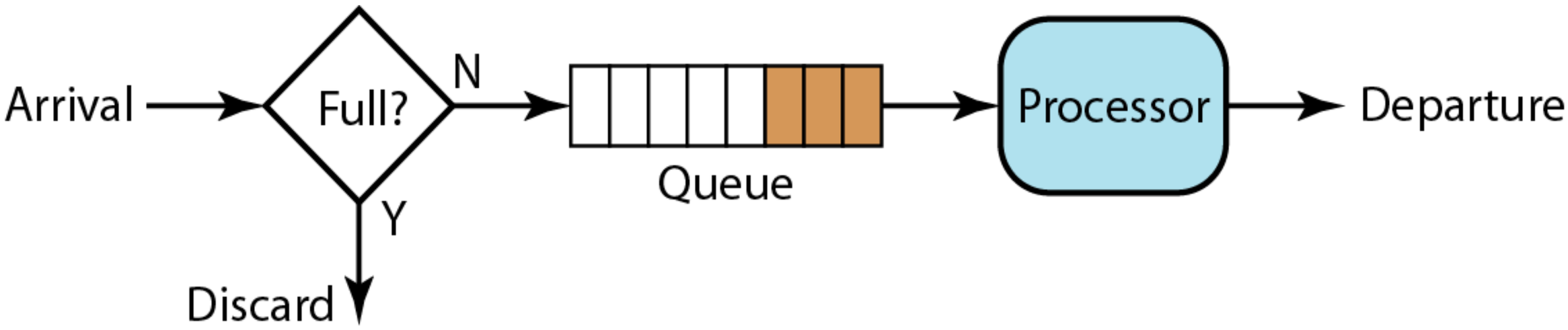
TECHNIQUES TO IMPROVE QoS

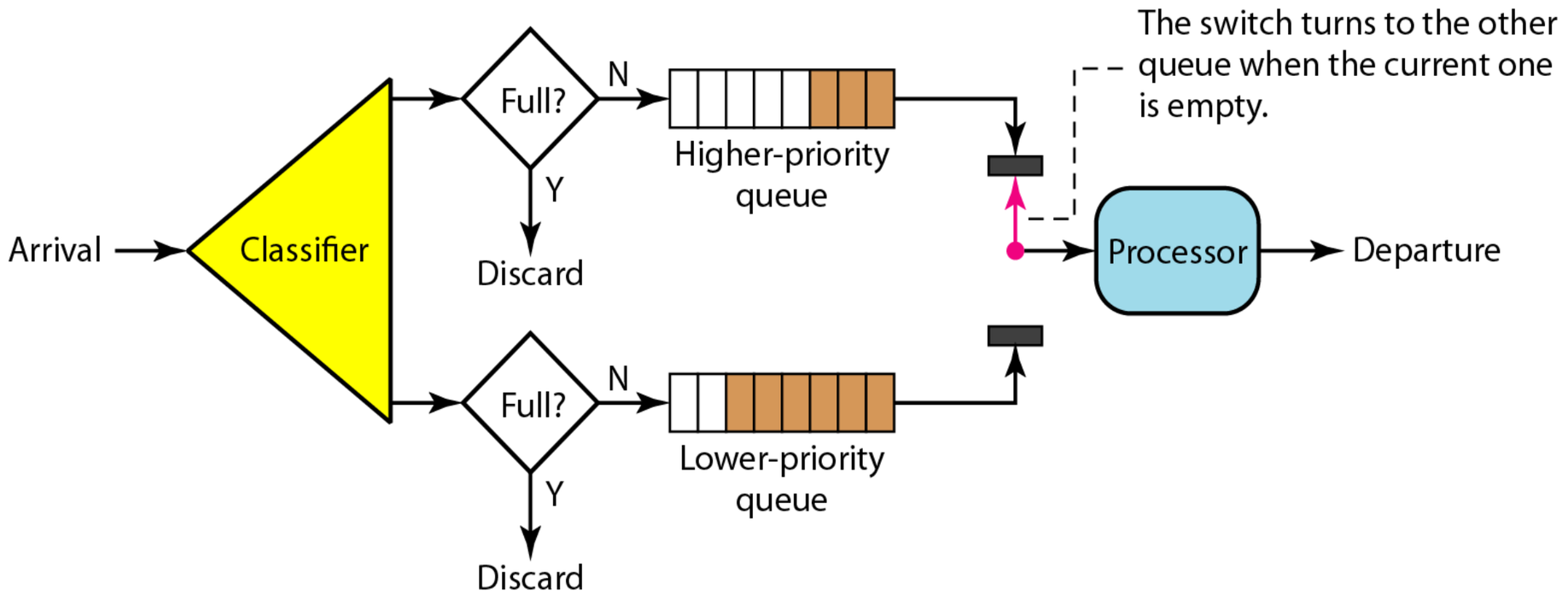
1. Scheduling



a) FIFO queue

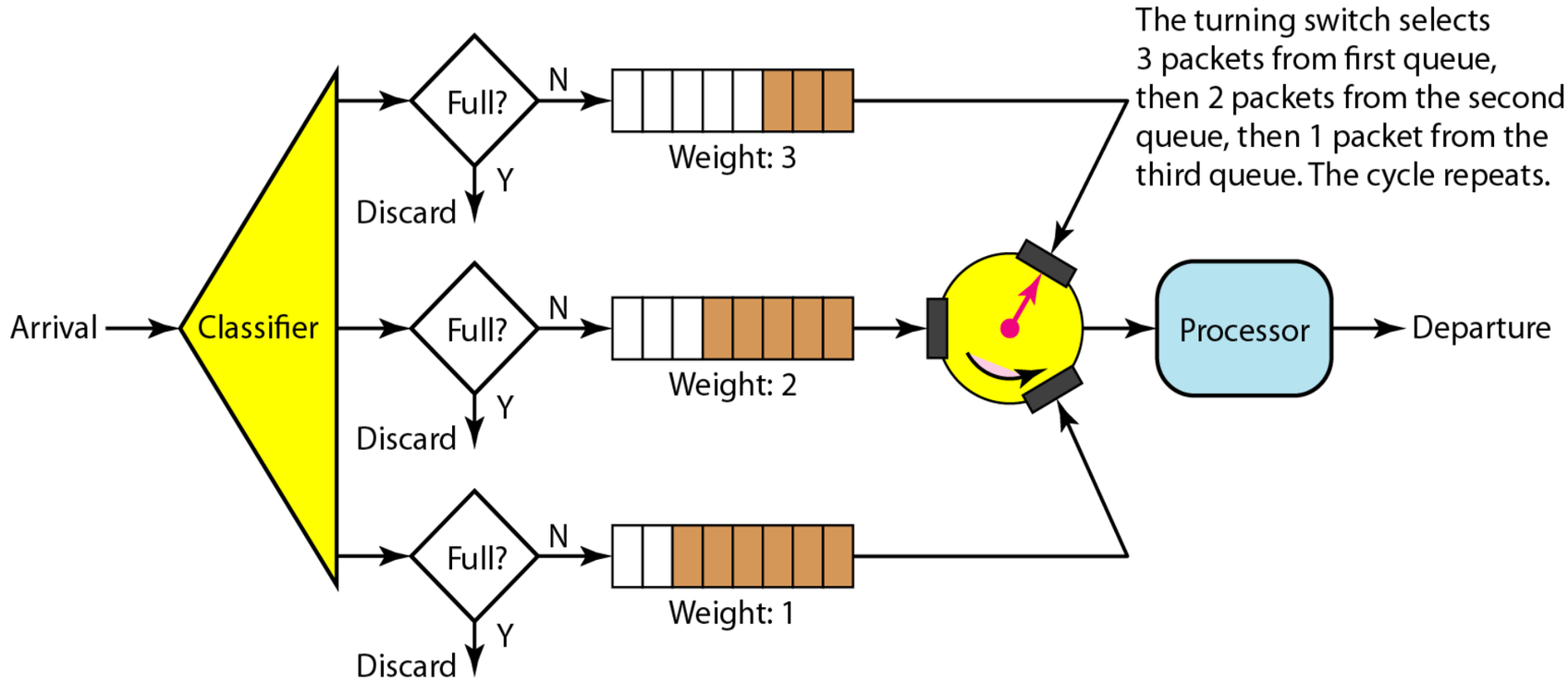
Reference: 1. Ferouzan, Behrouz A., Data Communications and Networking, 2. Stallings William, Data and Computer Communication. 3. https://ieeexplore.ieee.org

b) Priority queuing



Reference: 1. Ferouzan, Behrouz A., Data Communications and Networking, 2. Stallings William, Data and Computer Communication. 3. https://ieeexplore.ieee.org

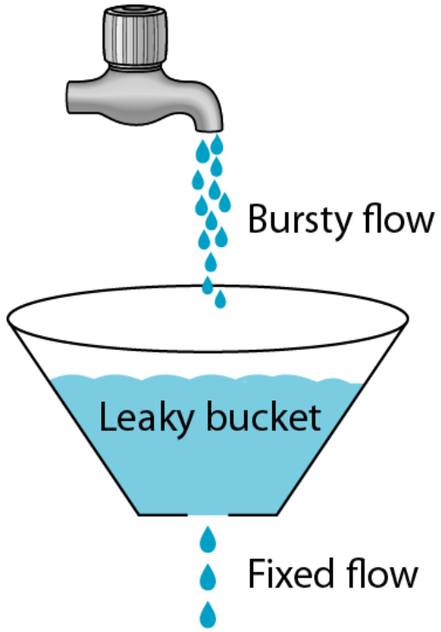
c) Weighted fair queuing

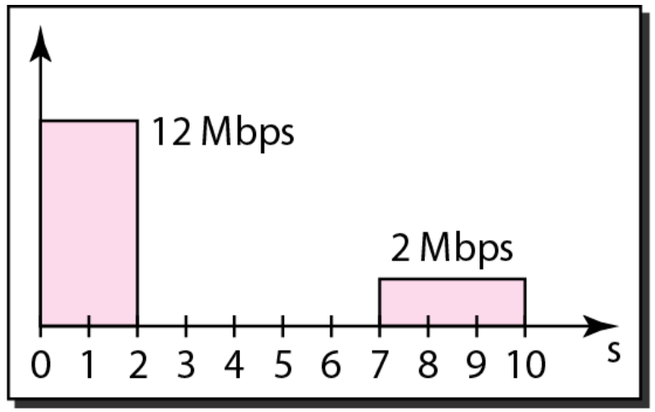


Reference: 1. Ferouzan, Behrouz A., Data Communications and Networking, 2. Stallings William, Data and Computer Communication. 3. https://ieeexplore.ieee.org

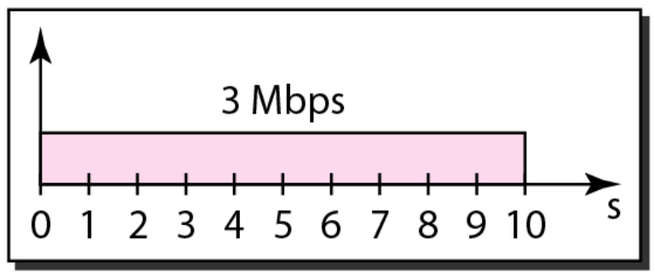
2. *Traffic Shaping*

a) Leaky bucket





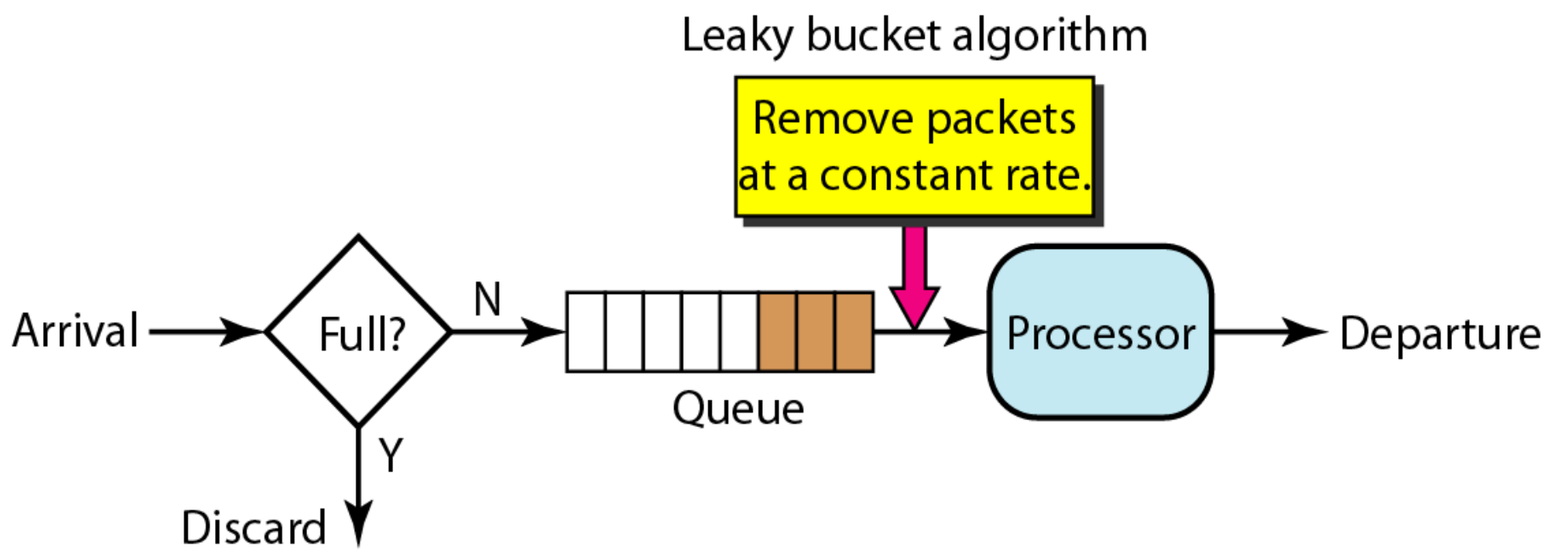
Bursty data



Fixed-rate data

Reference: 1. Ferouzan, Behrouz A., Data Communications and Networking, 2. Stallings William, Data and Computer Communication. 3. https://ieeexplore.ieee.org

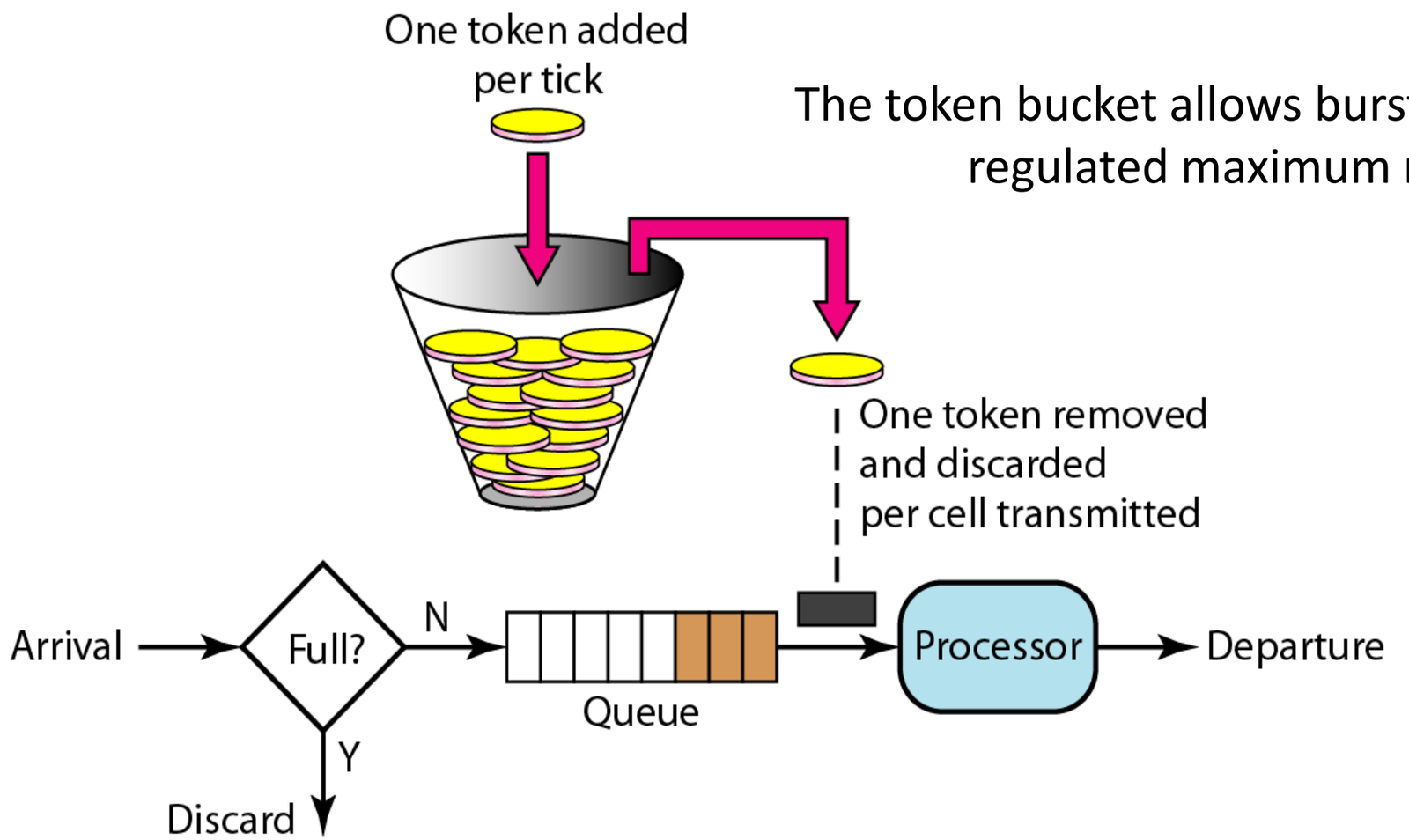
b) Leaky bucket implementation



A leaky bucket algorithm shapes bursty traffic into fixed-rate traffic by averaging the data rate. It may drop the packets if the bucket is full.

Reference: 1. Ferouzan, Behrouz A., Data Communications and Networking, 2. Stallings William, Data and Computer Communication. 3. https://ieeexplore.ieee.org

c) Token bucket



The token bucket allows bursty traffic at a regulated maximum rate.

Reference: 1. Ferouzan, Behrouz A., Data Communications and Networking, 2. Stallings William, Data and Computer Communication. 3. https://ieeexplore.ieee.org

3. RESOURCE RESERVATION: (INTEGRATED SERVICES)

Integrated Services is a flow based QoS model designed for IP

- Signaling
- Flow Specification
- Admission
- Service Classes:

  a) Guaranteed Service Class, and b) Controlled-Load Service Class

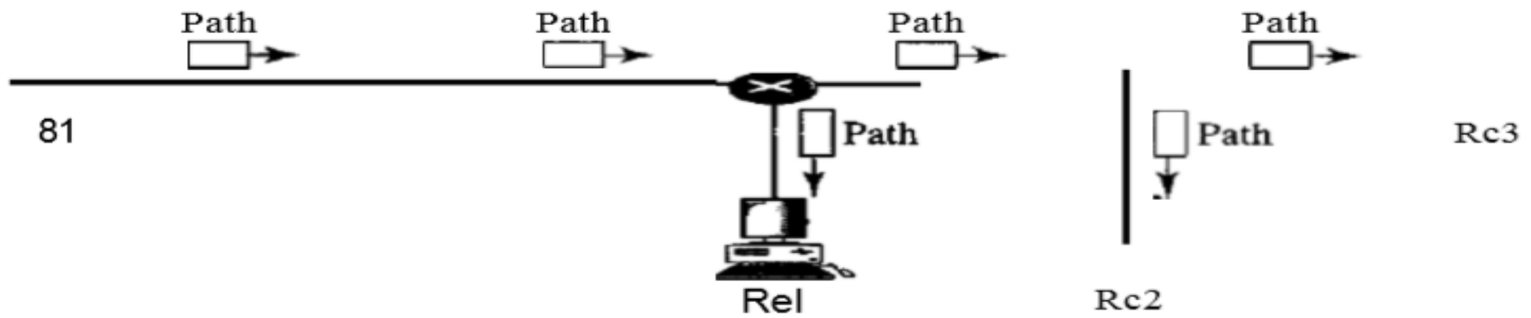
Reference: 1. Ferouzan, Behrouz A., Data Communications and Networking, 2. Stallings William, Data and Computer Communication. 3. https://ieeexplore.ieee.org

RSVP (The Resource Reservation Protocol)

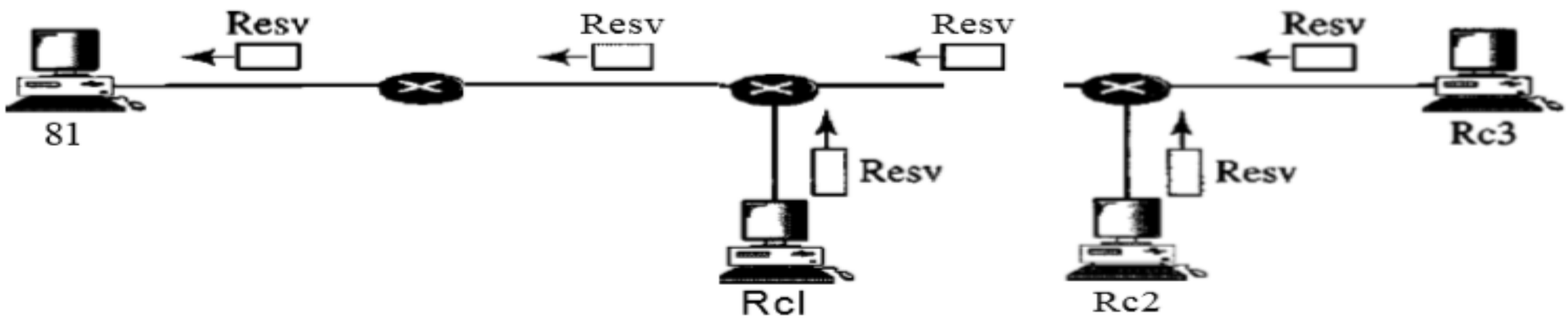
a) Multicast Trees b)Receiver-Based Reservation

RSVP Messages:

a) Path Message



b) Resv Messages



Reference: 1. Ferouzan, Behrouz A., Data Communications and Networking, 2. Stallings William, Data and Computer Communication. 3. https://ieeexplore.ieee.org

DIFFERENTIATED SERVICES

Differentiated Services is a class-based QoS model designed for IP

Two fundamental changes were made:

1. The main processing was moved from the **core of the network to the edge of the network.** This solves the **scalability** problem. The routers do not have to store information about flows. The applications, or hosts, define the type of service they need each time they send a packet.

2. **The per-flow service is changed to per-class service.** The router routes the packet based on the class of service defined in the packet, not the flow. This solves the service-type limitation problem. We can define different types of classes based on the needs of applications.

Benefits: **a) Low loss** **b) Low latency** **c) Ensured bandwidth**

Reference: 1. Ferouzan, Behrouz A., Data Communications and Networking, 2. Stallings William, Data and Computer Communication. 3. https://ieeexplore.ieee.org