



**IKN**  
Institut für  
Kommunikationsnetze

# **Cyclic Demand Advertisement boosts RPR MAC Performance**

Harmen R. van As, Arben Lila, Guenter Remsak, Jon Schuringa  
Vienna University of Technology, Austria

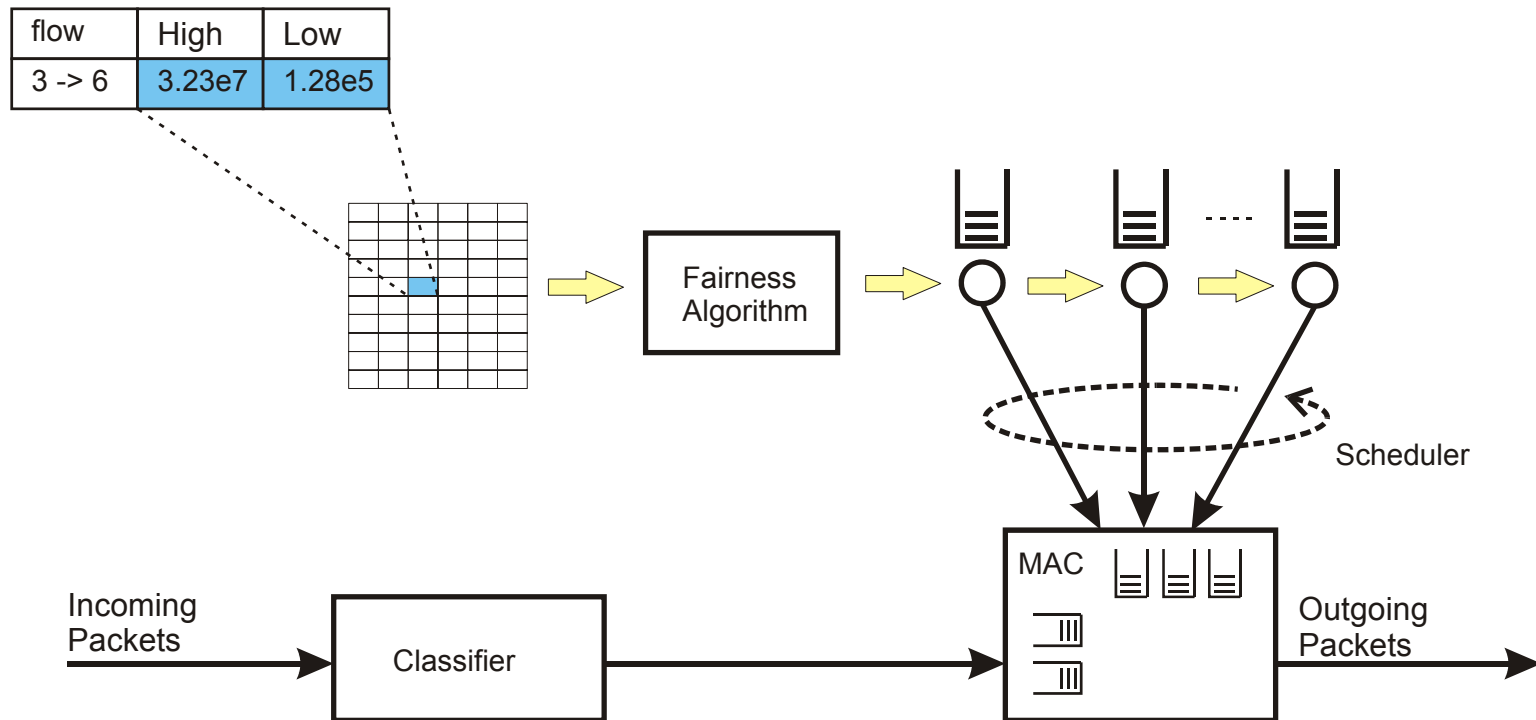
# Overview

---

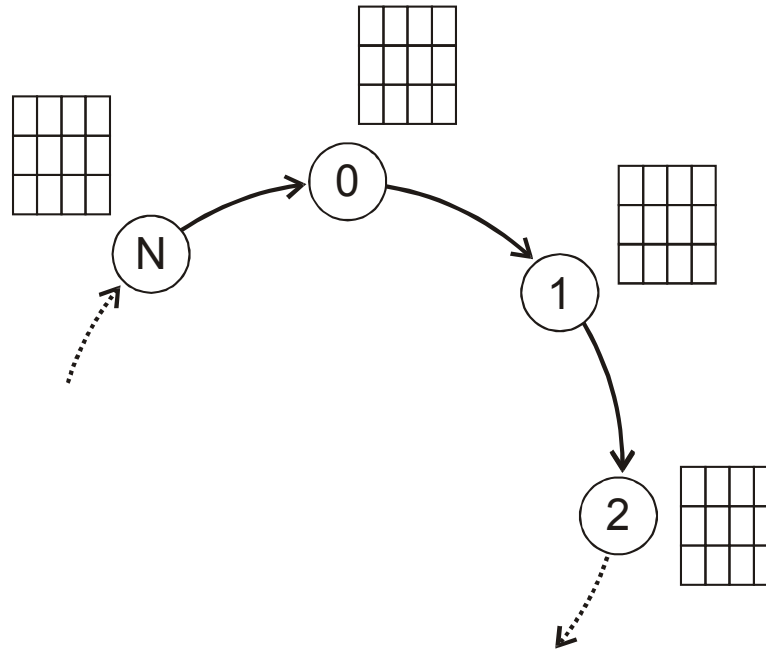
- Fairness Architecture
- Information Distribution
- Multiple Traffic Classes
- Performance
- Conclusions

# Fairness Architecture

- Table holds all relevant source-destination flow information
- Table used as input for fairness algorithm
- Algorithm is executed each “calcInterval”

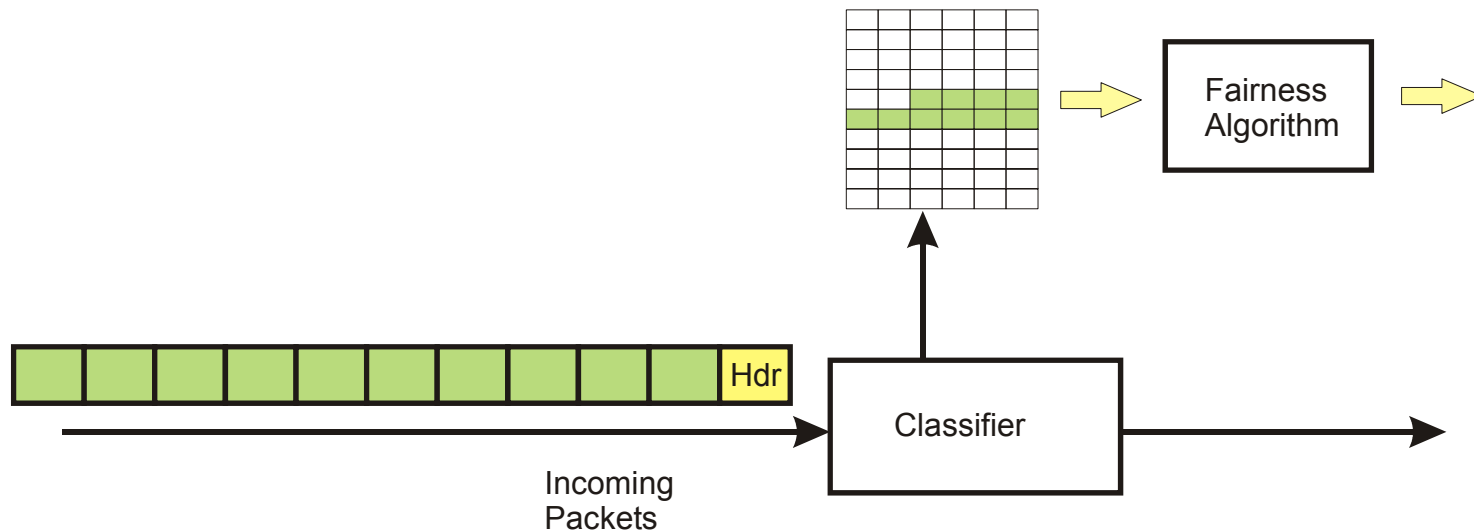


# Fairness Information Distribution



- The tables are being updated by a fairness control packet
- Using one control packet with all information would result in a very big packet, therefore we use segmentation

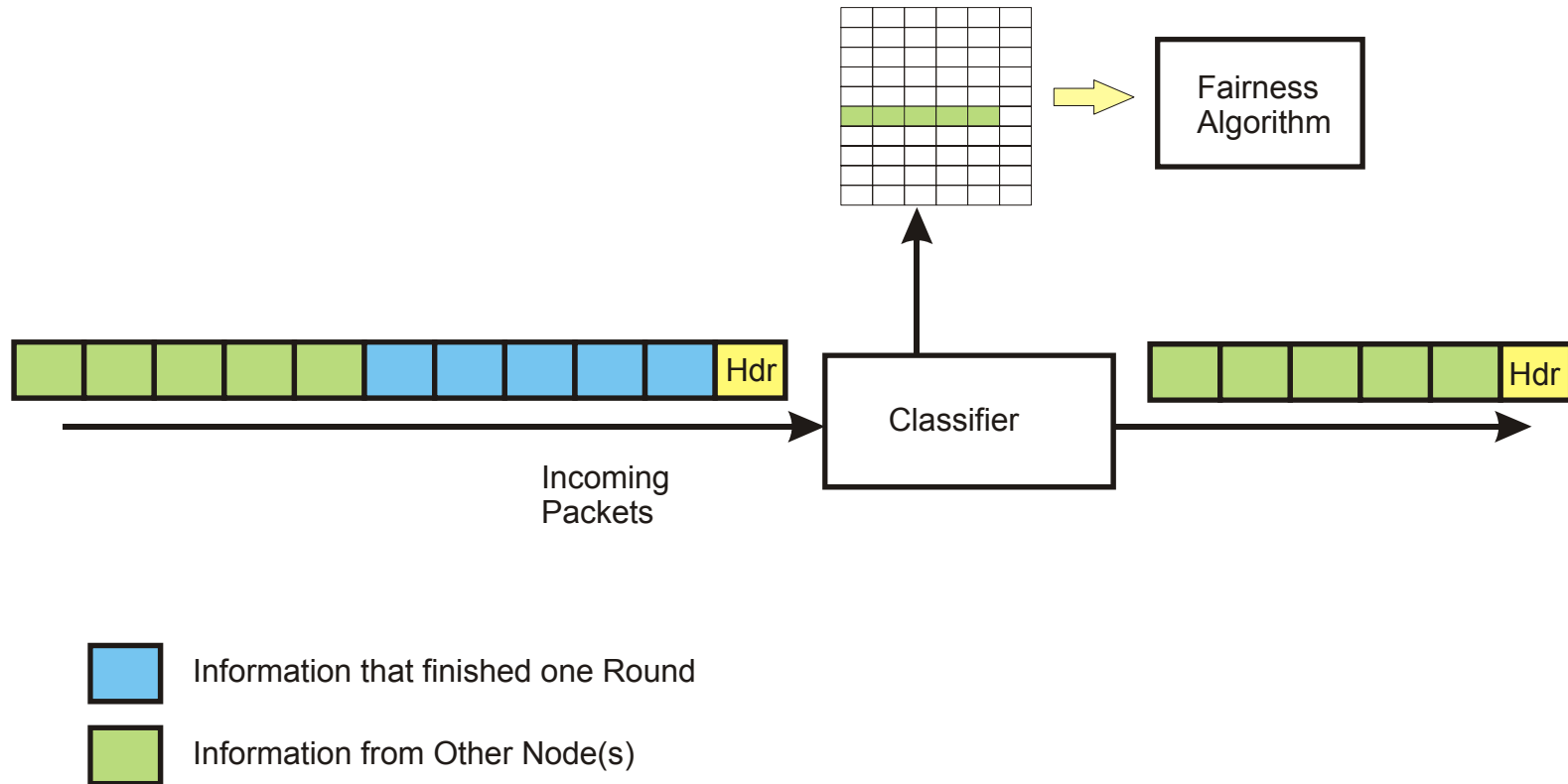
# Table Update



- New data is copied from control packet into local table
- Control packet header contains
  - Offset in table
  - Number of valid entries in packet

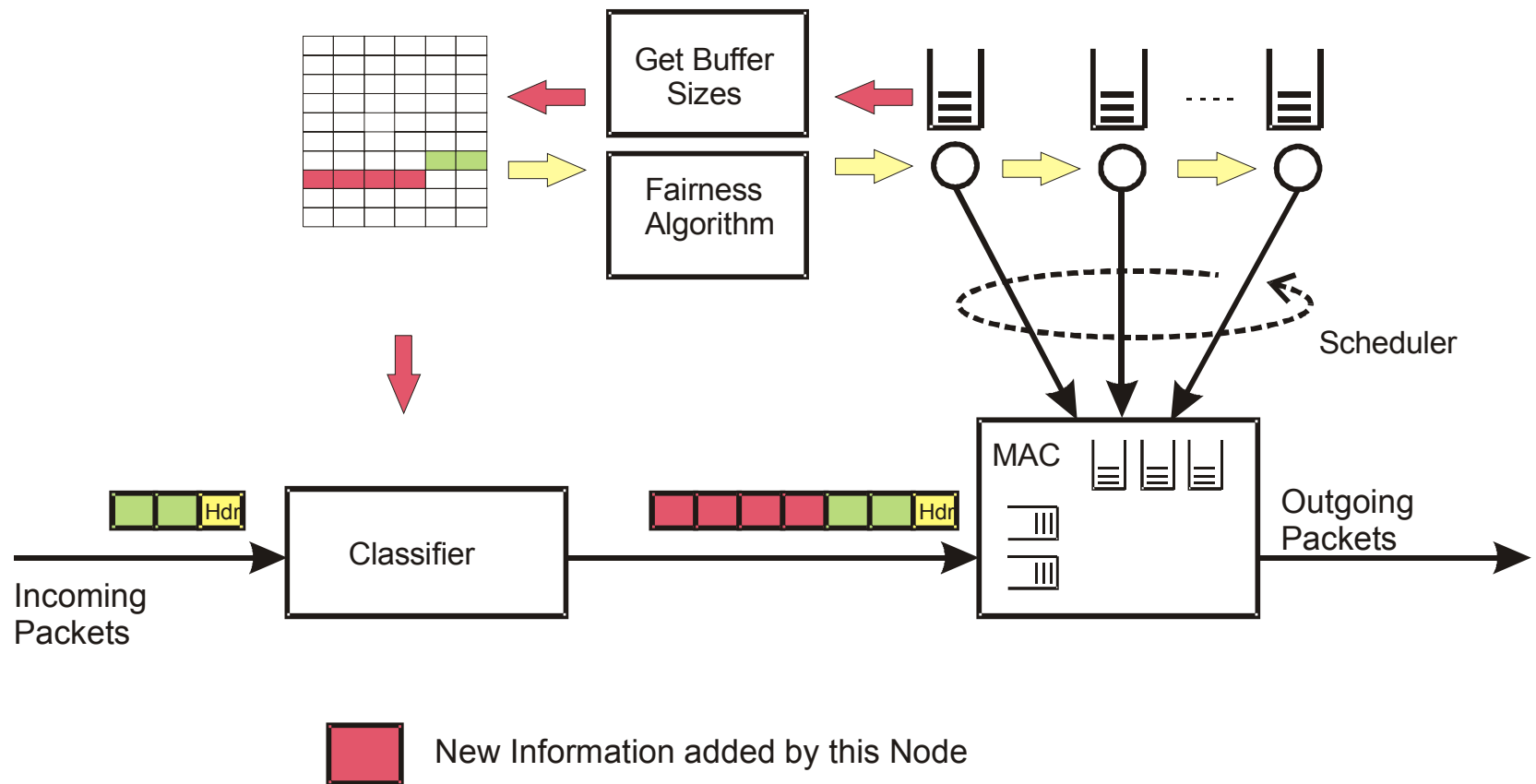
# Control Packet Update (1)

- Deleting Old Information



# Control Packet Update (2)

- Inserting New Information



# Control Packet Update (3)

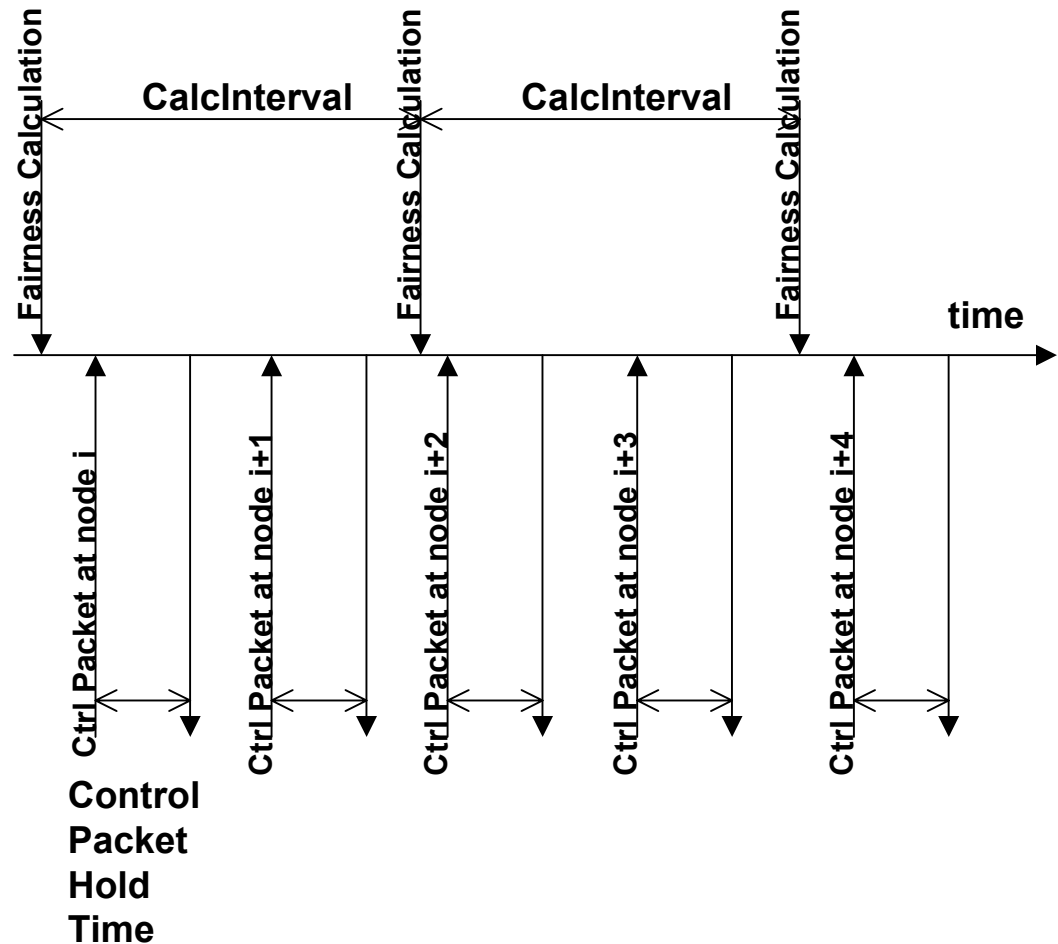
---

- Summary of actions upon arrival of control packet
  - Delete information that finished one round
  - Copy valid information into local table
  - Add local information to the control packet if:
    - There is place available, and
    - It is “my turn” to add
  - Schedule the packet forwarding

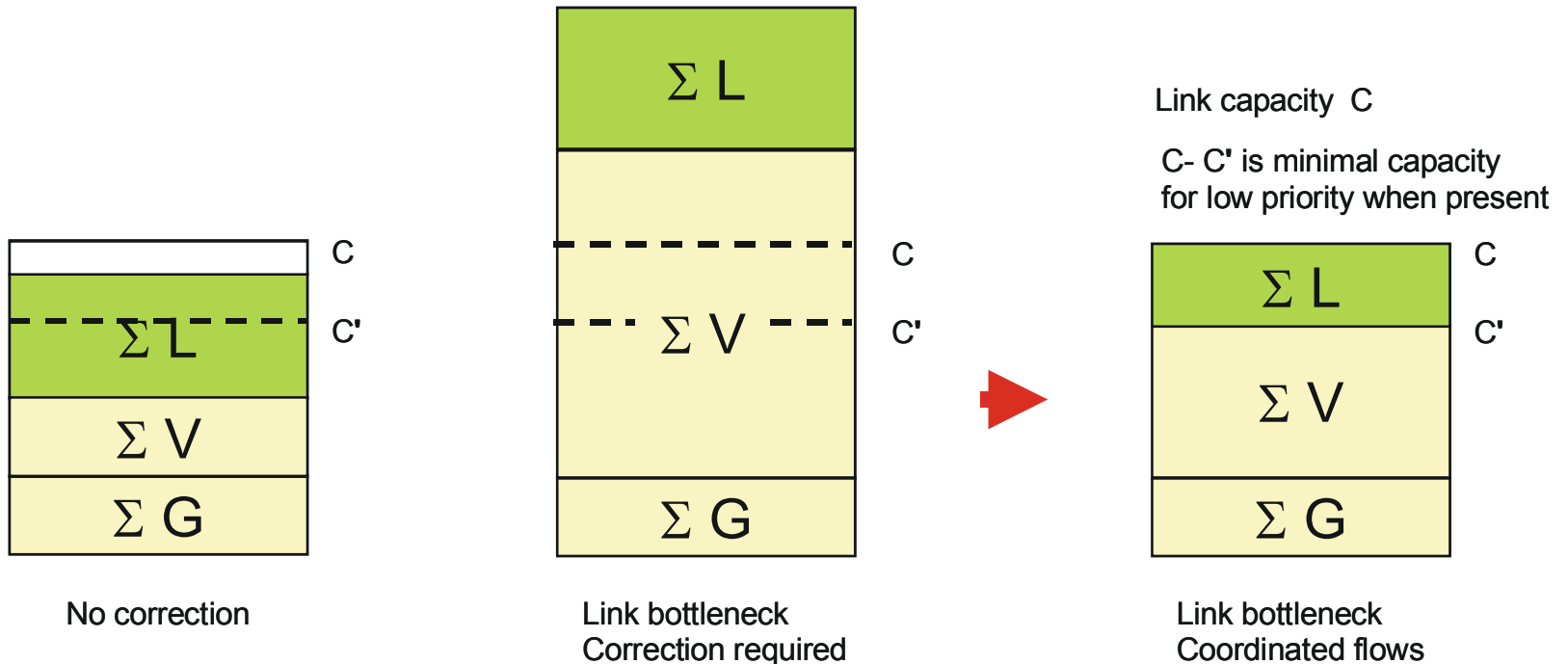


# Fairness Control Packet Timing

- System parameters:
  - Calculation interval
  - Control packet size
  - Control packet hold time
- These parameters control reactivity versus transmission overhead

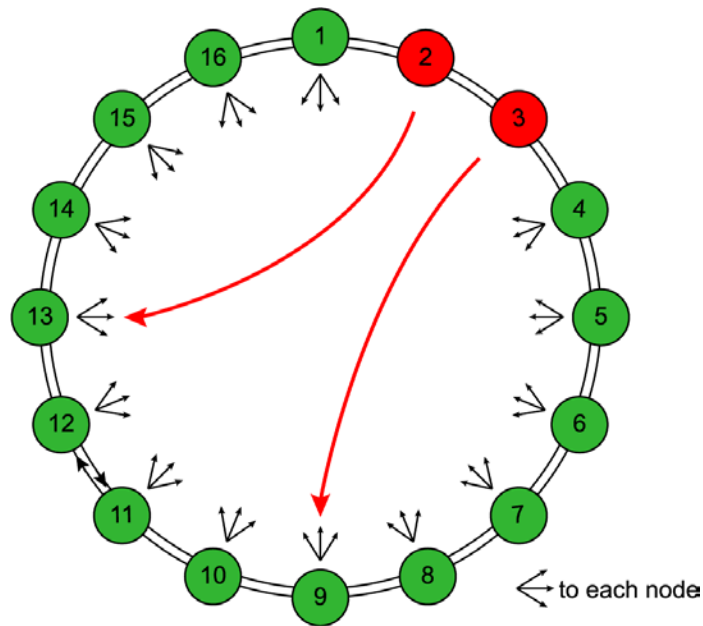


# Fairness and Traffic Classes (1)

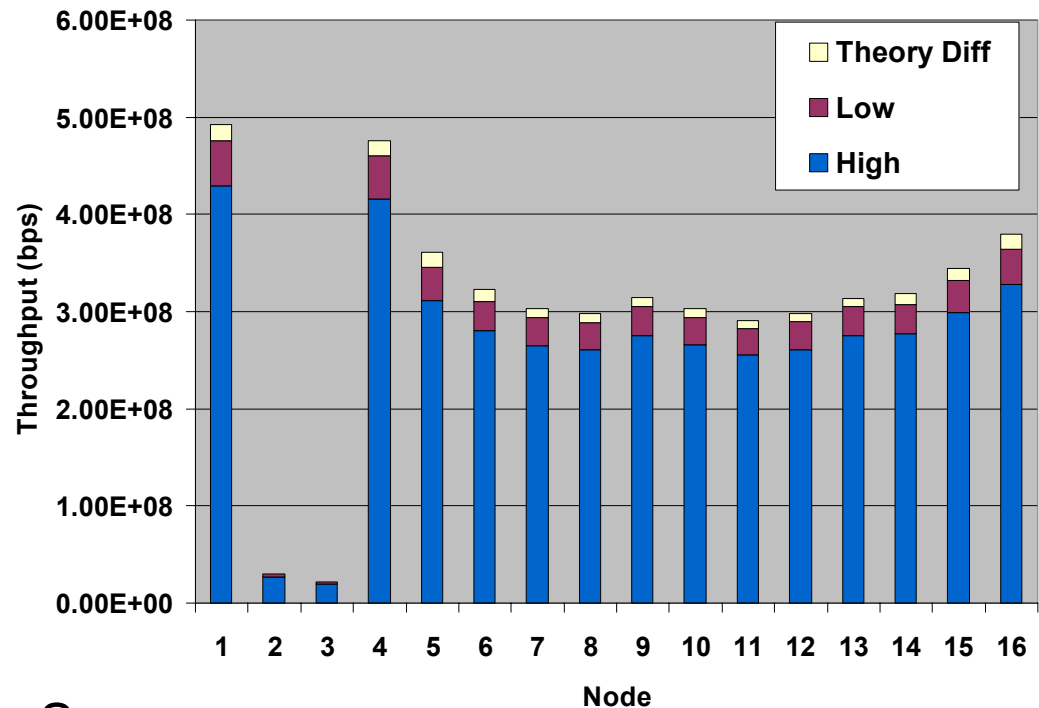


$\Sigma L$  : all low-traffic flows  
 $\Sigma V$  : all non-guaranteed high-traffic flows  
 $\Sigma G$  : all guaranteed high-traffic flows

# Fairness and Traffic Classes (2)



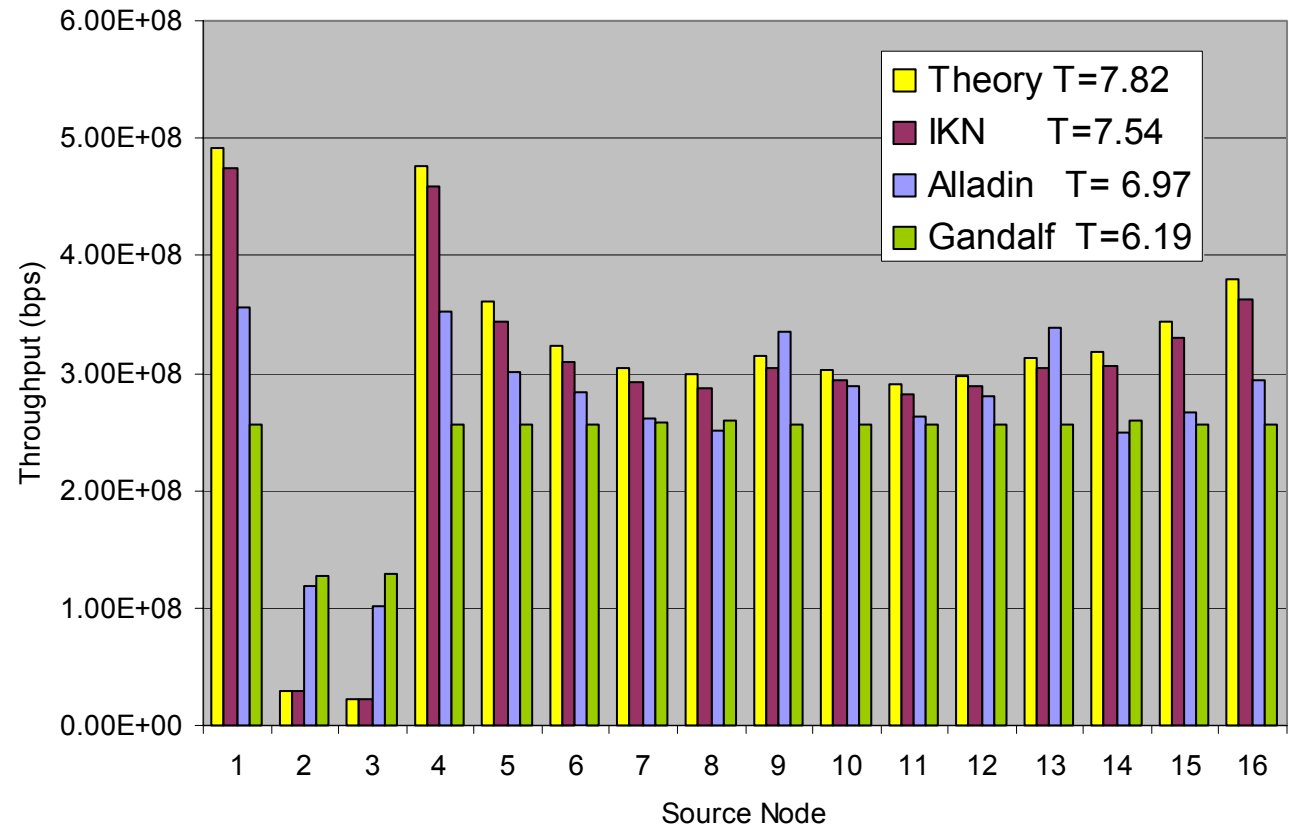
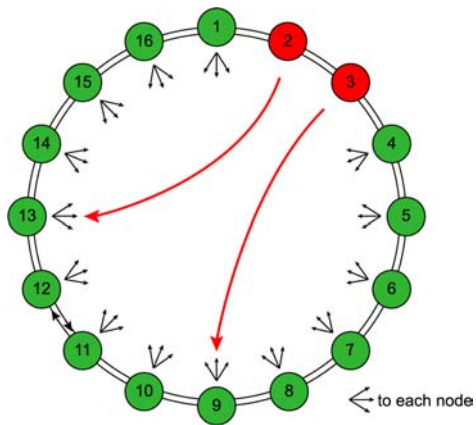
Throughput per Source Node



Saturated High and Low Traffic Sources  
100km OC-12 Ring

$$C' = 0.9 * C$$

# Performance Comparison



Saturated Low Traffic Sources  
100km OC-12 Ring

# Conclusions

---

- Pro-active mechanism
- The fairness algorithm assigns fair rates to all source-destination flows close to the maximum theoretical limit
- Fair rates for all traffic classes
- Supports multiple link capacities on a single ringlet
- Excellent throughput and delay performance