Pasquale Imputato
Tutor: Stefano Avallone
XXXI Cycle - I year presentation

Improving the performance of Wifi networks through innovative Active Queue Management algorithms

Background

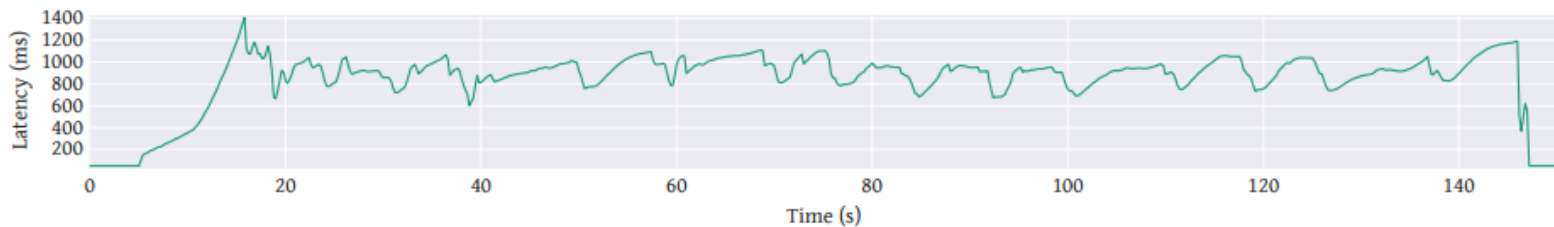- MS in Computer Engineering at University of Naples "Federico II"

- COMICS research group

- Fellowship of the University of Naples "Federico II"

Introduction

- An uncontrolled growth of the queuing time due to the excessive size of the buffers and the attitude of TCP to increase the sending rate until a packet is dropped
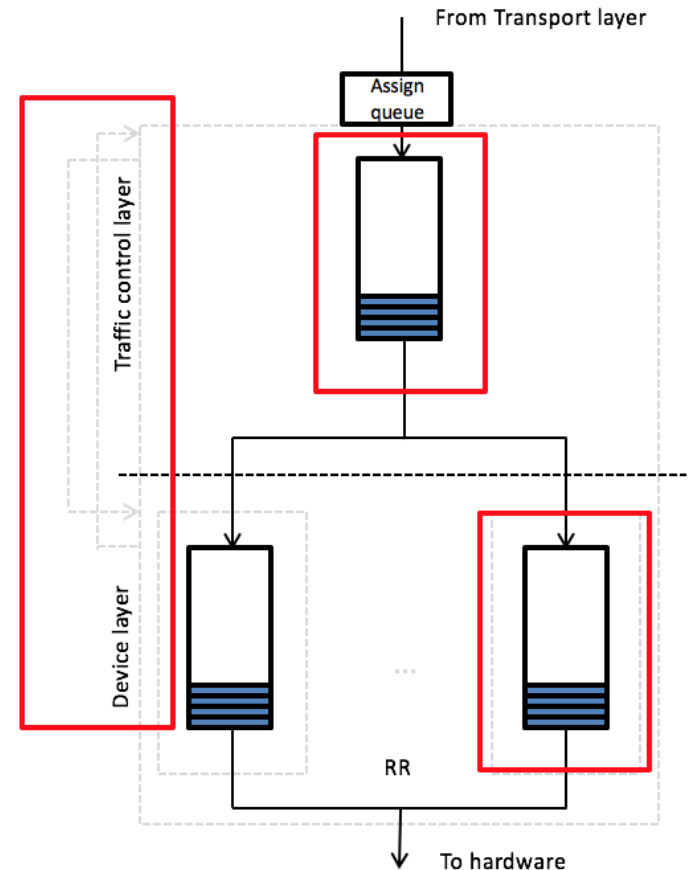- Recently coined the term bufferbloat[1]

- In Wifi networks, the bufferbloat problem is exacerbated by a number of peculiar mechanisms

[1]Vinton G. Cerf, "Bufferbloat and Other Internet Challenges", IEEE Internet Computing, vol. 18, no. , pp. 80, Sept.-Oct. 2014
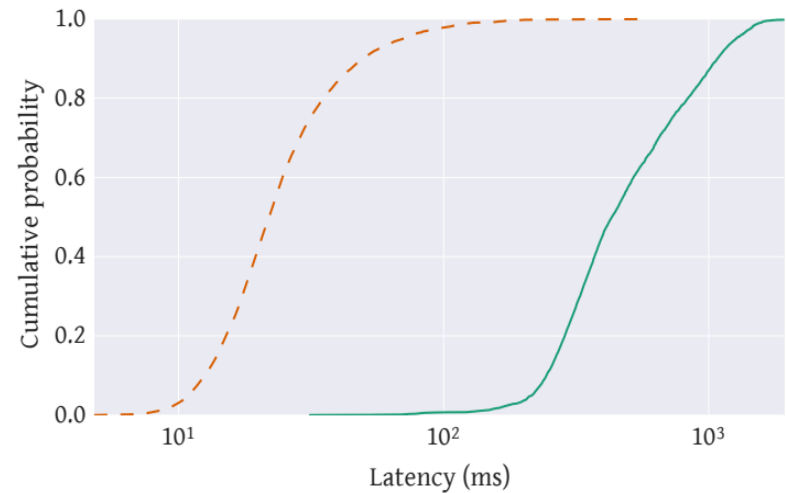
Packet queues

- ## Network layer
  - Scheduling, Active Queue Management (AQM)

- ## Device layer
  - Dynamic sizing

- ## Wifi peculiarity
  - Rate Adaptation Algorithm (RAA), Frame aggregation (FA)

From Transport layer

Assign queue

Traffic control layer

Device layer

RR

To hardware

Research activity

- Exploring dynamic sizing in Wifi
  - Meet the needs of RAA and FA

- AQM specifically designed
  - Information keep by RAA can be useful to AQM

- Activities supported by network simulation
  - Preliminary modelling and validation in ns-3

Products

- P. Imputato and S. Avallone. "Design and implementation of the traffic control module in ns-3". In Proceedings of the Workshop on Ns-3, WNS3 '16, pages 1-8. ACM, June 2016. **Best Paper Award**.

- P. Imputato and S. Avallone. "Evaluating the benefits of dynamically sizing the network device buffers through simulations". To be submitted to "Journal of Network and Computer Applications".

Next years

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| | Credits year 1 | | | | | | | | Credits year 2 | | | | | | | | Credits year 3 | | | | | | | | | |
	Estimated	bimonth 1	bimonth 2	bimonth 3	bimonth 4	bimonth 5	bimonth 6	Summary	Estimated	bimonth 1	bimonth 2	bimonth 3	bimonth 4	bimonth 5	bimonth 6	Summary	Estimated	bimonth 1	bimonth 2	bimonth 3	bimonth 4	bimonth 5	bimonth 6	Summary	Total	Check
Modules	20			3	5	6	8	22	10							0								0	22	30-70
Seminars	5	1,6	1	1	1,6		3	8,2	5							0								0	8,2	10-30
Research	35	4	7	7	4	4	4	30	45							0	60							0	30	80-140
	60	5,6	8	11	10,6	10	15	60,2	60	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	60	180