Impact of the COVID-19 pandemic on the Internet latency

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Thanks to my co-authors

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Info

- Presented in May at RIPE80 and released on arXiv
- Published in August in Computer Networks

ELSEVIER

Computer Networks

Available online 20 August 2020, 107495

In Press, Journal Pre-proof ⓘ

Impact of the COVID-19 pandemic on the Internet latency: A large-scale study

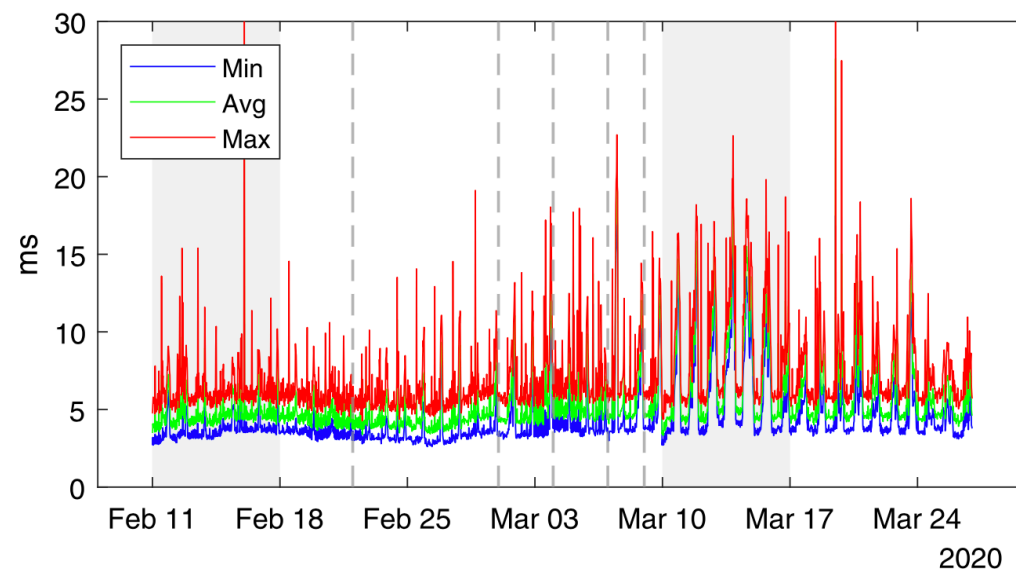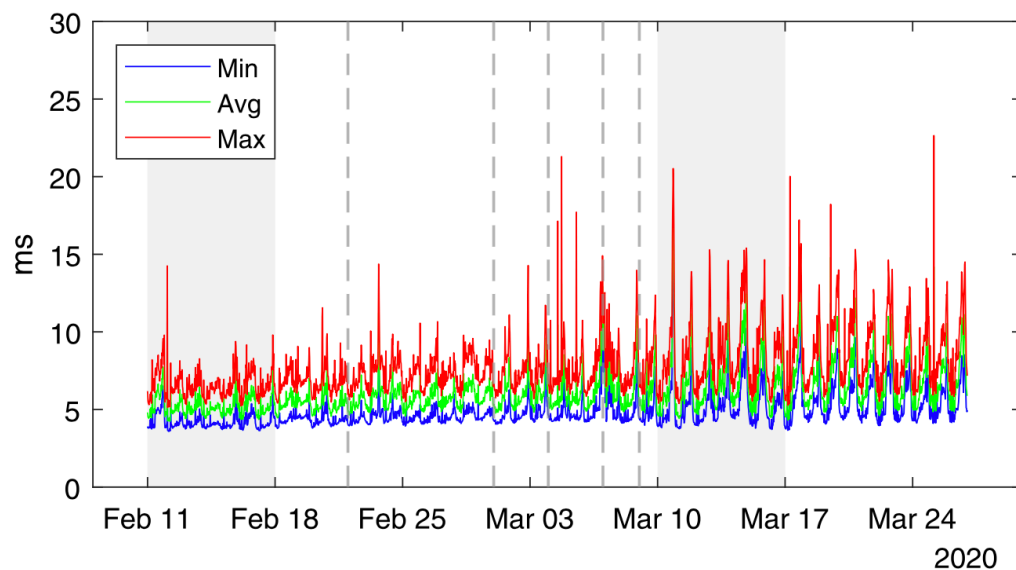Massimo Candela [a] ✉, Valerio Luconi [b] ✉, Alessio Vecchio [a] 🖎 ✉

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Goals

- We study the impact of the lockdowns on the Internet latency
  - Compare **before** and **after**
  - From a global point of view (no specific provider/IXP)
  - With a large dataset of measurements (**12+ billion samples**)
    - RIPE Atlas!!

- We consider the impact of:
  - The time of the day
  - The type of target (belonging to a content delivery network or not)
  - The version of the Internet Protocol
- Additionally, we provide numbers about:
  - Packet loss
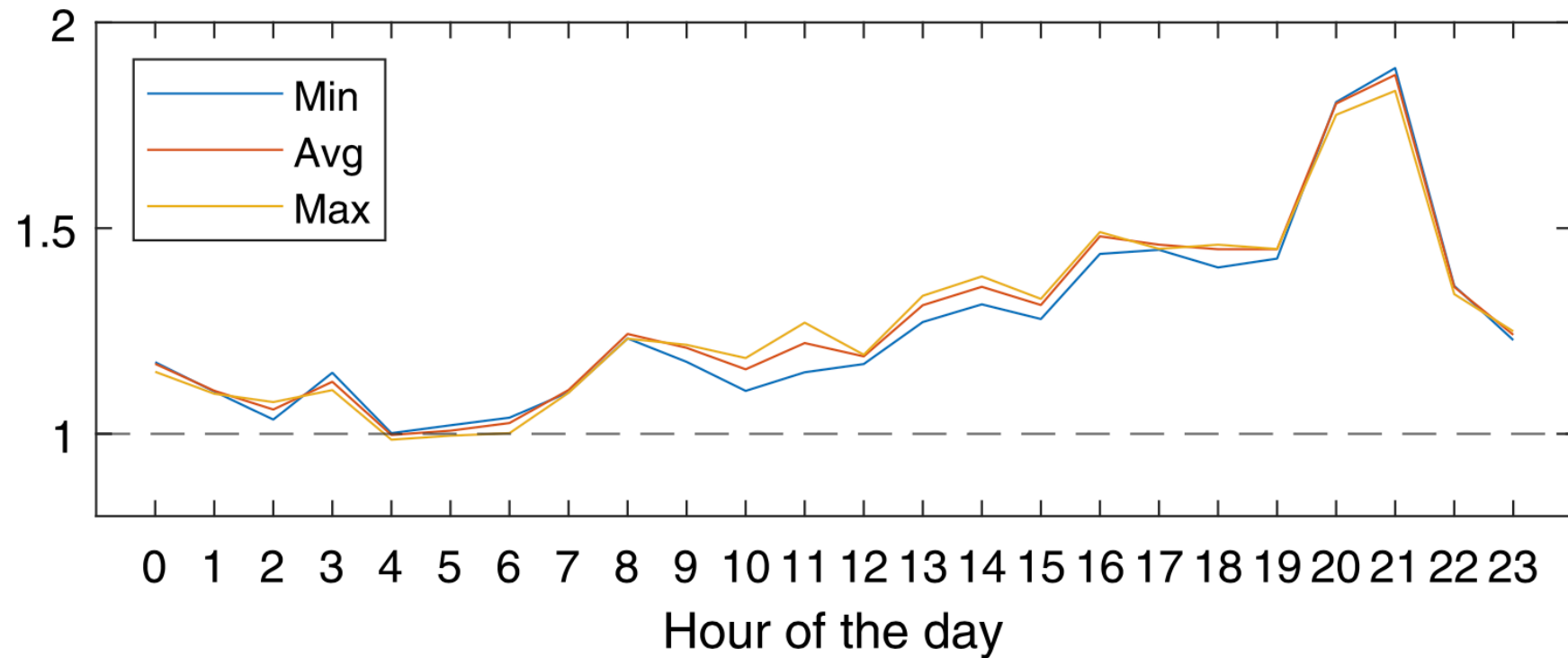 - Path changes
  - HTTP-based latency

Results for Italy

- We plot the increase of RTT above the minimum value collected for each source-target pair

- The grey areas are:
  - On the left, a week without lockdowns
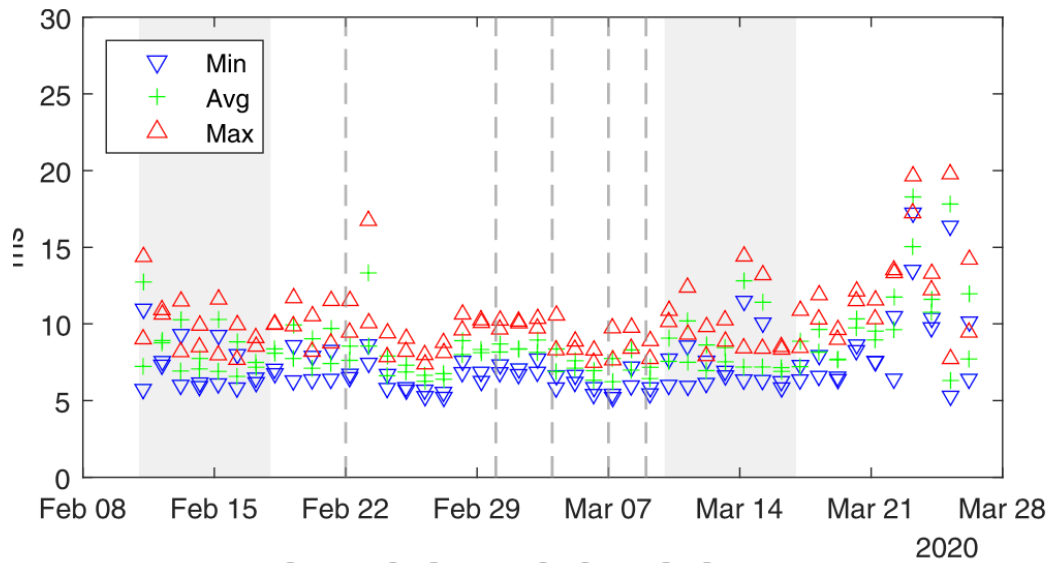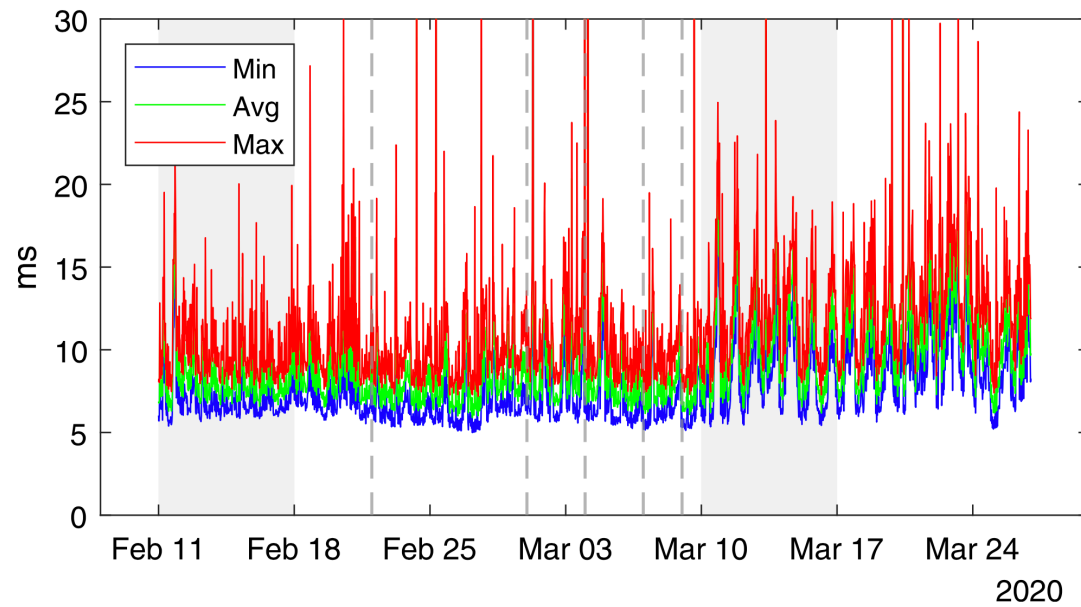 - On the right, first week of total lockdown

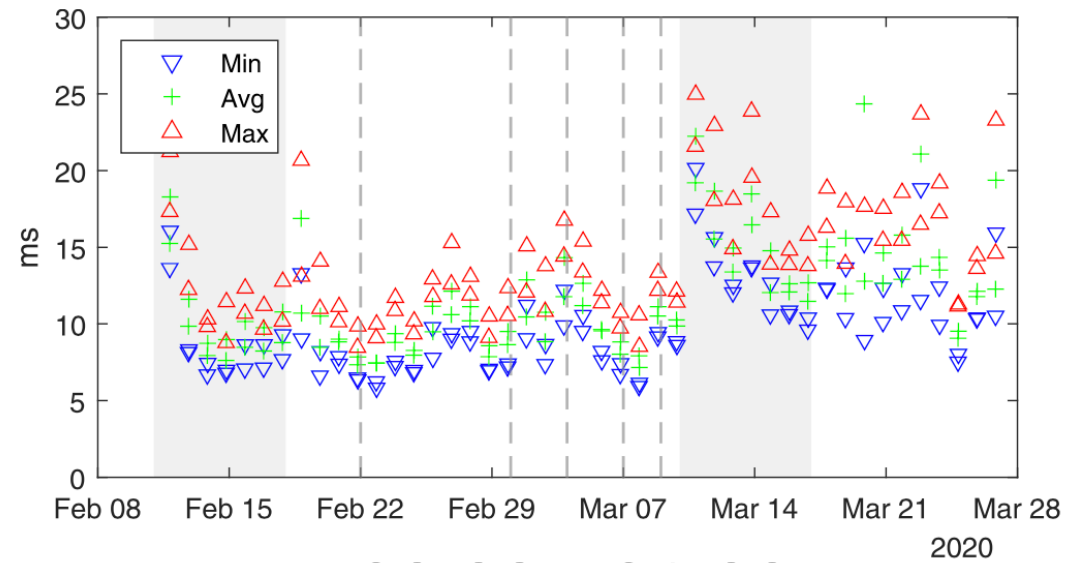| Date	Event
Date	*Event*
February 22	Some Italian municipalities involved in the COVID-19 outbreak are quarantined (~ 50 thousand people)
March 1	A larger number of Italian municipalities are quarantined (the so called "red zone"), while in others (the "yellow zone") schools, cinemas, sport events, and other gatherings are suspended
March 4	Schools and universities are shutdown nationwide
March 7	Several northern Italian regions are put on lockdown (approximately 16 million people)
March 9	All Italy is put on lockdown
March 14	Spain is put on lockdown
March 16	France is put on lockdown
March 22	Germany is put on lockdown

Remote working?

- Ratio (after/before), mean value

- **No! It's probably entertainment**

- Time is UTC

YouTube

05:00 - 06:00   20:00 - 21:00

Other Results

Country	Avg. increment (%)	Std. avg. increment (%)
Italy	66,8	280,8
Spain	63,2	19,3
France	0.5	49.6
Germany	34.1	88.7
Sweden	28.6	231.7

Questions?

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