Congestion Control for Haptic Communication

❑ Rationale:

– Human-centric technologies (for individuals)

– However, network devices doesn't consider the delay constraints
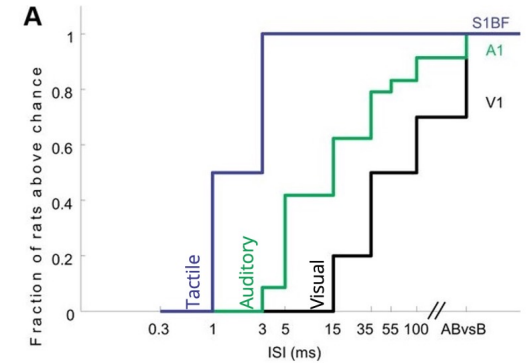of different individuals and applications (data, video, audio, and haptic)

❑ Aim:
Differentiate traffic flows according to their priorities
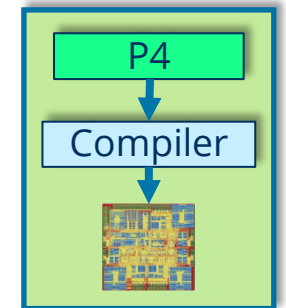
❑ Technology:
Programmable network devices (e.g., with P4 & Intel's Tofino)

❑ Tasks:

1. Build a simulation framework for evaluating haptic communication

2. Implement a novel algorithm, e.g., active queue management (AQM)
in combination with end-to-end control algorithm

3. Conduct experiments to compare performance with the state-of-the-art

Programmable
network device

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Dresden // 06.2022

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References

- ❑ P4: https://p4.org
- ❑ P4 language tutorial: https://opennetworking.org/wp-content/uploads/2020/12/P4_tutorial_01_basics.gslide.pdf
- ❑ Tofino: https://www.intel.com/content/www/us/en/products/network-io/programmable-ethernet-switch.html
- ❑ For further detail:
  - ❑ (RFC) Controlled Delay Active Queue Management: http://pollere.net/Pdfdocs/draft-02.pdf
  - ❑ (paper) P4QoS: QoS-based Packet Processing with P4: https://ieeexplore.ieee.org/document/9492539
  - ❑ (paper) Analysis and design of the google congestion control for web real-time communication (WebRTC) https://doi.org/10.1145/2910017.2910605
  - ❑ (paper) Congestion control for web real-time communication https://doi.org/10.1109/TNET.2017.2703615

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