

GAMES AND FRAMES: A STRANGE TALE OF QoE STUDIES

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Open-Minded

Florian Metzger*, Tobias Hoßfeld*, Albert Rafetseder†, Christian Schwartz

* Chair of Modeling of Adaptive Systems, University of Duisburg-Essen, Germany

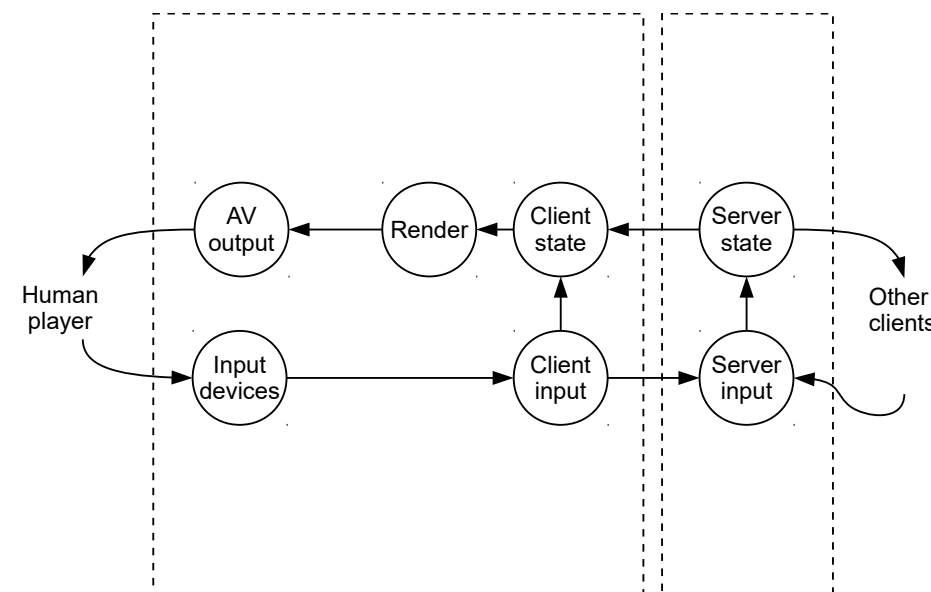
† NYU Tandon School Of Engineering, New York, United States of America

Motivation

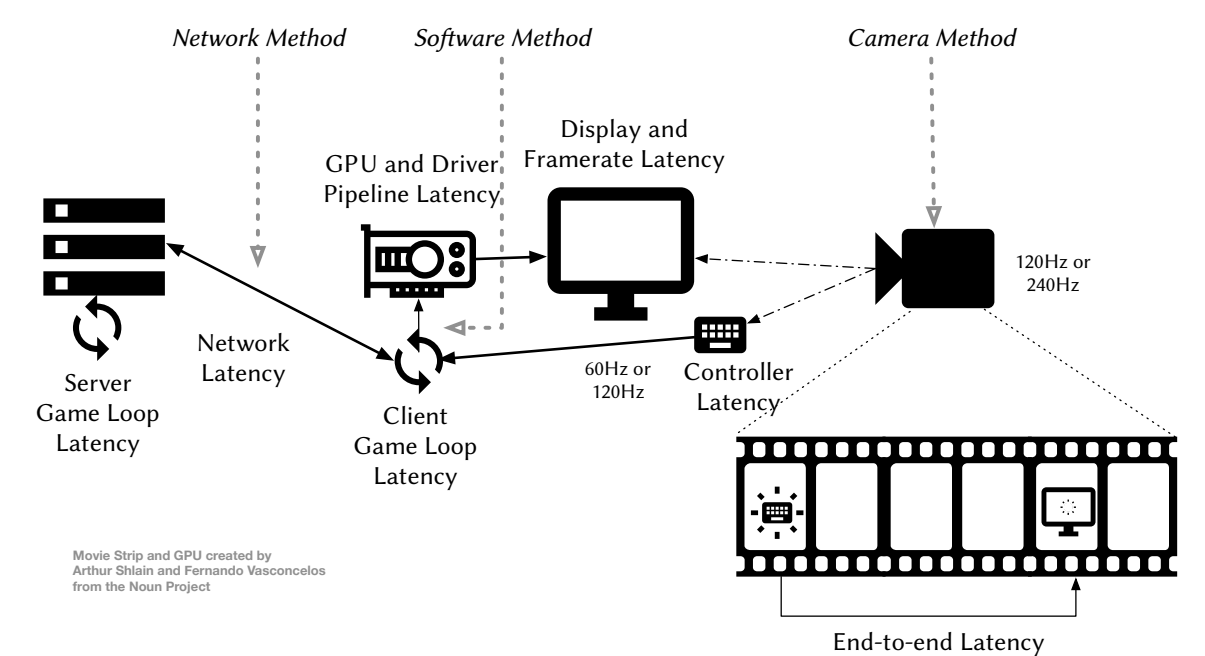
- Increasing research interest for video game QoS/QoE
- Past approaches treated video game QoE assessments similar to video streaming
- Networked video games have difficult-to-understand interlocked mechanics (frame and tickrates, lag, ...)
- Singular focus on network delay
- Need for a better theoretical understanding of these mechanics

Frame- and Tickrates

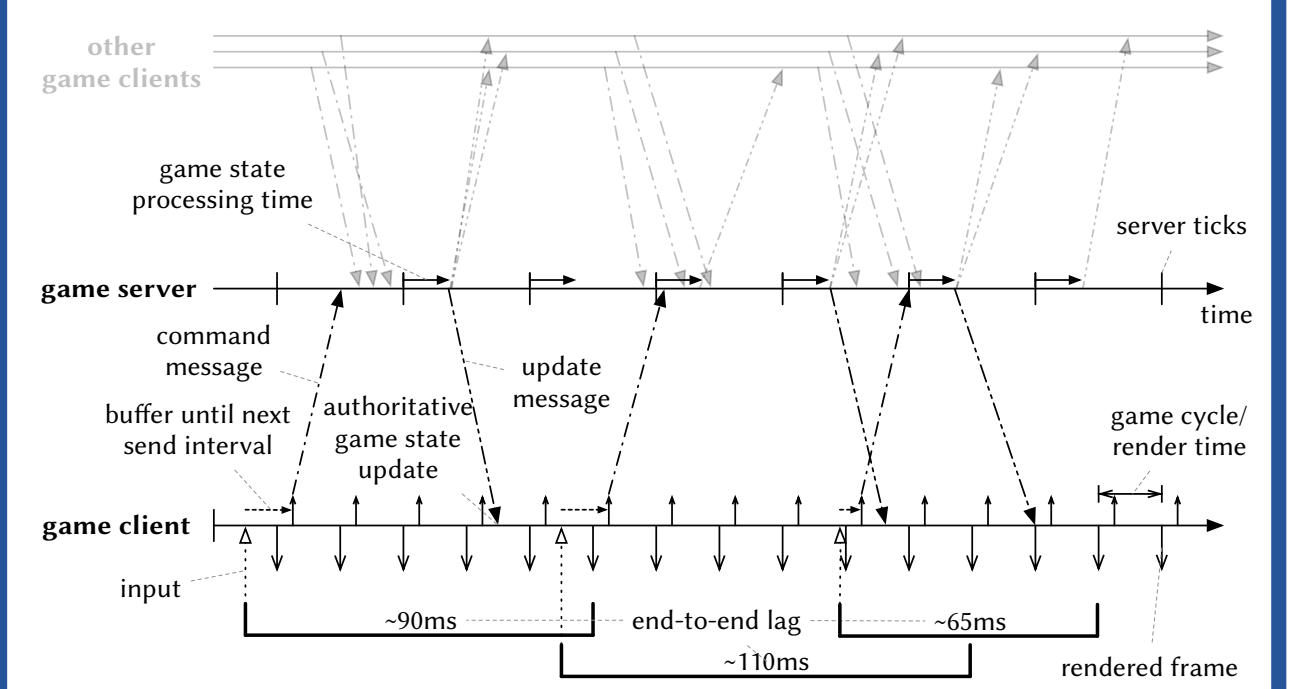
- Framerate and tickrate governings factor in input latency
- Independently clocked processes in networked games



Sources of Lag



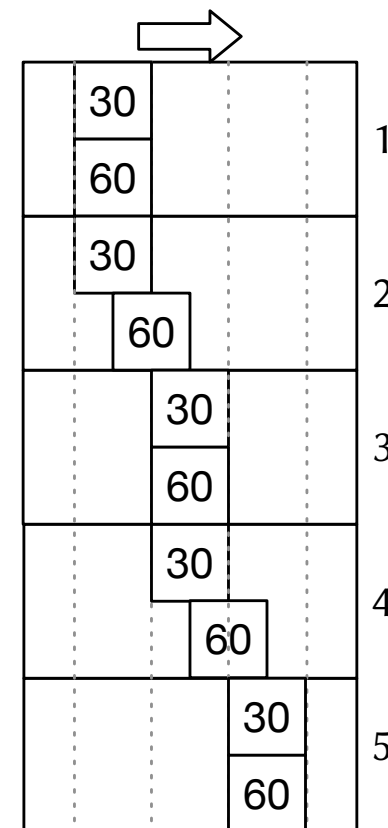
- Every game is influenced differently by lag and its sources
- Lag has different effects on gameplay
- Lag distribution through inter-arrival time distributions and clocked processes
- Different vantage points to observe lag



Issues of Past Studies

Examples of issues in past gaming QoE studies:

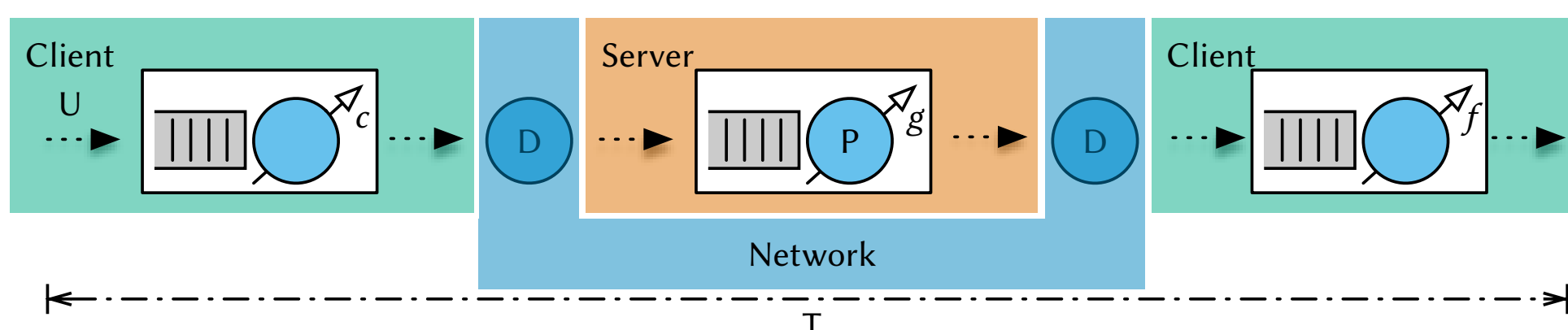
- Framerates insufficient for motion perception (3, 7, 15Hz), also increasing latency; but still observing acceptable quality
- Wrong choice of metrics (e.g. timescale-wise)
- Lack of training sessions and too short observation period
- No understanding of core gameplay mechanics
- Inability to generalize results from specific games



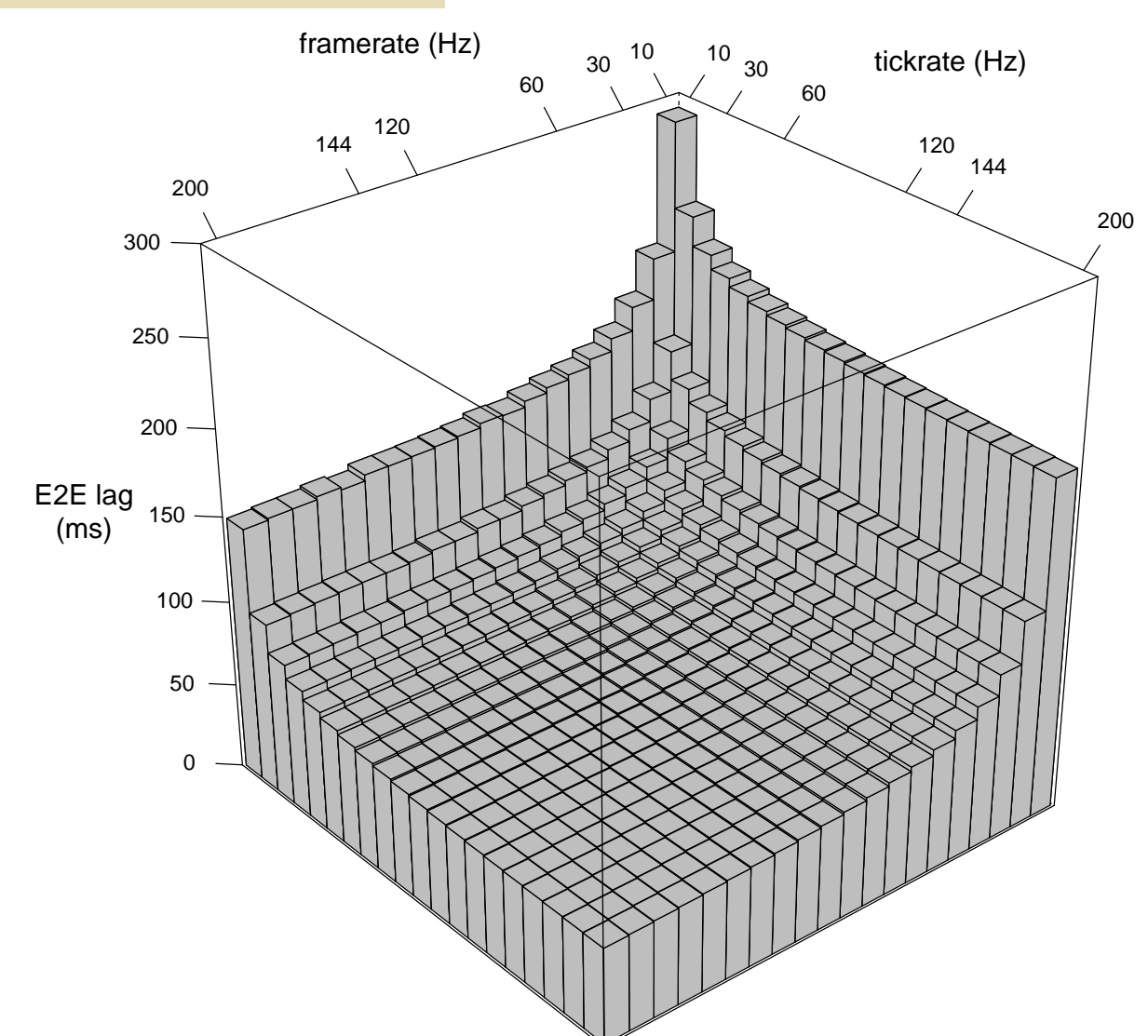
Motion perception in video (and games) follows the concept of "apparent motion", kicking in at ~16Hz

Modeling and Simulating Lag

- End-to-End lag sources modelled as a queuing system
- Goal: investigate influences of sources previously not directly attributed to lag: framerate, tickrate, client/server message rates
- Interaction of multiple, independently clocked processes plays a significant role
- Generic model allows mapping the above game types by adding or removing delay components.
- Extension for cloud gaming: further clocked processes and for video en-/decoding
- Increase level of realism by determining correct parametrization of model entities
- Implement model in GNU R simulation, run studies for different game types

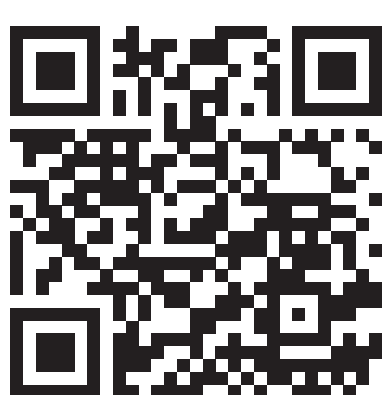


Results



Evaluation of the networked game case for 10-200Hz frame/tickrates, ~40ms base network RTT

- Large influence of frame/tickrate on E2E lag
- Network influence is negligible if frame/tickrate low
- Lowering the framerate has a bigger impact than lowering the tickrate
- Guidelines for future user study parametrizations!



Further information, the full paper, all data as well as source code can be found at
<https://github.com/mas-ude/onlinegame-lag-sim>,
contact florian.metzger@uni-due.de,
or just scan the QR-code.

References and Acknowledgements:

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