**PRIVA-STREAM: Private Collaborative Streaming**
Simon Da Silva
Univ. Bordeaux, LaBRI, France

### Video content consumption

- 24% CAGR 2016-2021
- Exabytes per month
- Gaming (1%, 4%)
- File Sharing (8%, 3%)
- Web/Data (18%, 11%)
- VoD (22%, 13%)
- Internet Video (51%, 67%)

### PRIVA-STREAM idea

- Reliability, QoE and scalability
- MS-Stream: Multiple-Source adaptive streaming over HTTP
- Incentive to contribute
  - Rewarding: contributing users get a higher quality
- End-users privacy
  - TEE (SGX): encryption, NAT and anonymity

### PRIVA-STREAM overview

#### Content Delivery Networks (CDN)

#### HTTP Adaptive Streaming (HAS)

#### MS-Stream: Multi-Source Streaming over HTTP

- Sub-segment request
- Sub-segment delivery
- Sub-segment composition
- Sub-segment aggregation
- Adaptation

### Problem statement

- Reduced scalability cost
- High reliability
- P2P
- HAS
  - Game streaming services
  - 4K virtual reality
  - High QoE

### PRIVA-STREAM early results

**Experiment:** Four clients joining the system sequentially

- Startup delay per client (s) - MS-Stream (top) vs PRIVA-STREAM (bottom)

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https://simondasilva.fr
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contact@simondasilva.fr