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# Build an ultra-low latency OTT streaming TV station: with Raspberry Pi as encoder and Akamai as CDN


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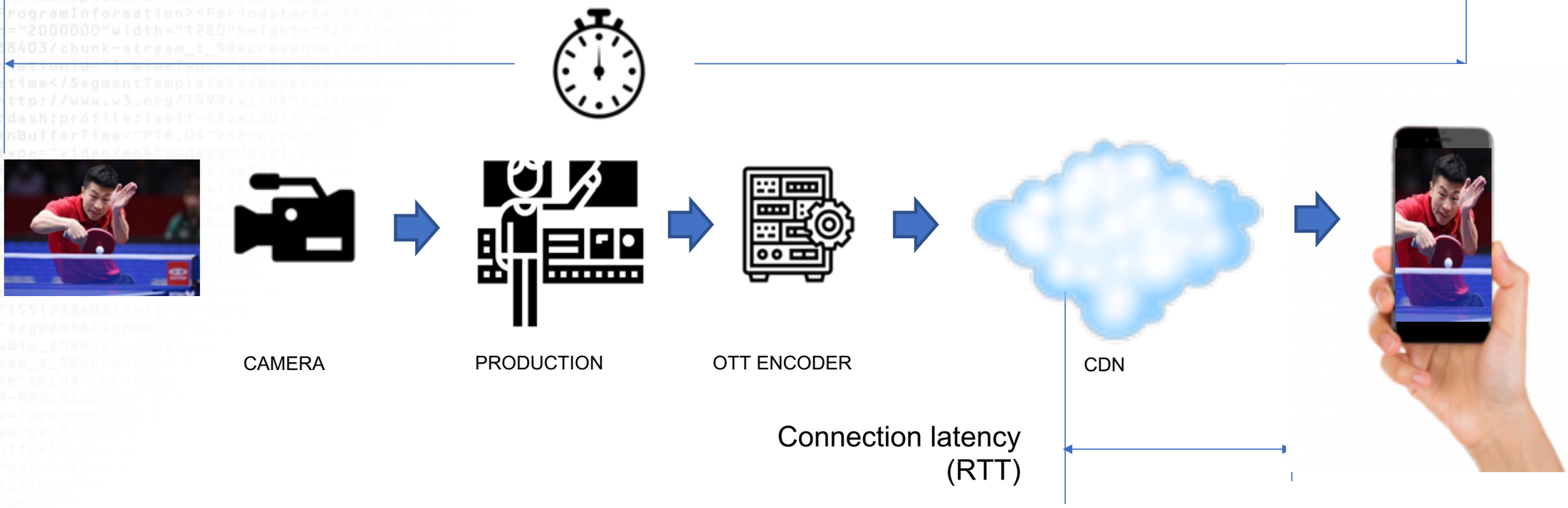
# Live stream latency

Live stream latency = end-to-end latency = glass-to-glass latency = hand-waving latency

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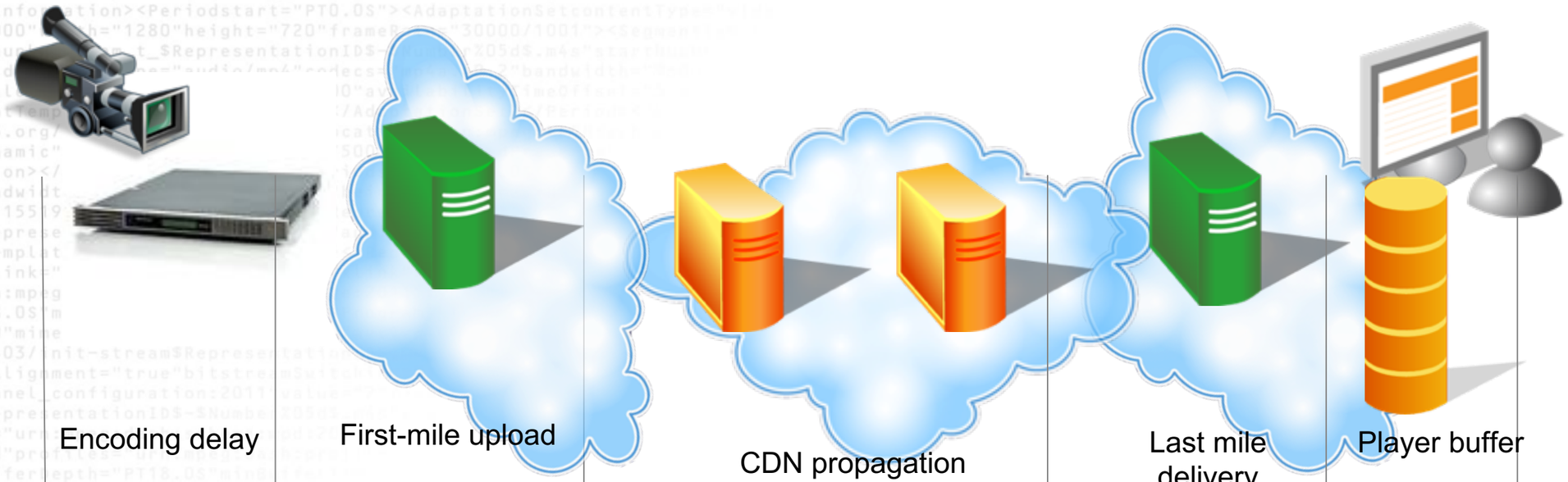
2019

# Components of latency in live stream segmented media delivery



| | Encoding delay | First-mile upload | CDN propagation | Last mile delivery | Player buffer | Total |
|---|---|---|---|---|---|---|
| | Min(1xD, 5) | 0.25xD | 1xD | 0.25xD | 3xD | 5.5xD |
| 10s | 5 | 2.5 | 10 | 2.5 | 30 | 50s |
| 2s | 2 | 0.5 | 2 | 0.5 | 6 | 11s |

D = Segment duration

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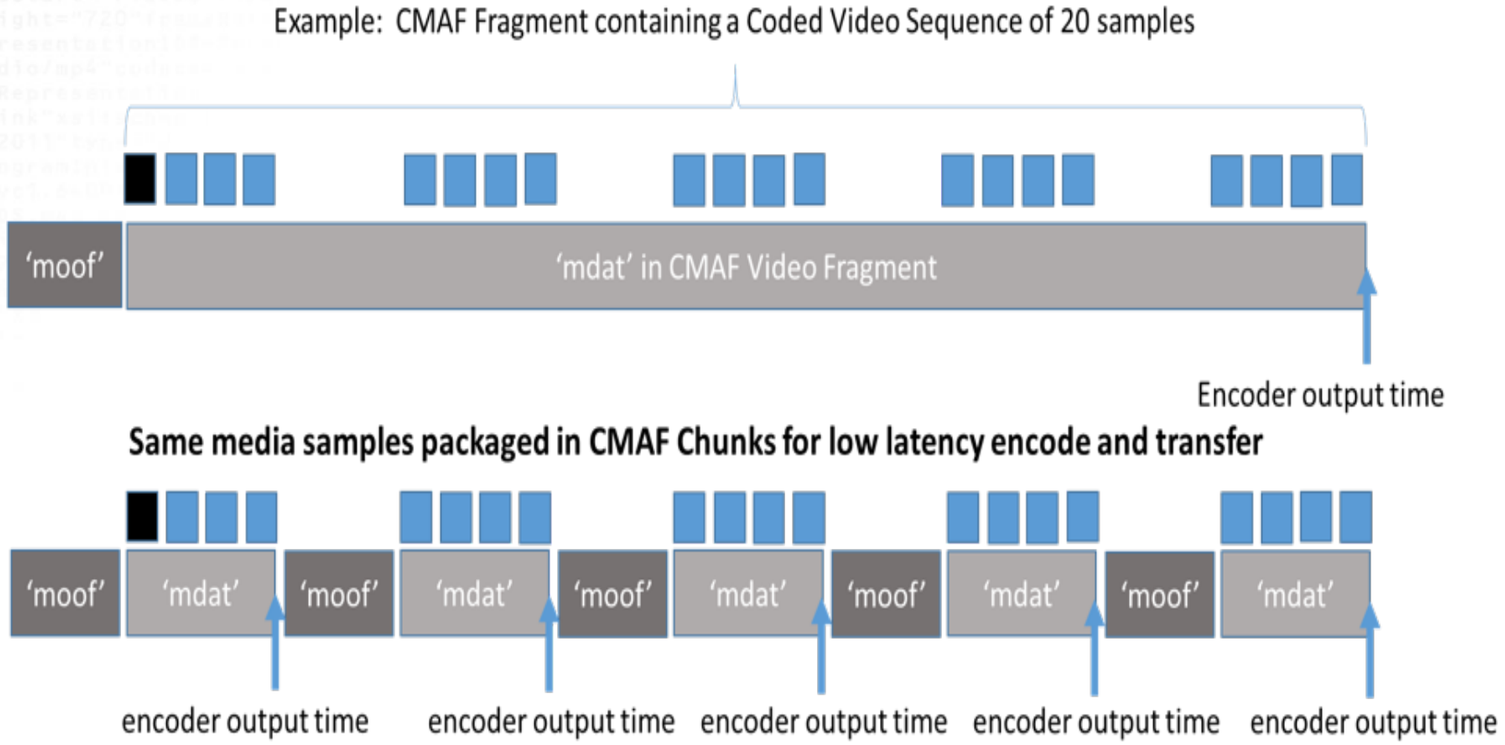
# Super Bowl 2019: Measured Lag Behind Real-Time

Comparing various streaming sources with the on-field game

Conclusion: Viewers on all platforms are significantly delayed, leading to spoilers and a degraded user experience.

# CMAF Low Latency Chunks




*[Image credit deep inside MPEG somewhere, possibly Kilroy Hughes]*

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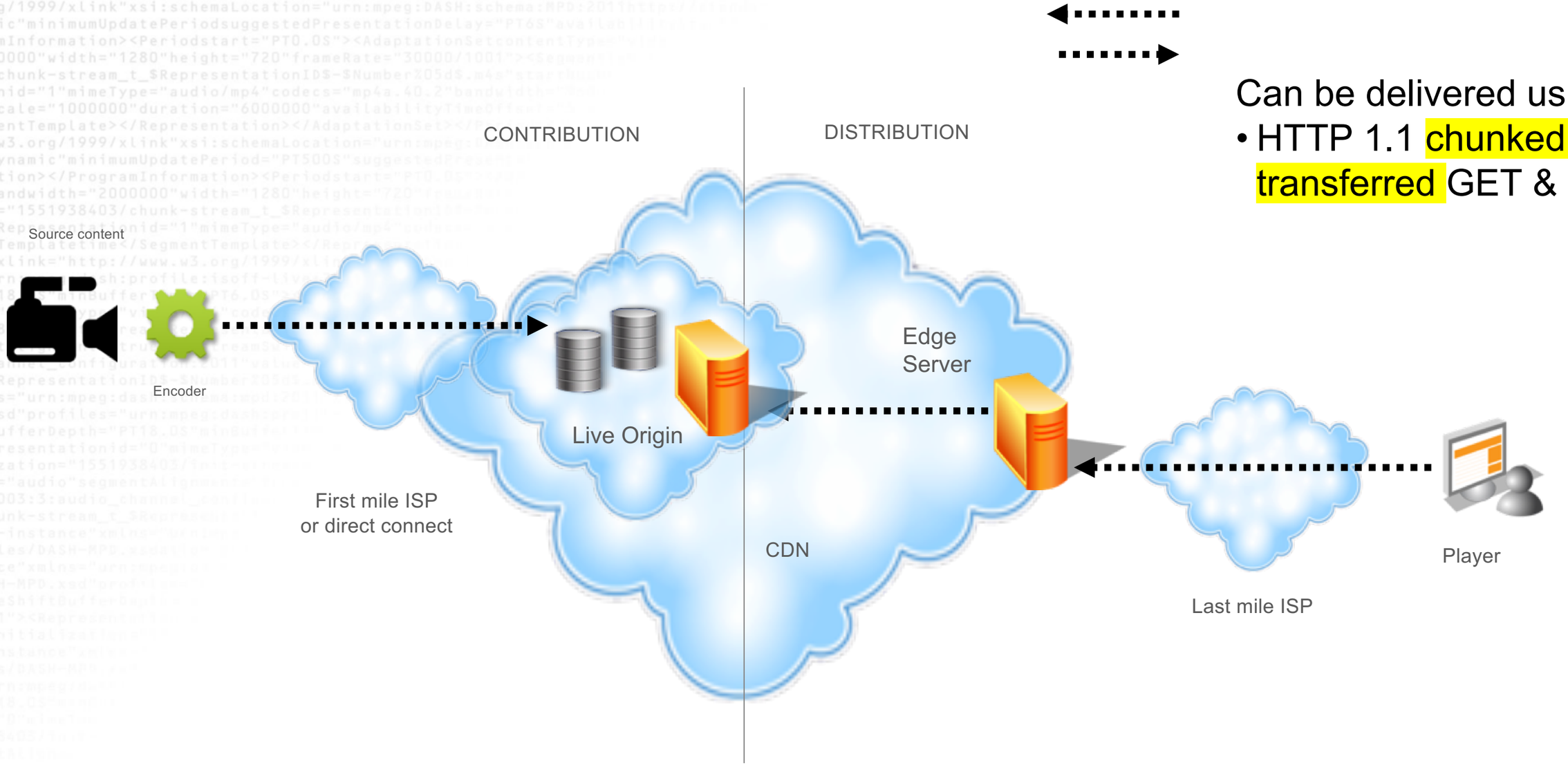
# Distribution Architecture




Can be delivered using:

- HTTP 1.1 chunked transferred GET & POST

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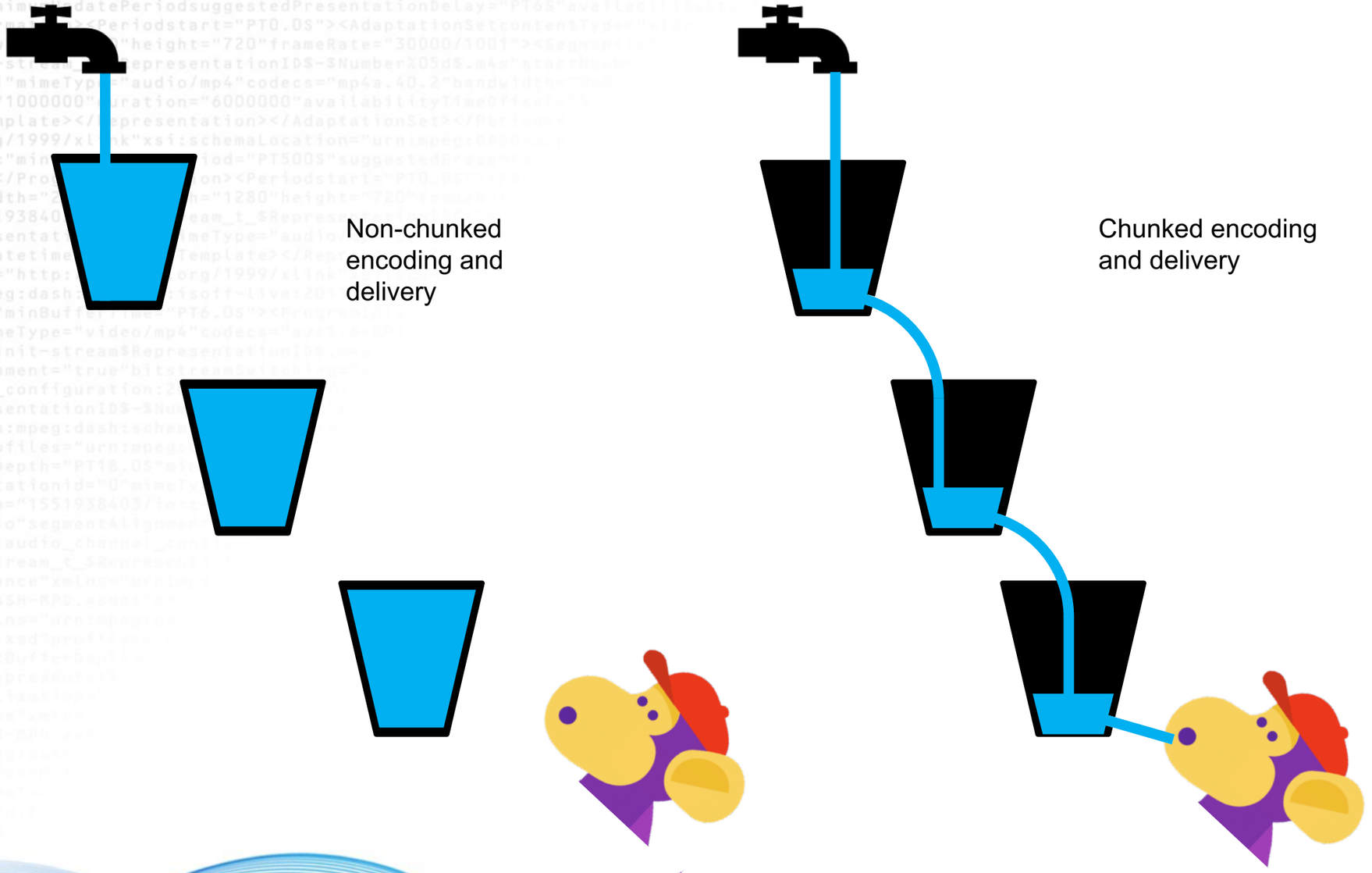
# Bucket analogy for chunked encoding and transfer

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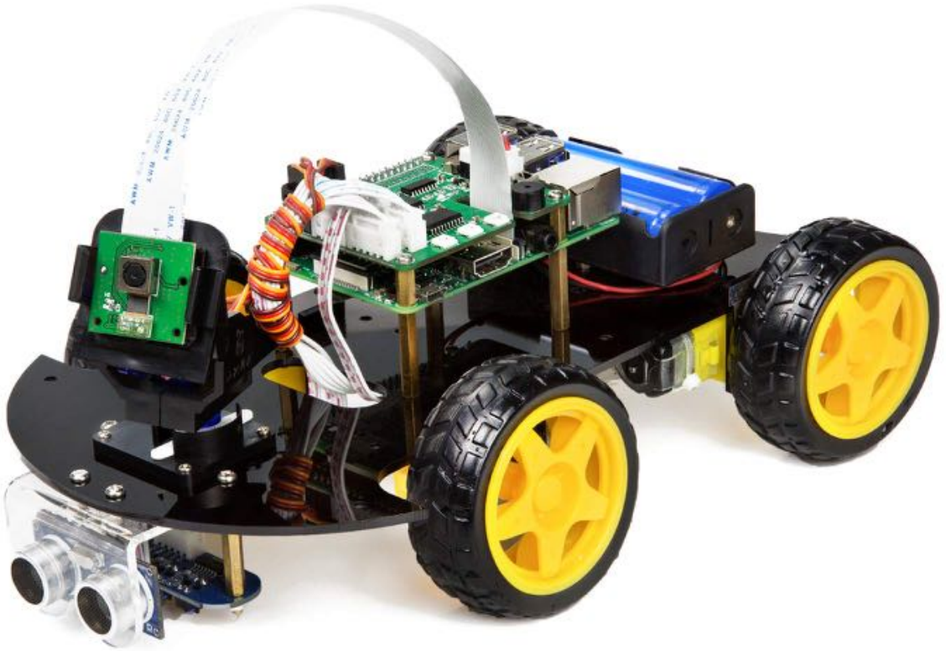
# Live demo



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# Executive Summary

- ✓ Audience wants the epic moment in no time.
- ✓ Keeping shortening segment duration isn't a sustainable approach.
- ✓ You don't need a supercomputer as your video encoder.
- ✓ Chunk-encoded-chunk-transfer can achieve 3 sec end-to-end latency!

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THANK YOU