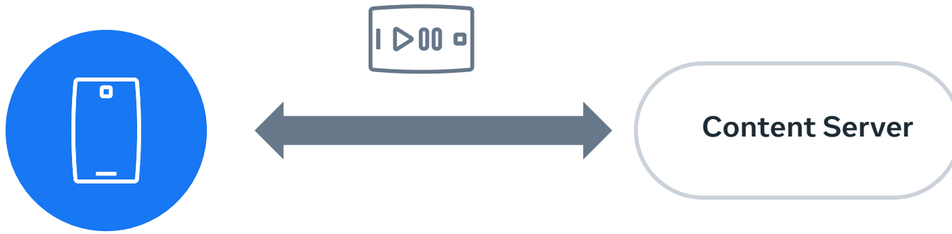
Adaptive Video Traffic Shaping Problems

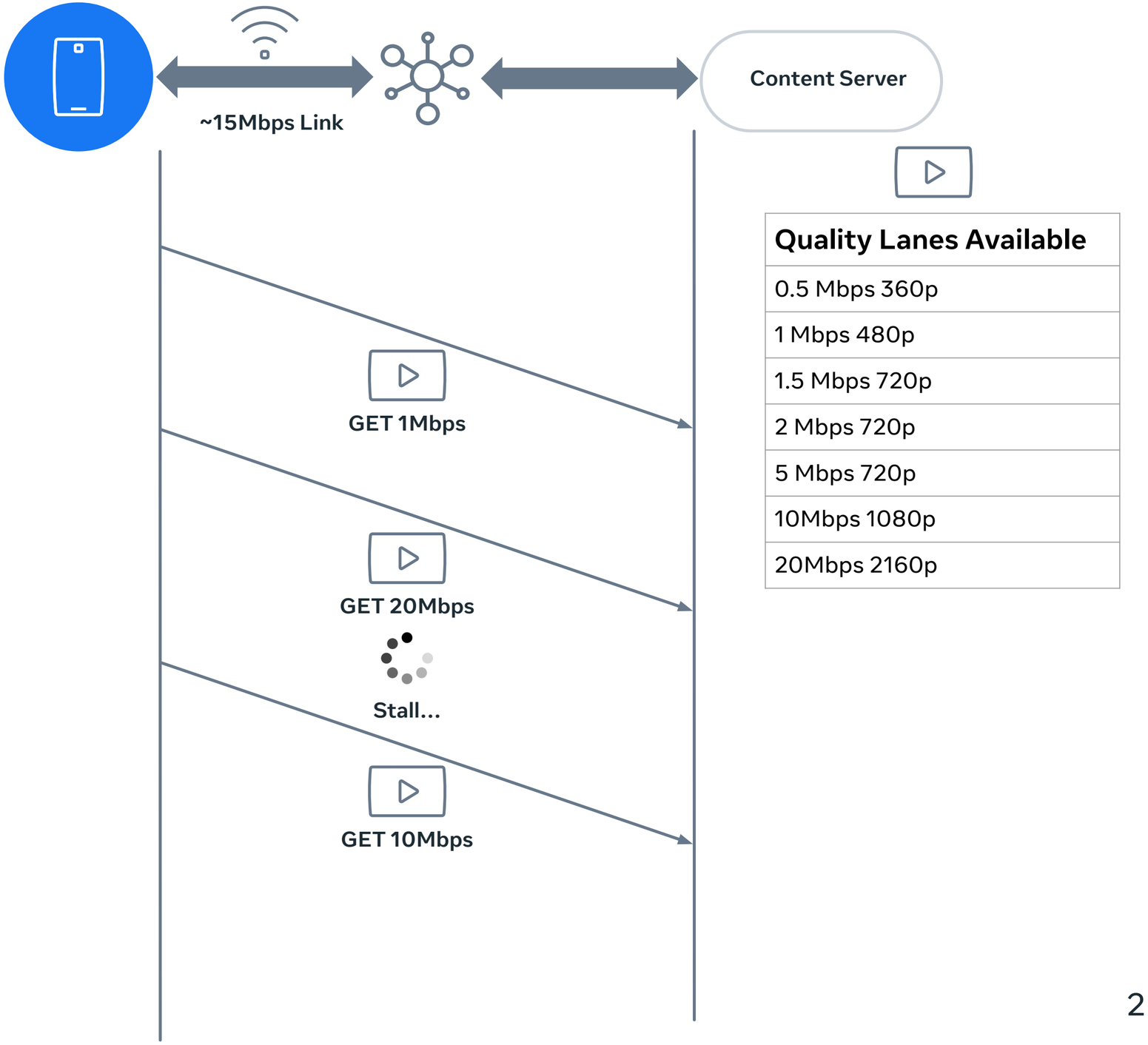
- Extremely common CSP (mobile, satellite, cable) practice.
- Shaper typically implemented as Token Bucket Filter
- Configured so player adapts video to target bitrate (e.g. 2Mbps)



Adaptive Bitrate Video w/o Shaping

Modern ABR schemes can vary video quality requested per segment (e.g. HLS or DASH).

Adapts quality of media being fetched to try to maximize bitrate without stalling based on measured bandwidth.



Quality Lanes Available
0.5 Mbps 360p
1 Mbps 480p
1.5 Mbps 720p
2 Mbps 720p
5 Mbps 720p
10Mbps 1080p
20Mbps 2160p

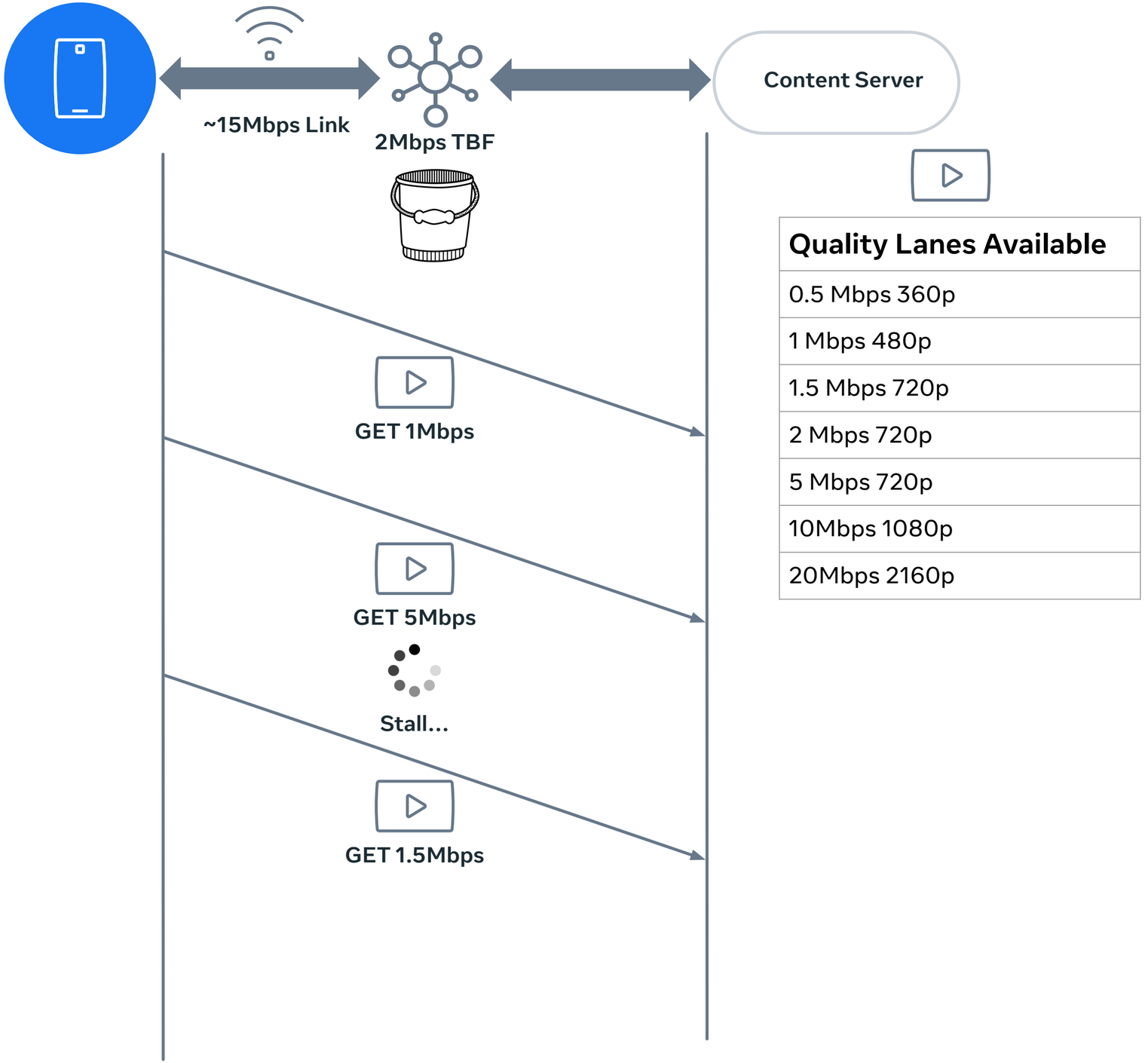
Adaptive Bitrate Video w/ Shaping

Video in particular can be expensive for operators and users.

Under congestion or to avoid plan overages, operators apply traffic shaping

Desired network outcome: ABR selects 2Mbps.

However, there are still stalls and unideal outcomes.



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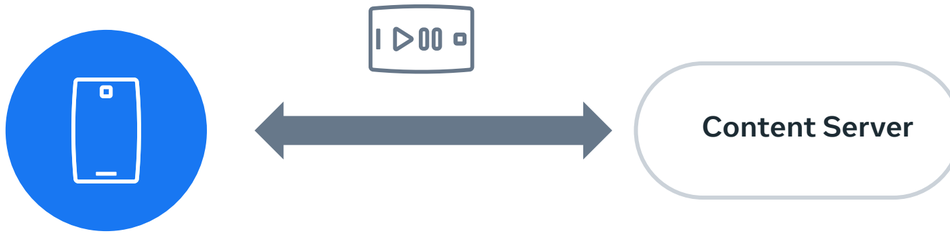
It works but…

- The limit imposed by the TBF is *artificial* – the path could have instantaneously provided more bandwidth, leading to periods of underutilization and difficulty for radio equipment to optimize spectrum usage.
- ABR schemes are not perfect and don’t converge quickly, causing poor user experience and stalling as it “ping pong” between qualities.
- General purpose congestion controllers are application agnostic, are designed for simple queueing and often make the “ping ponging” worse.



Adaptive Bitrate Video w/ Agreed Bitrate Cap

Video content provider and the operator agree to an instantaneous maximum quality.

Operator communicates that to media player.

The shaper is removed or “dialed back”.

Less stalling and better utilization of network resources.

Quality Lanes Available
0.5 Mbps 360p
1 Mbps 480p
1.5 Mbps 720p
2 Mbps 720p
~~5 Mbps 720p~~
~~10Mbps 1080p~~
~~20Mbps 2160p~~

SCONEPRO!

- We can do better with explicit cooperation!
- Encryption of explicit signal
- Focused on Video Playback over QUIC.
- BOF Thursday Session I
- Chat w/ Matt Joras / Marcus Ihlar