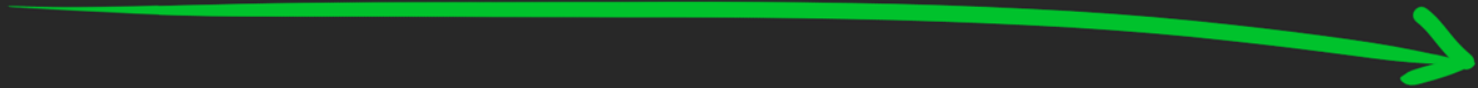


Media over QUIC



It me

Luke Curley @kixelated

ex Twitch / Amazon IVS

now MoQ Enthusiast

Whats Wrong?

WebRTC: real-time only

RTMP/SRT: contribution only

HLS/DASH: distribution only

? WHY?

Media Encoding

example



How does this get transmitted?

Latency Theory

How does a protocol behave
during congestion?

RTMP

TCP

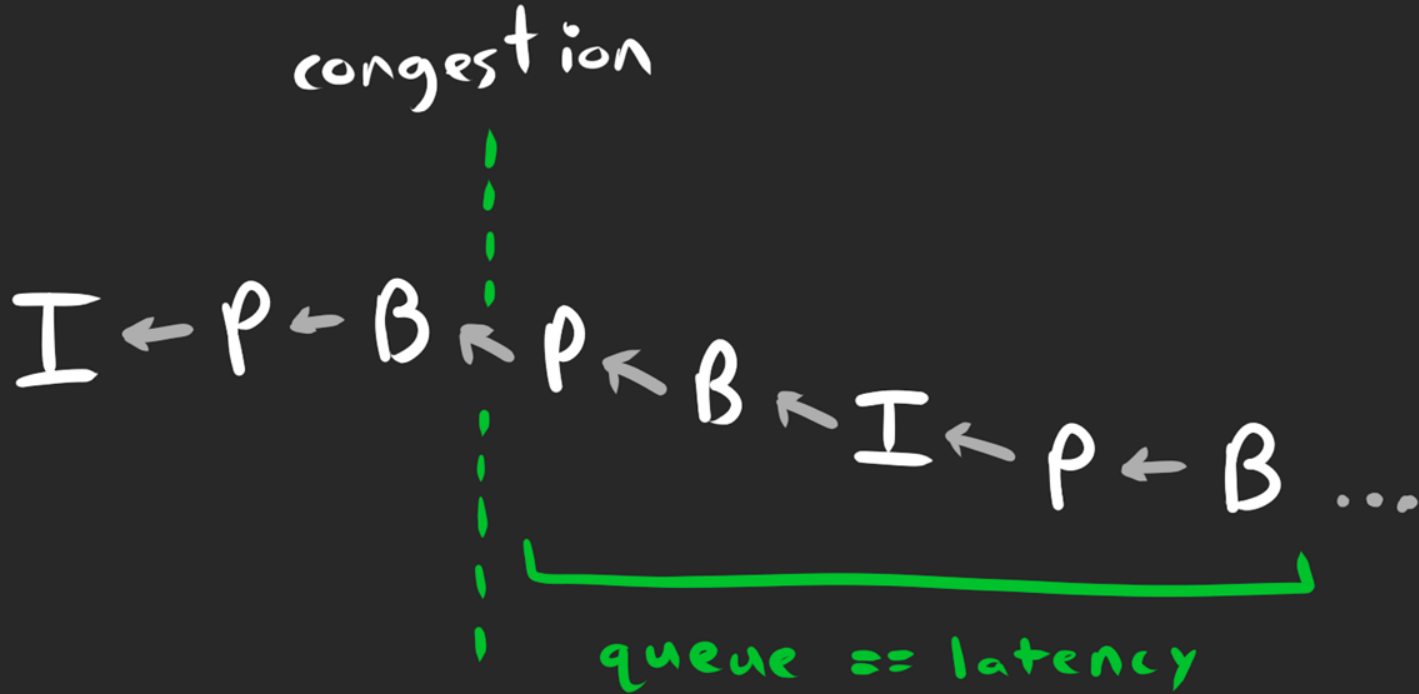
congestion

reduce bitrate



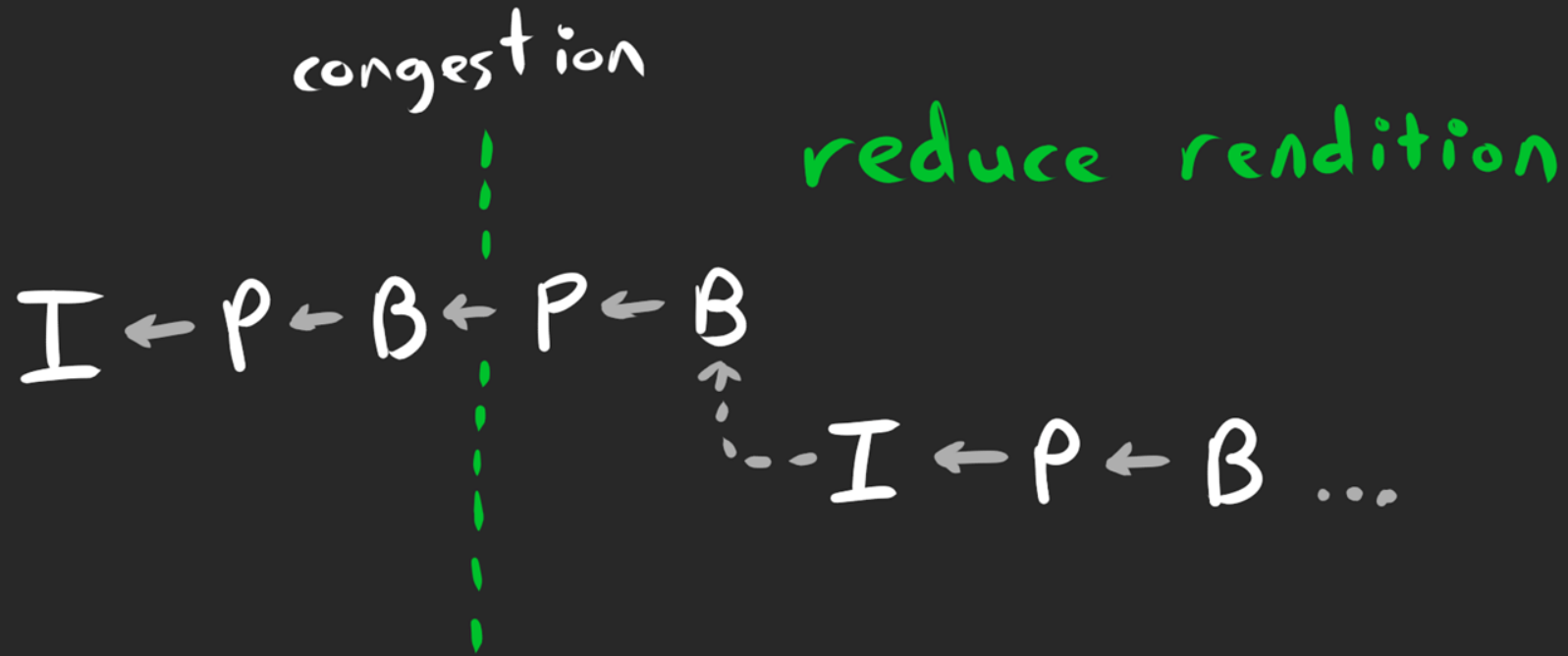
RTMP

TCP



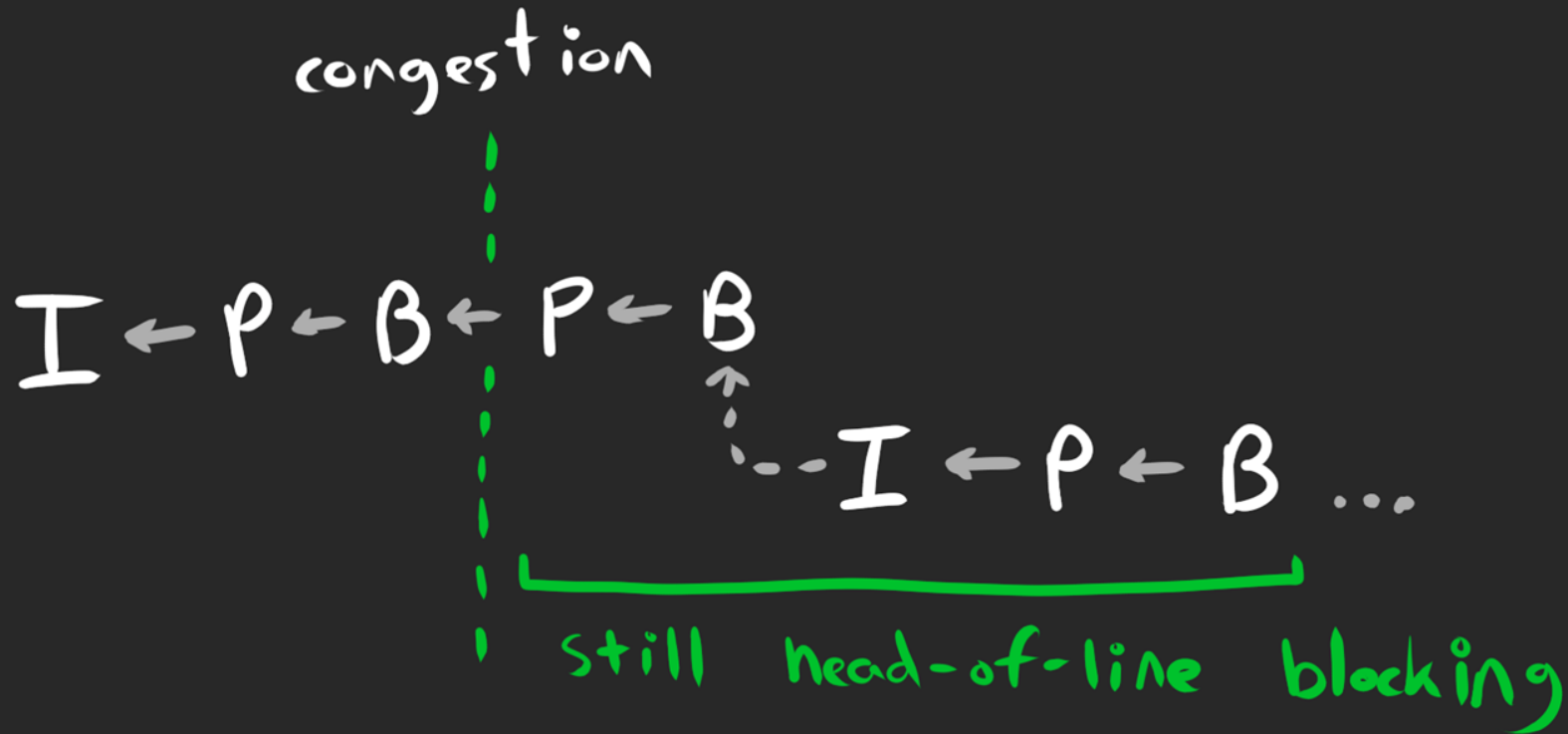
HLS / DASH

HTTP



HLS / DASH

HTTP



WebRTC / SRT

UDP

congestion



drop packets



WebRTC / SRT

UDP

congestion

11 13 14

~~13~~

~~14~~

11

13

14

fixed latency

WebRTC / SRT

UDP

congestion

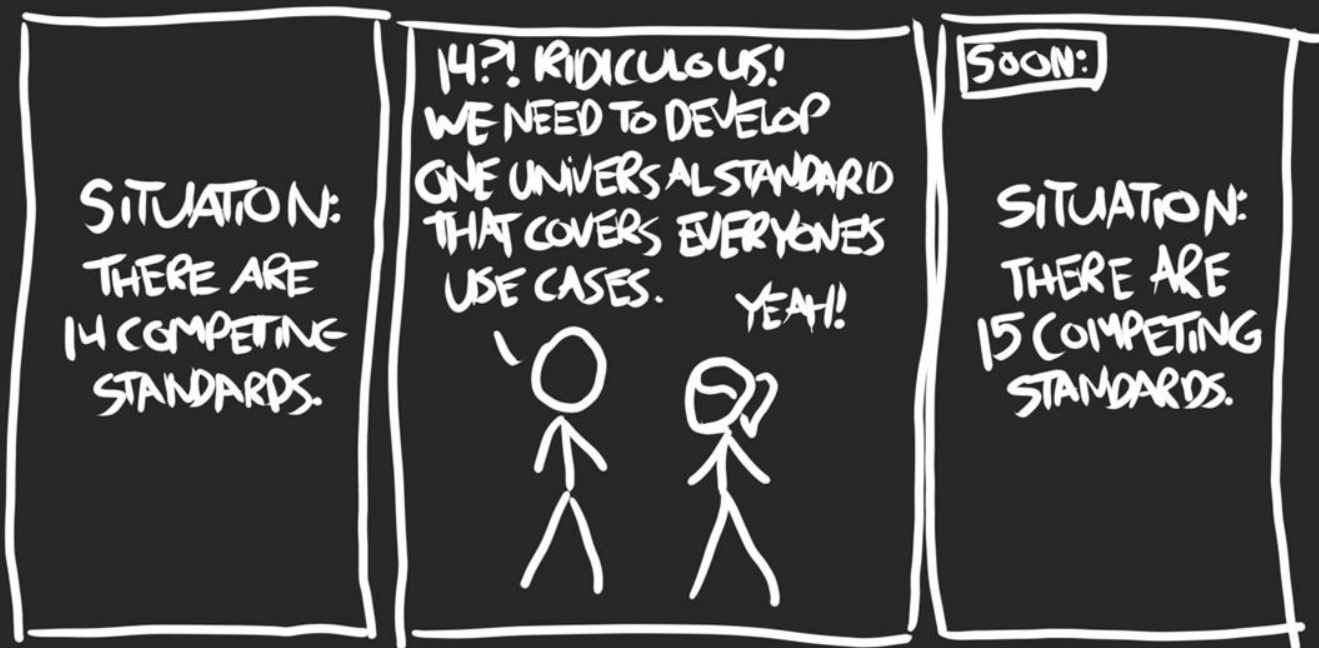


dependency

oops

Why something new?

xkcd 927



TCP
is
dead



QUIC

- IETF RFC 9000
- powers HTTP/3
- More features
... more complexity

QUIC Features + Many more

- Fully Encrypted
- Fast Handshake
- Roaming Support
- Congestion Control
- Load Balancing



1RTT

📶 + 4G

BBR+



QUIC API

multiple independent

⇒ STREAMS ⇒

no cost

closed with code

Media over QUIC

Warp

+

RUSH

+

QUICR



Twitch



Meta



Cisco

Warp

QUIC

congestion

2nd I ← P ← B ← P ← B

1st I ← P ← B ...

Prioritize!

Warp

QUIC

congestion

2nd



1st



Prioritize!

Features

- relay instructions deterministic
- Viewers choice latency vs quality
- web support WebTransport
- contribution, distribution, real-time

Get Involved

IETF

MoQ working group

Draft

[github/kixelated/warp-draft](https://github.com/kixelated/warp-draft)

Demo*

[github/kixelated/warp](https://github.com/kixelated/warp)

Strim

twitch.tv/kixelated

QUIC family

RTP over QUIC

HLS/DASH over HTTP/3

SRT over QUIC

THANKS!

