

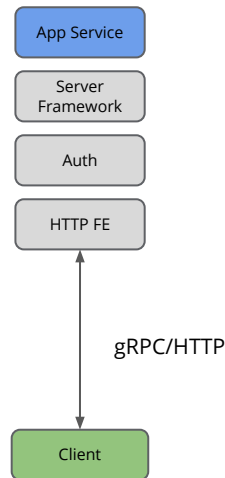
RTC Implementation Experiences

Justin Uberti, Google

IETF 107, March 2020

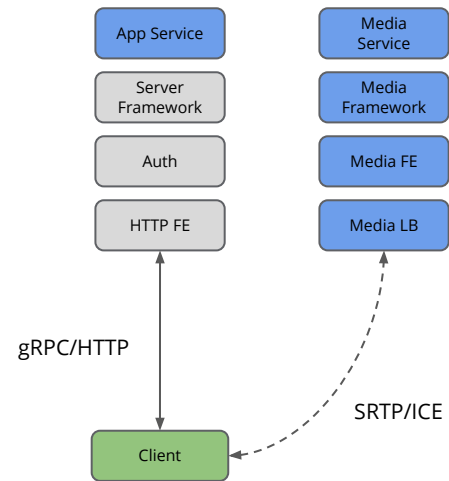
Typical HTTP-Based Application

- Client-server RPCs over HTTP
- May use media, but peer-to-peer
- Turn up on App Engine (or similar) in minutes
- Built-in authentication, failover, auto-scaling, metrics, logging
- AppRTC (first WebRTC app on App Engine)
1 eng, 1 week



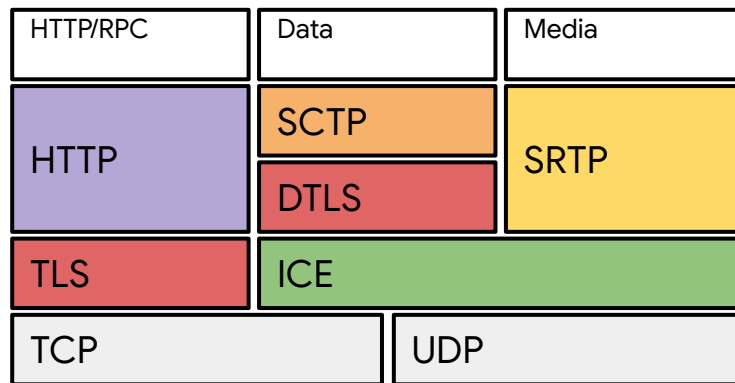
Typical RTC Application

- Signaling over HTTP
- Media over SRTP/ICE
- Need to build own frontend service, FE/BE protocol, load balancing, authentication, failover, metrics
- Even need custom browser devtools
- Development can take dozens of eng-years



Typical RTC Protocol Stack

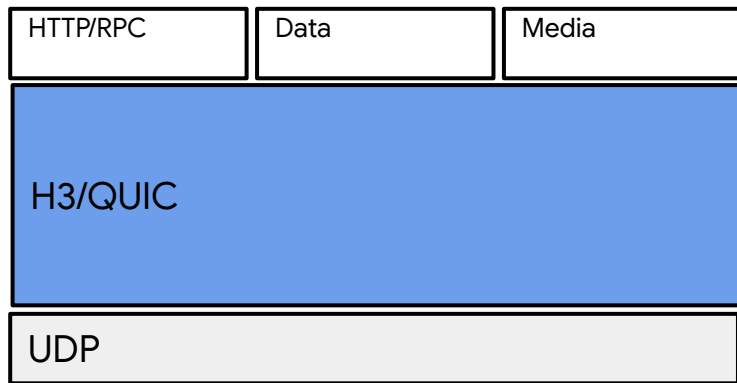
- Application/signaling over HTTP
- Video streamed over SRTP/ICE
- Real-time messaging streamed over SCTP/DTLS/ICE
- Hand-built servers, frontends, failover
- **This is not a simple stack, on client or server**



WebRTC

Someday?

- Ubiquity of HTTP + performance of WebRTC
- Build on H3 and WebTransport
- **Much simpler protocol stack**
- Seamless integration with HTTP server deployments



Why Standardize?

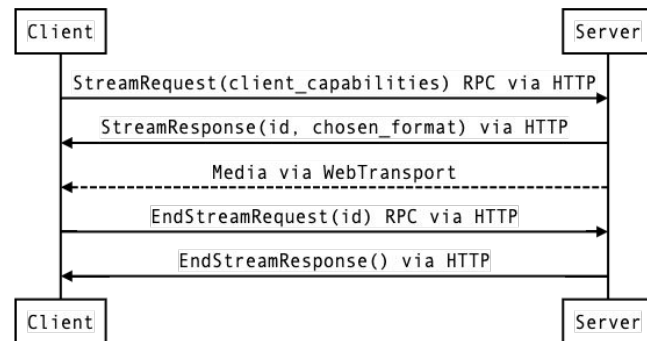
- WebTransport by itself isn't enough
 - Need to figure out how WebTransport is exposed in cloud providers
 - Need to figure out congestion control when WT is muxed with H3 traffic
- Want to allow interop between services
 - Any smart TV can consume a realtime media broadcast
 - Any cloud provider can ingest a realtime IP camera feed

What to Standardize?

1. Media over H3/WebTransport
 - a. Media wire format (RTP over WT? QUIC streams?)
 - b. Fallback mechanism for pre-H3
2. Some signaling mechanism over HTTP?
 - a. RPC mechanism (e.g., REST or gRPC)
 - b. RPC operations (e.g., start/stop stream)
 - c. Media Descriptions (e.g., SDP or a replacement?)
 - d. Negotiation (e.g., offer-answer or a replacement?)

#1 lets us build client APIs + cloud services that can easily produce + consume realtime media

#2 gives us cross-provider interop (e.g., send a stream from one provider to another)



Thanks