QUIC update

ATS Summit 2018 Fall

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Agenda

- IETF QUIC

- ATS QUIC Project

- Interop result

- Major issues

- Plans for merge

IETF QUIC

Since the last ATS summit…

- 12th draft series was released on May. 22

- 13th draft series was released on Jun. 28

  - 1st draft for QPACK was released too

- 14th draft series was released on Aug. 15

  - 2nd draft for QPACK was released too

Several things are still under discussion…

Nov 2018	QPACK: Header Compression for HTTP over QUIC to IESG draft-ietf-quic-qpack
Nov 2018	Header Compression for HTTP over QUIC to IESG draft-ietf-quic-qcram
Nov 2018	QUIC Applicability and Manageability Statement to IESG draft-ietf-quic-applicability draft-ietf-quic-manageability
Nov 2018	HTTP/2 mapping document to IESG draft-ietf-quic-http
Nov 2018	TLS 1.3 Mapping document to IESG draft-ietf-quic-tls
Nov 2018	Loss detection and Congestion Control document to IESG draft-ietf-quic-recovery
Nov 2018	Core Protocol document to IESG draft-ietf-quic-transport
Sep 2018	Version-Independent Properties of QUIC to IESG draft-thomson-quic-invariants

These milestones would be changed

ATS QUIC Project

- Status

  - Supported version: draft-14 (still catching up some features)

    - Client implementation is also updated

  - Current target: 9.0 release

  - HTTP/QUIC: Not available yet (maybe within 1-2 months)

QPACK

- HPACK is for HTTP/2

- QPACK is for HTTP/QUIC

- They are similar but:

  - Only few things are common

  - QPACK is more complicated

```
$ wc -l proxy/hq/QPACK.{cc,h}
    1719 proxy/hq/QPACK.cc
     325 proxy/hq/QPACK.h
    2044 total
$ wc -l proxy/http2/HPACK.{cc,h}
     865 proxy/http2/HPACK.cc
     178 proxy/http2/HPACK.h
    1043 total
$ wc -l proxy/hdrs/XPACK.{cc,h}
     202 proxy/hdrs/XPACK.cc
      37 proxy/hdrs/XPACK.h
     239 total
$ wc -l proxy/hdrs/HuffmanCodec.{cc,h}
     243 proxy/hdrs/HuffmanCodec.cc
      33 proxy/hdrs/HuffmanCodec.h
     276 total
```

Interop result (QUIC)

client ↓ | server →	Minq	Mozquic	Quicly	quant	ngtcp2	mvfst	picoQUIC	winquic	f5	ATS	Pandora	AppleQUIC	ngx_quic
Minq													
Mozquic													
Quicly			VHDRZ	VHDRZ	VHDRZ		VHDRZ		VHD	VHD			VHDR
quant			VHDCRZ	VHDCRZS	VHDCRZS		VHDCRZS	VHDCRZS	VHDC	VHDCRZ		V	VHDC
ngtcp2			VHDCRZ	VHDCRZS	VHDCRZS			VHDCRZ					VHDCR
mvfst													
picoQUIC			VHDRZ	VHDCRZSM	VHDCRZS		VHDCRZSM	VHDCRZS	VHDC	VHDCRZM			VHDR
winquic			VHDCRZ	VHDCRZS	VHDCRZS		VHDCRZS	VHDCRZS	VHDC	VHDCRZ			VHDCR
f5									H				
ATS			VHDC	VHDC	VHDC		VHDC	VHDC	VHDC	VHDC			VHDC
Pandora													
AppleQUIC			VHDC	VHDC	V		VHDC	VHDC	VHDC	VHDC		VHDC	
ngx_quic													

Interop Matrix for the September 17-18, 2018 hackathon at the interim in NYC
https://github.com/quicwg/base-drafts/wiki/8th-Implementation-Draft

Interop result (QPACK)

encoder ↓ | decoder →	litespeed	proxygen	minhq	qthingey	f5	ATS
litespeed	NQR	NQR	NQ	NQR	NQR	
proxygen	NQR	NQR		NQR	NQR	
minhq	NQ	NQ	NQ	NQ		
qthingey	NQR	NQR		NQR		
f5	NQ	NQ		N	NQR	
ATS		NQR				NQR

*To fill cells a decoder need to be able to decode all files encoded with different parameter values from the encoder

Parameters:
- **Maximum dynamic table size**
- **Maximum blocking stream numbers**
- **Acknowledge mode**

One small bug can cause complete defeat on QPACK interop

Major issues

- Performance

  - Terribly slow like Modem Age (not because of QUIC protocol)

- OpenSSL

  - Needs a patch to access TLS messages

Plans for merge

- When

  - Before 9.0 branching (?)

- How

  - One commit (?)

- Criteria

  - Can build (or work) on all supported platforms (?)

  - Can work with pure OpenSSL (?)

  - Can interop with other HTTP/QUIC implementations (?)

  - Have an approval from 9.0 RM (?)

Future Plans

Date	Event	Note
2018 Nov 4-9	• IETF 103 • QUIC WG Last Call (?)	
2019 Nov 12-13	• ATS QUIC Hackathon Fall 2018	
2019 Jan	• QUIC WG interim meeting (?)	
2019 May	• ATS Summit Spring 2019 (?)	• Merge quic-latest to the master (?)
2019 Jun	• ATS 9.0 release (?)	• Experimental QUIC support (?)

Thanks

- Documentations & Links

  - https://cwiki.apache.org/confluence/display/TS/QUIC

- Code

  - https://github.com/apache/trafficserver/tree/quic-latest

- Questions?

  - List: dev@trafficserver.apache.org

  - IRC: #traffic-server on freenode