A Survey of Transport Security Protocols

draft-pauly-taps-transport-security

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TAPS
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Overview

Goals:

- Survey existing transport security protocols
- Extract mandatory and optional features
- Identify (common) interfaces

Scope

What’s in?

- Any transport security protocols - not limited to IETF
- Analysis of existing protocols (in collaboration with Security area)

What’s out?

- Recommendations for specific algorithms
- Constructions of new protocols

History

- IETF 98: Action taken to survey security properties of existing transport security protocols

- IETF 99: draft-pauly-taps-transport-security-survey-00, including: TLS (QUIC + TLS), MinimalT, CurveCP, tcpcrypt, IKEv2+ESP

- IETF 100: Added SRTP (with DTLS) and WireGuard

- IETF 101: Added gQUIC

Methodology

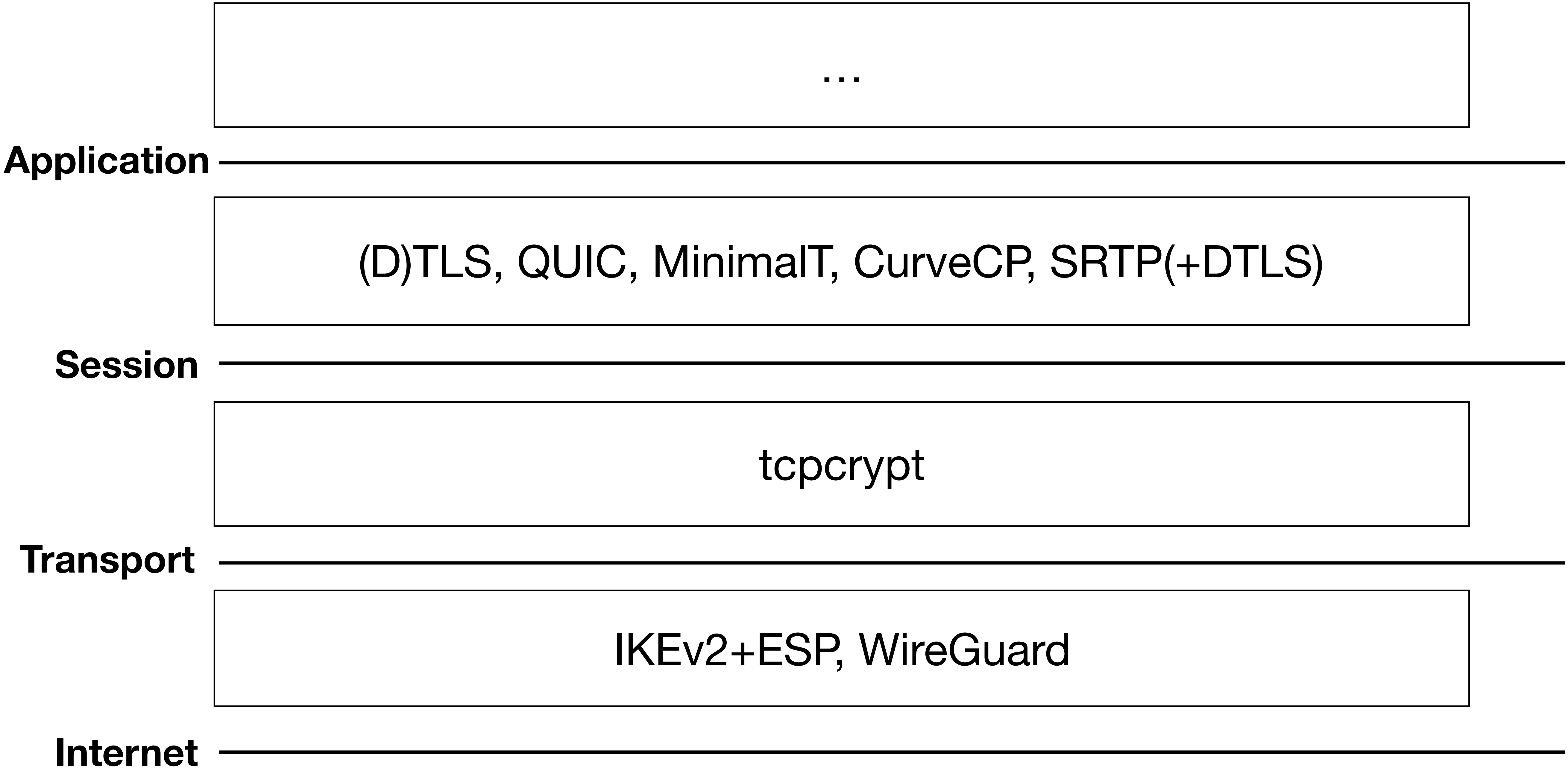
Decouple handshake- and record-specific parts of protocol

- Some protocols (ESP) do not have a handshake
- Some protocols (Noise — omitted) do not have a record or framing layer

Focus on interface of each part, not implementation

- Analogous to transport services [RFC 8095]

Protocols



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Application

(D)TLS, QUIC, MinimalT, CurveCP, SRTP(+DTLS)

Session

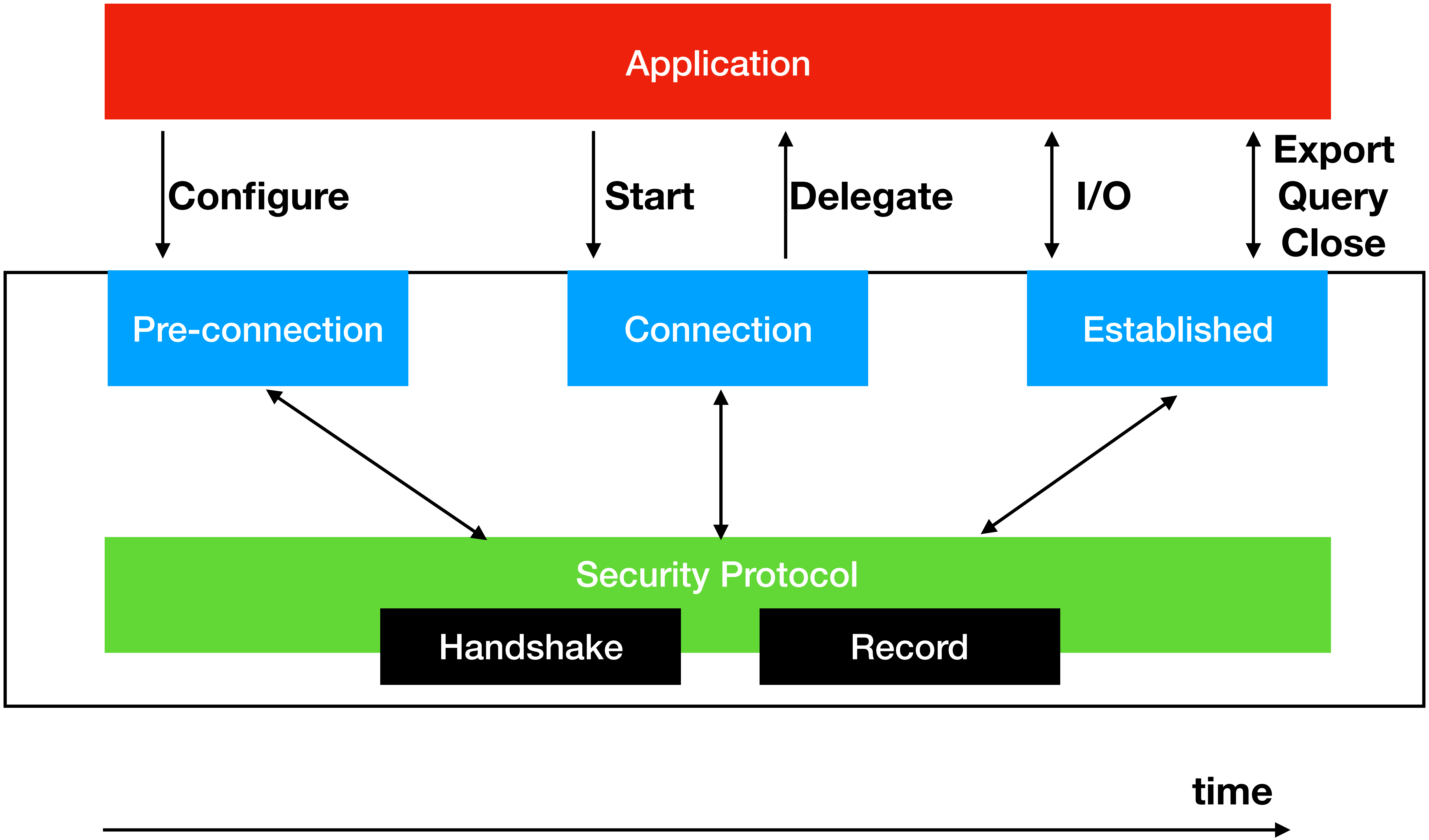
tcpcrypt

Transport

IKEv2+ESP, WireGuard

Internet

TAPS Architecture



Handshake Features

Mandatory	**Optional**
Private key interface or injection	Mutual authentication
Remote authentication	Application-layer feature negotiation
Source validation	Configuration extensions
	Session caching and management

Record Features

Mandatory	Optional
Pre-shared key support	Connection mobility
Segment encryption and authentication	

Configuration Interfaces

- Identity and private keys
- Supported algorithms
- Session cache configuration and management
- Authentication delegation

Handshake Interfaces

- Send handshake messages
- Receive handshake messages
- Identity validation
- Source address validation
- Key update
- Pre-shared key export

Record Interfaces

- Pre-shared key import
- Encrypt application data
- Decrypt application data
- Key expiration
- Transport mobility

Open Issues

Address outstanding Github issues

- Unify document structure [https://github.com/mami-project/draft-pauly-transport-security/issues/16]
- Expand Security Considerations [https://github.com/mami-project/draft-pauly-transport-security/issues/21]

Identify delta between protocol implementations and identified interfaces

- Not all bits of an RFC are implemented, and not all implementation interfaces are standardized

Next Steps

1. Call for WG adoption
2. Continue adding protocols [Issues #3, #4, #5, #6, #7, …]
3. Commence reviews with Security area