External PSK Importers

draft-wood-tls-external-psk-importer-01

David Benjamin (davidben@google.com)
Christopher A. Wood (cawood@apple.com)

TLS
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Hash Reuse

PSKs may only be used with one hash function in TLS 1.3

TLS 1.2 has no such restriction

**Problem:** PSKs may be used in two different contexts with the same hash function

**Goal:** Allow safe use of existing PSKs and provisioning technologies with TLS 1.3
Key Importers

Diversify an existing “universal” PSK based on supported ciphersuites and protocol versions

Imported keys use an identity based on the external PSK identity

Open issue: should hash be part of label so that future versions of TLS which do not use HashAlgorithm can still support this?

```
struct {  
    opaque external_identity<1...2^16-1>;  
    opaque label<0..2^8-1>;  
    HashAlgorithm hash;  
} ImportedIdentity;
```
Diversification Example

HKDF(PSK, Identity + “tls13” + SHA256) → PSK-1

(PSK, PSKHash) → HKDF(PSK, Identity + “tls13” + SHA384) → PSK-2

HKDF(PSK, Identity + “tls13” + SHA512) → PSK-3

*HKDF hash function PSKHash, SHA256 if unspecified
Assessment

Pros

- Makes no change to the key schedule
- Adds few (|label| + |hash|) bytes per PSK
- Supports TLS 1.3 and 1.2, and works with QUIC

Cons

- PSK count increases multiplicatively with each new version and hash function
Draft Changes

- Clarify requirements for single-hash-function PSKs
- Clarify that duplicate PSKs should be imported for each ciphersuite they support
  - TLS_AES_128_GCM_SHA256 and TLS_CHACHA20_POLY1305_SHA256 require one PSK
  - TLS_AES_128_GCM_SHA256 and TLS_AES_256_GCM_SHA384 require two PSKs
- Clarify TLS 1.2 support with an explicit label
- Add privacy considerations and a sketch design from draft-ietf-dnssd-privacy
Next Steps

Should the WG adopt this document?