Status and Issues for the “Client-Server” Suite of Drafts

draft-ietf-netconf-crypto-types-22
draft-ietf-netconf-trust-anchors-17
draft-ietf-netconf-keystore-24
draft-ietf-netconf-tcp-client-server-12
draft-ietf-netconf-ssh-client-server-27
Draft-ietf-netconf-tls-client-server-27
Draft-ietf-netconf-http-client-server-09
Draft-ietf-netconf-netconf-client-server-25
Draft-ietf-netconf-restconf-client-server-25

NETCONF WG
IETF 113 (Hybrid)

Since IETF 110 (last time presented)

crypto-types:

- Accommodated SecDir review by Valery Smyslov.
- Added "hidden-keys" feature.

trust-anchors:

- Added prefixes to 'path' statements per trust-anchors/issues/1
- Renamed feature "truststore-supported" to "central-truststore-supported".
- Removed two unnecessary/unwanted "min-elements 1" and associated "presence" statements.
- Added Informative reference to "draft-ma-netmod-with-system".

keystore:

- Added prefixes to 'path' statements per trust-anchors/issues/1
- Renamed feature "keystore-supported" to "central-keystore-supported".
- Added features "asymmetric-keys" and "symmetric-keys".
- Added Informative reference to "draft-ma-netmod-with-system".

IEEE 802.1 Liaison

Since IETF 110 (cont.)

tcp-client-server:

- Removed the "tcp-connection-grouping" grouping (now models use the "tcp-common-grouping" directly).
- Added Security Considerations section for the "local-binding-supported" feature.

ssh-client-server:

- Removed the 'supported-authentication-methods' from {grouping ssh-server-grouping}/client-authentication.
- Moved algorithms in ietf-ssh-common (plus more) to IANA-maintained modules
- Added "config false" lists for algorithms supported by the server.
- Added ietf-ssh-common:generate-public-key() RPC for discussion.

tls-client-server:

- Moved algorithms in ietf-ssh-common (plus more) to IANA-maintained modules
- Added "config false" lists for algorithms supported by the server.
- Major update to support TLS 1.3

Since IETF 110 (cont.)

http-client-server:

- Nits

netconf-client-server:

- For netconf-client, augmented-in a 'mapping-required' flag into 'client-identity-mappings' only for the SSH transport, and refined-in a 'min-elements 1' only for the TLS transport.

restconf-client-server:

- Removed Appendix A with fully-expanded tree diagrams.

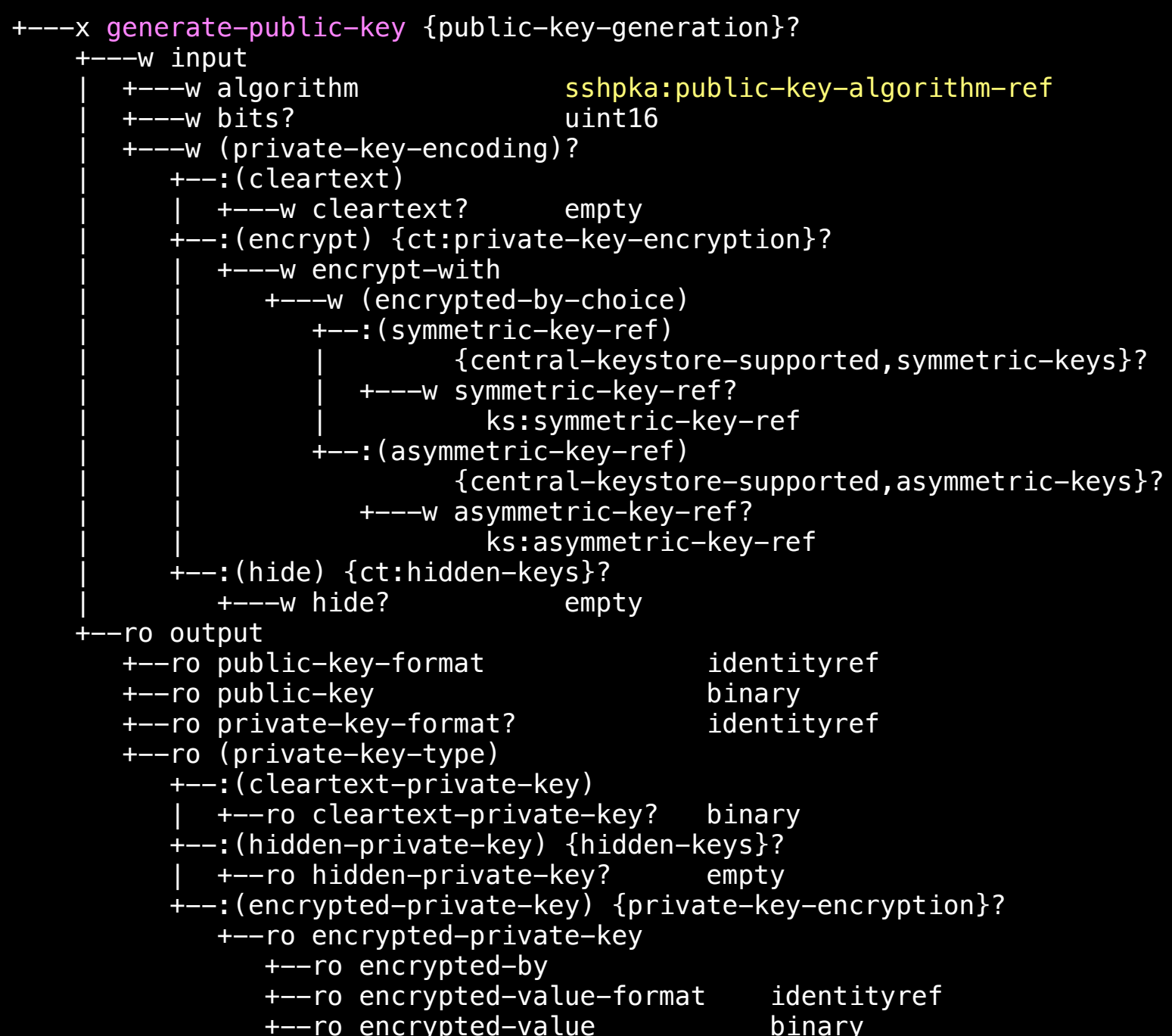
Open Issue: The "generate-public-key" RPC

- About three years ago, the "crypto-types" draft attempted to define actions for generating private keys. We abandoned these action statements when it became not possible to define a set of algorithm-identifiers that span protocol stacks (e.g., SSH and TLS).

- Now both the "ssh-client-server" and "tls-client-server" drafts have their own IANA-maintained algorithm identifiers, and so it becomes possible to a define protocol-specific RPC in each draft.

- Update already made in the SSH draft.

SSH RPC Tree diagram



But what about generating TLS keys?

The TLS algorithm registry only defines "cipher suites"

- Not a standalone private key algorithm (like SSH)
- A cipher-suite is a combination of the private key algorithm, encryption algorithm, blocking, and padding used (e.g., tls-rsa-with-aes-256-cbc-sha256)

Should we pass the cipher-suite algorithm identifier and assume the server can identify the private key algorithm?

Discussion

Slide Transition

For the "tls-client-server" draft

Pre-Shared Keys for TLS v1.3 vs. v1.2

ietf-tls-{client, server, common}.yang

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Problem: PSKs are fundamentally different between TLS versions 1.3 and 1.2

1. TLS v1.2 PSK
    1. Client offers version-specific ciphersuites in Client Hello
    2. Server offers version-specific ciphersuites and identity hint (or null) in Server Hello
    3. Client offers identity
2. TLS v1.3
    1. Client offers version-specific ciphersuites and identity in Client Hello
    2. Server offers version-specific ciphersuites and can immediately start sending data ("0-RTT"), or can fail back to a normal handshake
    3. PSKs can also used to resume sessions

Solution:

1. Redefine the existing YANG "psk" for TLS v1.2 only
2. Create a new TLS v1.3-specific psk object
    1. Ensure RFC8446's pre_shared_key (Section 4.2.11) and psk_key_exchange_modes (Section 4.2.9) extensions are satisfied
    2. Any necessary YANG types, identities, etc.

Noteworthy changes to ietf-tls-client.yang -- Desc/Ref fields not shown

```
grouping tls-client-grouping {
  container client-identity {
    choice auth-type {
      case tls12-psk {
        if-feature "client-ident-tls12-psk";
        container tls12-psk {
          uses ks:local-or-keystore-symmetric-key-grouping;
          leaf id {
            type string;
          }
        }
      }
      case tls13-epsk {
        if-feature "client-ident-tls13-epsk";
        container tls13-epsk {
          uses ks:local-or-keystore-symmetric-key-grouping;
          leaf external-identity {
            type string;
            mandatory true;
          }
          leaf hash {
            type tlscmn:epsk-supported-hash;
            mandatory true;
          }
          leaf context {
            type string;
          }
          leaf target-protocol {
            type uint16;
          }
          leaf target-kdf {
            type uint16;
          }
        }
      }
    }
  } // container client-identity
```

```
container server-authentication {
  leaf tls12-psks {
    if-feature "server-auth-tls12-psk";
    type empty;
  }
  leaf tls13-epsks {
    if-feature "server-auth-tls13-epsk";
    type empty;
  }
} // container server-authentication
```

Noteworthy changes to ietf-tls-server.yang -- Desc/Ref fields not shown

```
grouping tls-server-grouping {
  container server-identity {
    choice auth-type {
      case tls12-psk {
        if-feature "server-ident-tls12-psk";
        container tls12-psk {
          uses ks:local-or-keystore-symmetric-key-grouping;
          leaf id_hint {
            type string;
          }
        }
      }
      case tls13-epsk {
        if-feature "server-ident-tls13-epsk";
        container tls13-epsk {
          uses ks:local-or-keystore-symmetric-key-grouping;
          leaf external-identity {
            type string;
            mandatory true;
          }
          leaf hash {
            type tlscmn:epsk-supported-hash;
            mandatory true;
          }
          leaf context {
            type string;
          }
          leaf target-protocol {
            type uint16;
          }
          leaf target-kdf {
            type uint16;
          }
        }
      }
    }
  } // container server-identity
```

```
container client-authentication {
   leaf tls12-psks {
     if-feature "client-auth-tls12-psk";
     type empty;
   }
   leaf tls13-epsks {
     if-feature "client-auth-tls13-epsk";
     type empty;
   }
 } // container client-authentication
```

Noteworthy changes to ietf-tls-common.yang

```
identity tls12 {
   if-feature "tls12";
   base tls-version-base;
   status "deprecated";
   description
     "TLS Protocol Version 1.2.";
   reference
     "RFC 5246: The Transport Layer Security (TLS) Protocol
                Version 1.2";
 }

 identity tls13 {
   if-feature "tls13";
   base tls-version-base;
   description
     "TLS Protocol Version 1.3.";
   reference
     "RFC 8446: The Transport Layer Security (TLS) Protocol
                Version 1.3";
 }
```

```
typedef epsk-supported-hash {
    type enumeration {
      enum sha-256 {
        description
          "The SHA-256 Hash.";
      }
      enum sha-384 {
        description
          "The SHA-384 Hash.";
      }
    }
    description
      "As per Section 4.2.11 of RFC 8446, the hash algorithm
       supported by an instance of an External Pre-Shared
       Key (EPSK).";
    reference
      "RFC 8446: The Transport Layer Security (TLS) Protocol
       Version 1.3
       I-D.ietf-tls-external-psk-importer:
                   Importing External PSKs for TLS
       I-D.ietf-tls-external-psk-guidance:
                   Guidance for External PSK Usage in TLS";
  }
```

Transition Back

Next Steps

- Validate correctness of TLS 1.3 updates?
- Make updates as needed for the IEEE Liaison.
- Resolve the "generate-key" RPC/action issue.

- Done! *(WG Chairs can publish entire-set to AD)*

  - *Work started in 2014*