Managing Long-Term Keys for Routing Protocols

November 10, 2009

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Drafts

- Database of Long-Lived Cryptographic Keys
  - <draft-housley-saag-crypto-key-table-00.txt>
- Routing Authentication Using A Database of Long-Lived Cryptographic Keys
  - <draft-polk-saag-rtg-auth-keytable-00.txt>
- The former defines a conceptual model, the latter describes the model's application to routing protocols

Fundamental Concept

- Manual key management is today's reality in routing protocols
  - Future key establishment protocols must co-exist with manual keying
- Key establishment will remain separate protocols, not a handshake in routing protocols
- Modeled as a database or table of shared keys that are available to the routing protocols
- Accommodate textual description of database entries

Database

- Database is characterized as a table, with a row for each key
- Identifies 11 columns for the key and its attributes
- Describes rollover between long-lived keys

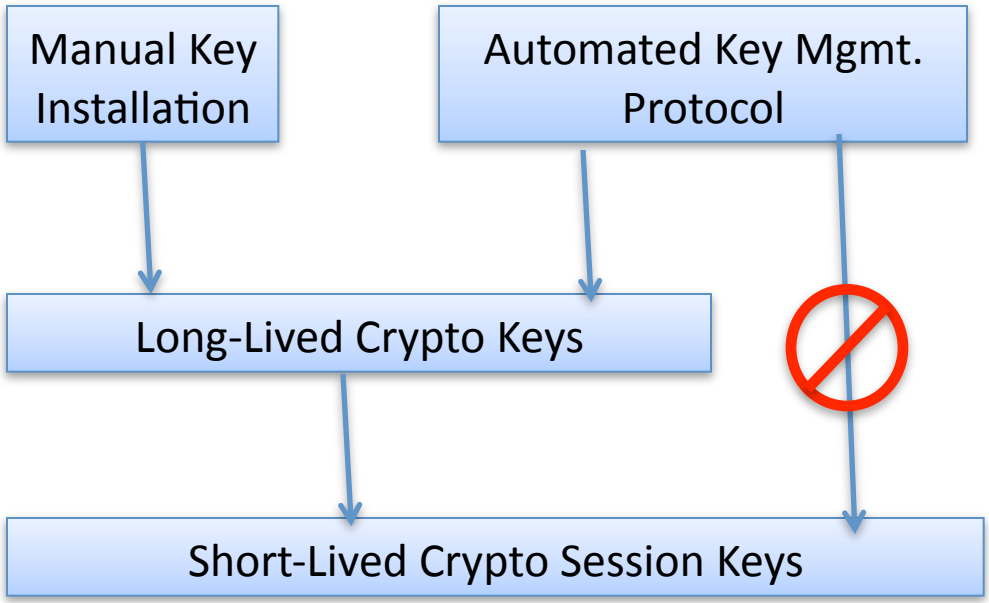
Database Columns (1 of 2)

- LocalKeyID
  - A 16-bit integer in hexadecimal, unique in the context of the database. The high order bit differentiates pairwise and group keys.
- PeerKeyID
  - For pairwise keys, the peerKeyID field is a 16 bit integer in hexadecimal provided by the peer or "unknown" if the peer has not yet provided this value.
  - For group keying, the PeerKeyID field is set to "group", which easily accommodates group keys generated by a third party.
- KDF
  - Indicates which key derivation function (KDF) is used to generate short-lived keys (or "none“ when the long-term key is used directly).
- KDFInputs
  - Used when supplemental public or private data is supplied to the KDF.
- AlgID
  - Indicates which cryptographic algorithm to be used with the security protocol.

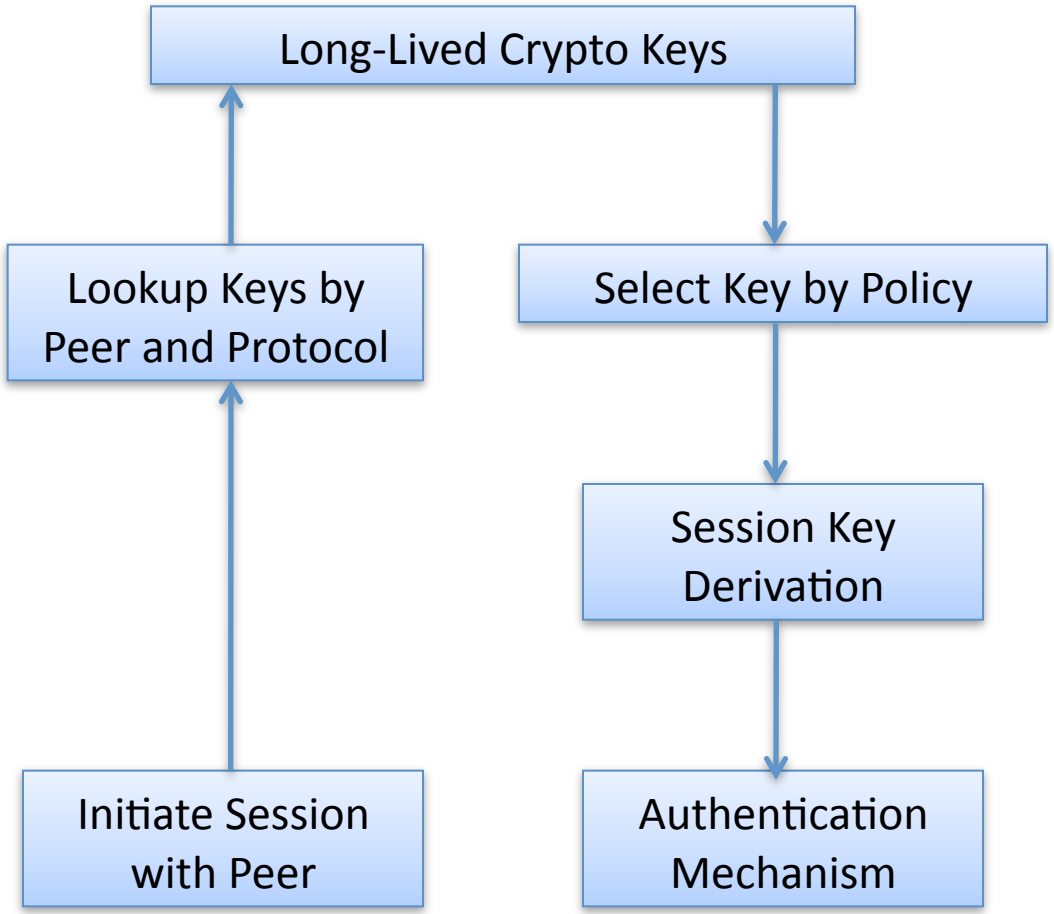
Database Columns (2 of 2)

- Key
  - A hexadecimal string representing a ling-lived symmetric cryptographic key.
- KeyDirection
  - Indicates whether this key may be used for inbound traffic, outbound traffic, or both.
- NotBefore
  - Specifies the earliest date and time at which this key should be considered for use.
- NotAfter
  - Specifies the latest date and time at which this key should be considered for use.
- Peers
  - Identifies a peer system or set of peer systems
- Protocol
  - Identifies the security protocol where this key is to be used to provide cryptographic protection.

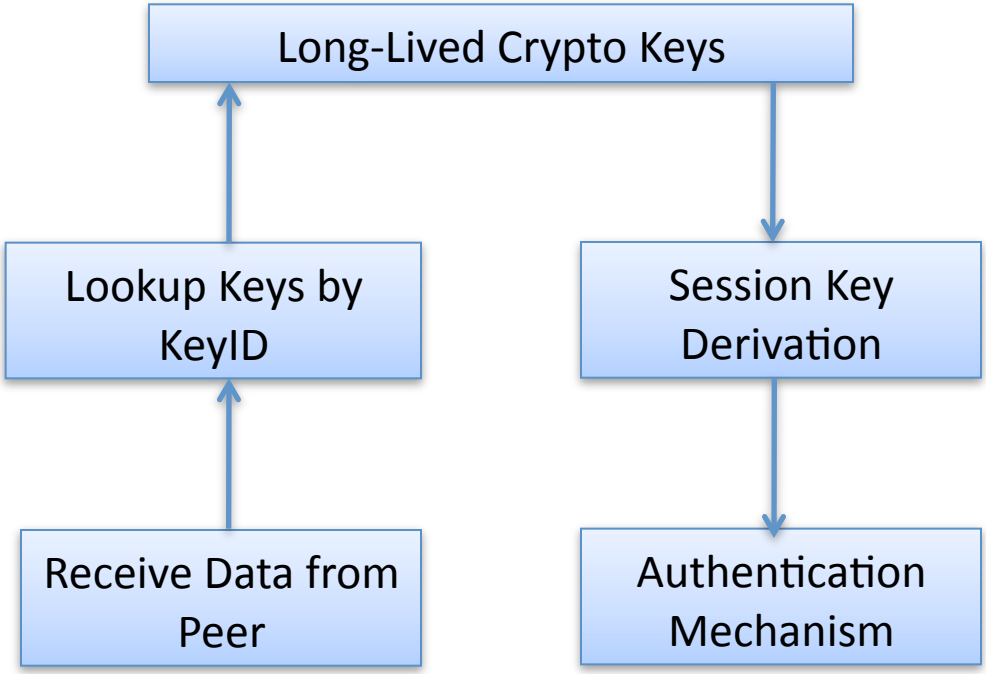
The Overall Model



Initiator's View



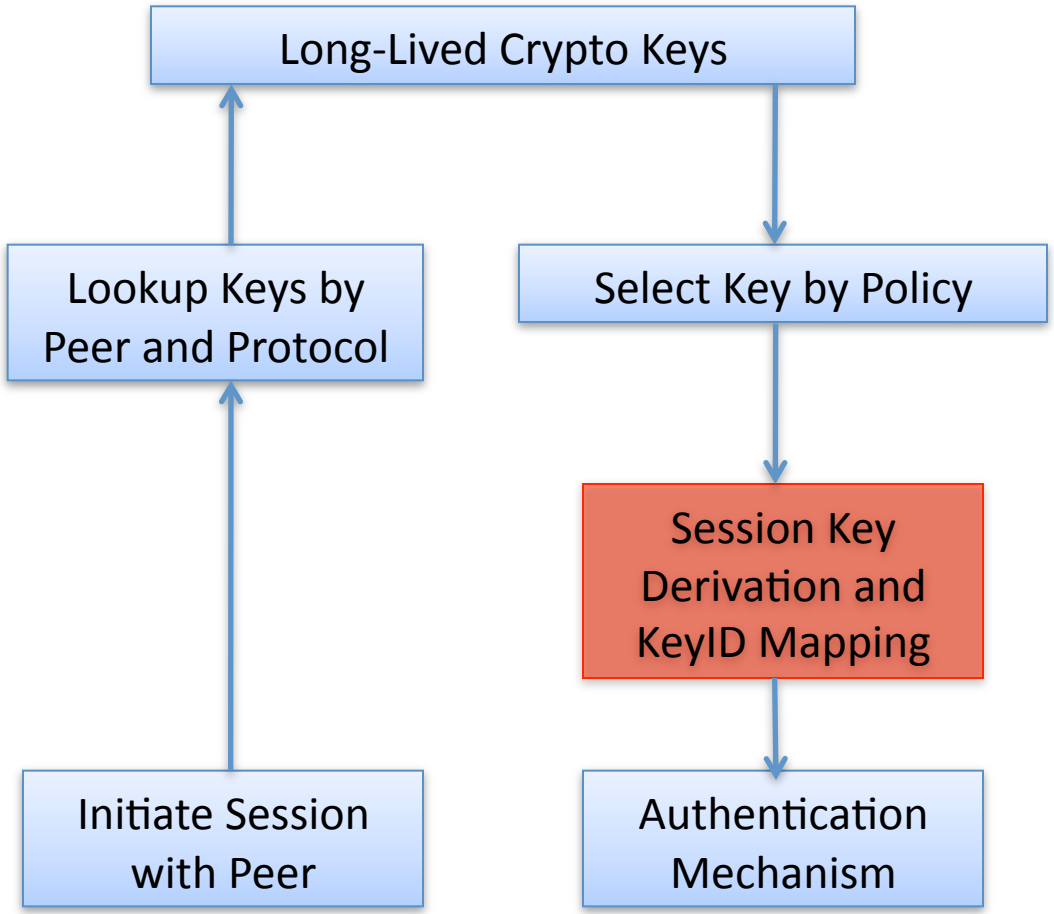
Receiver's View



KeyID Mapping

- Database specification mandates a 16-bit KeyID
- KeyID in the table may not be the KeyID used on the wire
  - Need to support more than just one security protocol
  - Allow translation to any needed format or size
  - Overlapping ranges may unnecessarily limit the total number of keys that can be maintained
- Mapping can resolve size mismatch and overcome overlapping range issues
  - Only applicable to local KeyID values
  - Peer's KeyIDs are not unique in the context of the table

Initiator's View with Mapping



Questions?