Recommendations for Implementing IPFIX over DTLS

draft-mentz-ipfix-dtls-recommendations-02

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80th IETF Meeting, Prague, 2011

Background

- RFC 5101:
  - support of DTLS mandatory for IPFIX-over-SCTP and IPFIX-over-UDP for **security reasons**

- Implemented DTLS support for our monitoring probe VERMONT
  - http://vermont.berlios.de/
  - based on OpenSSL and patches of Michael Tüxen and Robin Seggelmann http://sctp.fh-muenster.de/dtls-patches.html

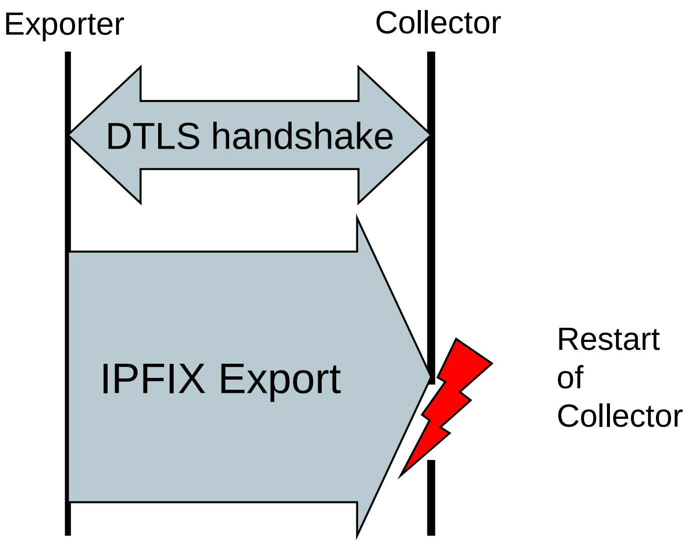
- Implementation guidelines give limited advice on how to implement DTLS support

- Found several problems during implementation phase

Problem with IPFIX-over-DTLS/UDP

Missing *“dead peer detection”*

- problem
  - IPFIX traffic is unidirectional
  - DTLS requires shared state
- Problem occurs on collector restart/crash
  - Collector looses state
  - state-loss cannot be detected by Exporter
  - Exporter continues to export encrypted Messages
  - results in Message loss



Recommended: DTLS Heartbeat Extension

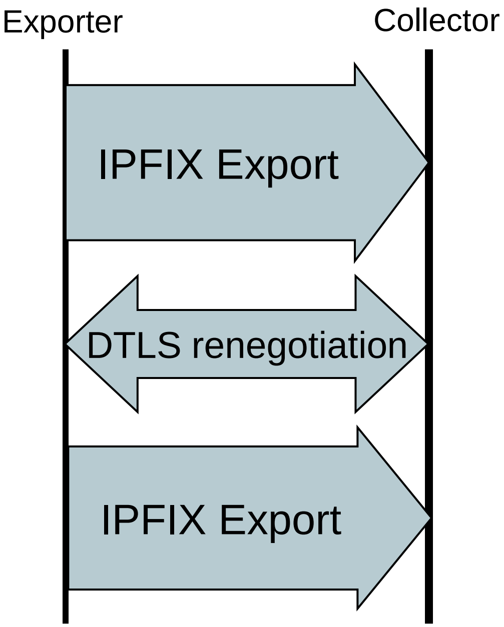
- draft-seggelmann-tls-dtls-heartbeat-02 (February 2010)
- problem: development in TLS-WG stalled

More workarounds in the draft

- trigger DTLS renegotiations periodically
- open new DTLS/UDP transport association periodically

Problem with IPFIX-over-DTLS/SCTP

- **DTLS renegotiation requires complete stall of IPFIX export**
  - in case of DTLS renegotiation
    - as defined in RFC 6083
    - renegotiation requires full stop of IPFIX export
  - Problem
    - buffers can fill up
    - Records/Messages can be lost



- **Proposal:**
  - **avoid DTLS renegotiation for IPFIX Export**
  - **if new keying material is required**
    - Exporter opens a new DTLS/SCTP transport session to Collector
    - “soft hand-off” of IPFIX export to new transport session after DTLS handshake is finished and Templates have been sent

Mutual Authentication via Pre-Shared Keys

- **Not a problem, more a nice to have**
  - reduces costs of association setup
  - simplifies DTLS/TLS setup

- **RFC 5101 requires mutual authentication with X.509 certificates**
  - PKI is necessary
  - maintaining a PKI may be disproportionate for small environments
  - costly public key operations on handshake/renegotiation

- **RFC 4279 defines ciphersuites that use pre-shared keys**
  - pre-configured keys on the monitoring device
  - no asymmetric keys, no costly public key operations or PKI needed
  - problem:
    - **Does not conform to RFC 5101**

Discussion

- **DTLS Heartbeat Extension should be used for DTLS/UDP**
  - however, no progress is made in the TLS group
  - **do we want to push it?**
  - **is there a way for us to do this?**

Problem **Fix**	**Dead Peer** **UDP**	**Renegotiation** **SCTP**	**MTU** **UDP**	**Ciphers** **all**
Do noting	No	No	No	No
Update Guidelines	**Yes**	**Yes**	**Yes**	No
State Problem in RFC 5101/ Update Guidelines	**Yes**	**Yes**	**Yes**	No
Update RFC 5101/ Update Guidelines	**Yes**	**Yes**	**Yes**	**Yes**