Multi-Path Time Synchronization

draft-shpiner-multi-path-synchronization-01

Alex Shpiner  Technion – Israel Institute of Technology
Richard Tse  PMC-Sierra
Craig Schelp  PMC-Sierra
Tal Mizrahi  Marvell

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Background: Using Multiple Paths

- **Multiple paths allow Slave Diversity**:
  - High accuracy.
  - Fault protection.
  - Security.

This draft defines two protocols:
- Multi-Path PTP (MPPTP).
- Multi-Path NTP (MPNTP).

Define an additional layer without modifying PTP or NTP.

Interoperability with conventional PTP / NTP.
Multi-Path Time Synchronization

- **Dual-ended multi-path synchronization:**
  - Both master and slave support multiple paths.

- **Single-ended multi-path synchronization:**
  - Only slave supports multiple paths.
  - Interoperable with conventional existing nodes.
Main Changes in Current Draft

- Changed the terms one-way / two-way time synchronization to single-ended / dual-ended time synchronization.

- Added description about how unicast negotiation is used.
  - Event messages must be unicast to allow transmission over multiple paths.

- Added flexibility WRT the slave’s choice of the number of paths to be used.
Next Steps

- Feedback from the WG.
- Request WG adoption.
Thanks
Mitigating MITM Attacks using Multiple Paths\(^1\)

- **Slave algorithm:**
  - Bob computes TOD\(_0\), TOD\(_1\), … TOD\(_{N-1}\) (TOD = Time Of Day) Corresponding to path 0, 1, … , N-1
  - If TOD\(_j\) is significantly different than Average\(_{i\neq j}\)(TOD\(_i\)), then assume TOD\(_j\) is based on false information, and ignore path j.
  - Bob’s TOD is Average(TOD\(_i\)) of the TOD values from the paths that have not shown faulty behavior.

- **A similar algorithm can detect m>1 attacked paths.**

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