1588 over MPLS Update

draft-ietf-tictoc-1588overMPLS-03

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Initial Scope

- Transport 1588 messages over MPLS network
- Support Master, Slave, Boundary Clock and Transparent Clock at LER
- Support Transparent clock at LSR
- Backward compatible with non-1588-Capable LSRs
Recap of the Solution

• Use standard Encapsulation
  – IP/MPLS or PW

• Use **Dedicated** LSPs to carry Timing messages
  – To detect Timing messages without DPI

• Timing LSP may be signaled
  – RSVP-TE extensions

• Routers advertise their 1588-capability
  – OSPF, IS-IS extensions
Changes based on IETF 84 (Vancouver) Action Items

• Made the draft more generic to support other Timing Protocols
  – PTP, NTP, Shim Timing, etc.
• Kept only the data-plane functions in this draft
• Created 3 other drafts for Control, Signaling
  – OSPF extensions
  – ISIS extensions
  – RSVP-TE extensions
Other Changes

• Support Time-stamping and Correction Field update
• Support various Timestamp field formats
  – 80-bit PTPv2, 4-b64-bit PTPv1, 64-bit NTP, etc.
• Support Signaling “offset” from BoS to Timing PDU
• Removed the UDP/IP over Ethernet as a option to simplify the solution
• Mandated CW to guarantee the proper parsing
Status

• Draf-00 published Jan 2011
• Draft-02 published Oct 2011
• Draft-03 published in Oct 2012
Next Step

• Release draft-04 by Jan 2013
  – Based on WG comments
  – Need to change the name to
    • “draft-ietf-tictoc-timing-over-mpls”

• Send draft-04 to WG last call after IETF 86
BACKUP SLIDES
Master Clock at LER

(A) LSP Label
IP header
UDP header
PTP Message

(B) LSP Label
PW Label
CW
Ethernet Header
PTP Message
Slave Clock at LER

LER

LSR1

LSR2

LSR3

PTP-LSP

(A)

(LSP Label)

(IP header)

(UDP header)

(PTP Message)

(B)

(LSP Label)

(PW Label)

(CW)

(Ethernet Header)

(PTP Message)
Boundary Clock at LER

- **Slave Clock**
- **Master Clock**

A PTP-LSP connects LER to LSR1, LSR2, and LSR3.

(B) LER

(B) LSR1

(B) LSR2

(B) LSR3

(A) LER

(A) LSR1

(A) LSR2

(A) LSR3

- **IP header**
- **UDP header**
- **PTP Message**
- **LSP Label**
- **PW Label**
- **CW**
- **Ethernet Header**
- **PTP Message**
- **LSP Label**
- **PW Label**
- **CW**
- **Ethernet Header**
- **PTP Message**
Transparent Clock at LER

Measure Transit Delay

Update Correction Field

PTP-LSP

LER

LSR1

LSR2

LSR3

(P)

IP header

UDP header

PTP Message

Ethernet Header

PTP Message

LSP Label

IP header

UDP header

PTP Message

LSP Label

PW Label

CW

Ethernet Header

PTP Message
Transparent Clock (TC) at LSR

Measure Transit Delay

Update Correction Field

PTP-LSP

LER

LSR1

LSR2

LSR3

LER

(A)

LSP Label

IP header

UDP header

PTP Message

(B)

LSP Label

PW Label

CW

Ethernet Header

PTP Message

(A)

LSP Label

IP header

UDP header

PW Label

CW

Ethernet Header

PTP Message

(B)

LSP Label

PW Label

CW

Ethernet Header

PTP Message
Backward Compatibility

- Ingress LER Must be 1588-Capable

1588-Capable LER
1588-Capable LSR
Non-1588-Capable LSR
1588-Capable LSR