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NTPWG: IETF 100

NTP Interleaved Modes

draft-mlichvar-ntp-interleaved-modes-00

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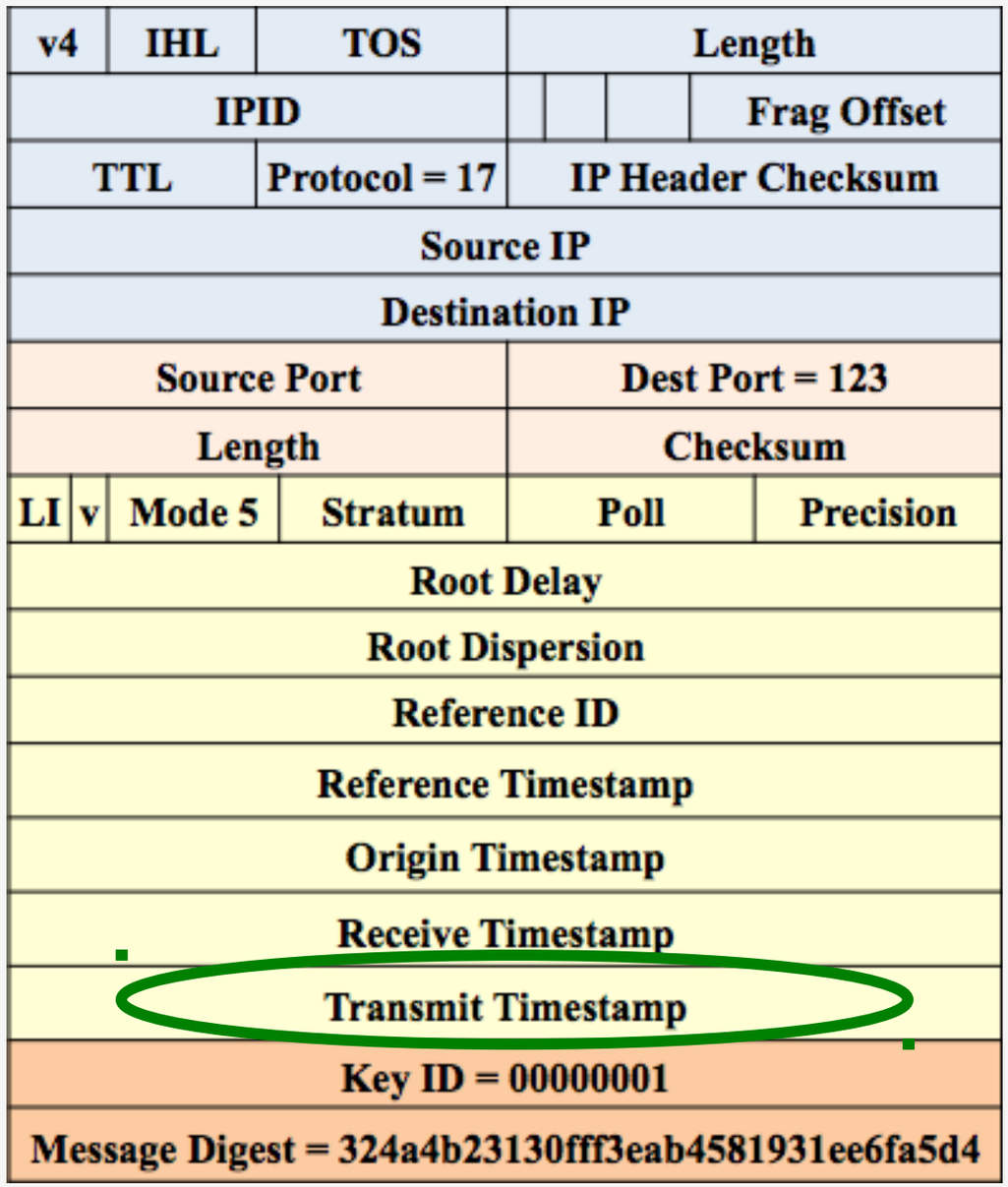
Transmit timestamp (Tx)

- Tx can be captured :
  - NTP daemon
  - Network drivers
  - MAC layer (OSI)
  - PHY layer (OSI)
- in basic mode (RFC 5905), Tx captured at NTP daemon
- includes errors - processing and queuing delays.



NTP packet

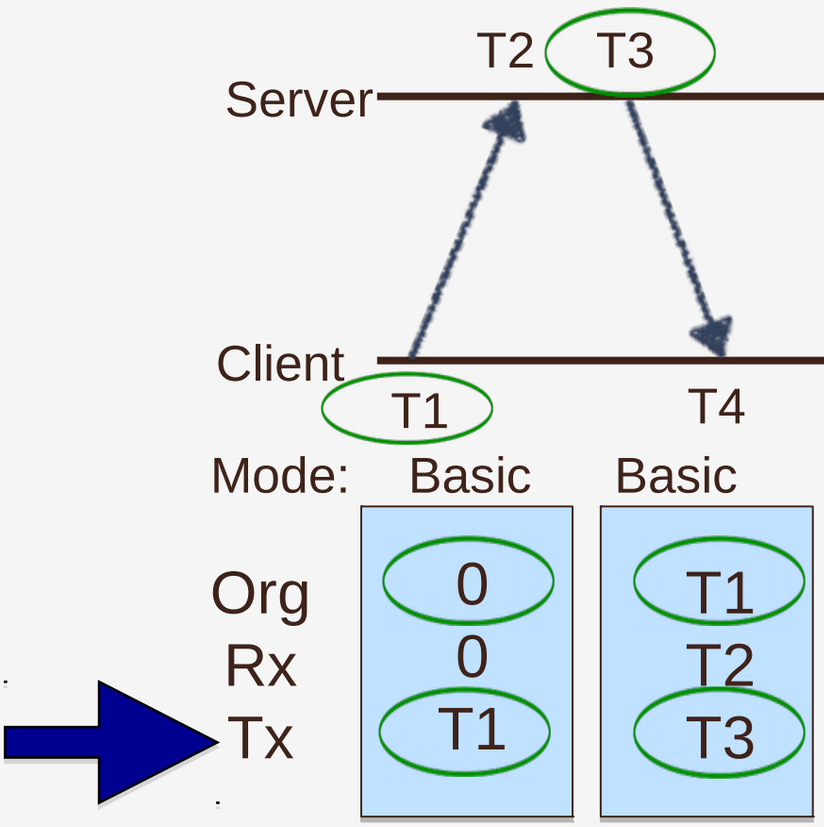
For more accuracy

- Tx should be captured close to the wire, ideally at PHY layer
- difficult to implement in current packet
- RFC 5905 provides no specification for server to provide this more accurate Tx to clients/peers

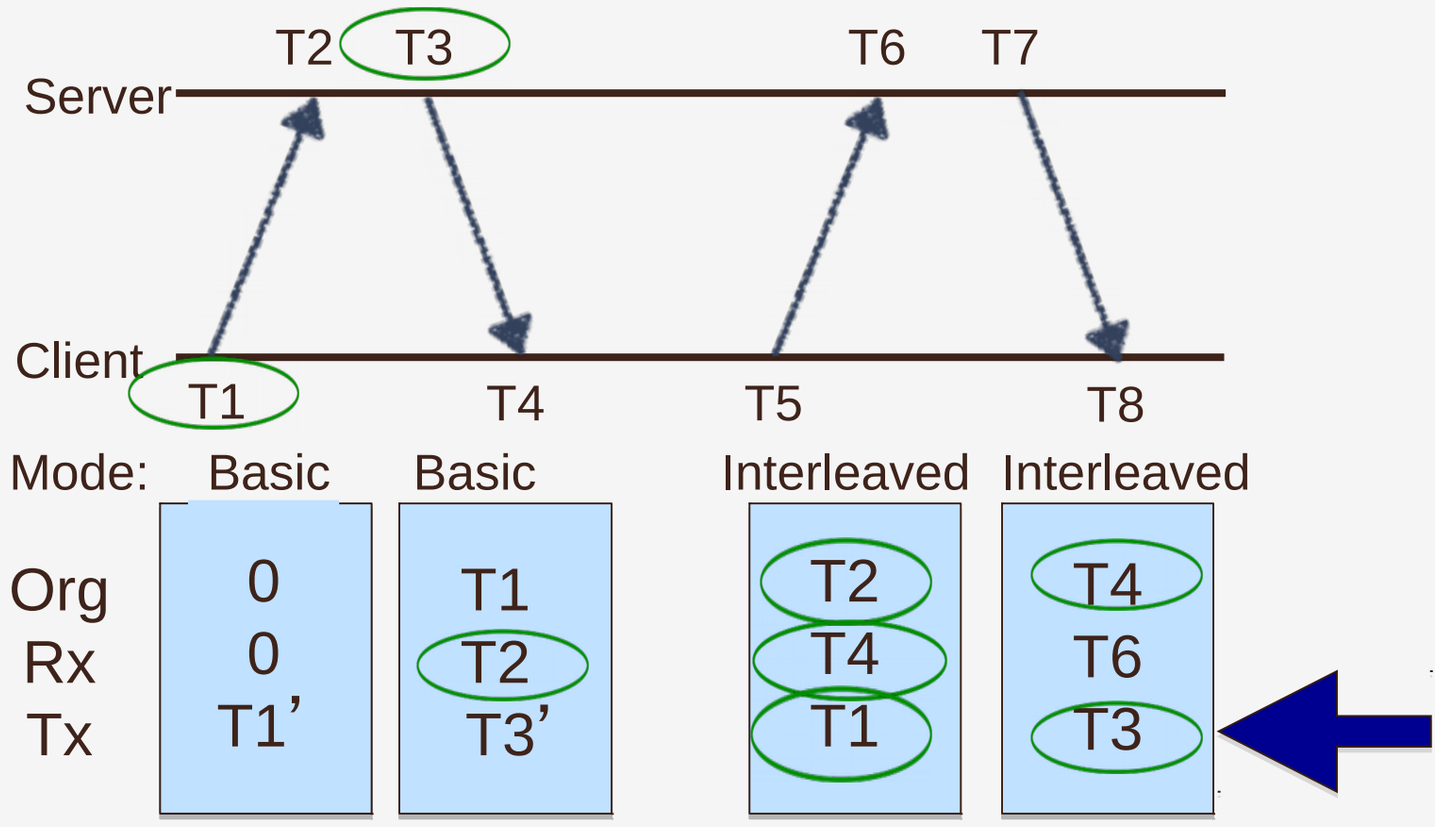
Interleaved mode

- NTP packet contains a Tx corresponding to the previous packet sent to the client or peer.
- This draft formally specifies:
  - A new interleaved client/server mode.
  - Interleaved symmetric mode with some modifications to NTP reference implementation.
  - Interleaved broadcast mode based purely on NTP reference implementation.

Interleaved client/server mode



basic client/server mode



interleaved client/server mode

Interleaved client/server mode

Server state:

- for client: (Rx, Tx)=(T2, T3)
- upon getting request:

check if T2=?Rx

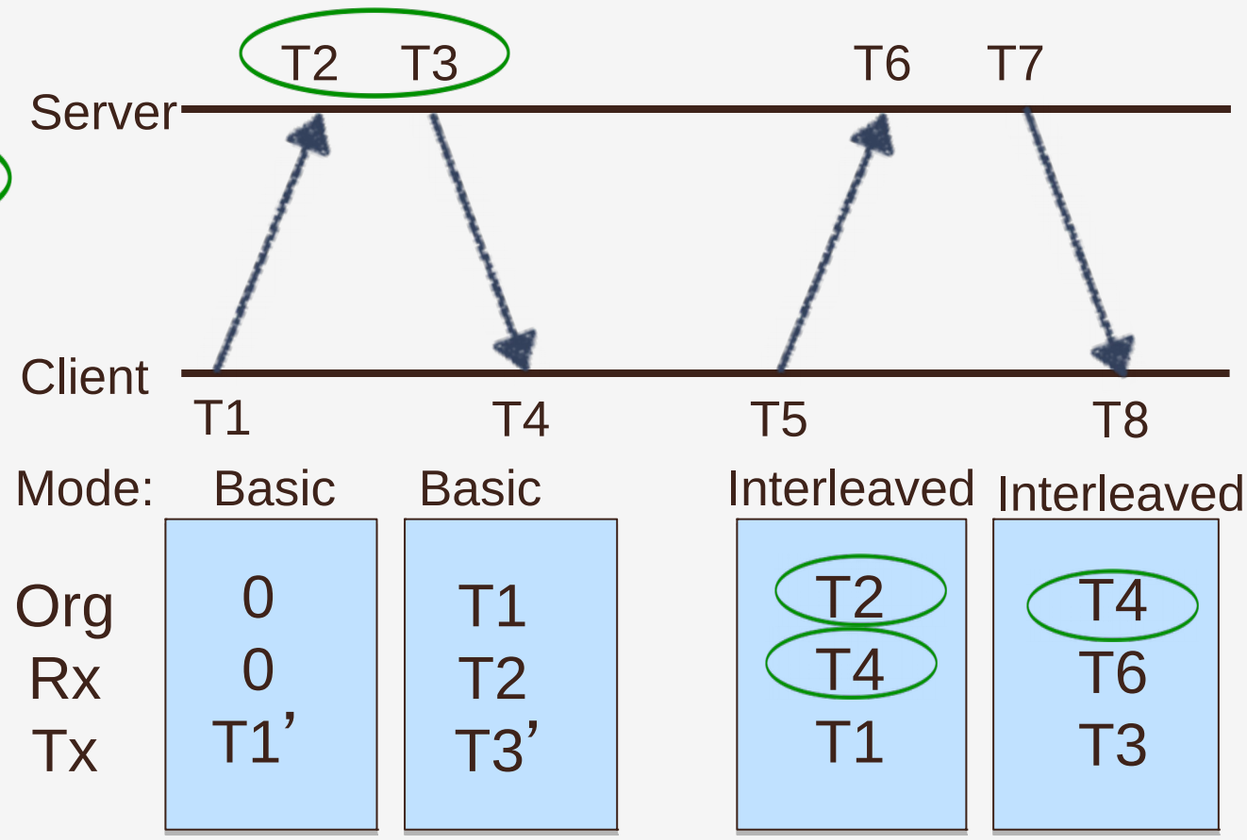
Client state:

- upon getting response:

perform all tests as in RFC 5905

&

check if T4=?Rx



Interleaved client/server mode

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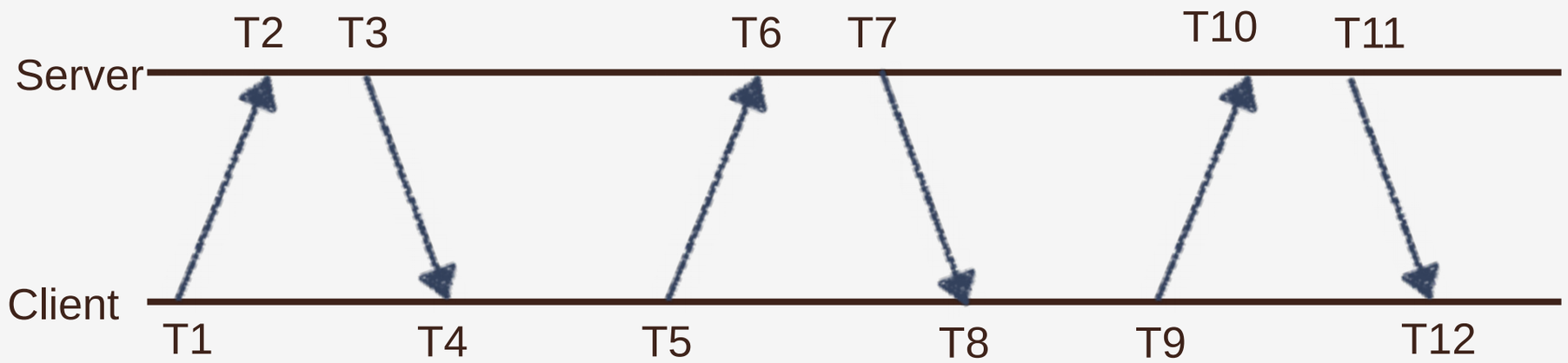

Mode:	Basic	Basic	Interleaved	Interleaved	Interleaved	Interleaved
org	0	T1	T2	T4	T6	T5
Rx	0	T2	T4	T6	T8	T10
Tx	T1	T3	T1	T3	T5	T11

Interleaved symmetric mode

- Similar to interleaved client/server mode.
- Modification from NTP reference implementation.
  - Additional restrictions to deal with:
    - unequal peer polling interval
    - packet loss

Interleaved broadcast mode

Based purely on NTP reference implementation.