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NTS4PTP

Network Time Security for the Precision Time Protocol

Update Report of the Draft

Martin Langer, Rainer Bermbach

IETF NTP working group, June 22, 2021

Agenda

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- Goals and Features
- Protocol Overview
- Draft Status

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Goals

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- We need a security solution for PTP
  - PTPv2.1 provides an AUTHENTICATION TLV
  - The key management system is out of scope
- Idea: Using NTS as a key management system for PTP
  - Then we have one NTS-KE server, which supports NTP and PTP
- We want a solution for all PTP functionalities and modes
  - Not easy and very different to NTP

NTS4PTP
Features

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- NTS4PTP defines two approaches:
  - Group-based approach (GrBA): for PTP multicast and mixed multicast/unicast
  - Ticket-based approach (TiBA): for PTP unicast only (scalable)

- We have extended the NTS-KE protocol to support PTP

- We have defined the NTS Time Server Registration (NTS-TSR) protocol
  - The communication between time server (PTP grantor) and NTS-KE server
  - Therefore, the NTS-KE server can run the NTS-KE and NTS-TSR protocol (depending on the ALPN)
    - Necessary to be able to distinguish messages

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Features

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- More features:
  - Group- and E2E security
  - Cyclic key update process
    - Without interruption of PTP communication
    - Simple group control
  - PTP grantor and algorithm negotiation for unicast connections

NTS4PTP
Protocol Overview – Group-Based Approach

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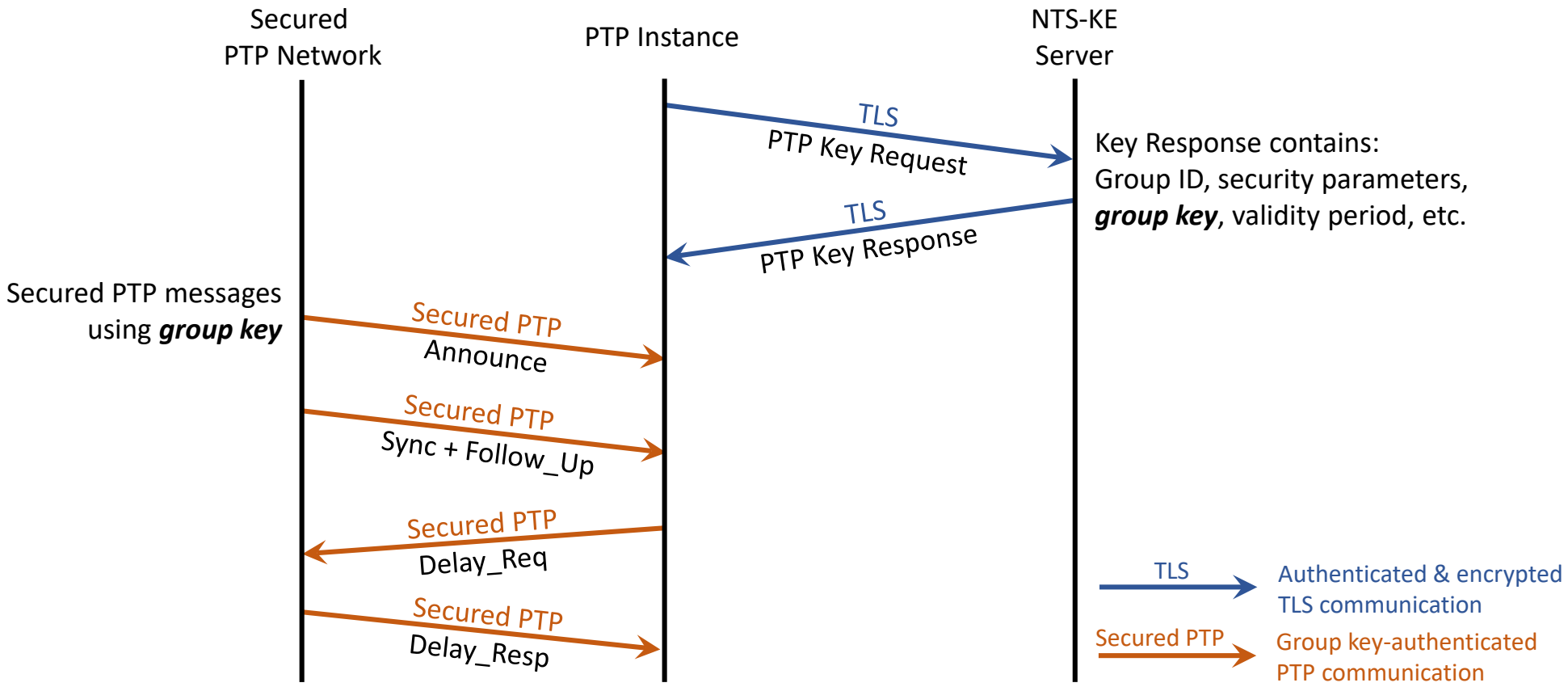
- Same procedure for every PTP instance of the group



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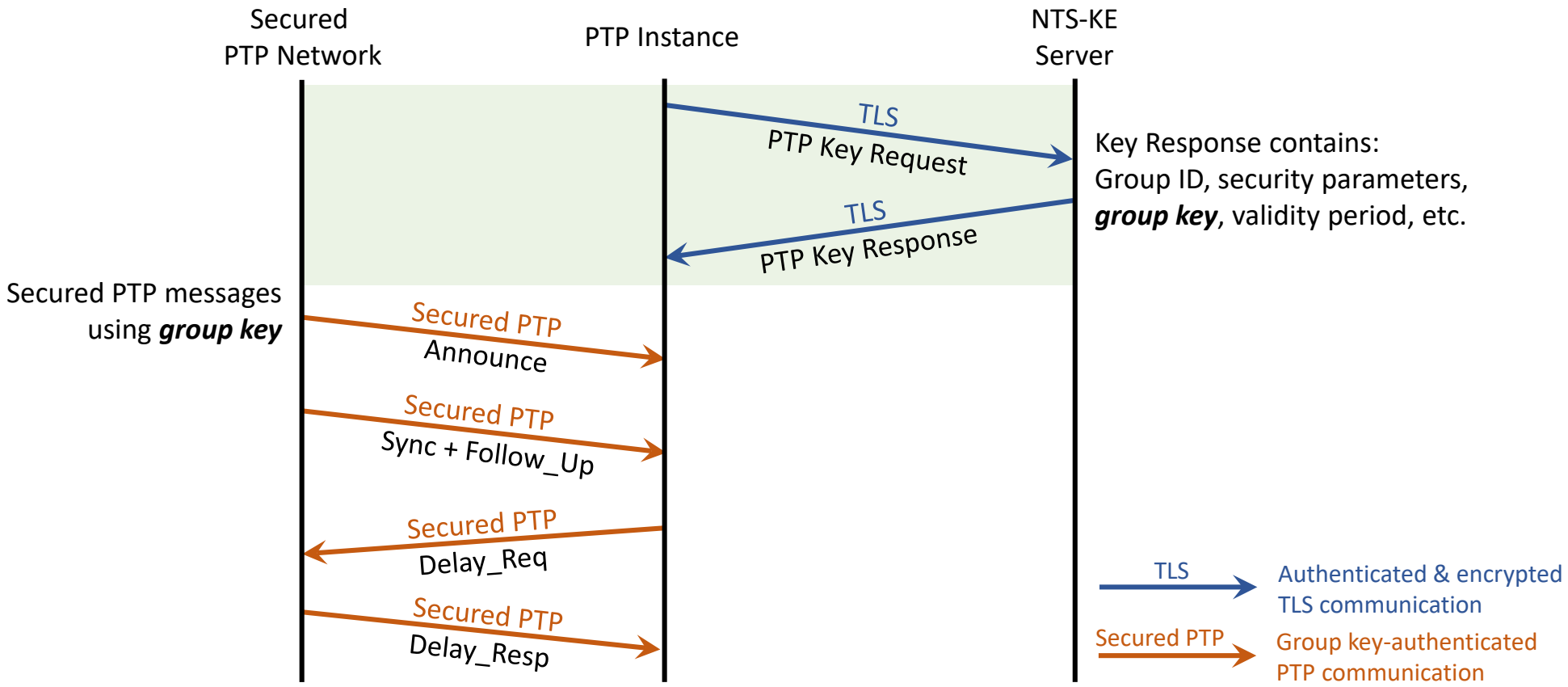

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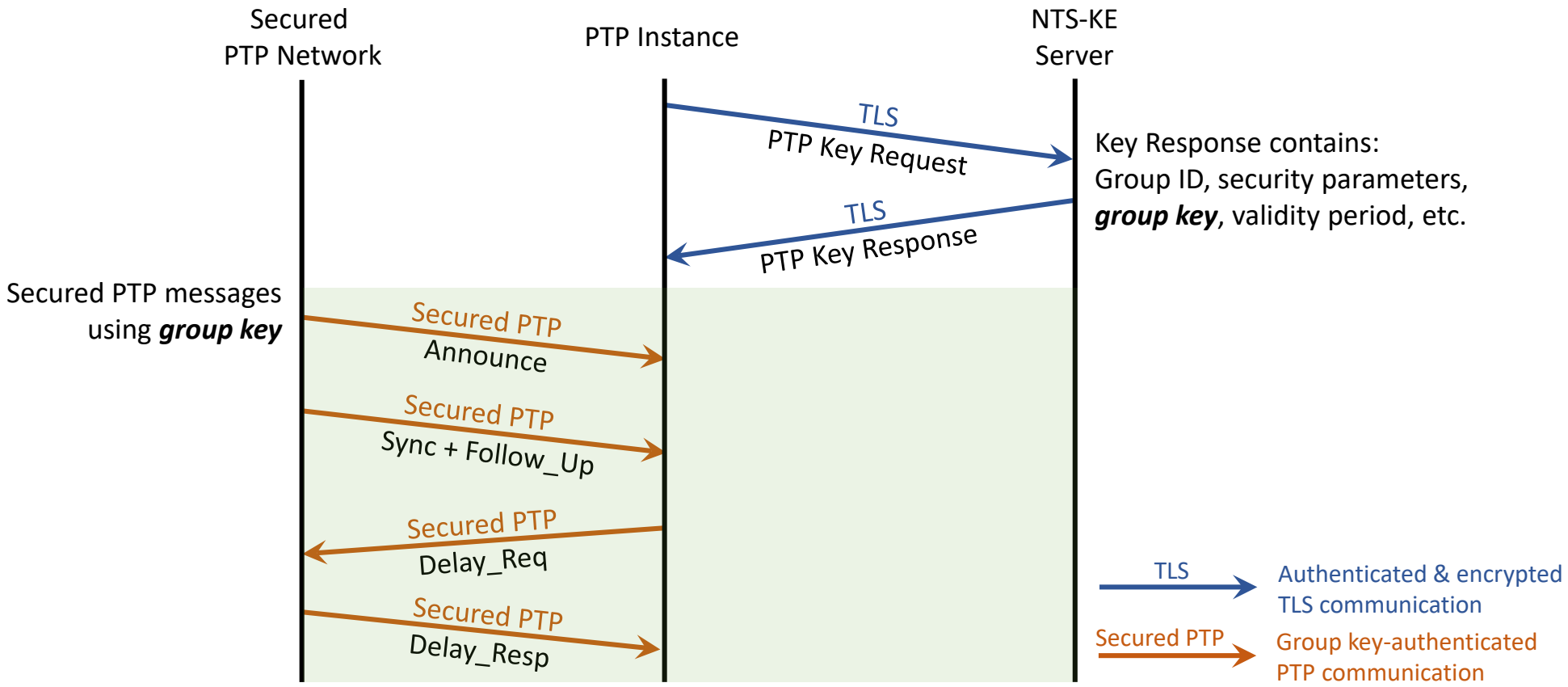

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Protocol Overview – Ticket-Based Approach

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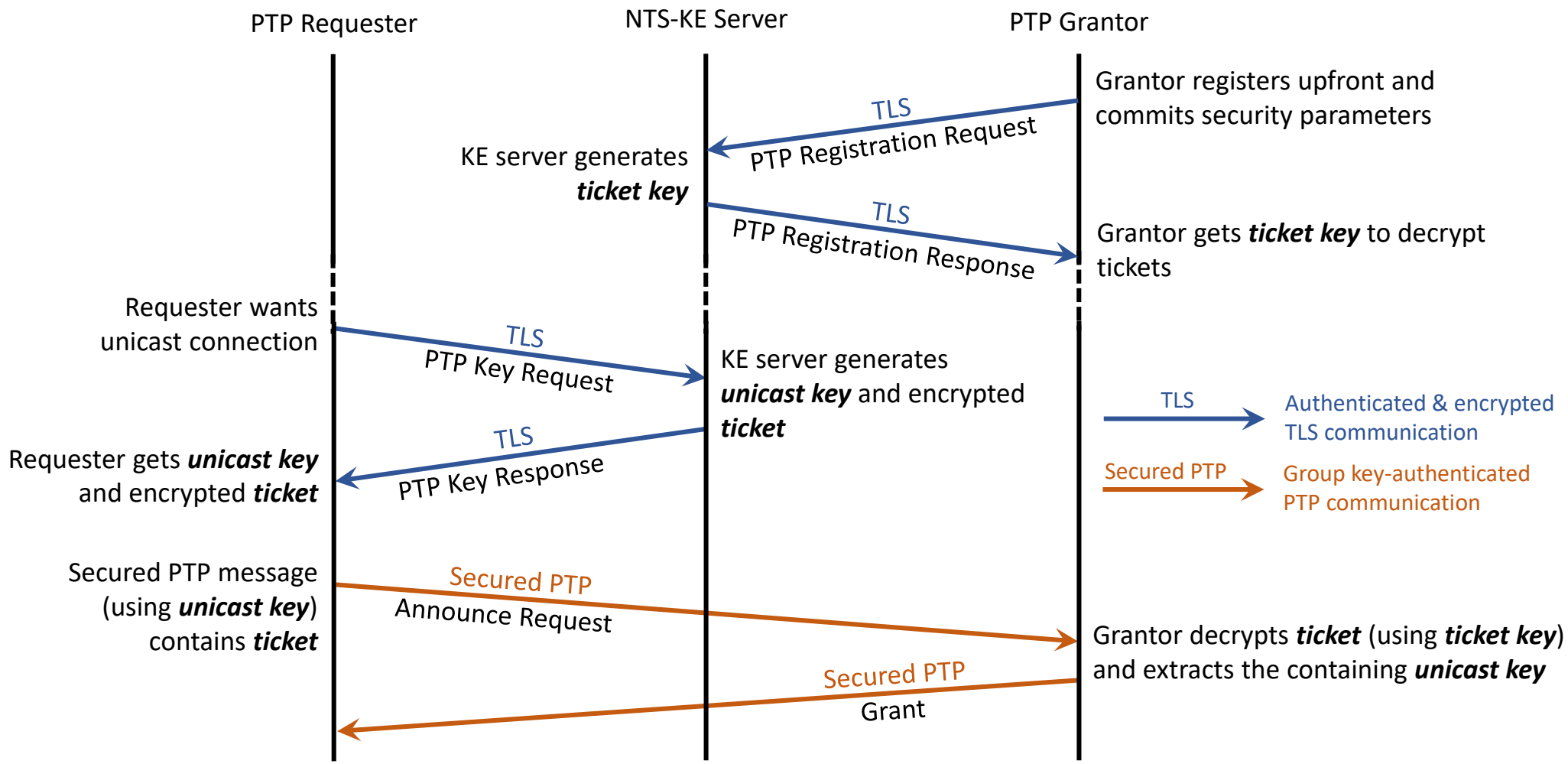

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Protocol Overview – Ticket-Based Approach

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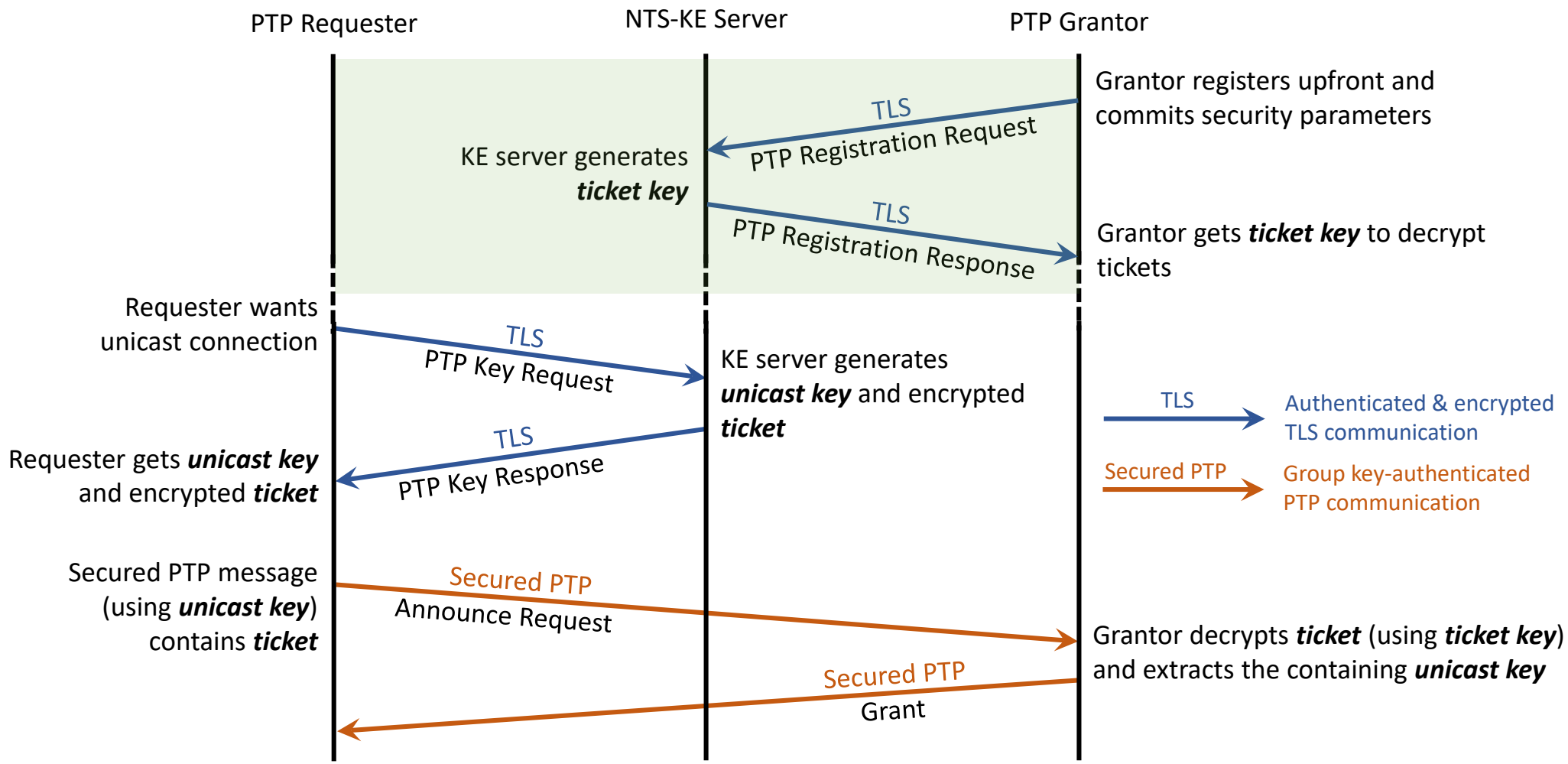

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Protocol Overview – Ticket-Based Approach

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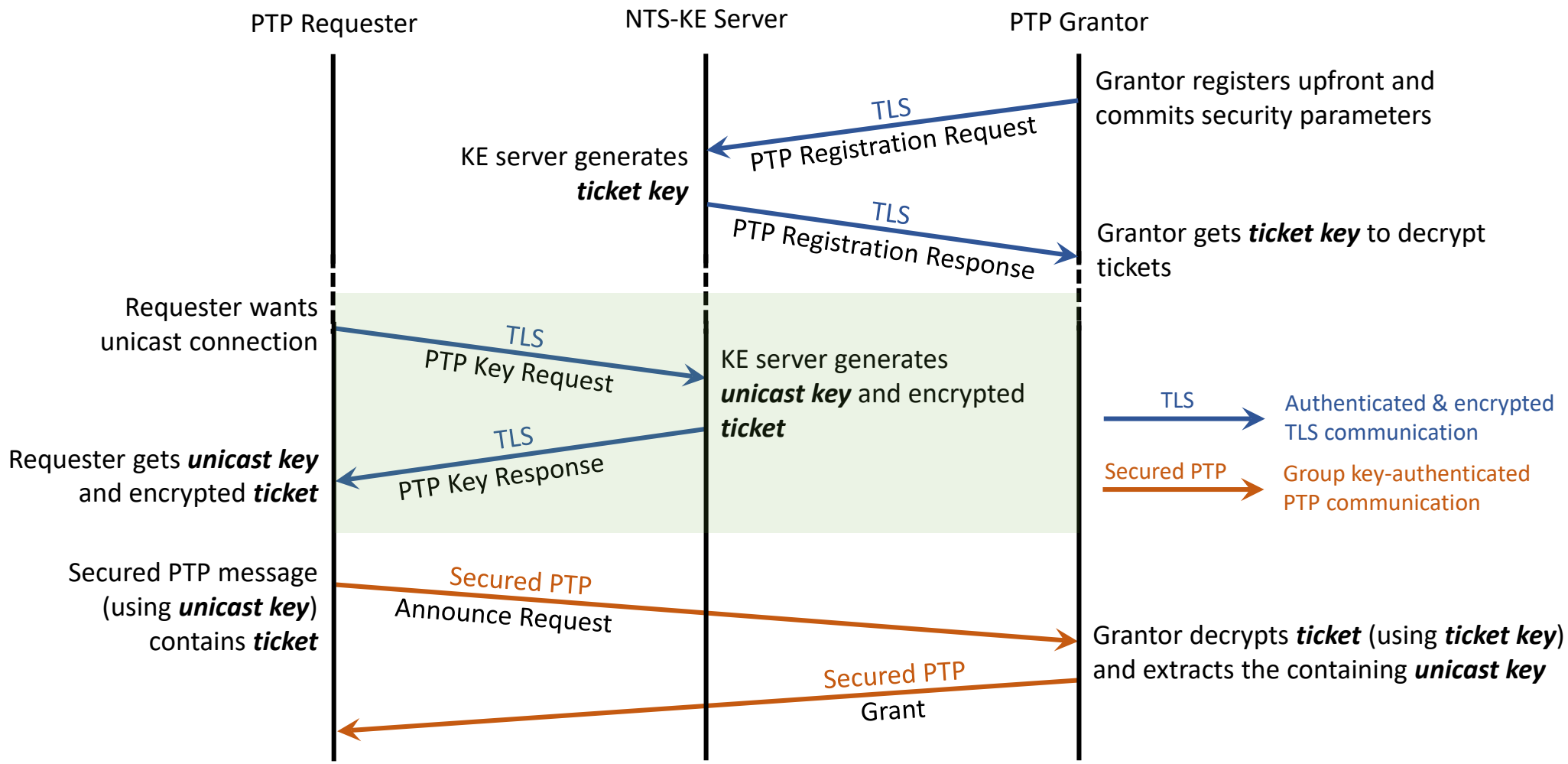

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Protocol Overview – Ticket-Based Approach

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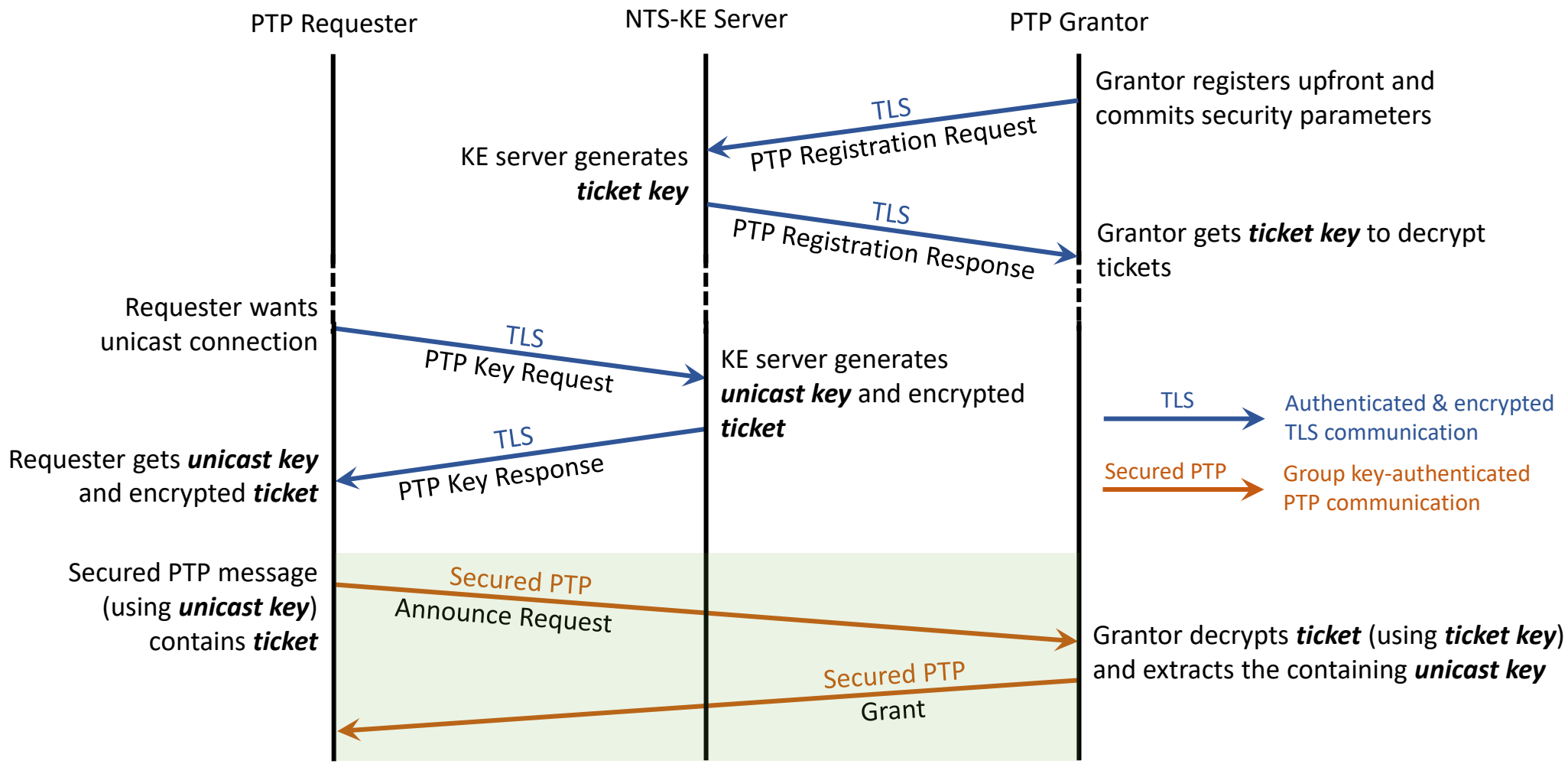

NTS4PTP
Draft Status

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- Current version: *draft-langer-ntp-nts-for-ptp-01*

- Next update in 6 to 8 weeks

- The following version contains many changes
  - NTS messages were simplified
  - Key rotation process has been optimized
  - Clarifications and text improvements
  - Preparation for PoC implementation underway
    - possible integration into Linux PTP for initial tests

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Thank you for your attention!

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