Autokey Version 2 Specification

draft-sibold-autokey-02

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Introduction

Scope:

Autokey V2 shall provide

- Authenticity of NTP servers
- Integrity of NTP data packets
- Conformity with the TICTOC Security Requirements
- Compatibility with the current NTP specification

Introduction

History

IETF 83	Presentation of security issues of RFC 5906 (autokey)
IETF 84	Plan for a new autokey standard was presented
IETF 85	00-version of draft (and preliminary 01-version)

Changes since IETF 85

- **Broadcast Mode**
  - Authentication and integrity check for NTP broadcast mode.
  - Based on TESLA (Time Efficient Stream Loss-Tolerant Authentication), RFC 4082
- **Unicast Modes (client-server, symmetric)**
  - HMAC approach for the generation of the MAC
  - No need for pseudo random keys (autokeys)
- **Revision of Appendix A**
  - Verification against TICTOC Security Requirements draft 04

Broadcast mode

Authentication of the server

- Same procedure as in the unicast modes

Broadcast mode (cont. …)

Integrity protection

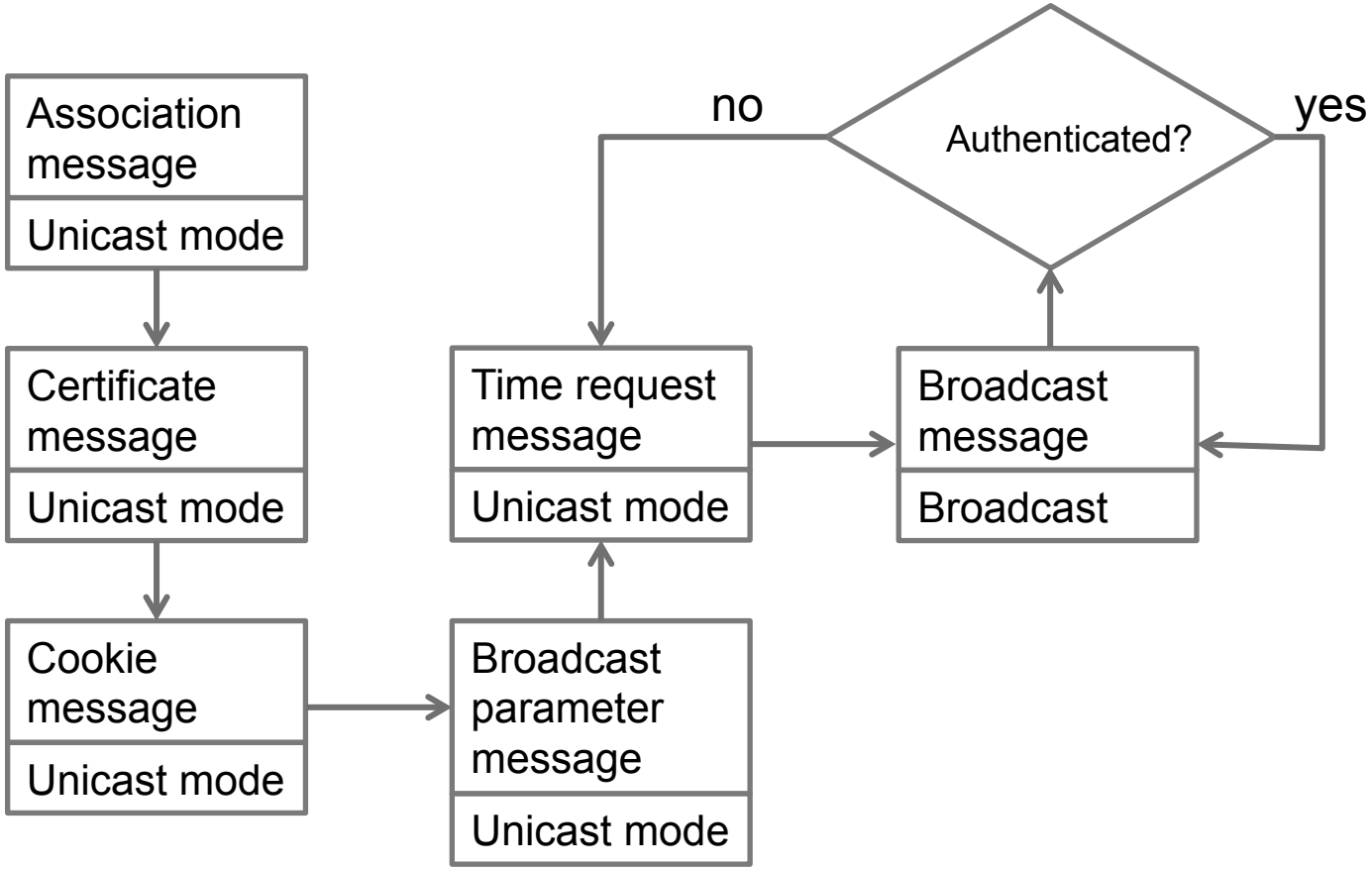
- **The approach for the unicast modes fails in the broadcast mode**
  - The generation of the MAC is based on a shared secret between client and server ➔ this conflicts with the broadcast mode
- **Asymmetric cryptography could solve this problem but conflicts with precise time synchronization requirements**
- **Suggested solution is based on TESLA (RFC4082)**
  - TESLA uses symmetric cryptography
  - The required “asymmetric” property is introduced by time-delayed key disclosure
  - TESLA requires “loosely” time synchronization between sender and receivers

Design of TESLA, RFC4082

Protocol sketch

- Assumption: Broadcast client is time synchronized to the broadcast server
- The server computes a one-way key chain and associates each key to a time interval
- Packets are appended by a MAC calculated with the current key from the one-way key chain
- The client ensures that the packet was sent before the key for the MAC was disclosed; it buffers the packet for later authentication
- The server discloses a key after a pre-defined time delay by appending the key to a packet
- If a key is disclosed the client checks that the key belong to the key-chain and verifies the correctness of the MAC.

Broadcast Protocol Sequence



Next steps

- A new name for the protocol (suggestions?)
- Awaiting for comments to the current state of the draft
- Acceptance as working group document