Private Service Discovery

draft-bradley-dnssd-private-discovery-00

Bob Bradley (bradley@apple.com)

DNSSD
IETF 103, November 2018, Bangkok

Problem

Bonjour service advertisements leak information about devices or users

- Types of services, names, persistent identifiers, etc.

Goal: Bonjour functionality between friends without compromising on privacy

Long-term peer key sharing and pairing is out of scope

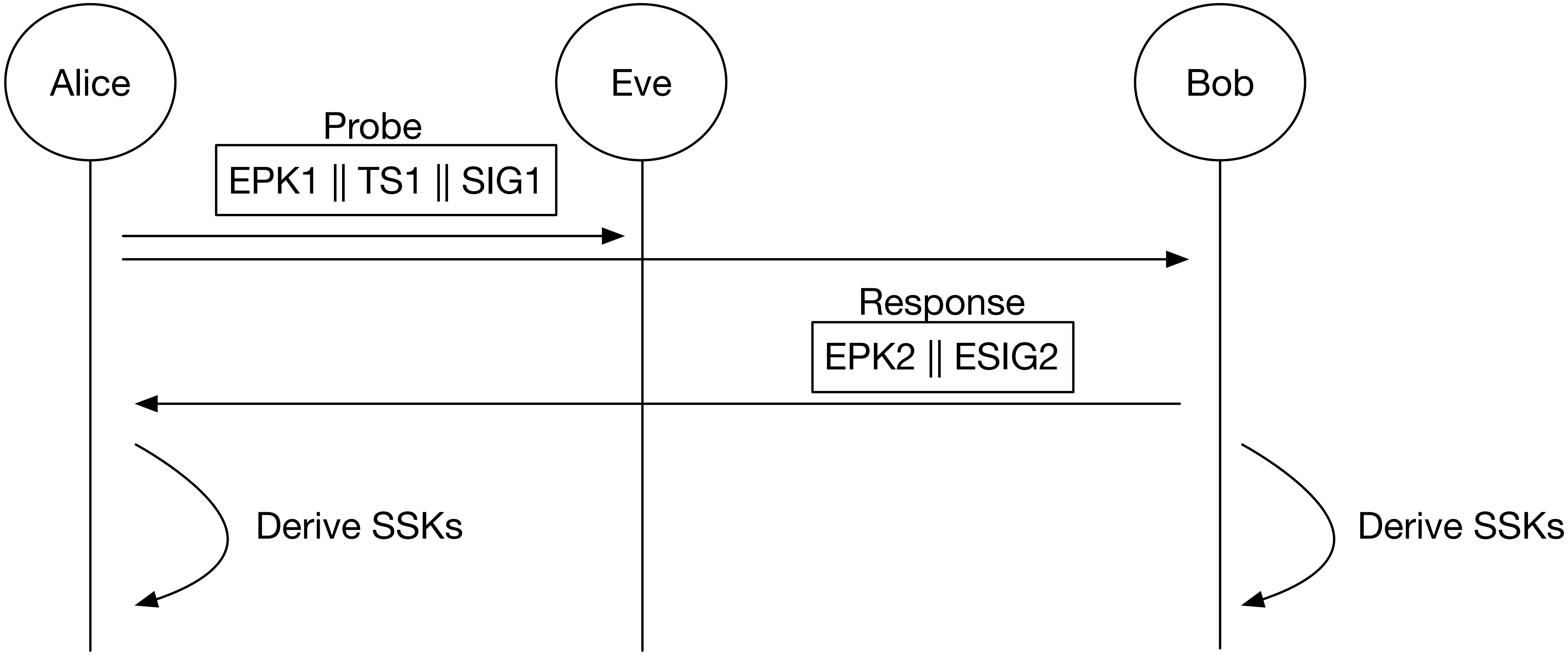
Protocol Overview

Peers **search for friends** via multicast probes, and friends respond with unicast responses to establish shared secrets

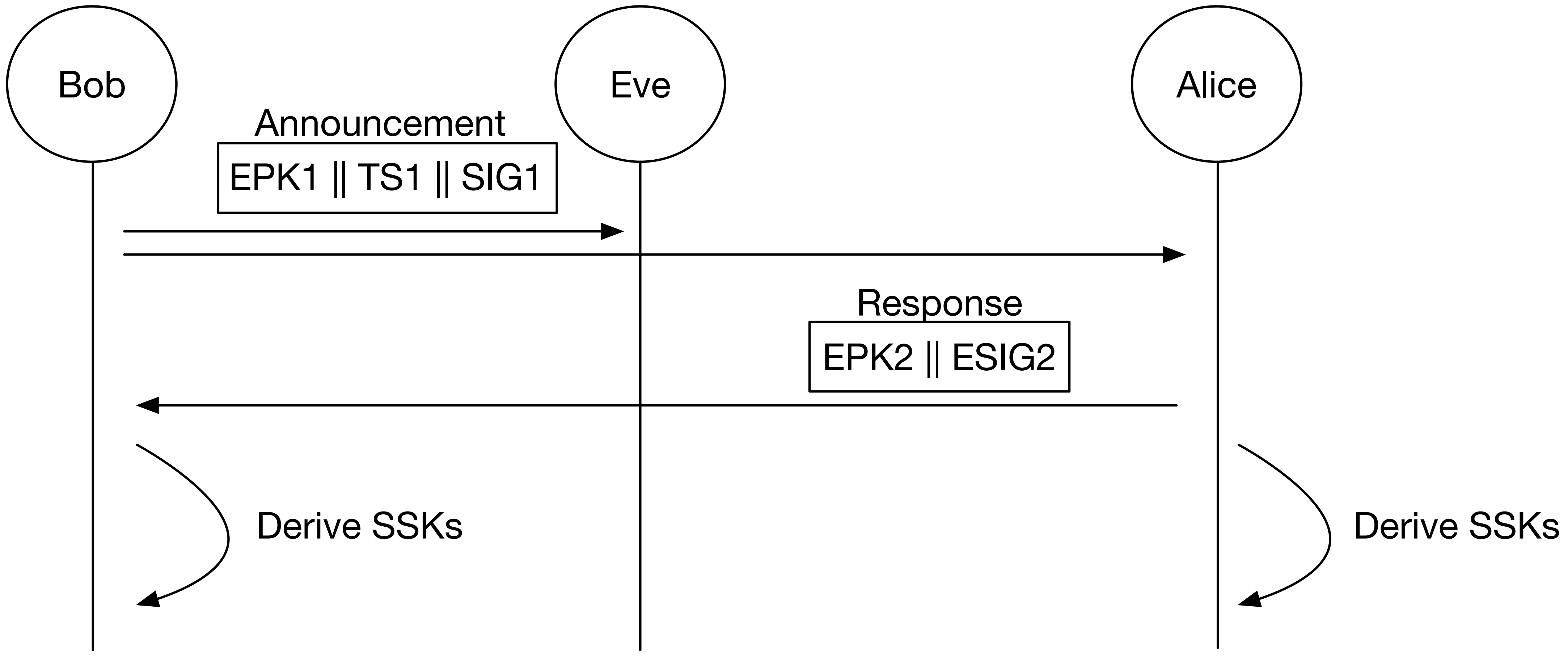
Peers **advertise availability** via multicast probes, and friends respond with unicast responses to establish shared secrets

Shared secrets are used to encrypt normal mDNS messages

Probe+Response



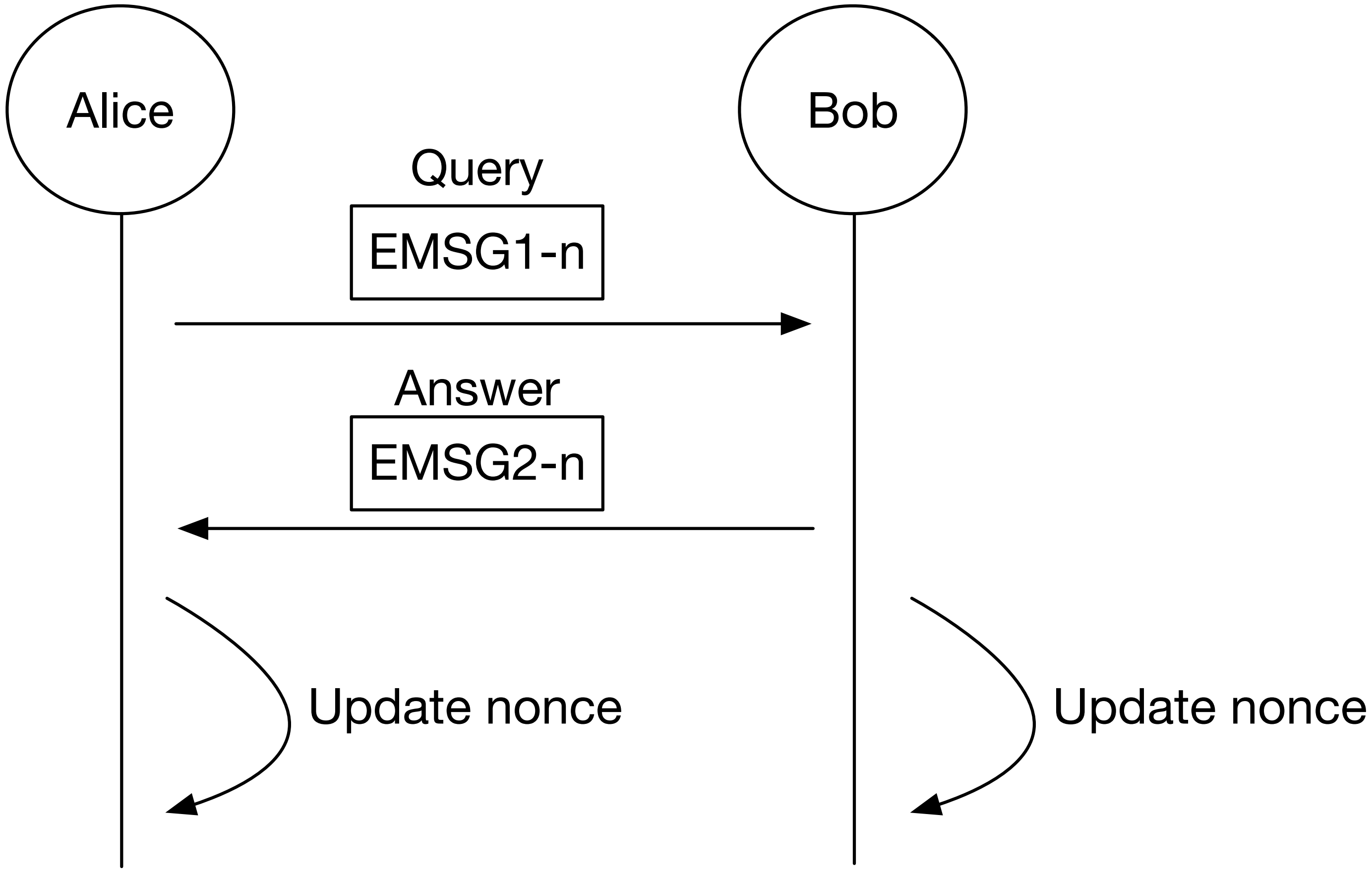
Advertisement+Response



Query+Answer

Queries are normal DNS messages (PTR, SRV, etc.)

Answers are encrypted answers



Key Schedule

x25519 [RFC7748] for key exchange using ephemeral public keys

HKDF with SHA-512 [RFC5869] for secret derivation

Encryption

Implicit and synchronized nonces between peers

- Makes replay trivial to detect
- Does not deal well with packet loss*
- Out-of-order packet processing requires trial decryption

Open Issues

Should responders send fake replies to non-friends to mask relationships between real friends? (Reaction attacks)

Should peer verification order be randomized to hide contents of friends list?

Do we need versioning? What about agility?

Do we accept the DoS risk?

Questions?