Post Sockets

a way to think about the world after sockets

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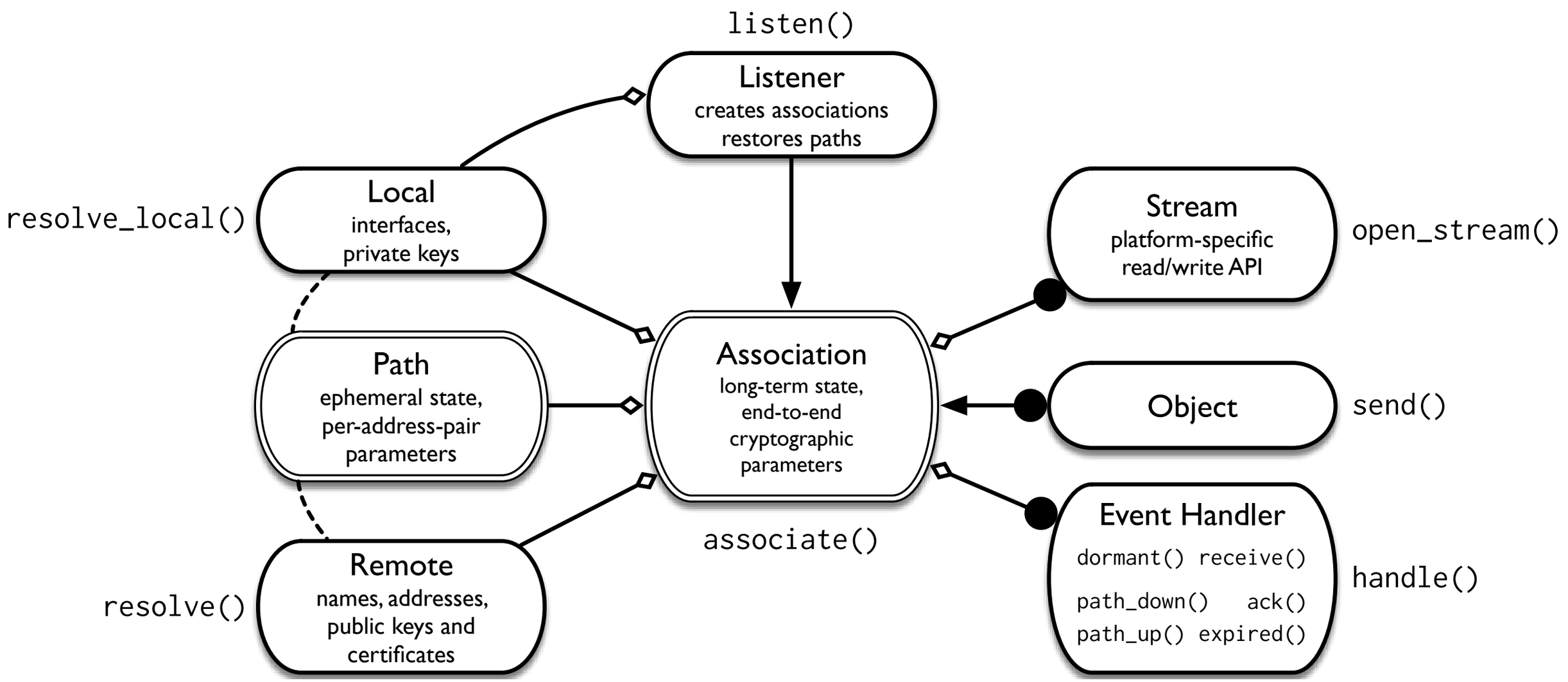
A few insights

- ***Applications deal in objects*** (messages) of arbitrary size
  - Files, assets, media frames, etc. may depend on each other, but usually don't require a strict ordering.
  - Streams exist too, but only when the underlying source of data is of unknown length and not easily divisble into objects.
- The network of the future is ***explicitly multipath***.
  - Applications must have access to the properties of these paths.
  - (And may be able to communicate with the path about these properties)
- Future transports must ***guarantee security properties.***
  - Path elements must not be able to see transport-layer metadata.
- Message reception is ***inherently asynchronous.***
  - Present scalable programming models enable (and require!) async IO.

Abstract Programming Interface

Classes and Entry Points



Abstract Programming Interface
Object and Stream properties

- Objects and streams have a **niceness**
  - Nicer `send()`s/`write()`s yield to less nice
- Objects have a **deadline**
  - An object will be cancelled if it cannot be realistically received before this deadline
  - Infinite-deadline objects are fully reliable
- Objects may have **antecedents**
  - other objects which should be sent before

Transport Independence

- Only two requirements for transport on the wire:
  - Framing for objects
  - Some (non-address) way to identify associations
- Assumption that the transport protocol provides encryption for payload confidentiality and public header integrity protection.
- Can make use of other transport features on demand:
  - Multipath load balancing and migration
  - Multistreaming for objects and streams
  - PLUS for path property exposure
- Object properties (niceness, deadline, dependencies) are sender-side only; path properties can be derived locally too.

Can TAPS use Post?

- Post places some requirements on the transport:
  - Won't run over TCP/MPTCP without a framing/association ID shim.
  - Not the generic API TAPS envisions, if TAPS must work with unmodified transport protocols.
- Can be modified for application-layer failover:
  - "Transport supports only `open_stream()`."

Work to do

- Define path properties beyond “up/down”
  - Defined properties: interface cost/preference
  - Measurable properties: RTT/loss rate
    - Exposed properties: Lo/La, etc. via PLUS
- Pilot implementation and experimentation
  - Post for QUIC/TLS over PLUS in Go?
  - Post for (Post stream shim) over TCP?
  - Within auspices of MAMI project, by mid-2018.