# Transport-Independent Path Layer State Management

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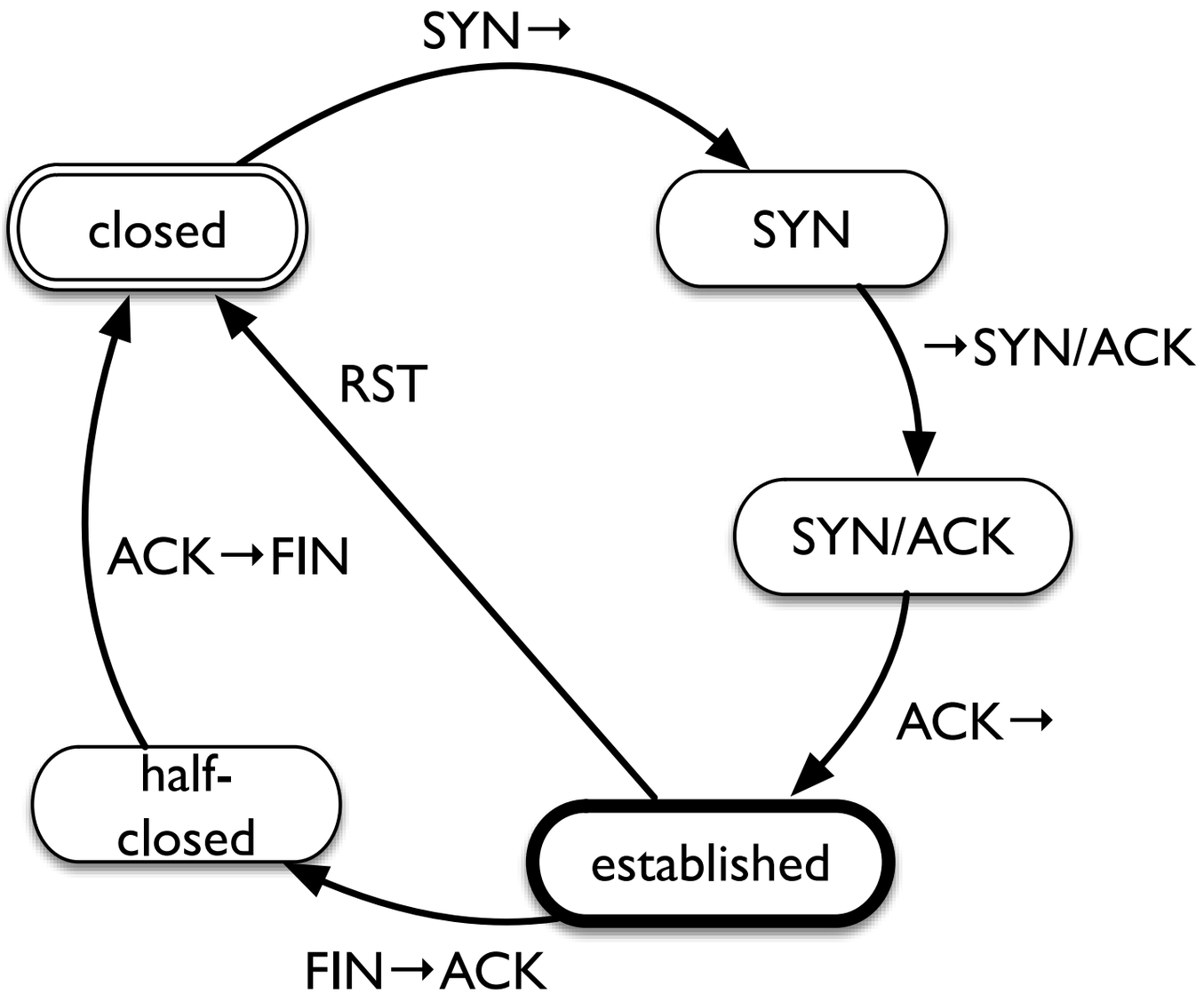
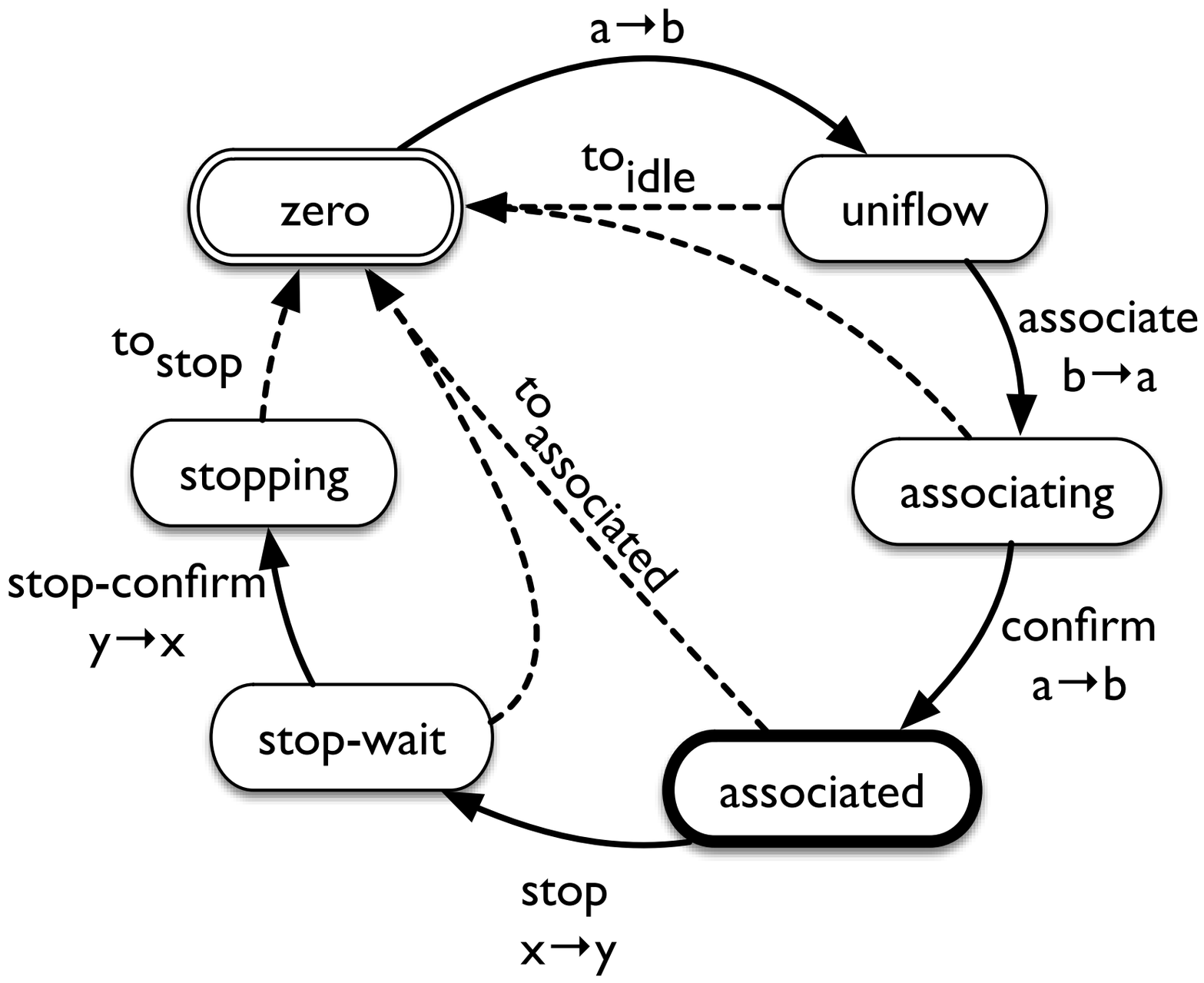
# The Problem

- Lots and lots of state-keeping devices on path…
  - … that assume TCP semantics
  - … won't work with non-TCP transports
- UDP-based transports need:
  - frequent keepalives
  - explicit directional rules, port mapping
  - other nasty hacks
  - or fall back to TCP
- These devices will do *something* with UDP transports anyway
  - Let's define something sane for them to do.

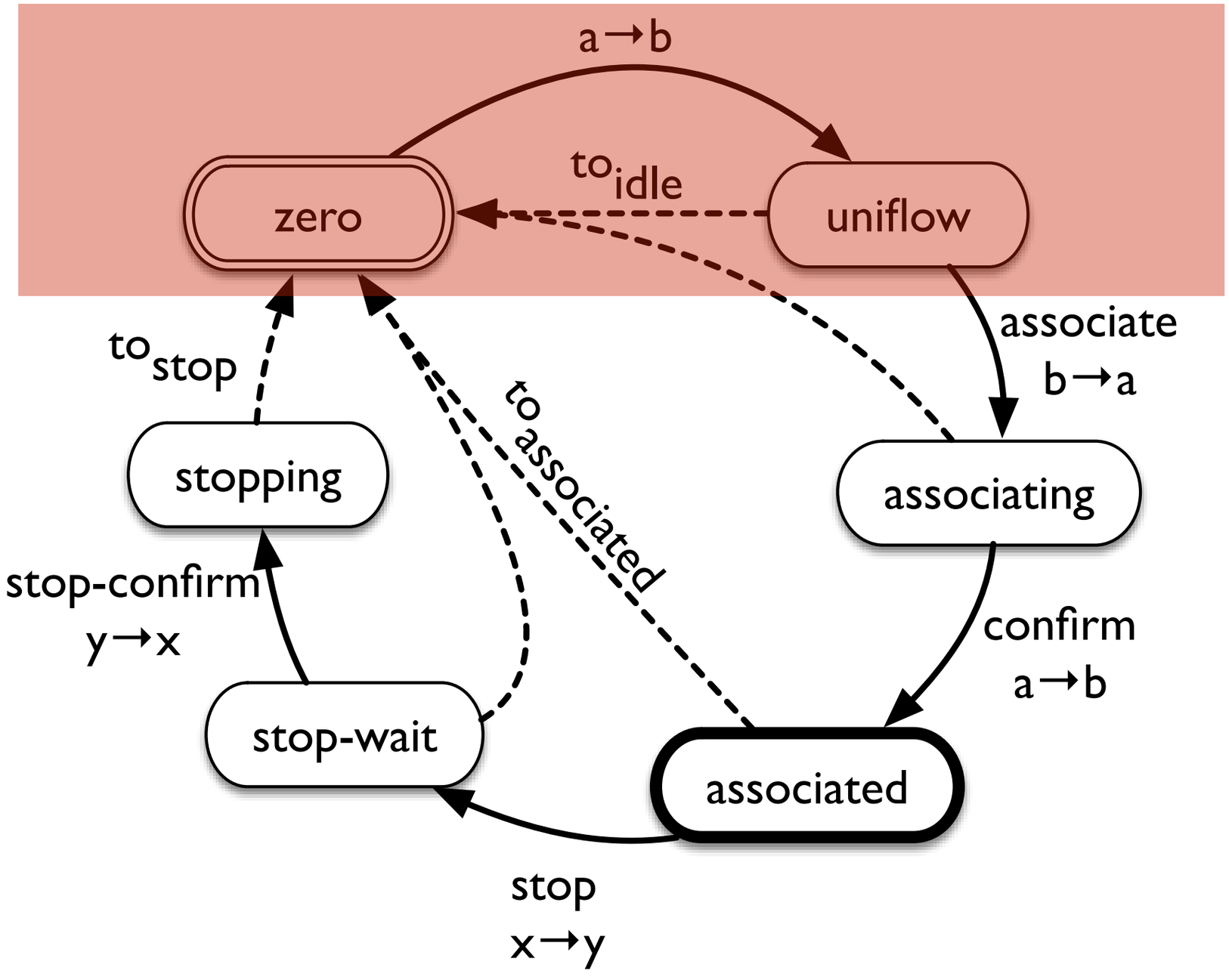
# TCP state modeling at middleboxes



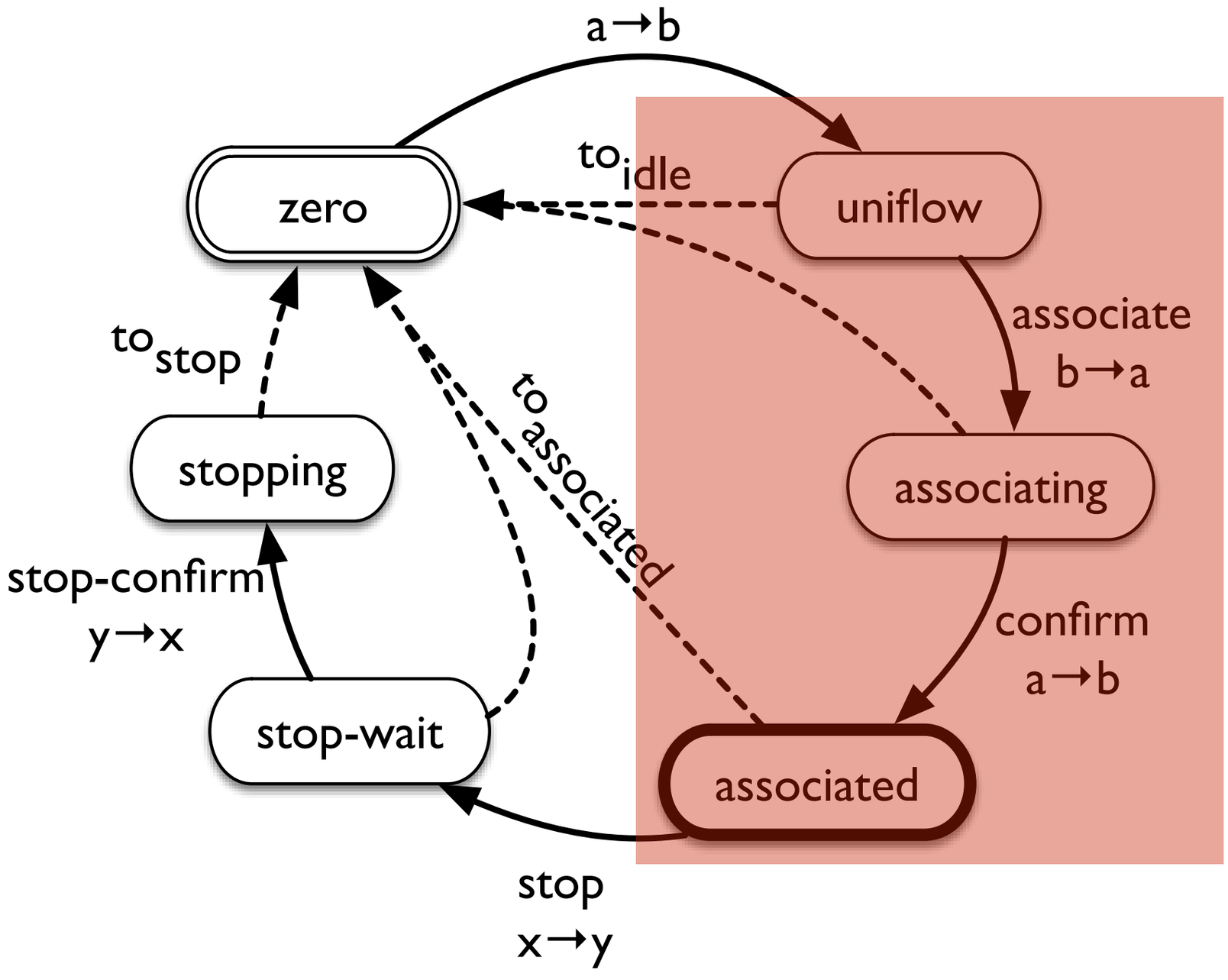
# A generic state machine



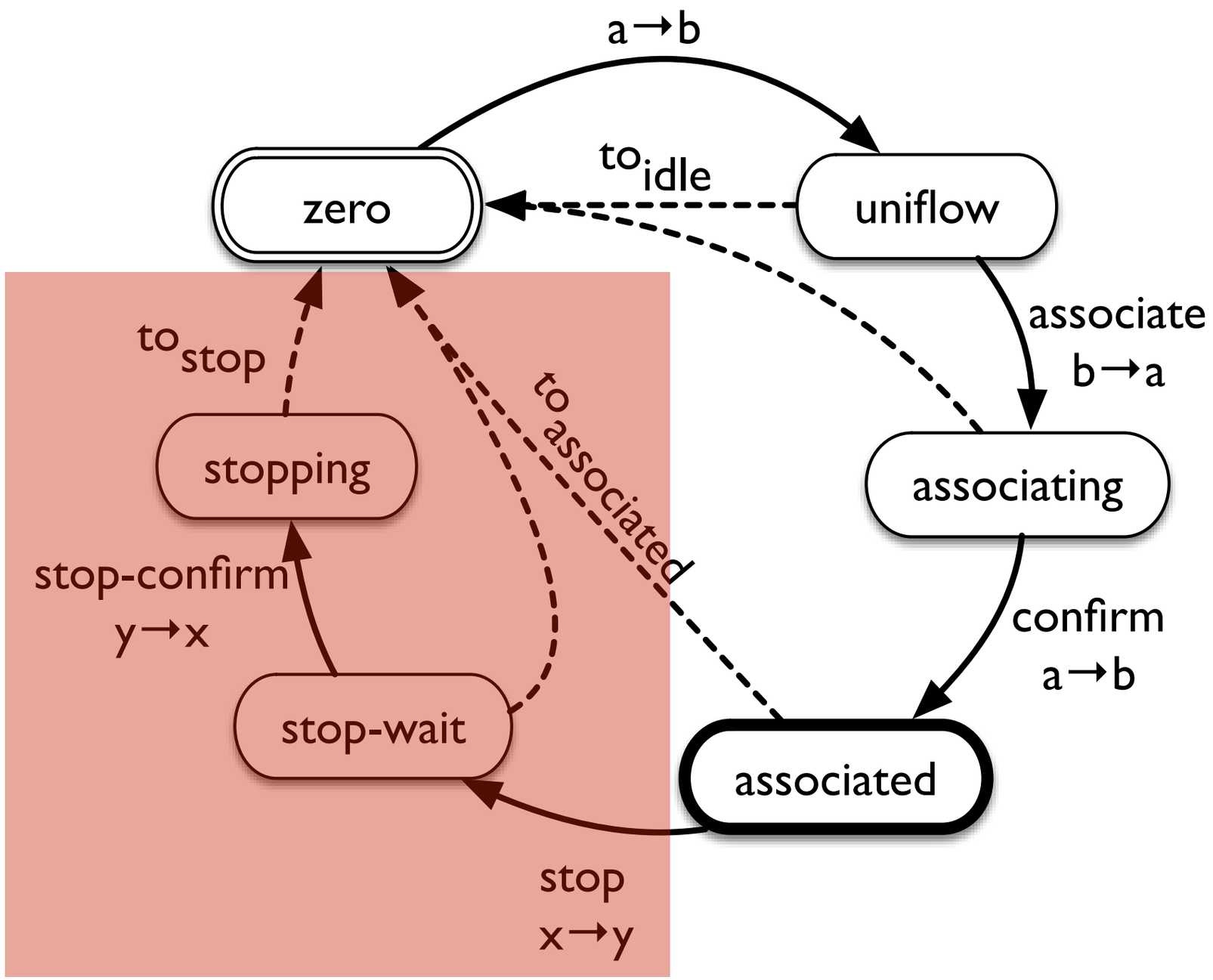
# One-way flows & one-sided devices



# Ensure intent
# & return-routeability



# Two-way stop


a→b
to idle
zero
uniflow
associate
b→a
to stop
to associated
stopping
associating
stop-confirm
y→x
confirm
a→b
stop-wait
associated
stop
x→y

# The draft

- As input to protocol design: consider which signals are made publicly available by your protocol, and how these will be used to maintain transport state on-path.

- As guidance for middlebox design: separate the extraction of signals from headers from the semantic treatment of those signals for state maintenance.

- Next steps?