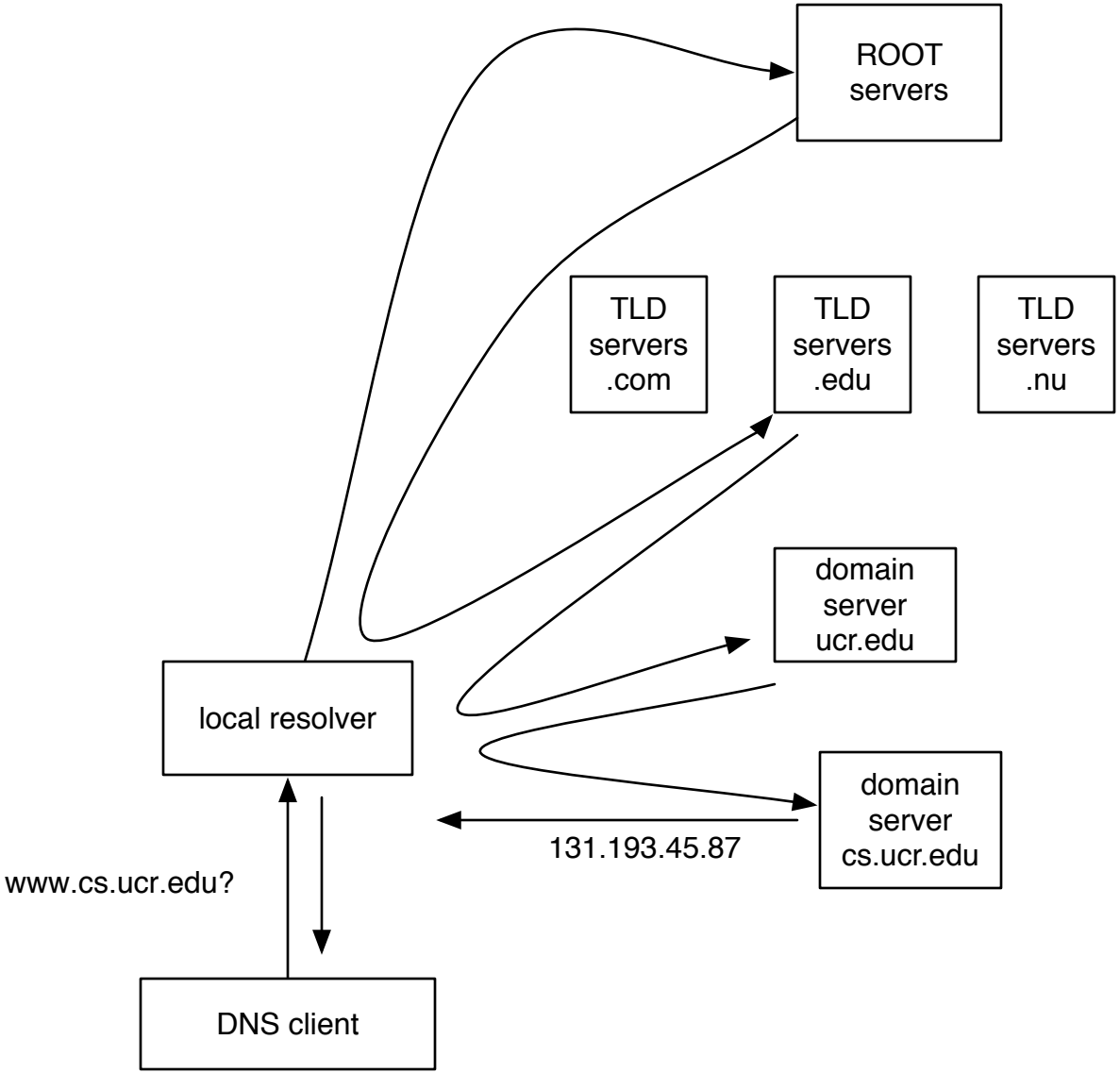
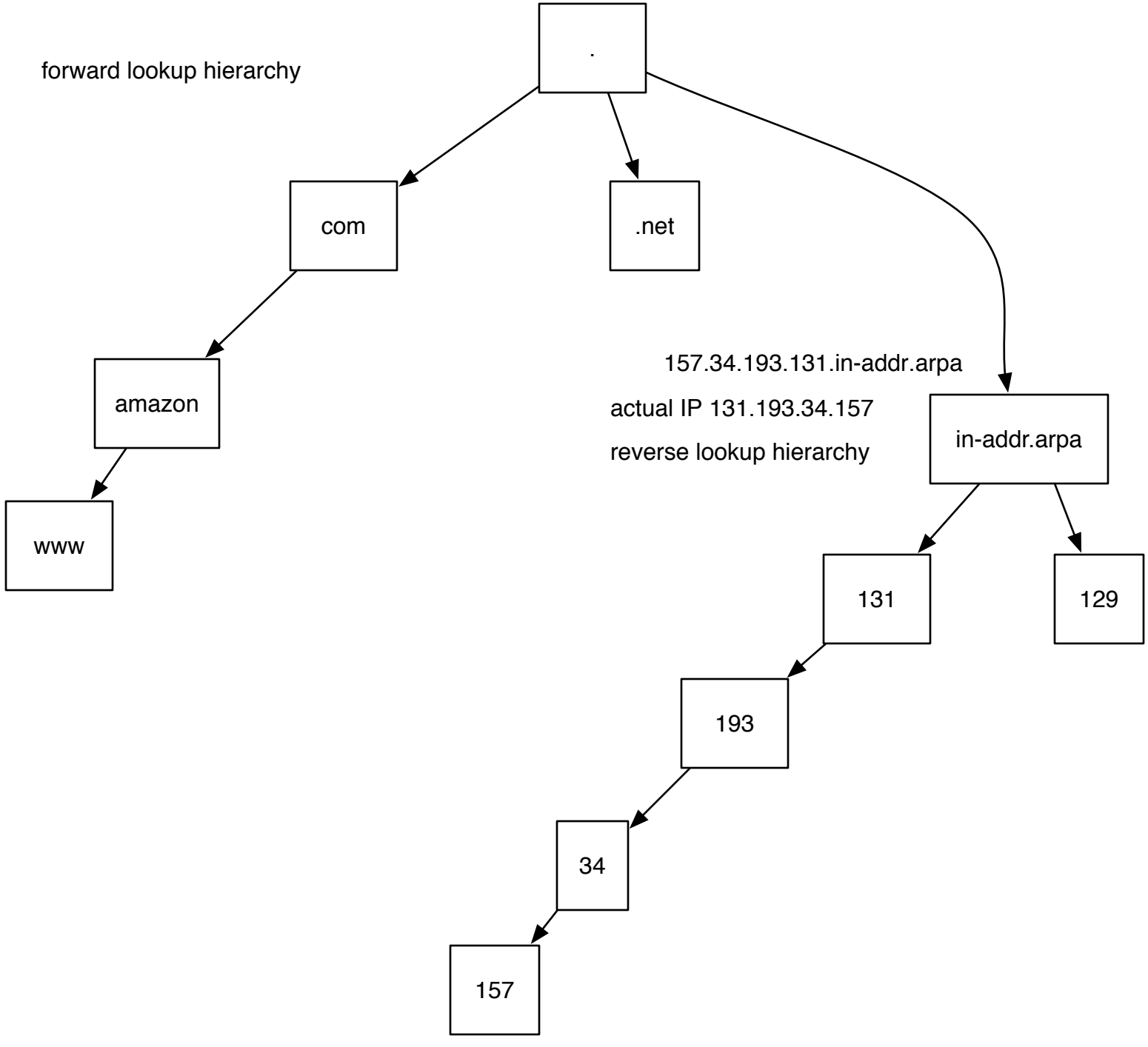
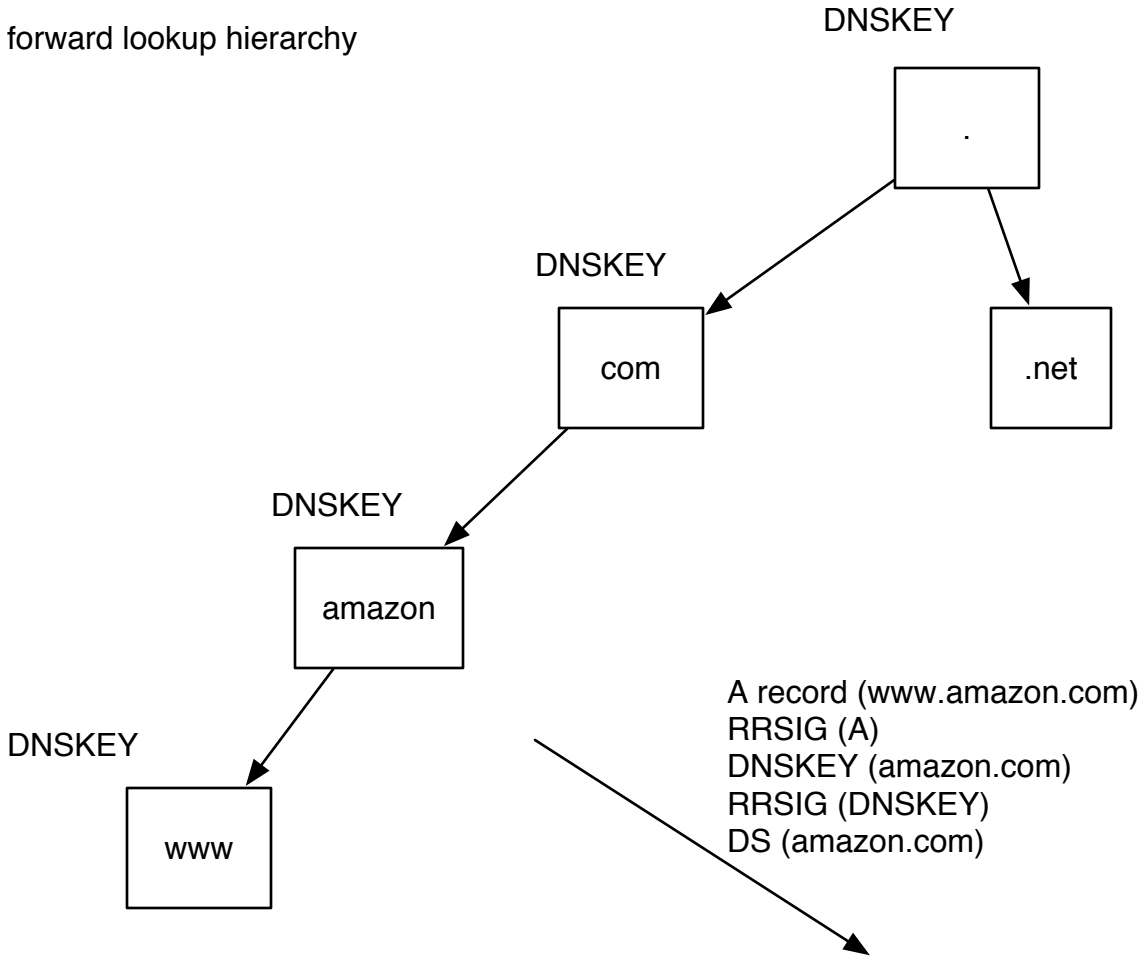
DNS


ROOT
servers
TLD
servers
.com
TLD
servers
.edu
TLD
servers
.nu
domain
server
ucr.edu
local resolver
domain
server
cs.ucr.edu
131.193.45.87
www.cs.ucr.edu?
DNS client

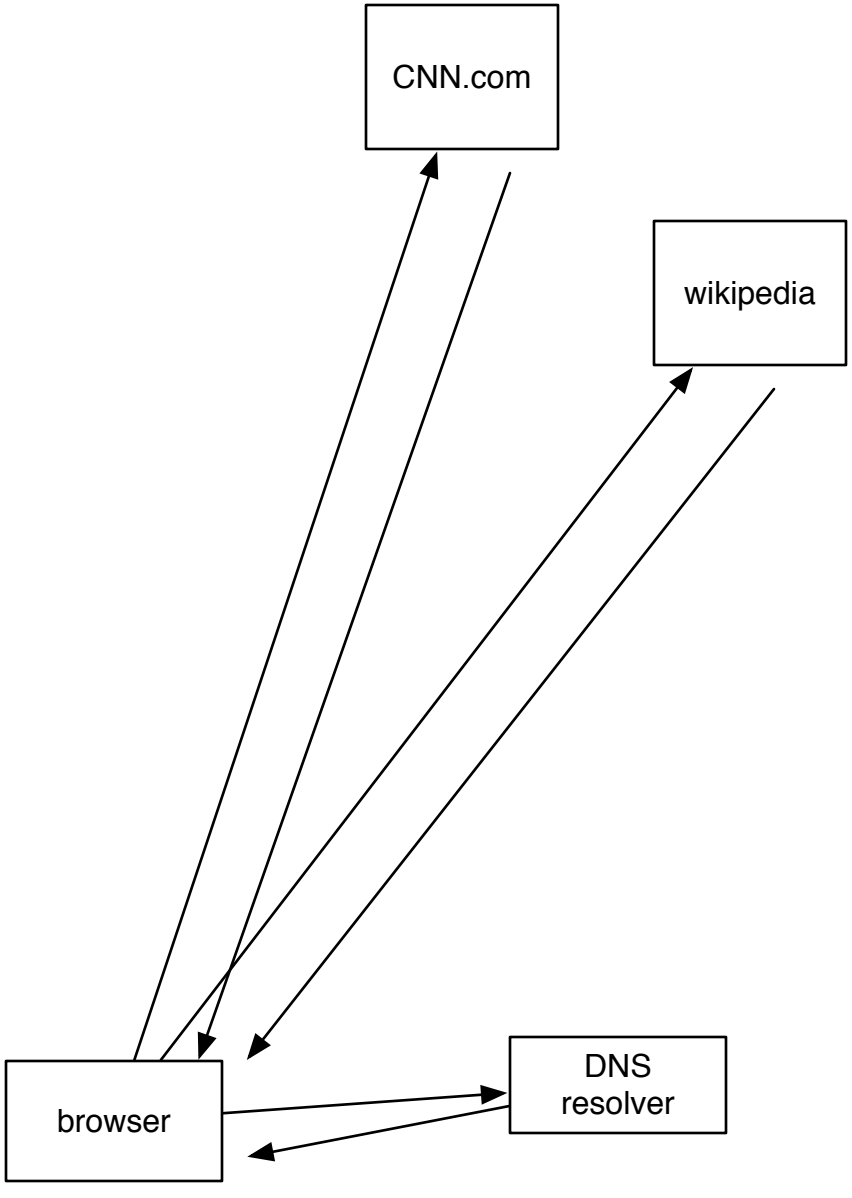

forward lookup hierarchy
.
com
.net
amazon
www
157.34.193.131.in-addr.arpa
actual IP 131.193.34.157
reverse lookup hierarchy
in-addr.arpa
131
129
193
34
157

forward lookup hierarchy

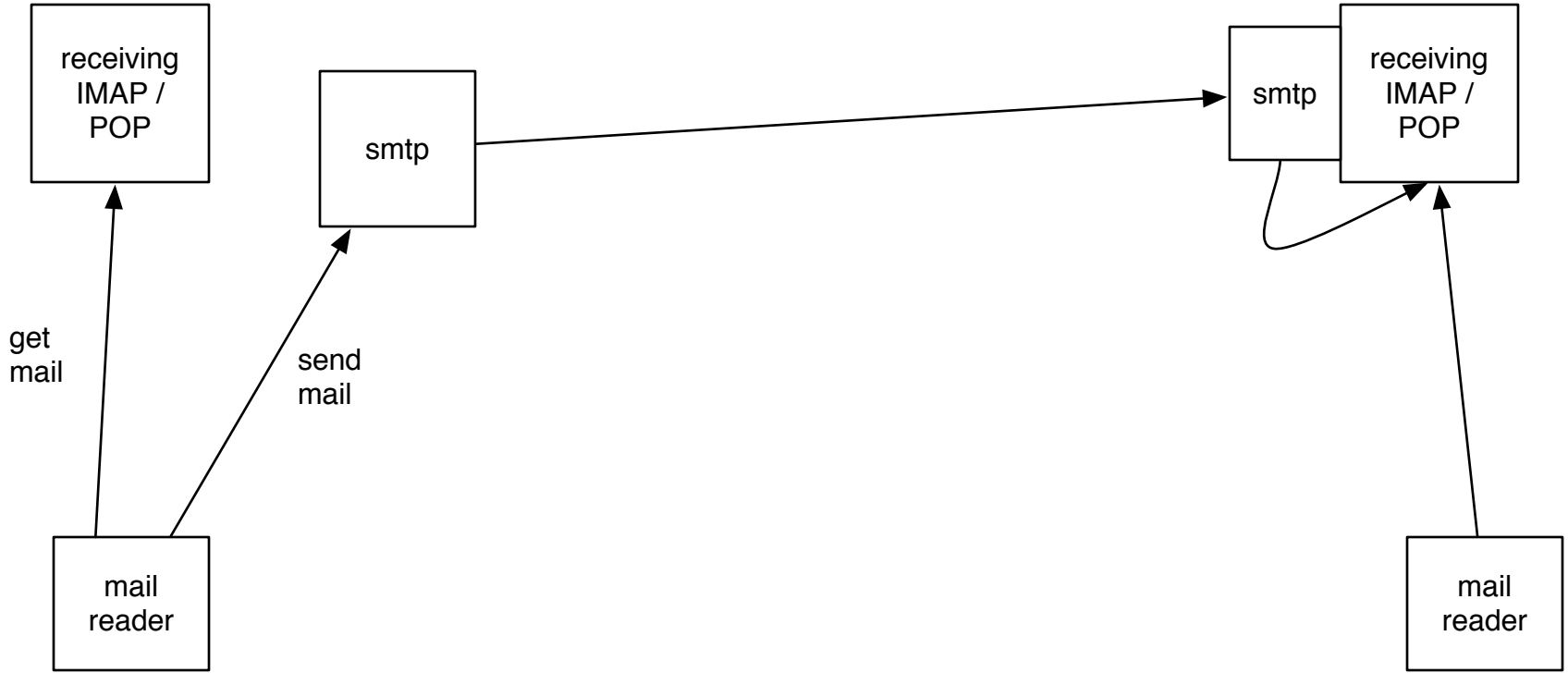


RRSIG - signature for Resource Record Set

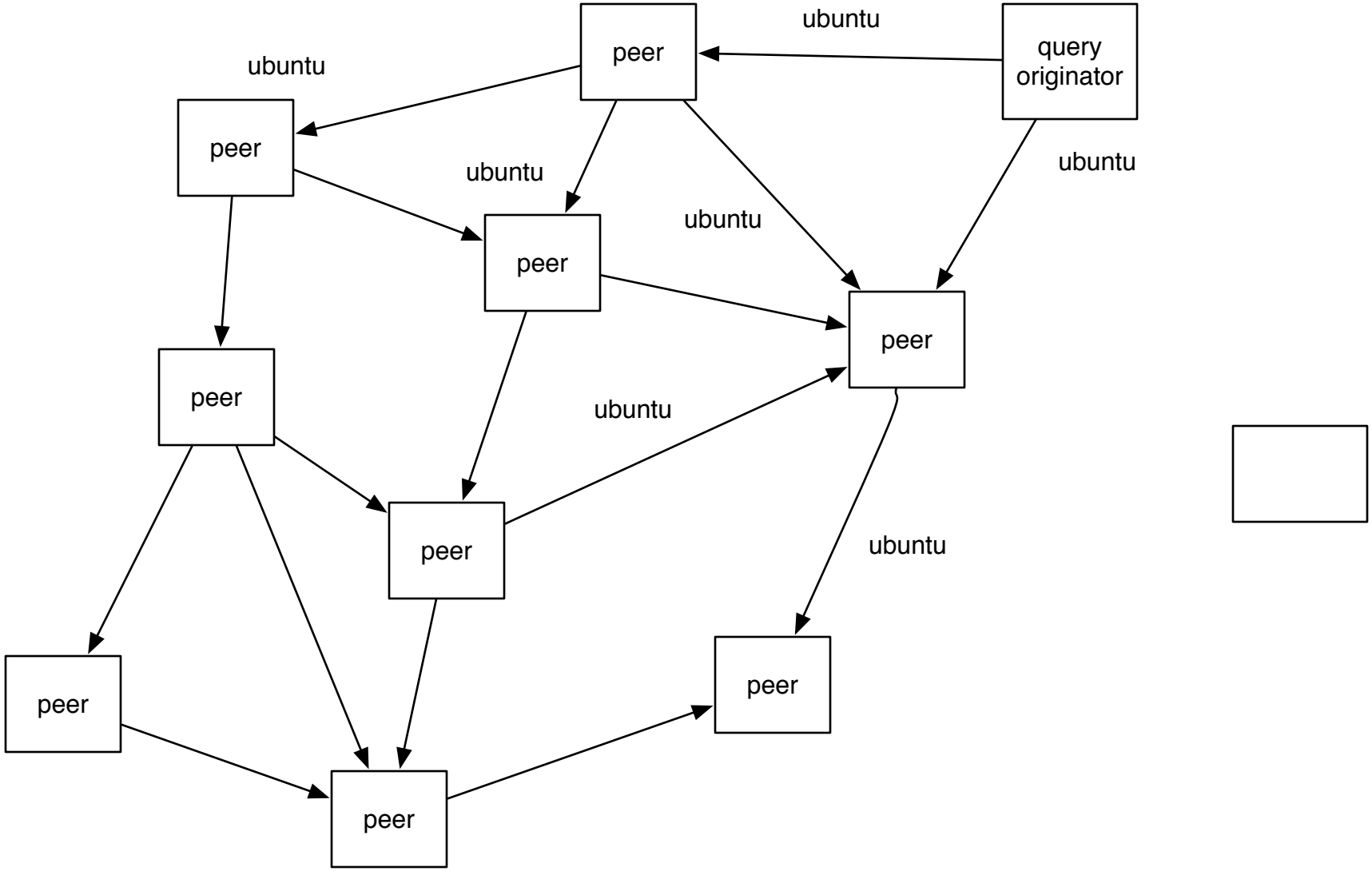
WWW

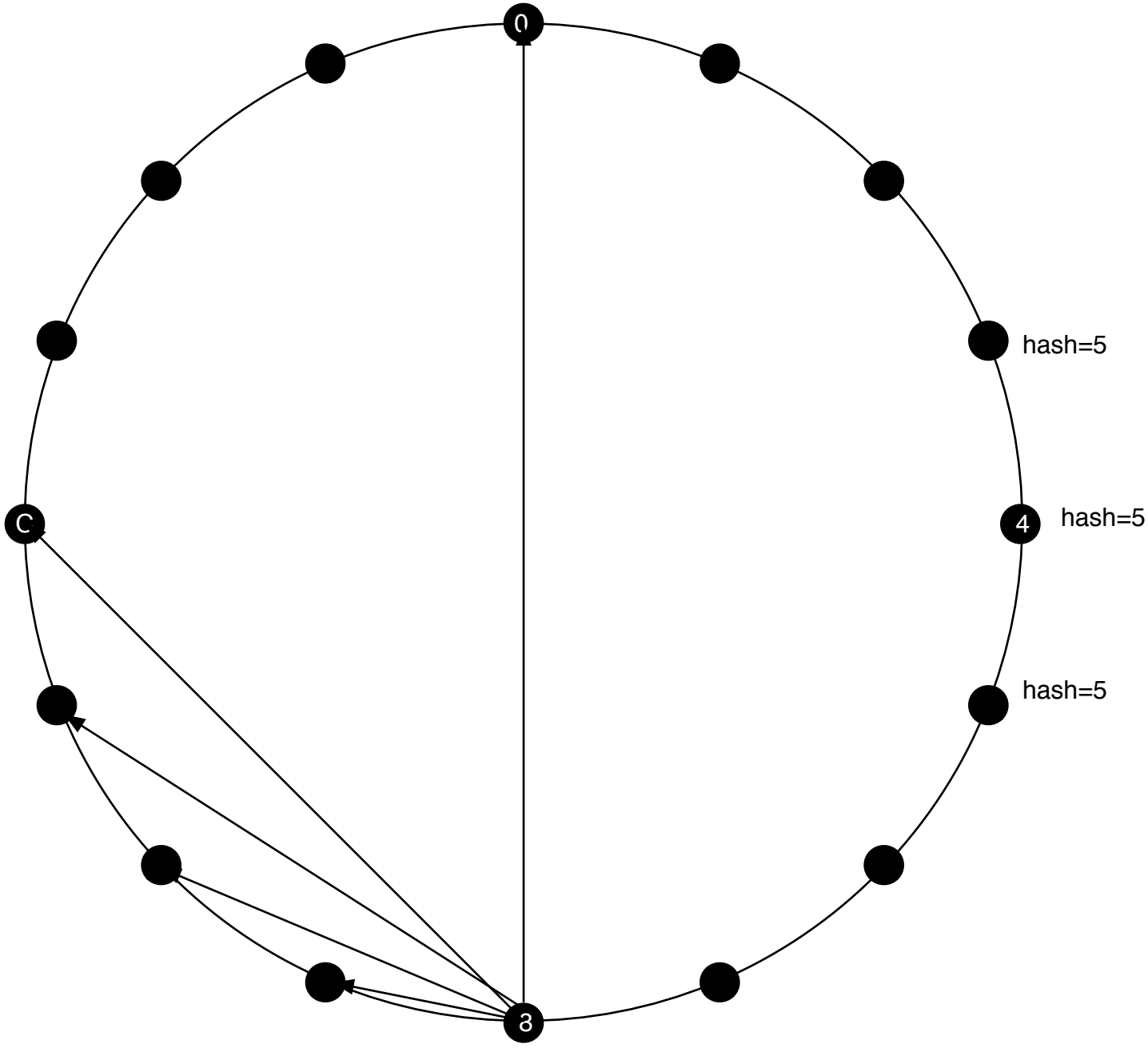


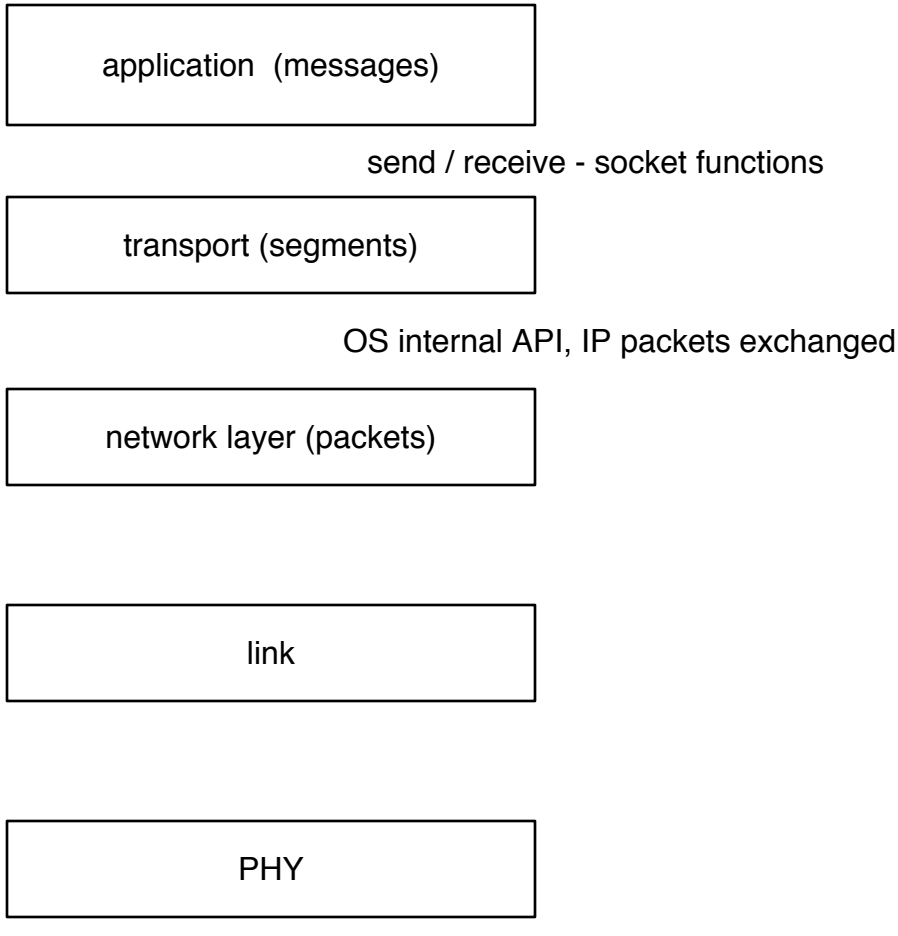
email

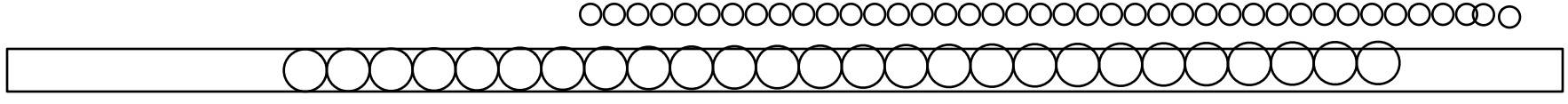

receiving
IMAP /
POP
smtp
smtp
receiving
IMAP /
POP
get
mail
send
mail
mail
reader
mail
reader

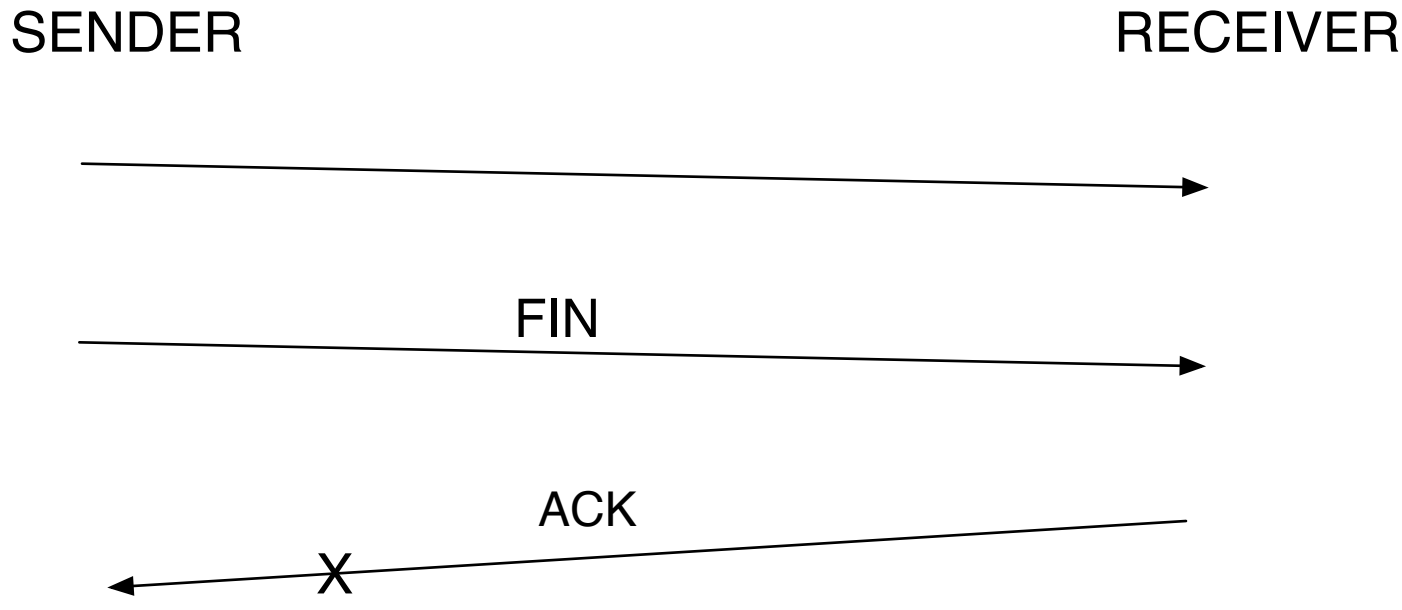
GNUTELLA content search

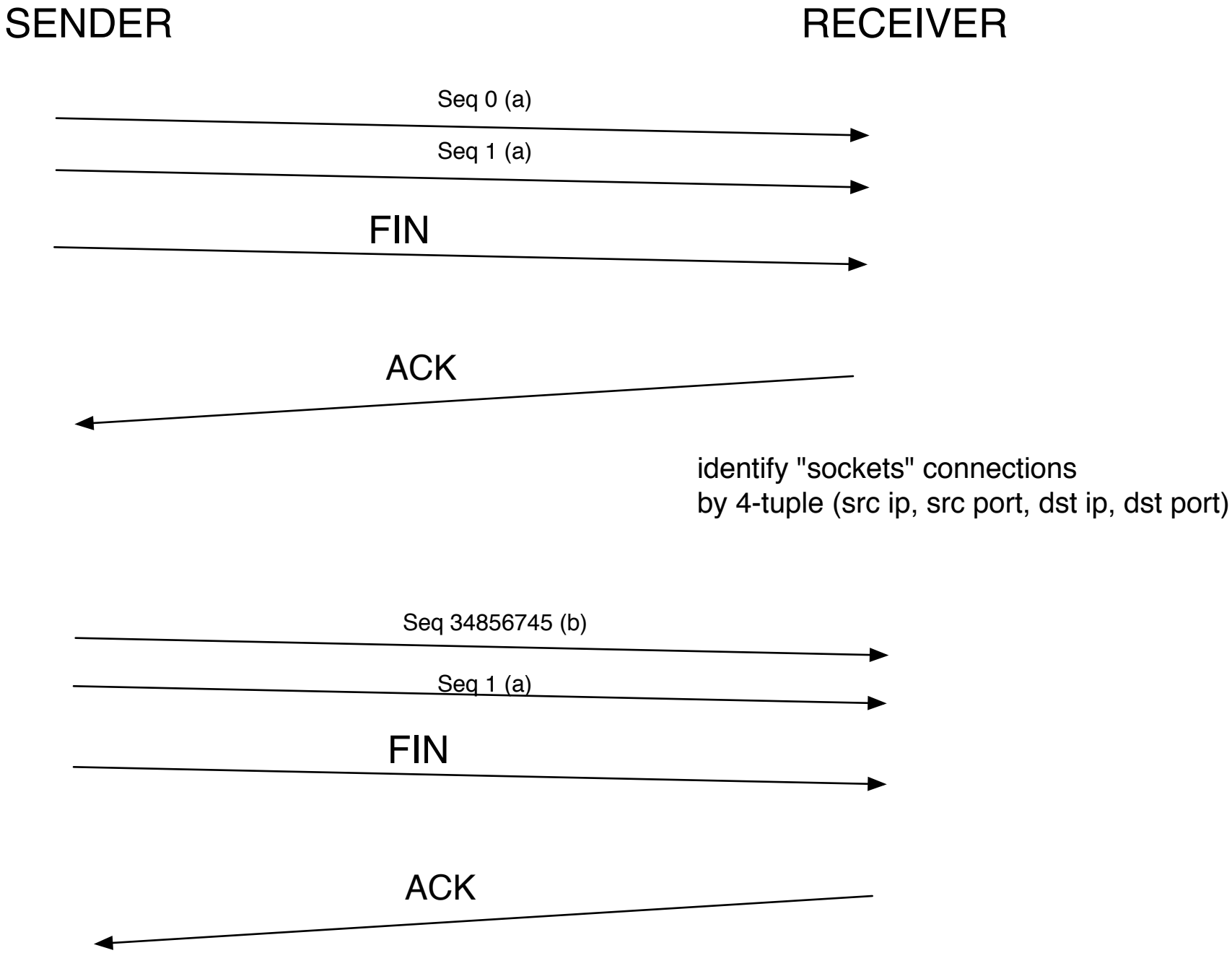



0
hash=5
4
hash=5
hash=5
C
8


application (messages)
send / receive - socket functions
transport (segments)
OS internal API, IP packets exchanged
network layer (packets)
link
PHY
MEDIUM




SENDER
RECEIVER
FIN
ACK
X


SENDER
RECEIVER
Seq 0 (a)
Seq 1 (a)
FIN
ACK
identify "sockets" connections
by 4-tuple (src ip, src port, dst ip, dst port)
Seq 34856745 (b)
Seq 1 (a)
FIN
ACK

10
13
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