One round of each phase (type = PREPARE | ACCEPT | READ) POST_WAIT_Q (owner) (addr) (type) (prop) **BRECV** BTIME_OUT **BRECV** Proposer **BSEND** PRE_ONCE (owner) (addr) (type) (d) NUM of recv events = NUM_ACC Multiple RECV msgs are refined as a single BRECV msg Multiple SEND msgs are refined as a single broadcast msg (BSEND) **BRECV** Proposer (c) **BSEND PRECV PRECV PRECV PSEND PSEND PSEND PSEND PRECV** Proposer **PRECV** (b) Try to receive ack from one acceptor whithin a certain time slot Length = NUM_ACC **PRECV PSEND** PRECV **PRECV PSEND** PRECV Proposer **PSEND** (a) **SEND GHOST** Only for proposers **RECV** Proposer -> Acceptor Proposer <- Acceptor PRECV (owner) (msg) PSEND (des) (msg) PTIME_OUT owner PRE_ONCE (owner) (addr) (type) (option val) BRECV (owner) (index) (addr) (prop) (msg) POST_WAIT_Q (owner) (addr) (type) (prop) BSEND (msg) BTIME_OUT (owner) (index) (addr) (prop) Acceptor -> Proposer **Acceptor -> Proposer** : Environmental steps (any nodes in the network can update packets that satisfies invariants) ARECV (owner) (msg) ASEND (cid) (des) (msg)

- (d) Top level Add logical events to enrich the information. All local states can be inferred by replaying network events
- (c) Intermediate level Simplify communication
- (b) Implementation level Restrict SEND and RECV pattern
- (a) Interface level Arbitrary interleaving is possible in SEND and RECV