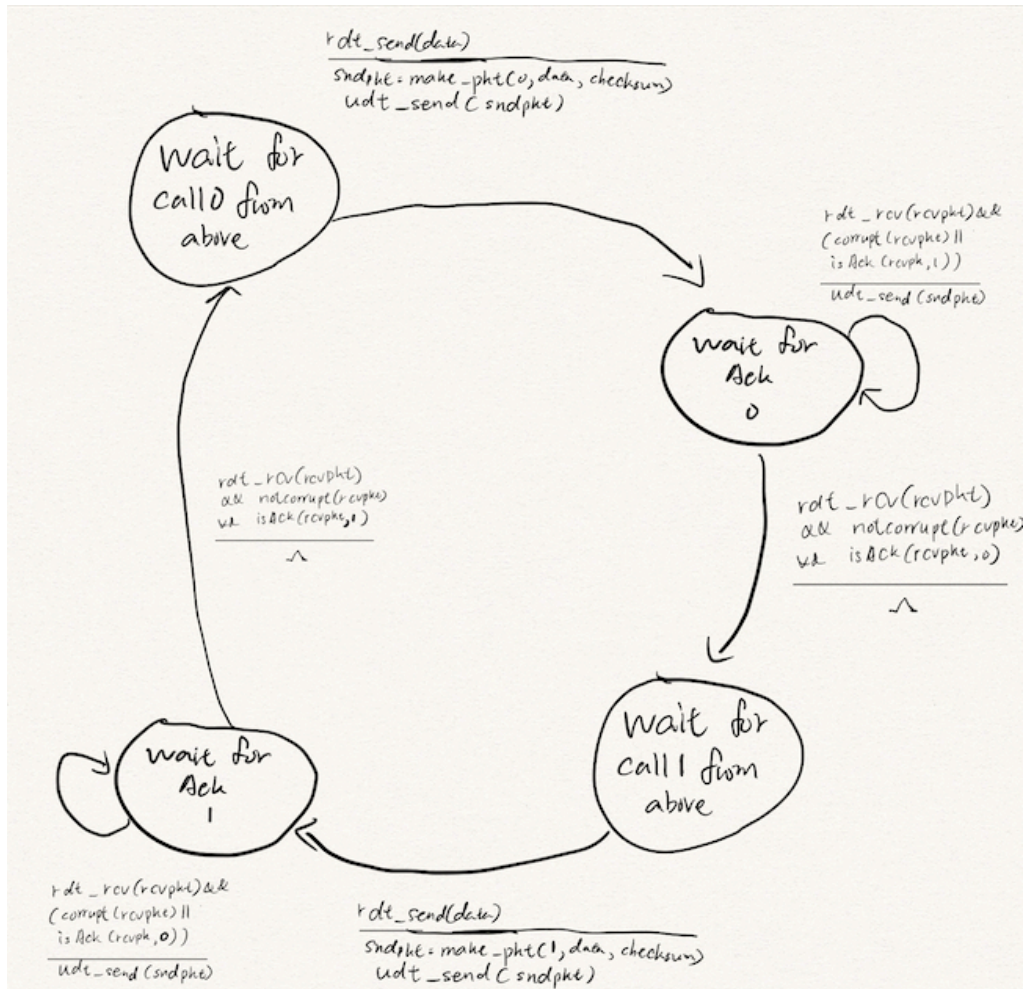
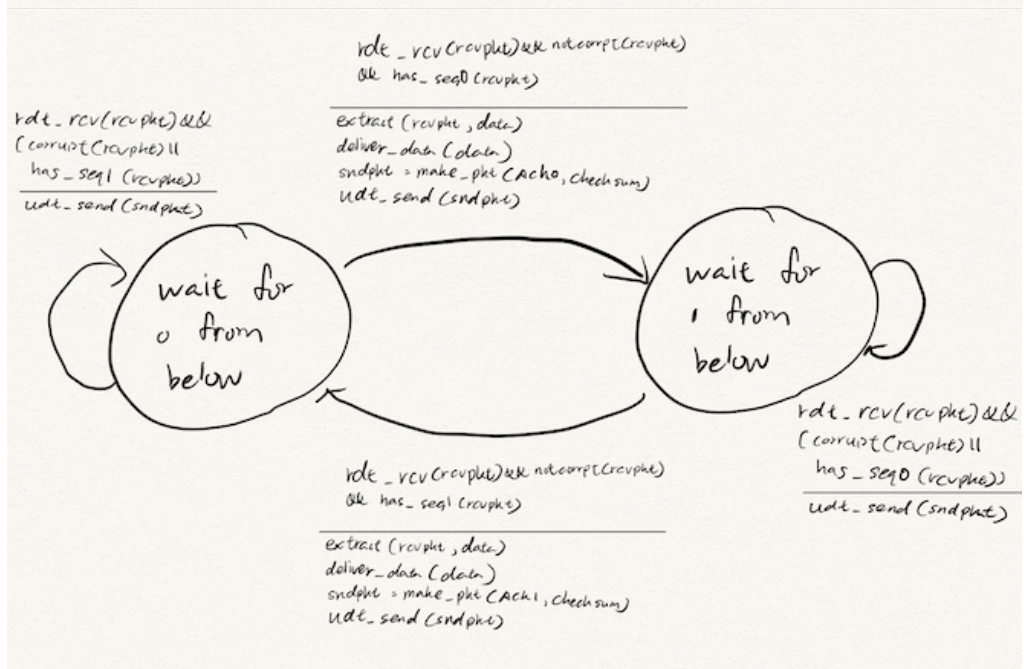


1.
  - a. The total time it takes until the last client has received the patch using a client-server solution residing at Microsoft
    - i.  $100\text{MB}/1\text{Mbps} = 100 * 8 / 1 = 800\text{s}$
    - ii.  $100\text{MB}/5\text{Mbps} = 100 * 8 / 5 = 160\text{s}$
    - iii. If we have 100,000 user and 1000 simultaneous, divide N to 2 sets of user:  $(100,000 / 1000 * 2) * 960 = 48000\text{s}$
  - b. The total time it takes assuming a perfect Bittorrent style P2P distribution system
    - i. We have two sets of users with same upload speed 500kbps,  $100\text{MB} = 100 * 1024 * 8 = 800000\text{kb}$ .  $800000 / (500/2 + 500/2) = 1638\text{s}$
2. What are the different peers that a given node has to keep track of?
  - a. Each peer must contain 3 successors.
    - i. Choose position for the new peer
    - ii. Add 3 successor to new peer
    - iii. Update the new peer information to previous peers in DHT
3. Is it sufficient to have just two sequence numbers?
  - a. Yes, if the sender can determine where the receiver from each other, 1 bit of sequence number is enough. The reason we only need 1 bit of sequence number is because sender is just checking the previous packet with current package. It only cares if it is duplicate packet. However, it wouldn't be efficient if sender sends multiple packets, it would be a good idea to use sequence number and ack# as the stack of packet size to determine.



4.



5.