CSE 452

Distributed Systems

Remote Procedure Call (RPC)

Protocol

- what code + data to run + store on each machine
- has the goal of solving some problem
  - in a particular fault model
- Correctness: works on any execution in the fault model

HashMap<String, String>

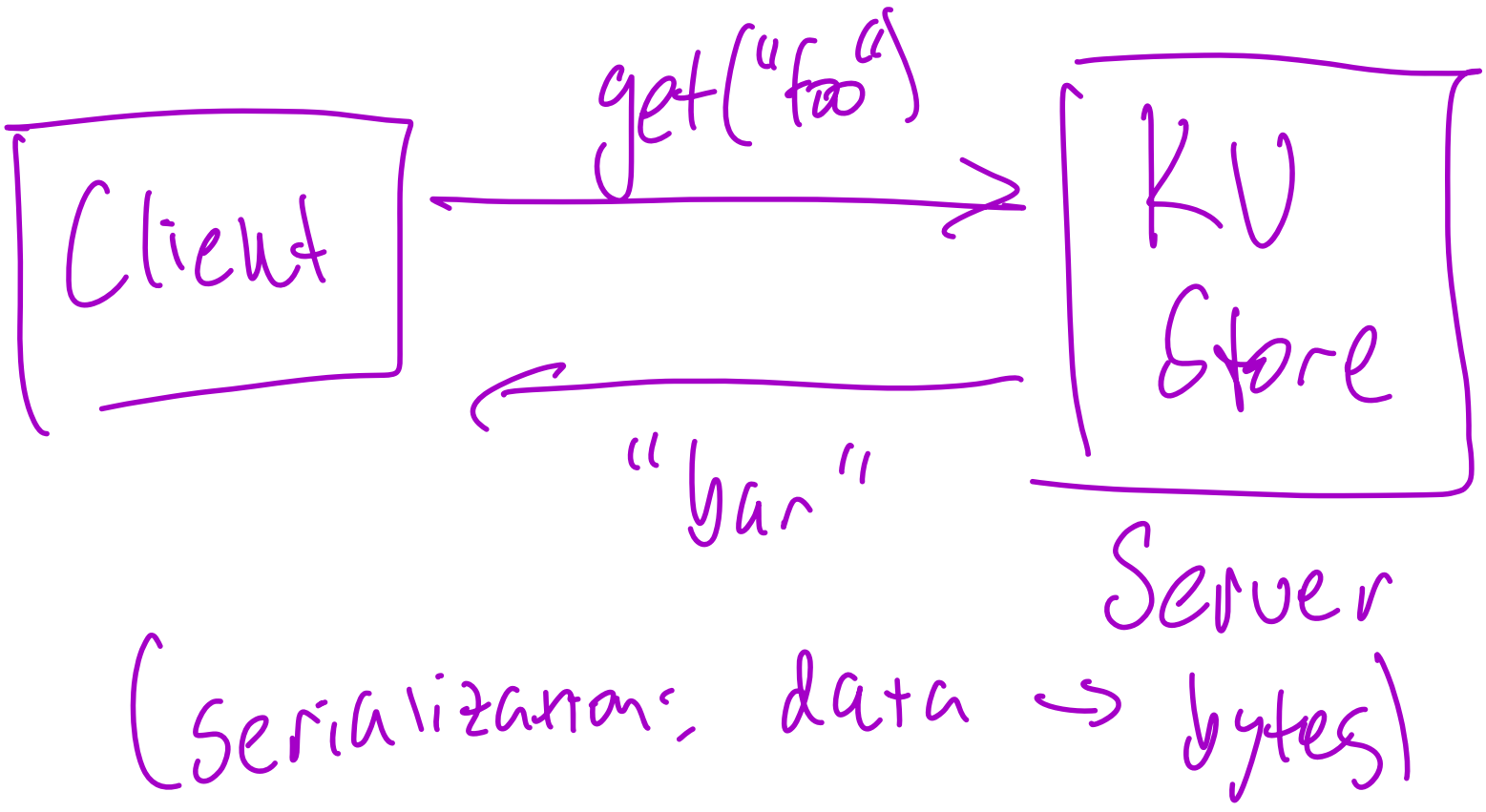
get(key)

put(key, value)

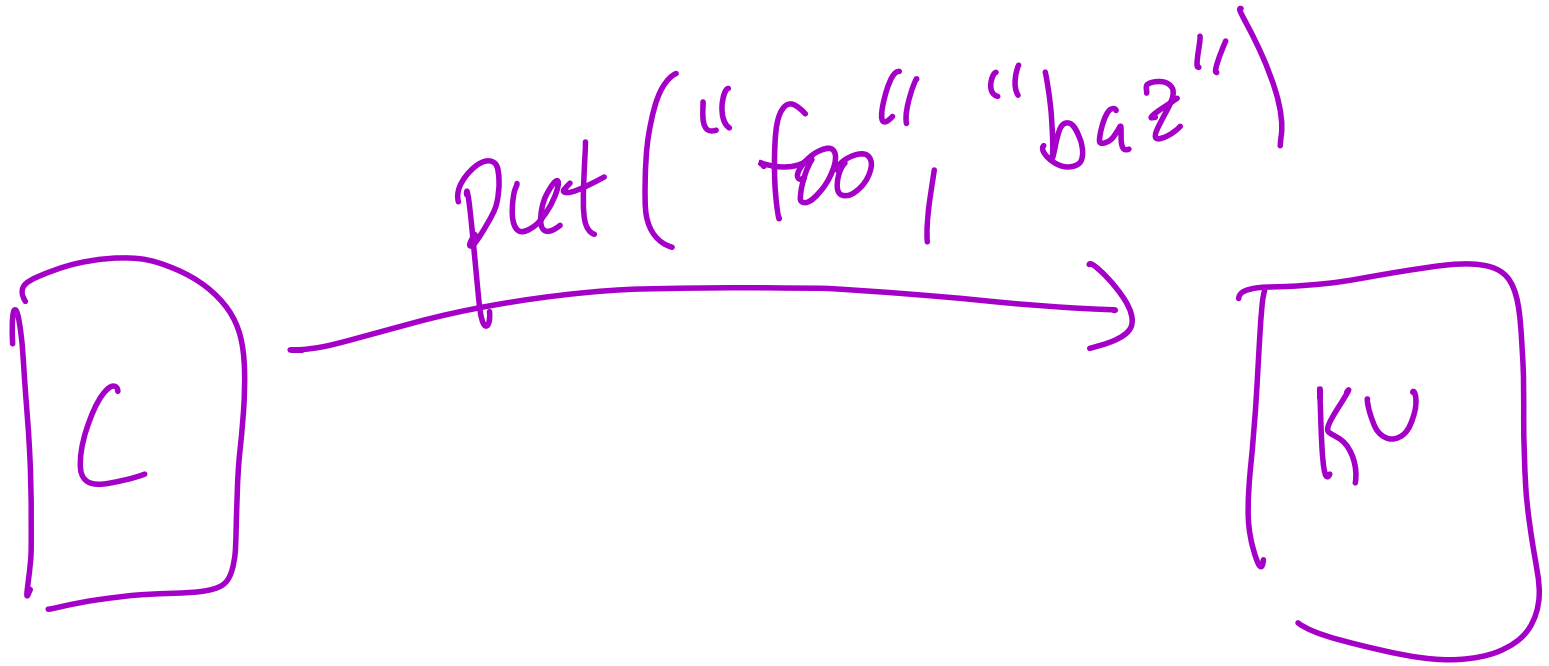
append(key, new-stuff)

Key-Value Store

get, put, append



(Serialization: data → bytes)


put("foo", "baz")
C
KV

Remote Procedure Call (RPC)

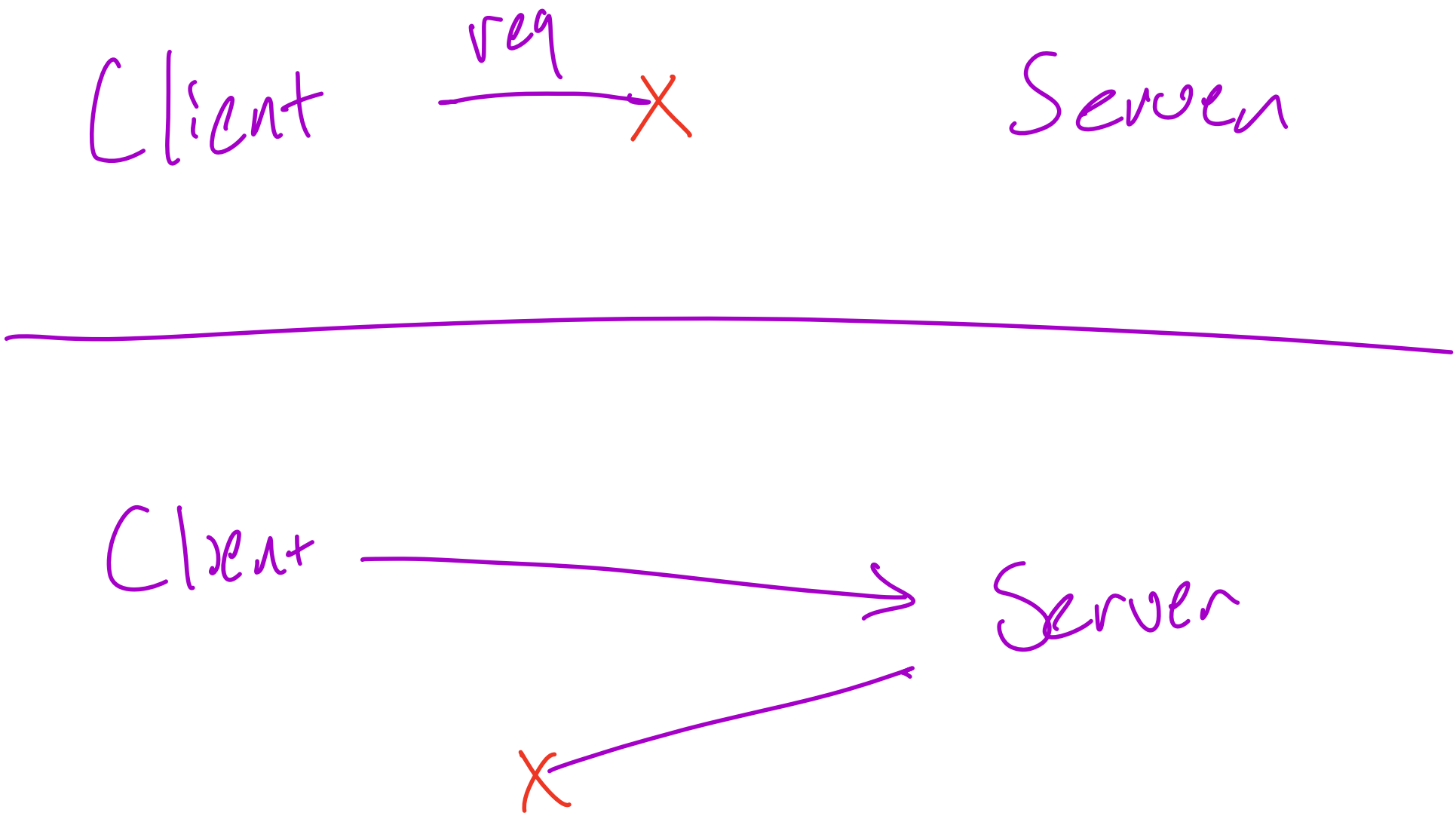
- request message
  - name of method to call
  - all the arguments
- response message
  - how the method terminated
    - success/failure
      + return value

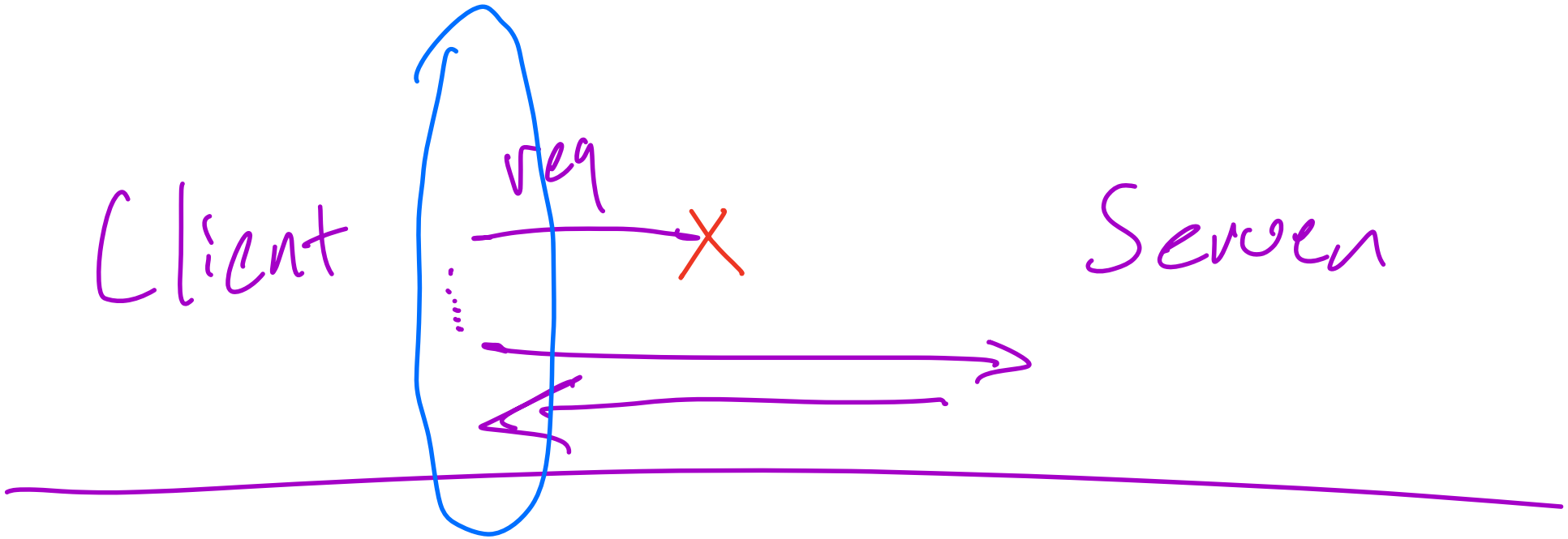
Naive RPC

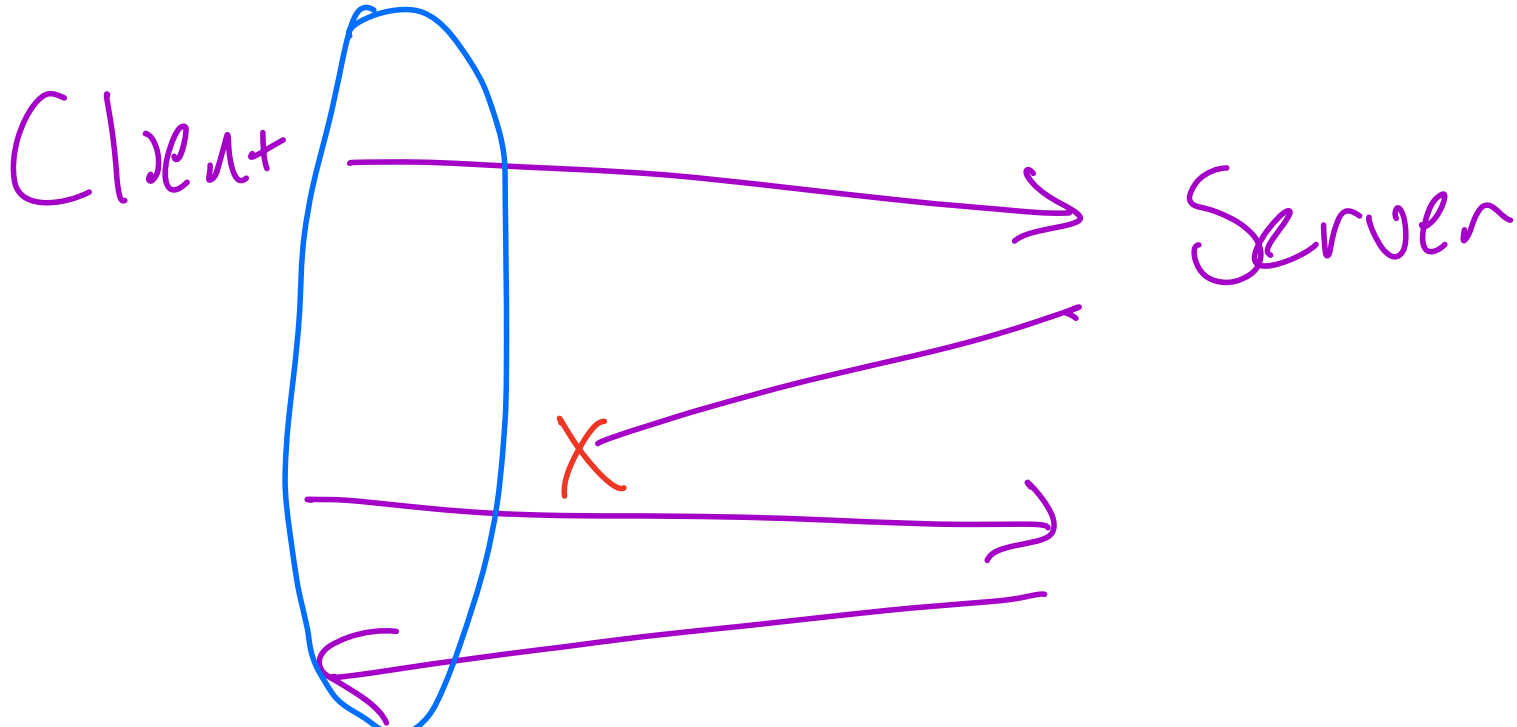
- allows calling remote methods
- failure model: no failures allowed

Standard Fault Model

- drop
- delay/reorder
- duplicate
- machine crashes


Client
req
Server
Client
Server


Client
req
Server


Client
Server

Idempotence

- f() is equiv to f(); f()

Naive RPC + Sequence numbers

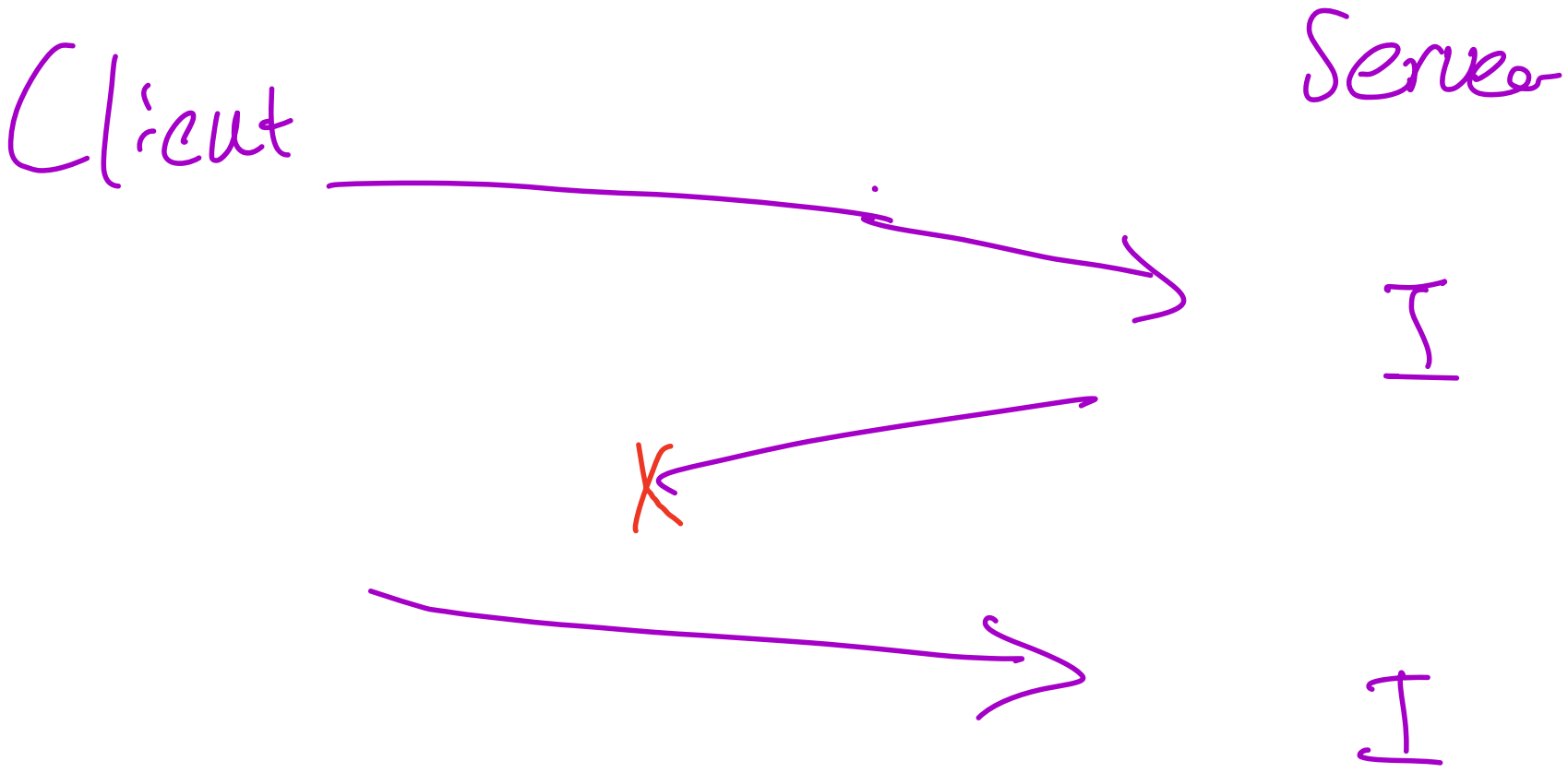
- unique id on every (new) message
- Server stores
  - Set of executed seq num — grows w/o bound ✓

↳ handle multiple clients

Set of (client_id, seq num, response)

(optimize space: highest seqnum per client)

(requires no concurrent requests from one client)


Client
Server