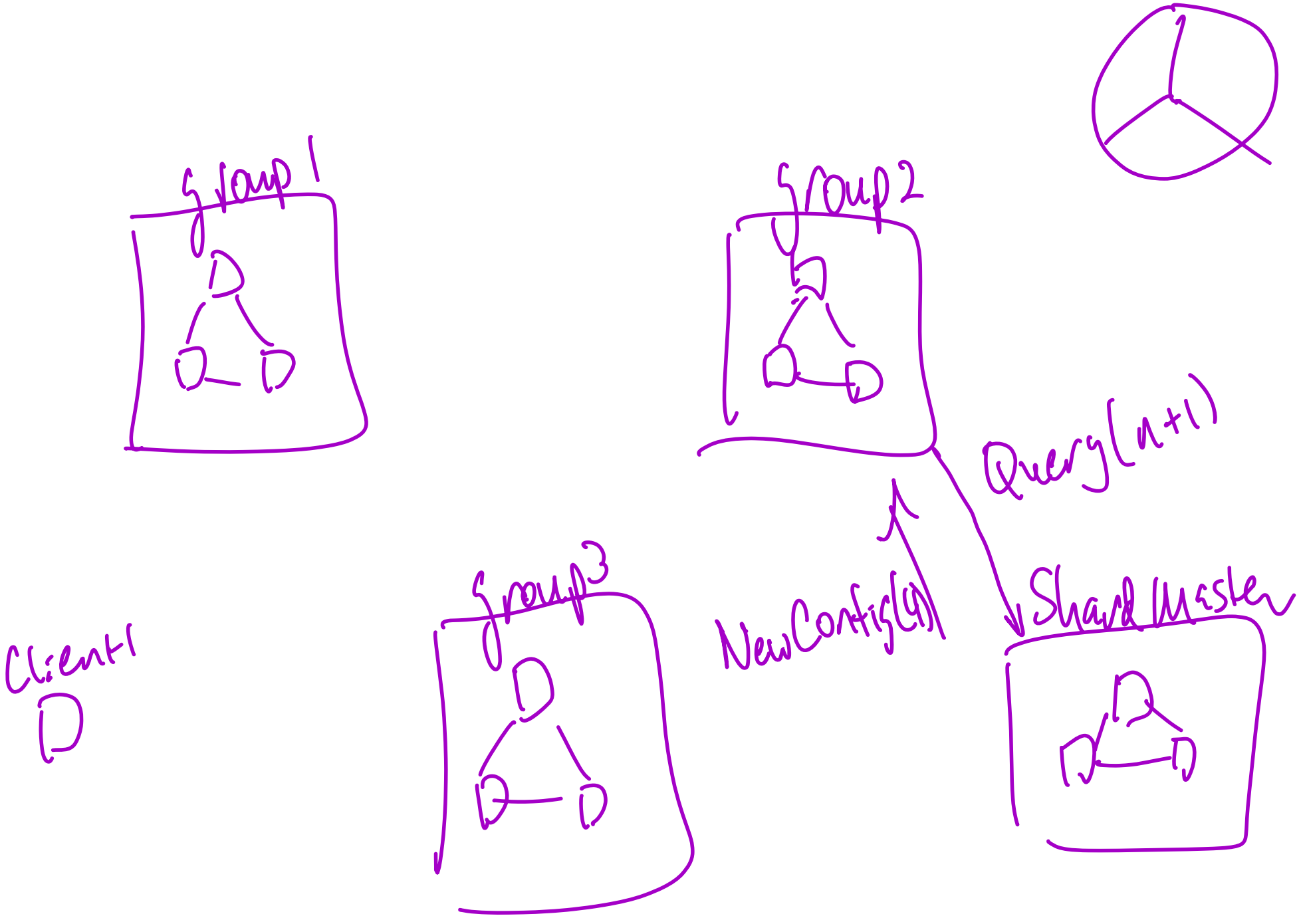
CSE P 552

Distributed Systems

Week 7

- static partitioning
- dynamic partitioning


group 1
group 2
group 3
Client1
Query(n+1)
NewConfig(4)
ShardMaster

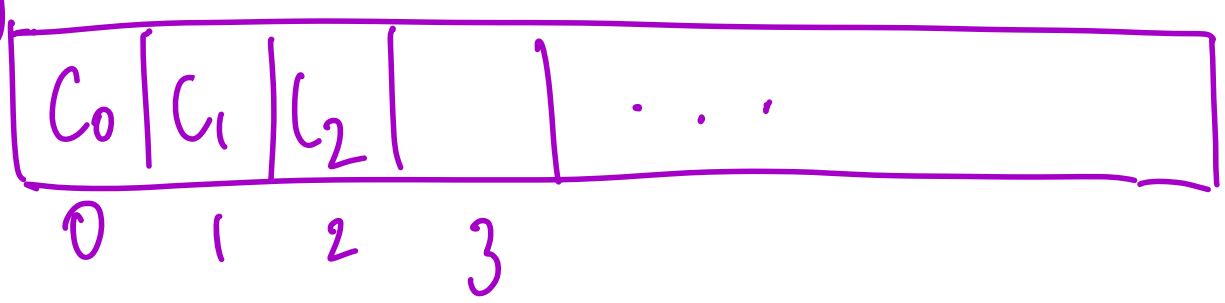
How to adjust indirection table?

What commands does Shard Master Accept?

writes
- Move(shard, to-group)
- Join(group) — "rebalance" key space while minimizing # of keys moved
- Leave(group)

read
- Query(config_num) that config
  or if num = -1, then most recent

Configuration History



Clients send Query(-1)

Servers/Groups send Query(n+1)

Where n is their current config num.

Configuration

Config-num

shard_id → group_id

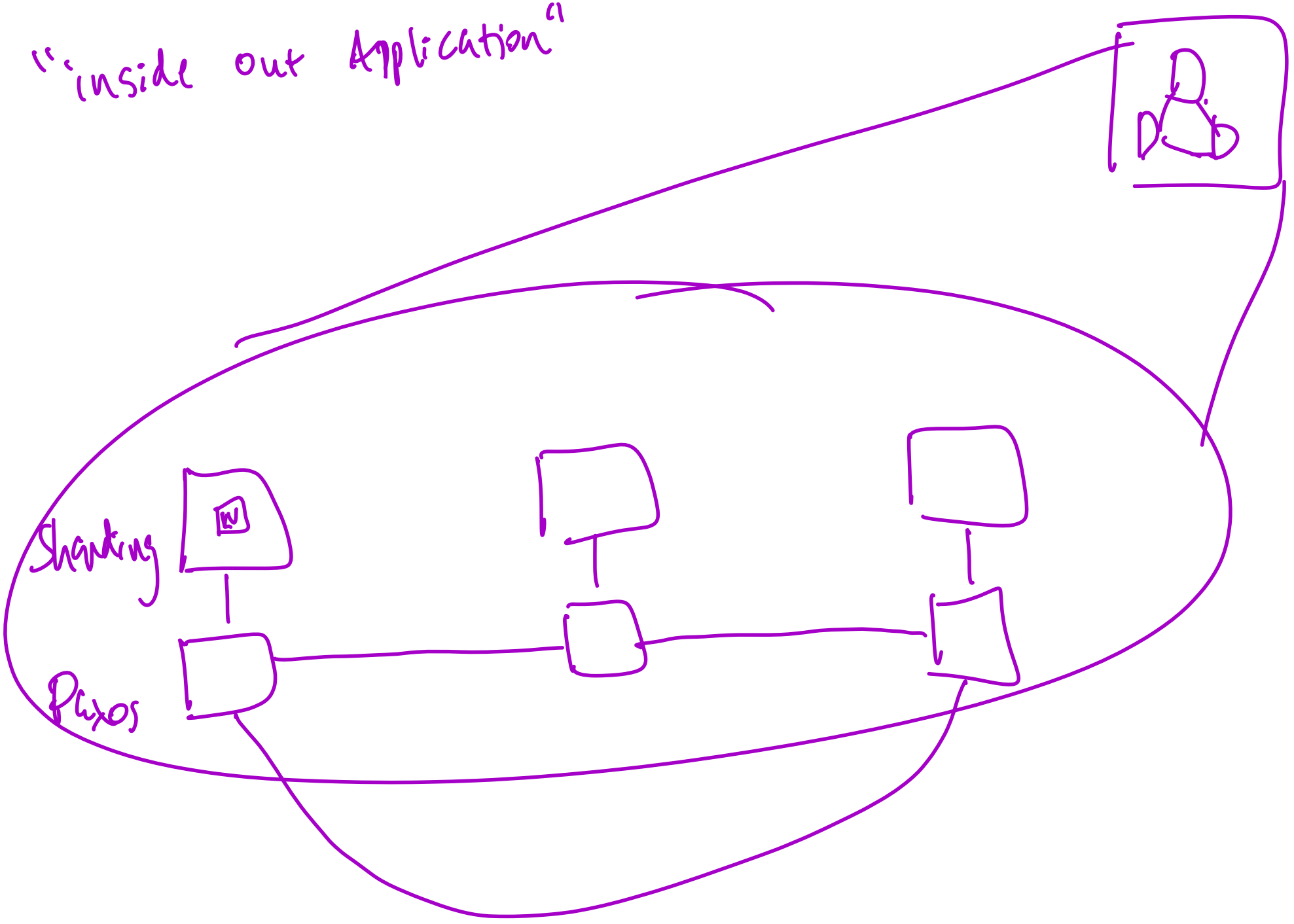
Reconfiguration

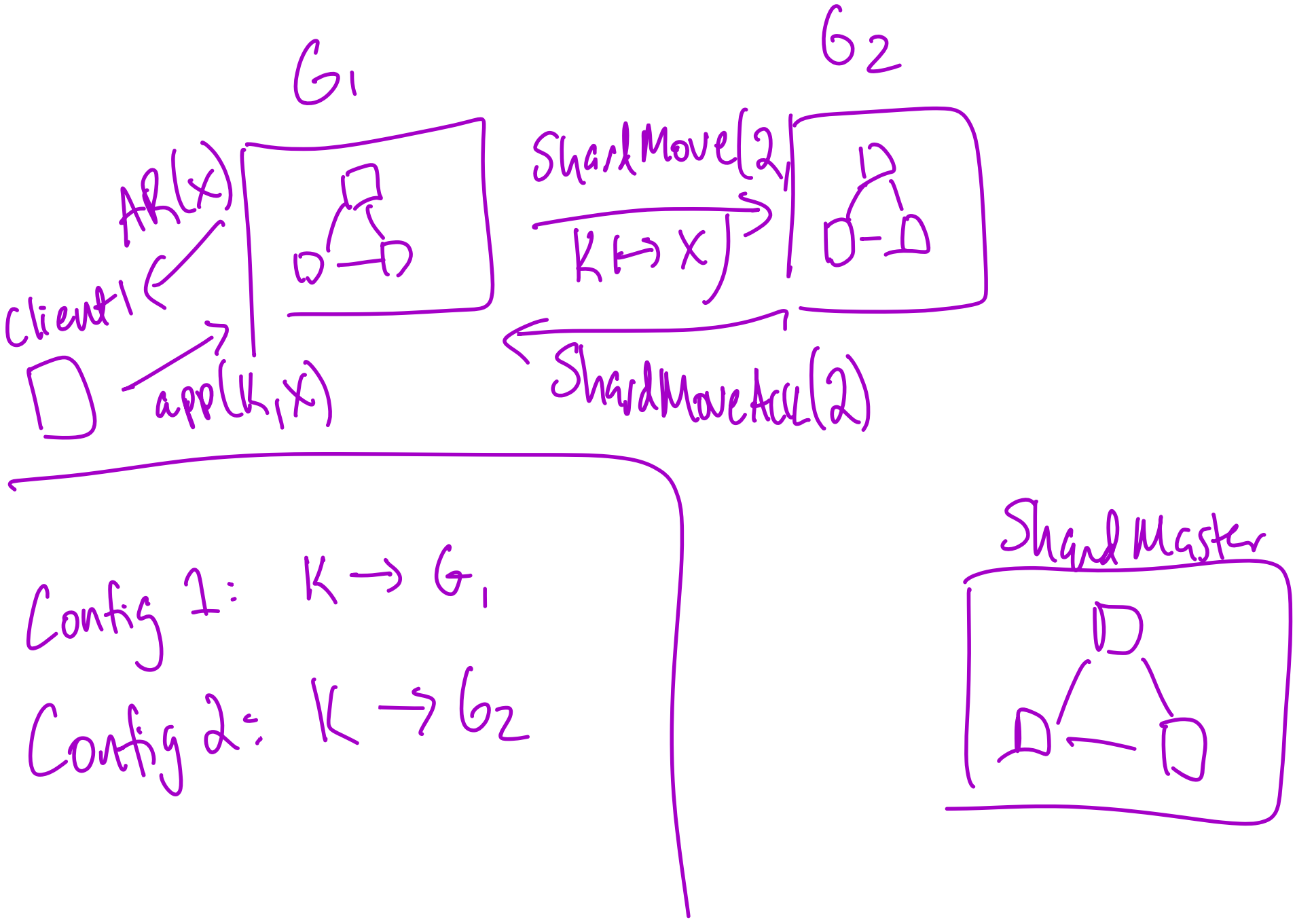
- moving from one configs to the next

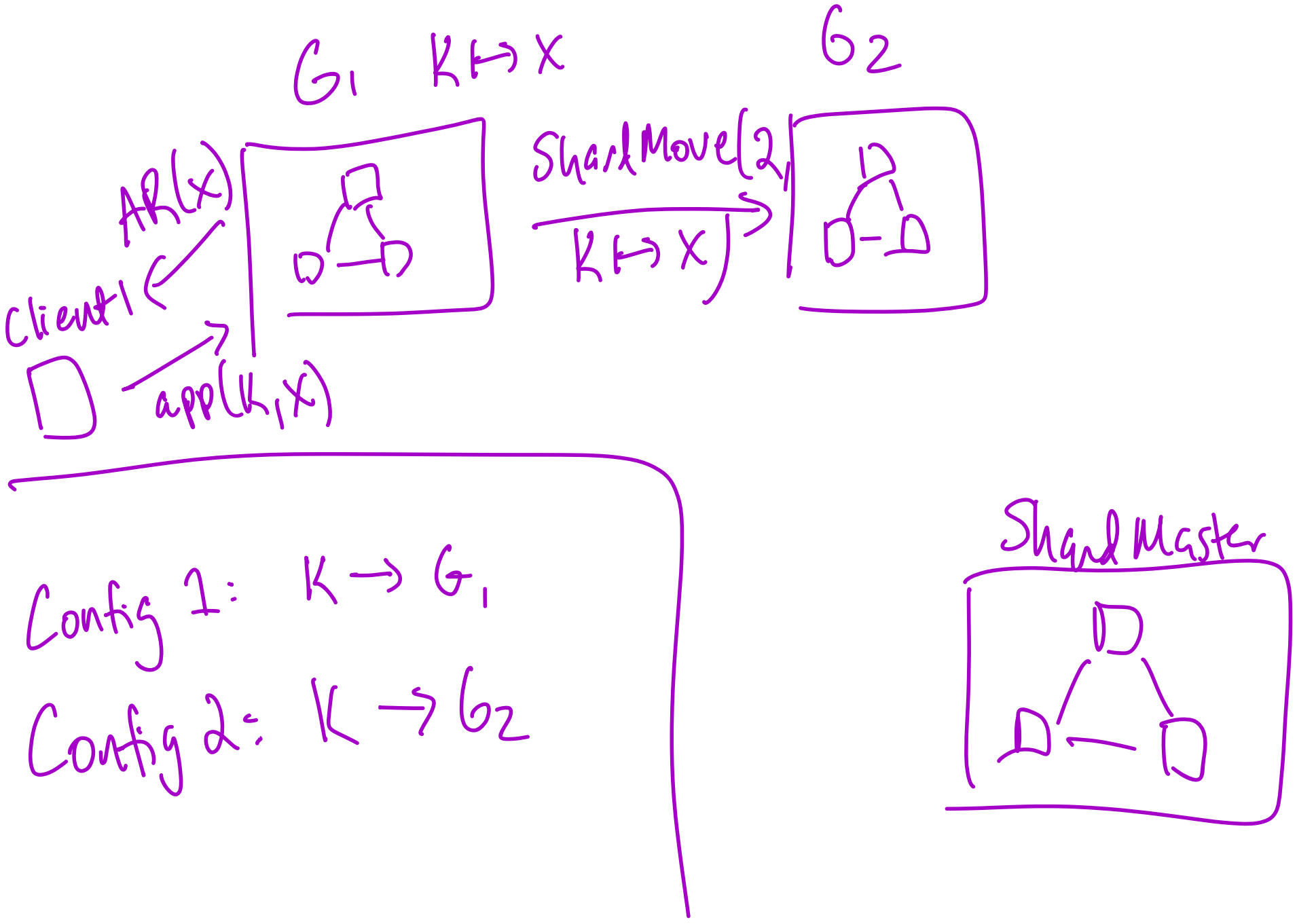
To do:

- exchange KV data from old owner to new owner
- reliably

"inside out Application"




G1
G2
AR(x)
Client1
app(K,X)
ShardMove(2,
K↦X)
ShardMoveAck(2)
Config 1: K → G1
Config 2: K → G2
ShardMaster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K↦X
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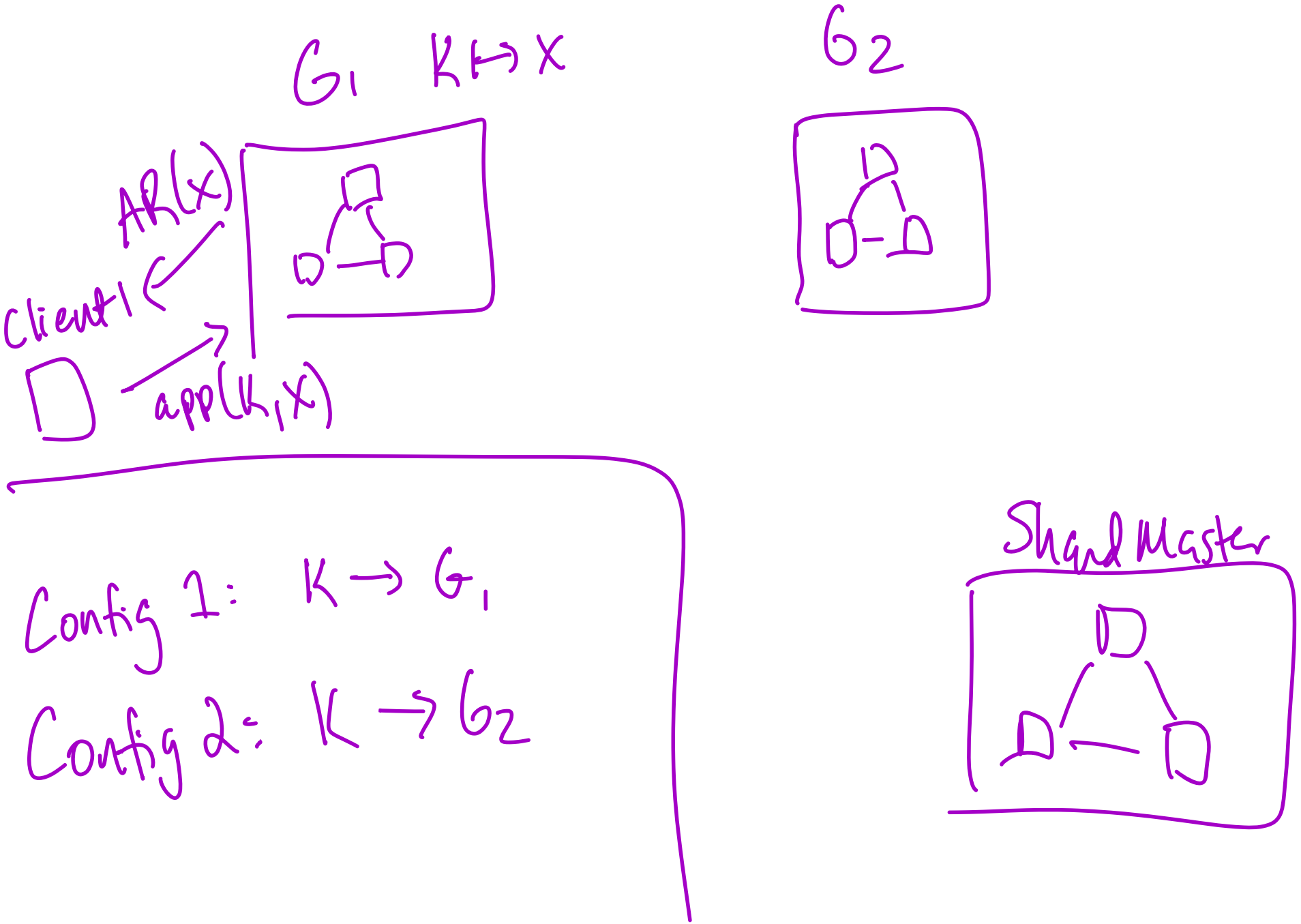

G1 K↦X
G2
AR(x)
client
app(K,X)
Config 1: K → G1
Config 2: K → G2
Shard Master

Lab 3 debrief

- What was/is hard?
- What did you learn? Mistakes?
- What experience did you get w/ design?

- errors are good, actually
- hard to find good intermediate stopping places to validate what you have so far

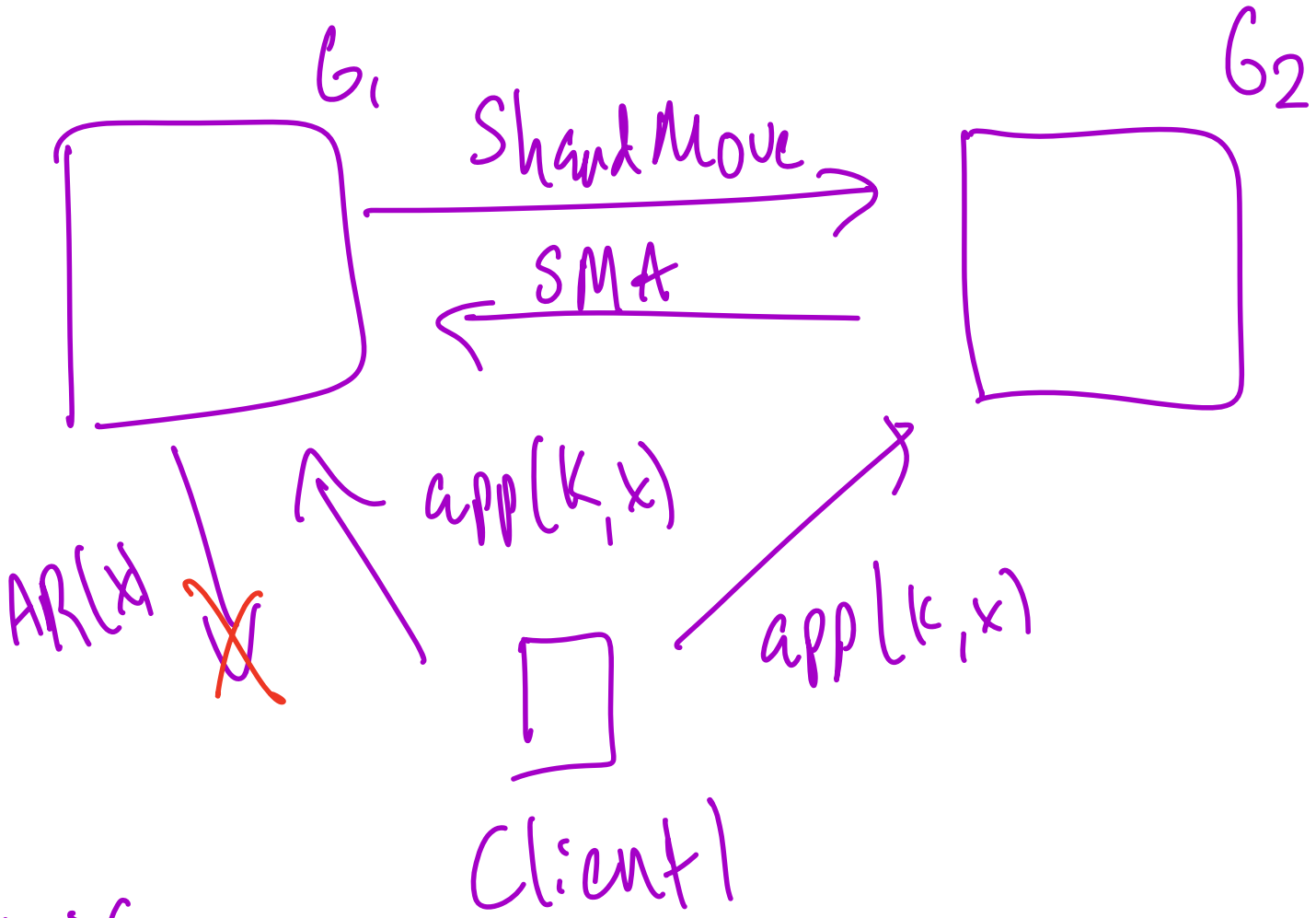
- heisenbug w/ logging level

Groups can be far apart in config_num

- each group proceeds sequentially through the configuration history Query(n+1)

- if the config does not change a group's ownership, it can consider it done as soon as it is chosen

- each group should process reconfigs one at a time



$C_1 : K \to G_1$

$C_2 : K \to G_2$