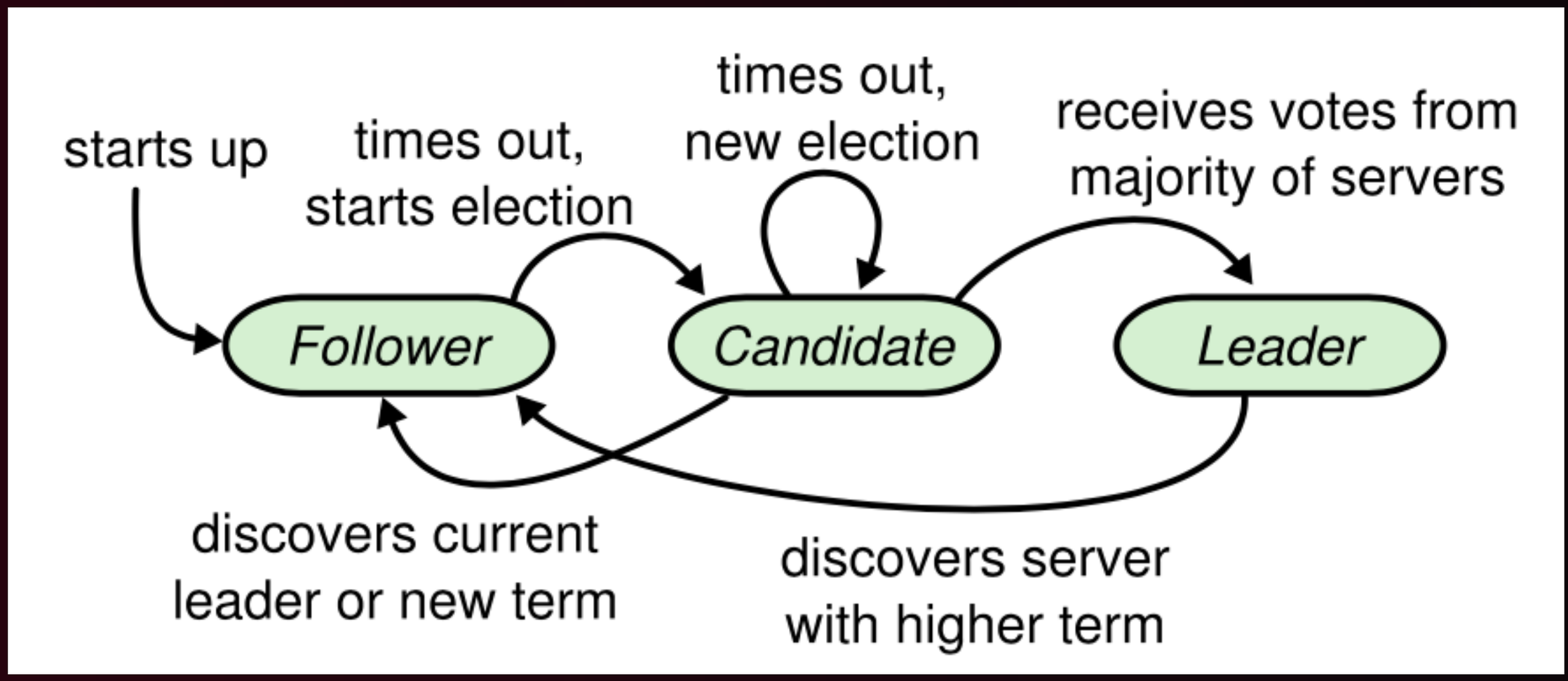
Crafting Raft in Elixir

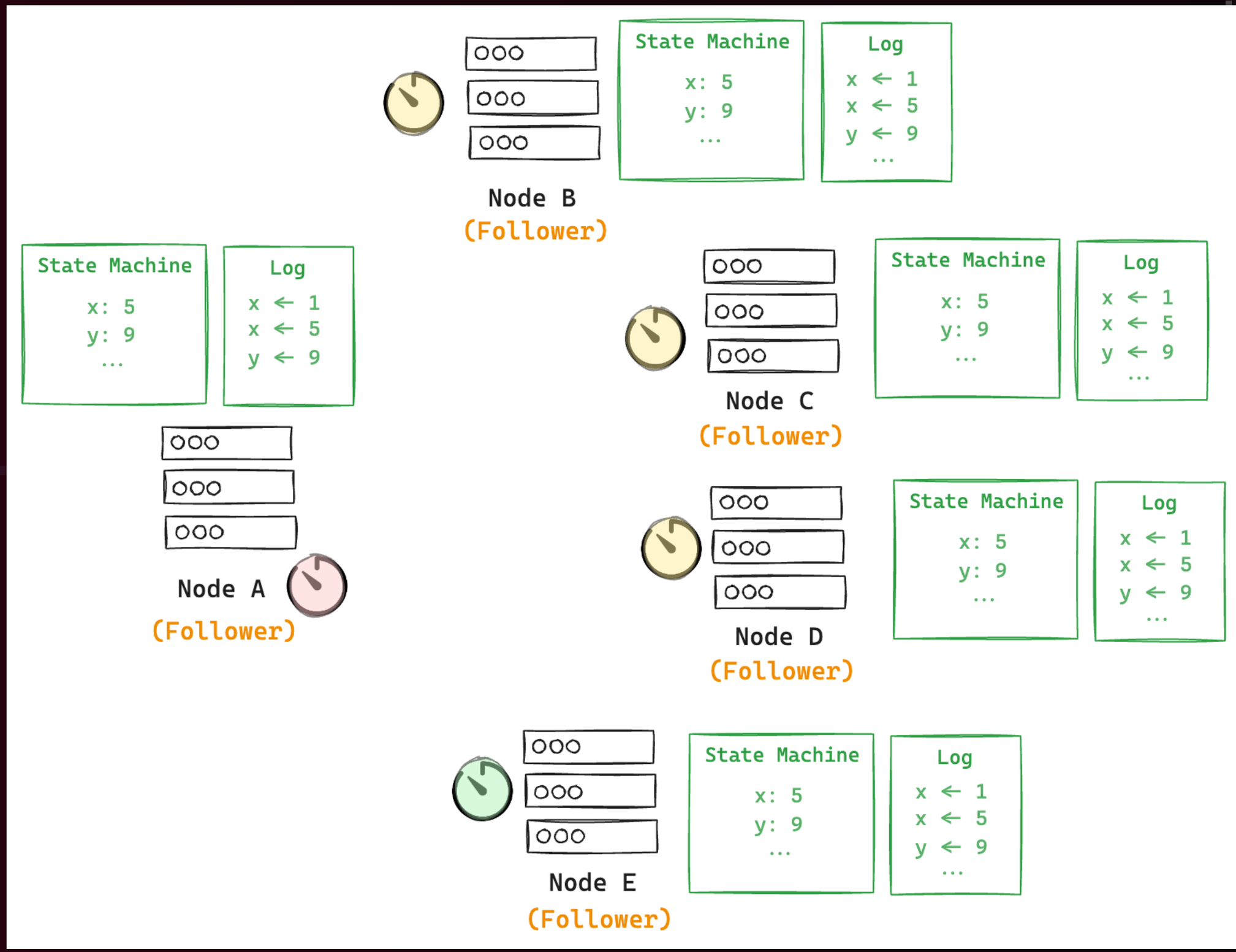
elixir

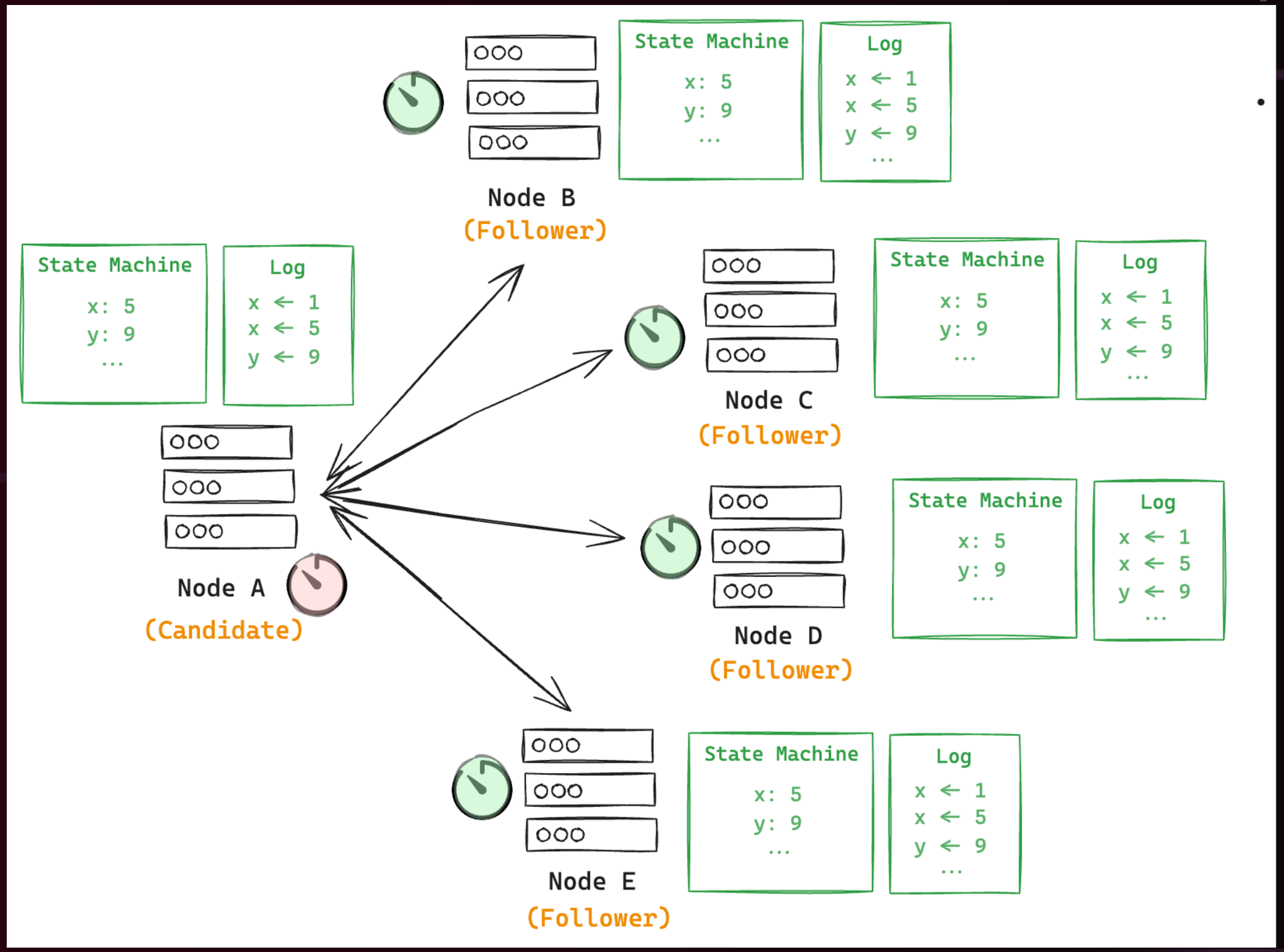
What is consensus?

Consensus describes how a distributed group of nodes can interact with one another to reach agreement in the presence of failure.

- Leader Election
- Log Replication


starts up
times out,
starts election
times out,
new election
receives votes from
majority of servers
Follower
Candidate
Leader
discovers current
leader or new term
discovers server
with higher term


State Machine
x: 5
y: 9
...
Log
x ← 1
x ← 5
y ← 9
...
Node B
(Follower)
State Machine
x: 5
y: 9
...
Log
x ← 1
x ← 5
y ← 9
Node C
(Follower)
State Machine
x: 5
y: 9
...
Log
x ← 1
x ← 5
y ← 9
...
Node A
(Follower)
Node D
(Follower)
State Machine
x: 5
y: 9
...
Log
x ← 1
x ← 5
y ← 9
...
Node E
(Follower)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x ← 5
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...
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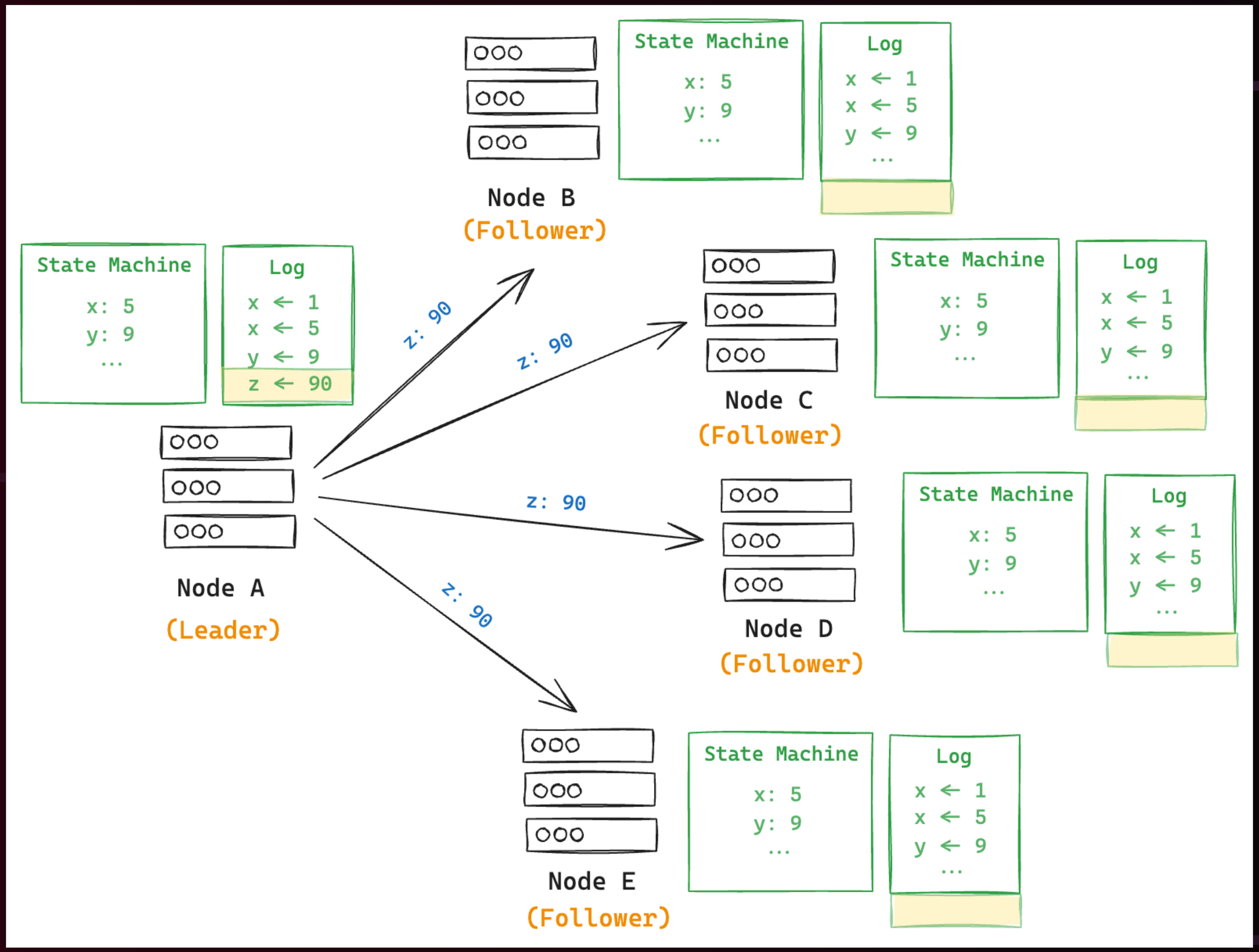
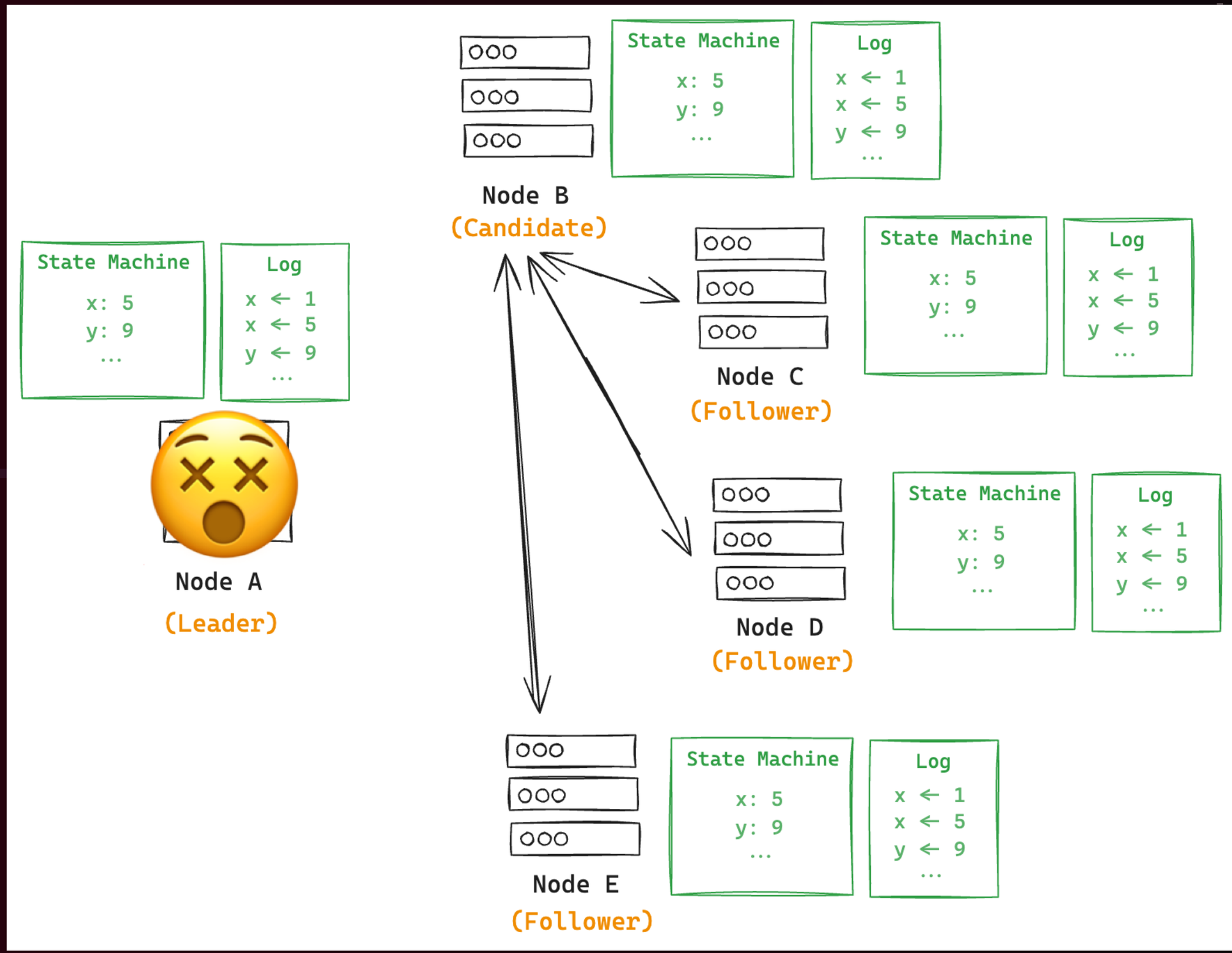
(Follower)
State Machine
x: 5
y: 9
...
Log
x ← 1
x ← 5
y ← 9
...
Node C
(Follower)
State Machine
x: 5
y: 9
...
Log
x ← 1
x ← 5
y ← 9
...
Node A
(Candidate)
Node D
(Follower)
State Machine
x: 5
y: 9
...
Log
x ← 1
x ← 5
y ← 9
...
Node E
(Follower)


Node B
(Follower)
State Machine
x: 5
y: 9
...
Log
x ← 1
x ← 5
y ← 9
...
State Machine
x: 5
y: 9
...
Log
x ← 1
x ← 5
y ← 9
z ← 90
z: 90
z: 90
Node C
(Follower)
State Machine
x: 5
y: 9
...
Log
x ← 1
x ← 5
y ← 9
...
z: 90
z: 90
Node A
(Leader)
Node D
(Follower)
State Machine
x: 5
y: 9
...
Log
x ← 1
x ← 5
y ← 9
...
Node E
(Follower)
State Machine
x: 5
y: 9
...
Log
x ← 1
x ← 5
y ← 9
...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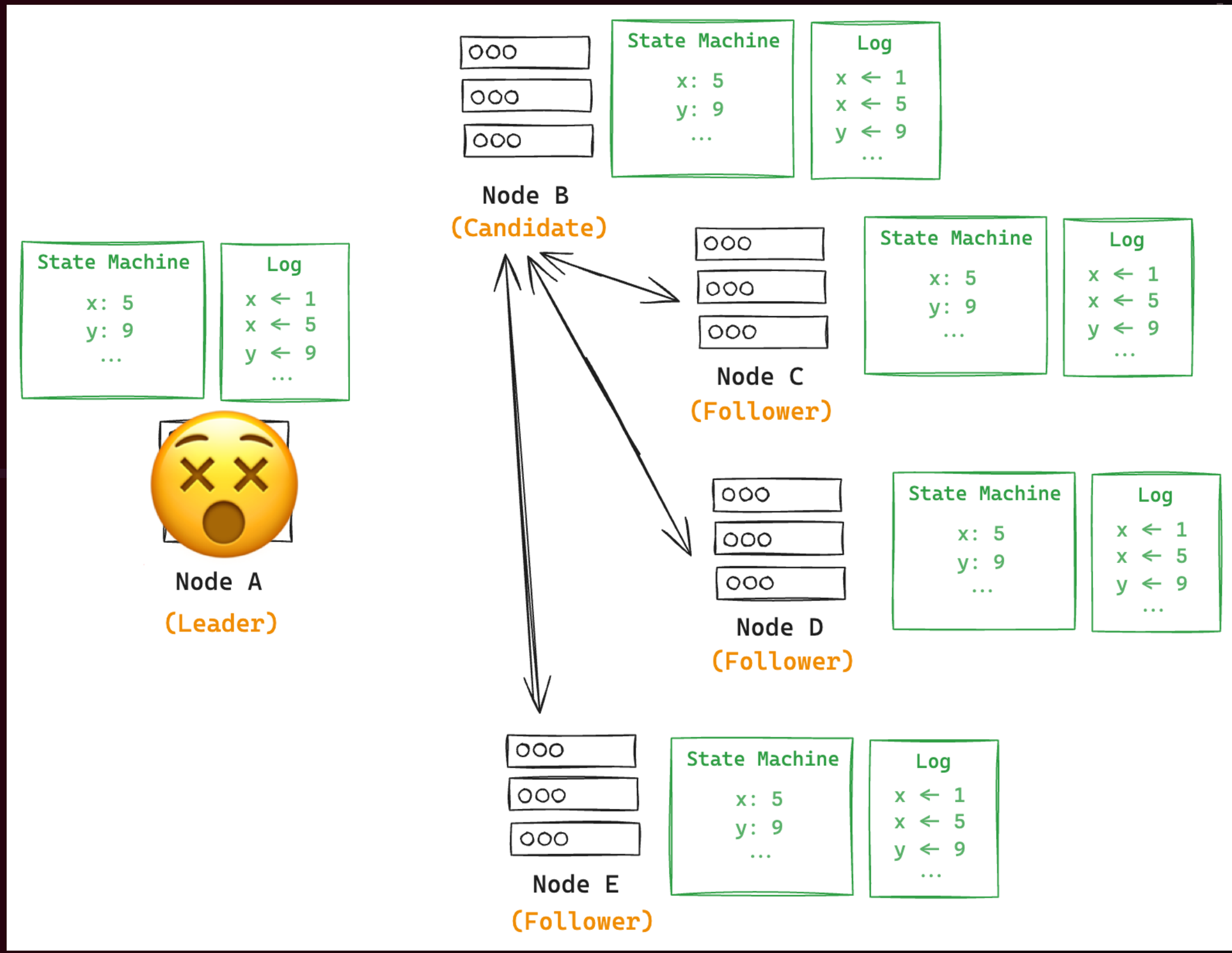
(Follower)
Node A
(Leader)
State Machine
x: 5
y: 9
...
Log
x ← 1
x ← 5
y ← 9
...
Node D
(Follower)
State Machine
x: 5
y: 9
...
Log
x ← 1
x ← 5
y ← 9
...
Node E
(Follower)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State Machine
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...
Log
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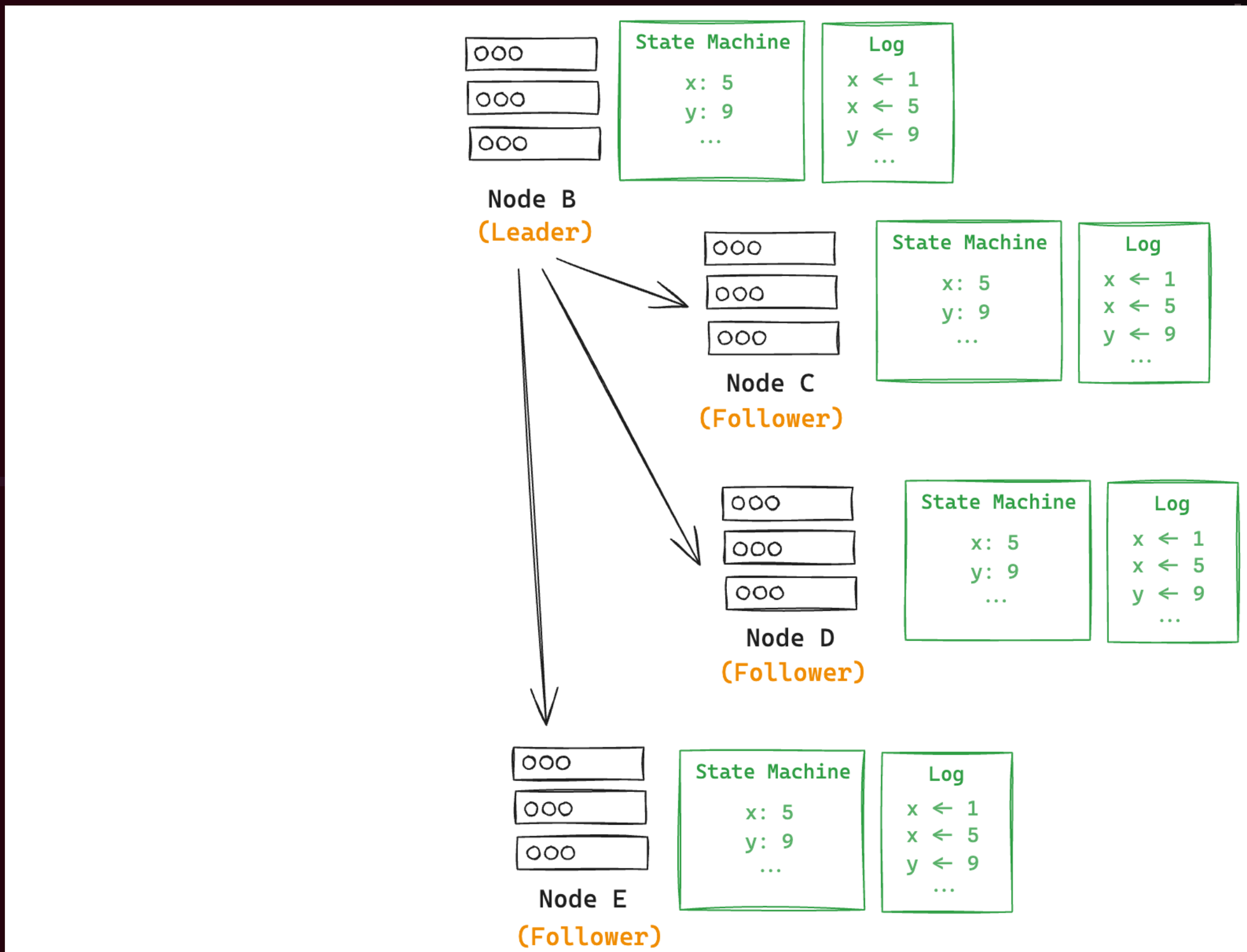
y ← 9
...
Node D
(Follower)
State Machine
x: 5
y: 9
...
Log
x ← 1
x ← 5
y ← 9
...
Node E
(Follower)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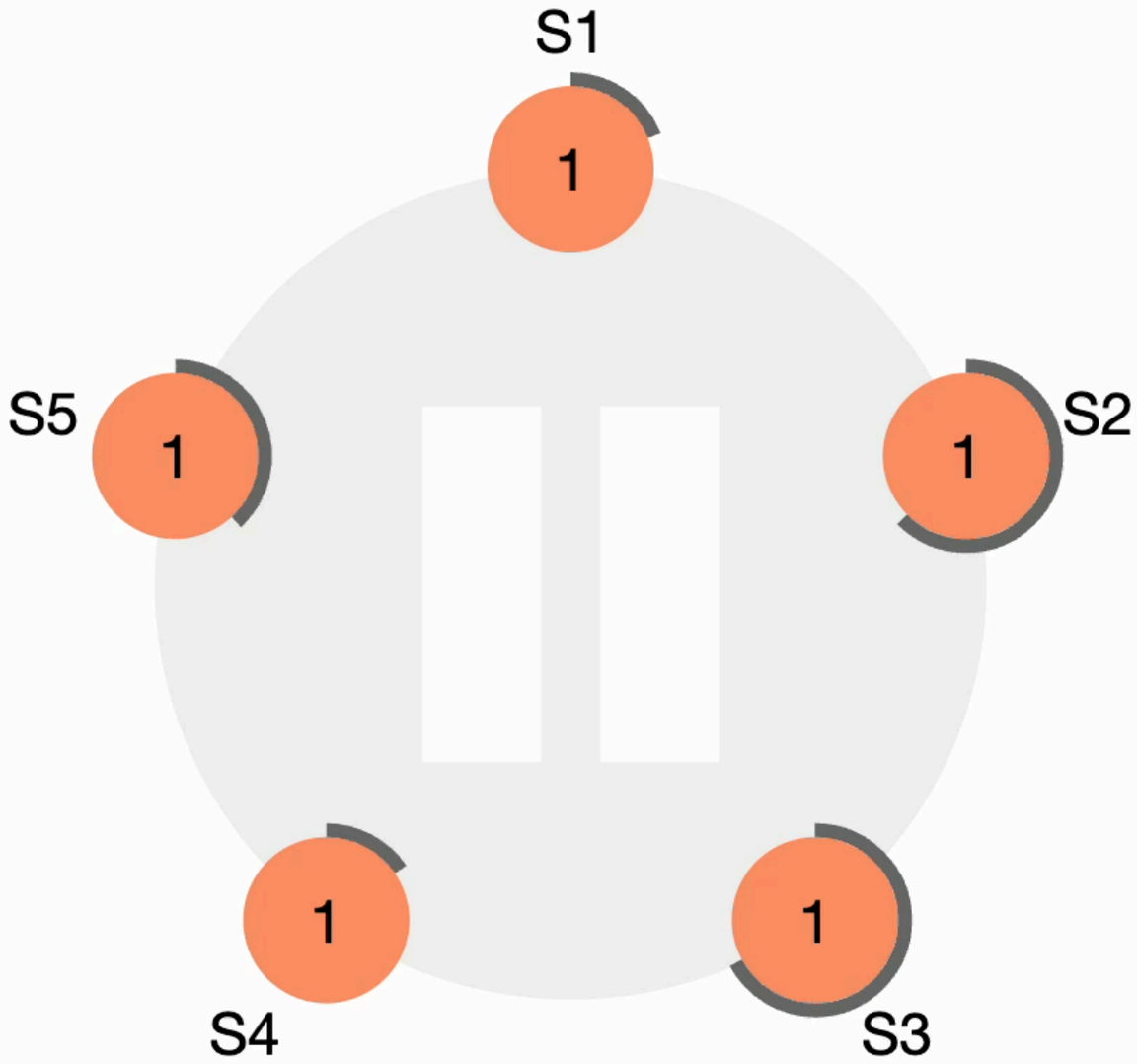
y ← 9
...
Node E
(Follower)



	1	2	3	4	5	6	7	8	9	10
S1										
S2										
S3										
S4										
S5										

Why Elixir?

- Process isolation
- Actor Model (message passing)
- Supervision Trees
- “Let it crash”

BEAM me up, ~~Bogdan~~
Björn?

Show me the code!