

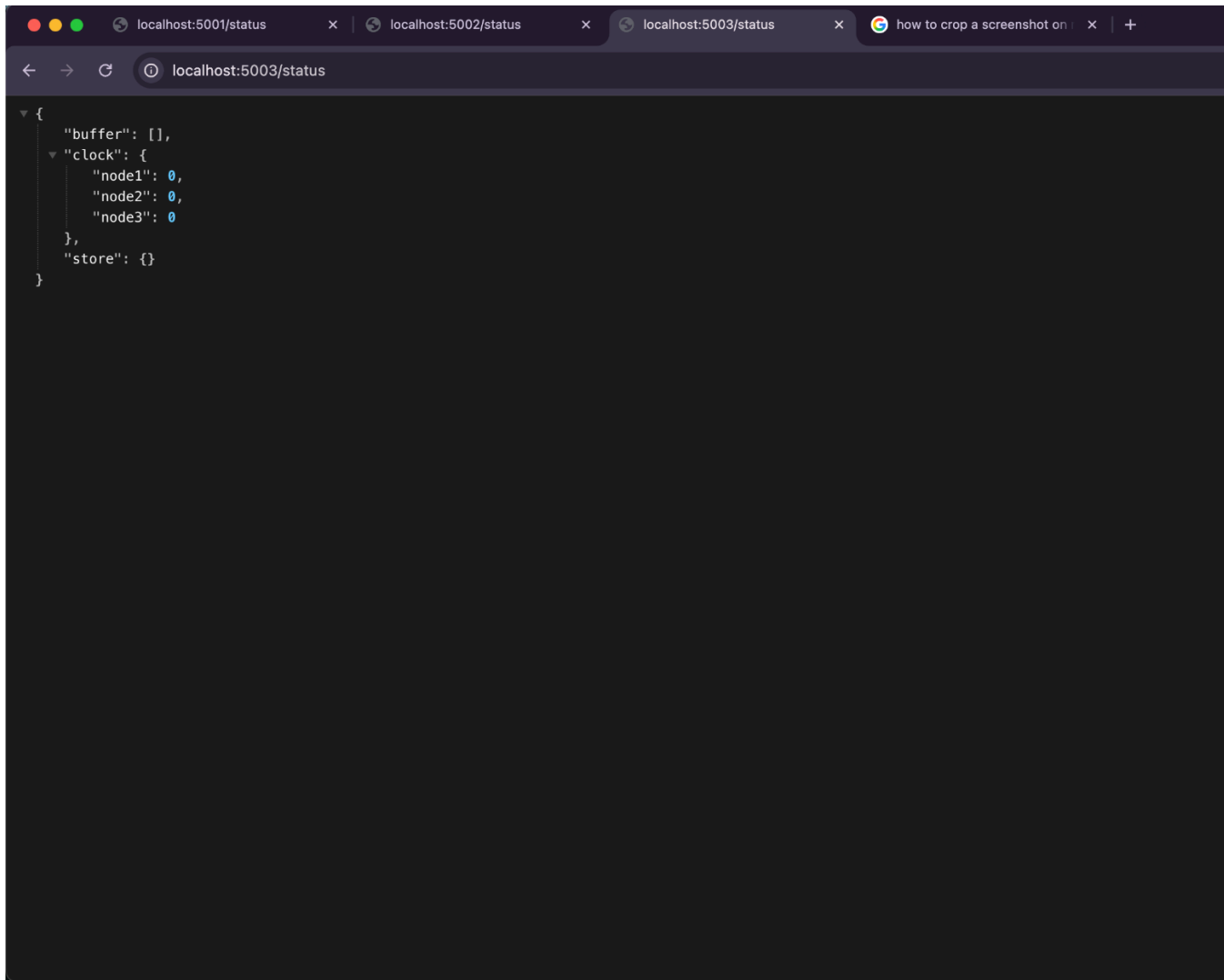
Yash Mathur

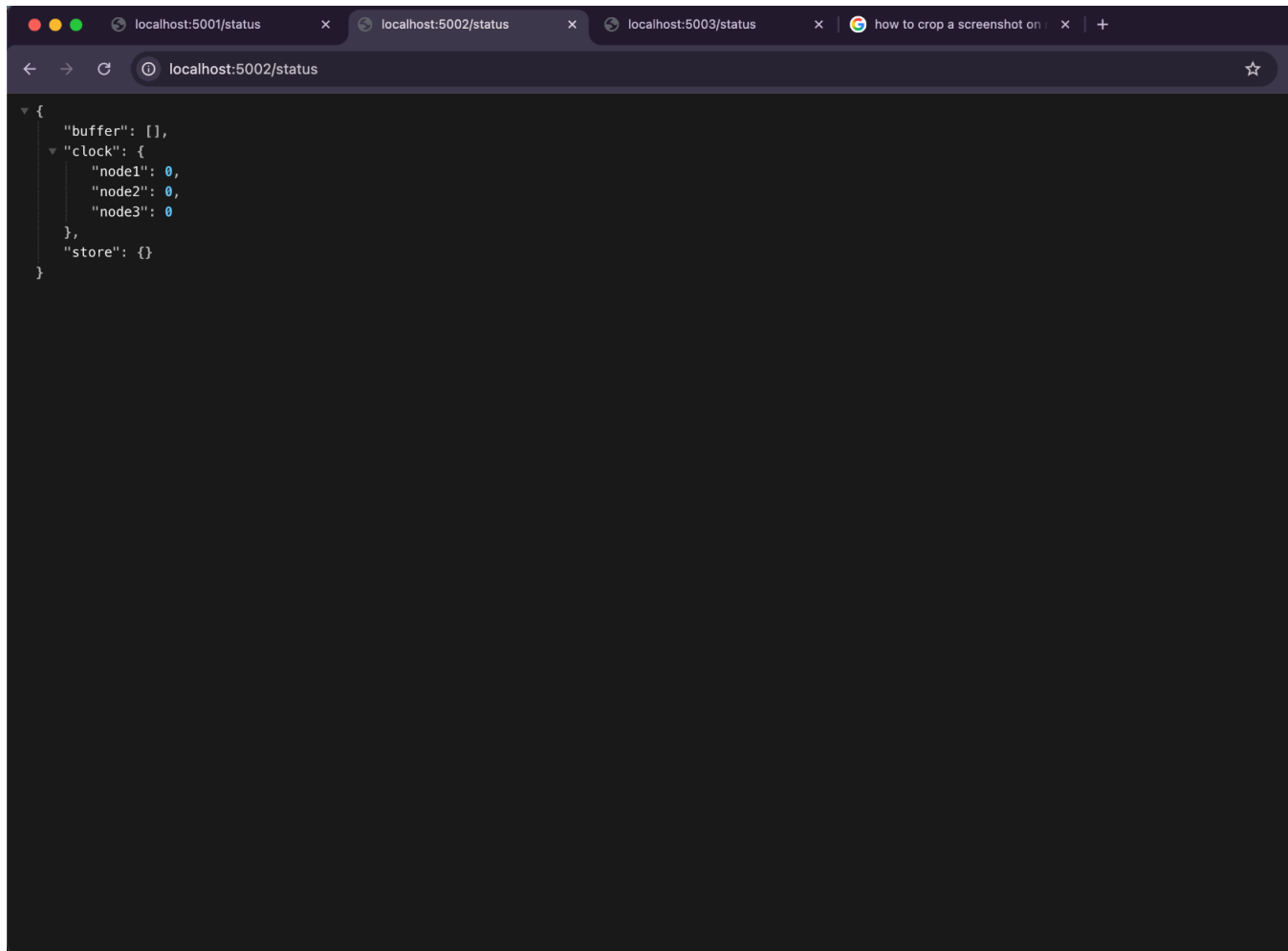
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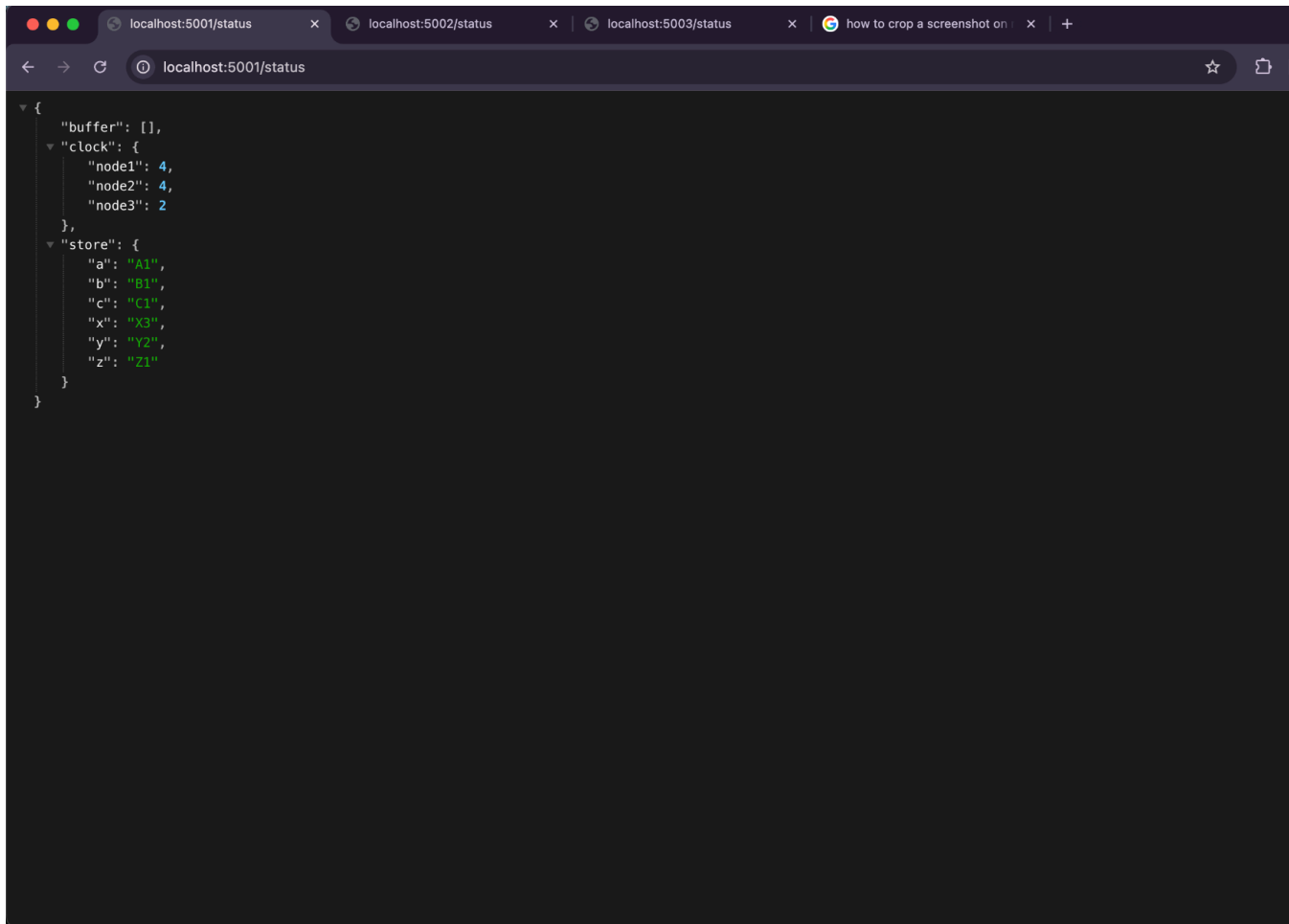
FDS Assignment 1

Architecture Summary

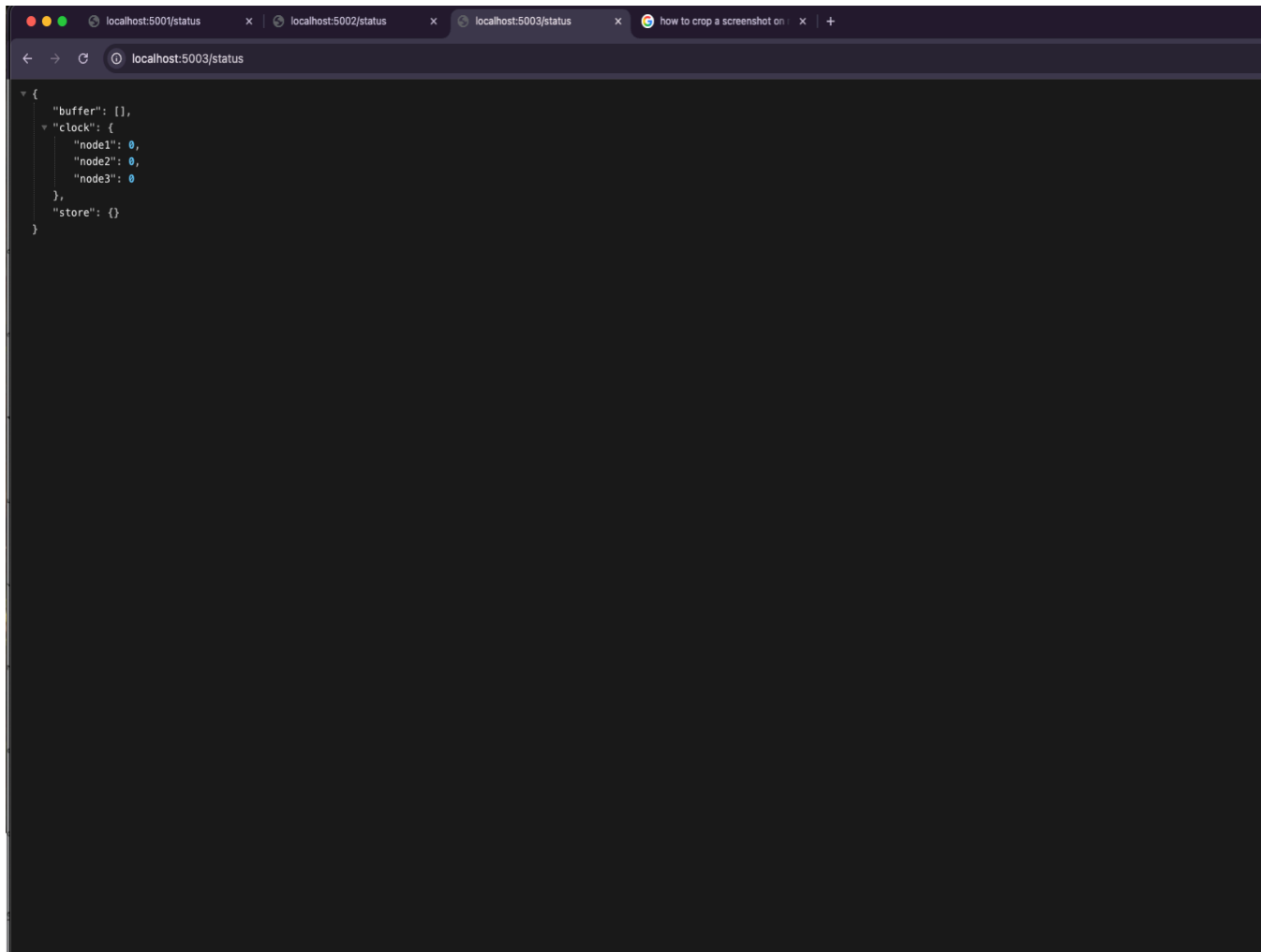
1. [node.py](#) key methods:
 - a. `Init_vector_clock`: initializes all node values to 0.
 - b. `Increment_clock`: increases vector clock value of current node by 1
 - c. `Update_clock`: # obtain max value for each node and update in current node's vector clock
 - d. `Get_sender_from_vector`: get sender node using the received vector clock
 - e. `Can_deliver`: checks current node's vector clock value for every node, return false if even a single value is greater than existing value
 - f. `Deliver_buffered_messages`: check and clears buffer values
 - g. `Put`: this method receives the sent node's key-value pair and vector clock and evaluates whether to buffer
 - h. `Local_put`: method to process client request locally; adds +1 to the value of current node's vector clock; updates key-value store
 - i. `Replicate_write`: calls put method; provides current node's key-value pair and vector clock to other nodes
 - j. `Status`: get method to output current status of each node
2. `Docker-compose.yml`:
 - a. Nodes' names: node1, node2, node3
 - b. Attached to Host Ports 5001, 5002, 5003
3. `Dockerfile`: Docker image to define containers. Runs command to download Flask, runs [node.py](#)
4. [client.py](#) key methods:
 - a. `Local_put`: initiates post request and provides key-value pair.
 - b. `Scenario_1_independent_writes`: independent Writes to Different Keys
 - c. `Scenario_2_causal_chain`: Causal Chain Across Nodes
 - d. `Scenario_4_out_of_order`: Out-of-Order Arrival Simulation
 - e. `Show_all_statuses`: show final states of all nodes

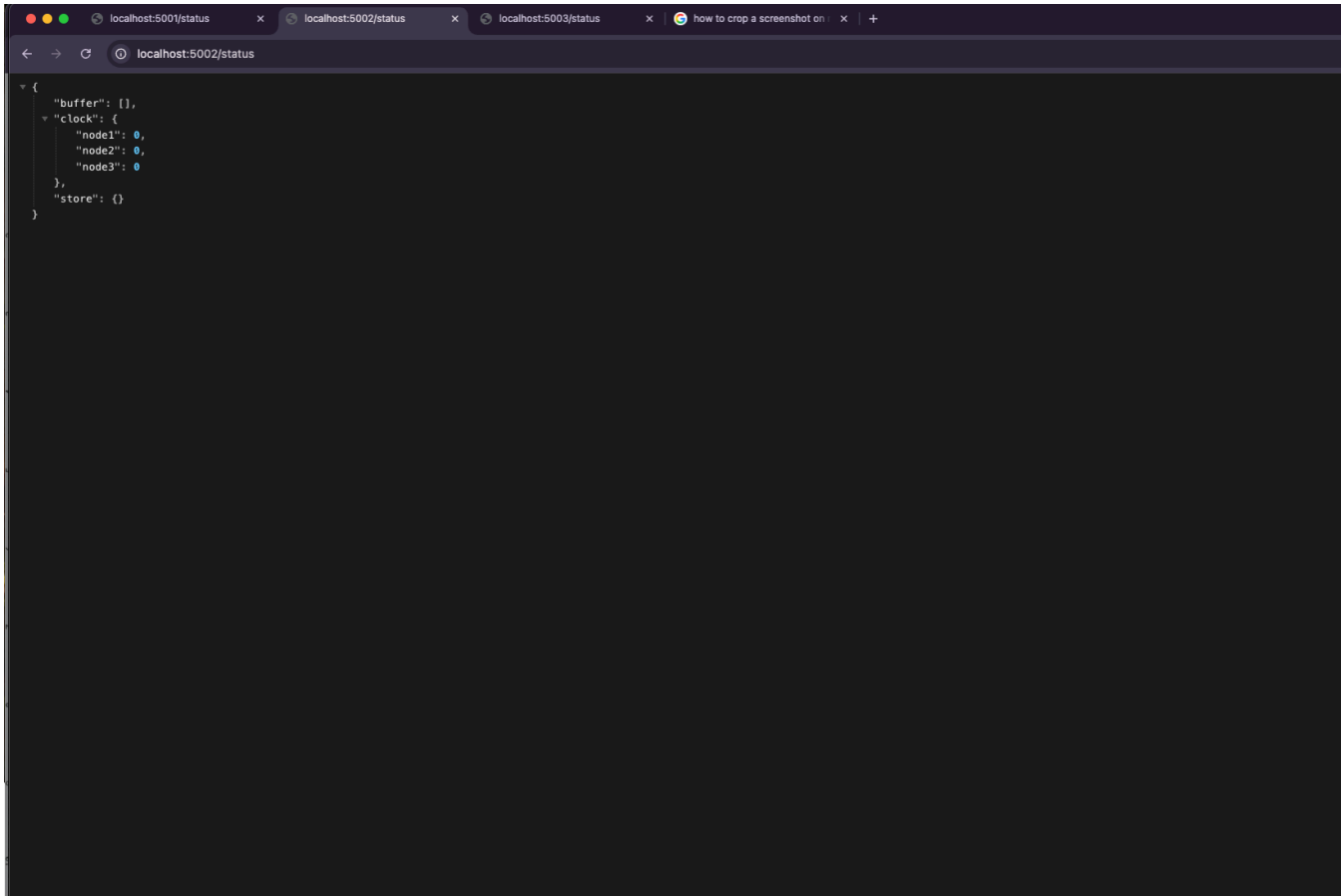


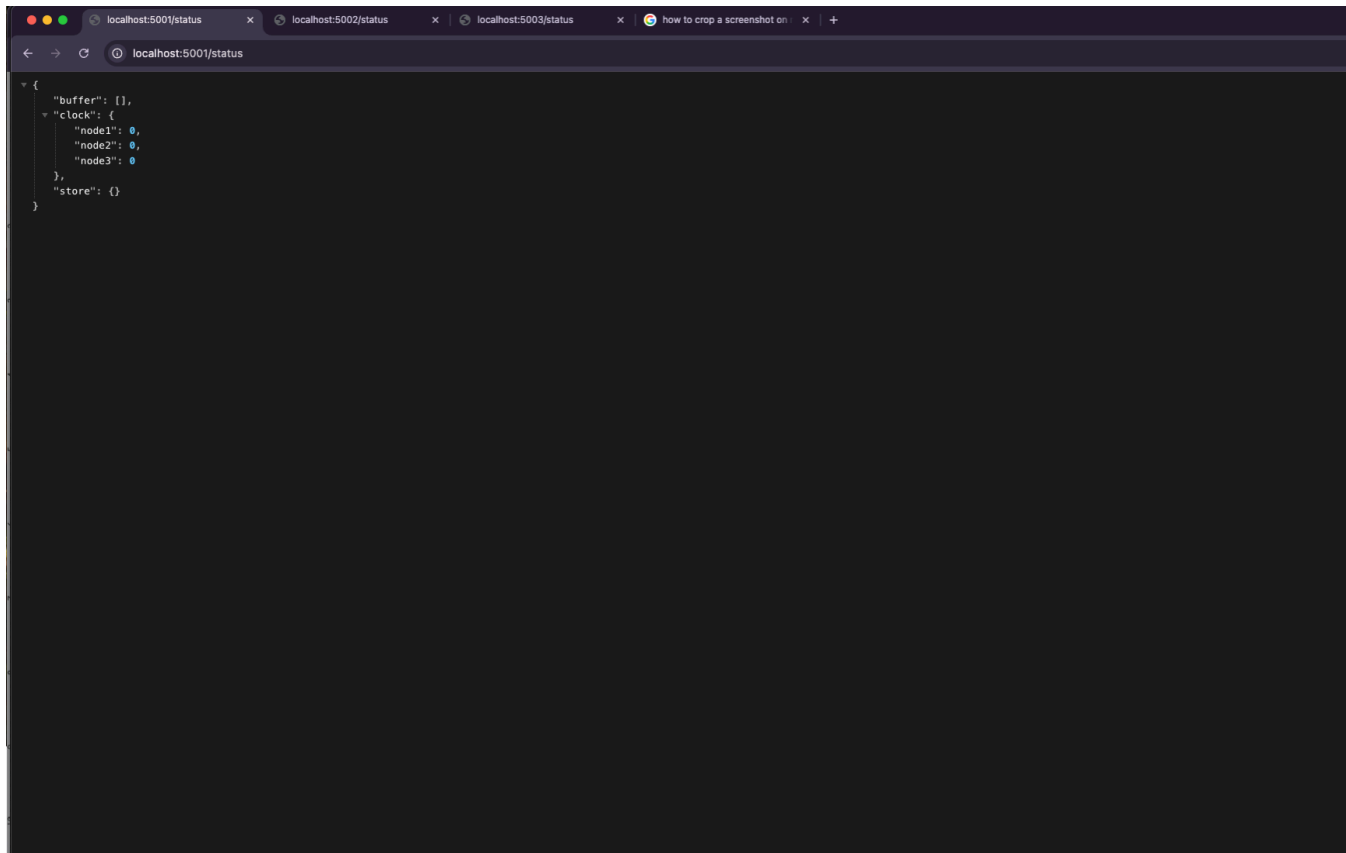


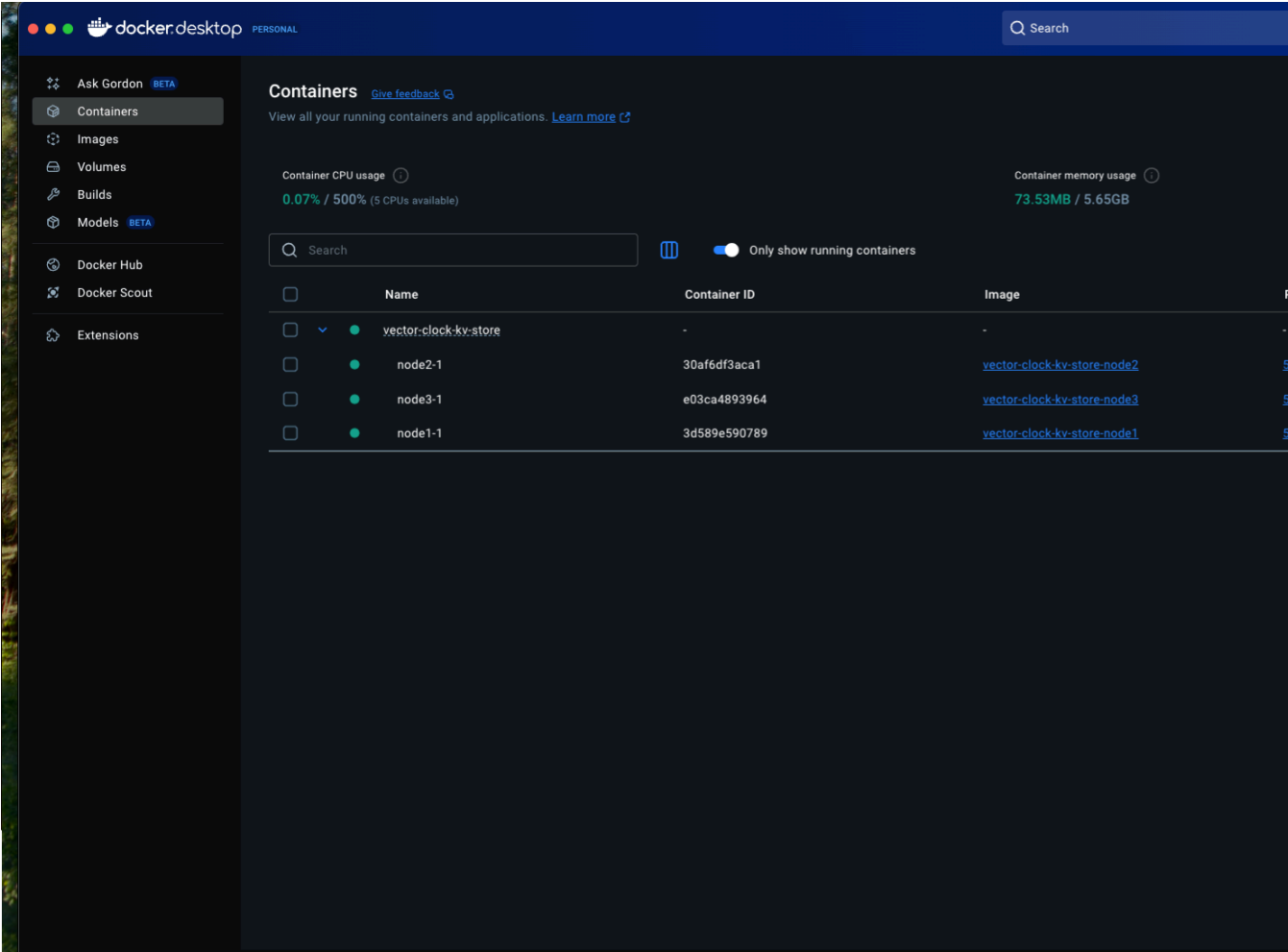


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vector-clock-kv-store
src > client.py > get_status
33 def scenario_3_parallel_causal_writes():
34     # File two writes to the same key from different nodes without dependency
35     local_put("node1", "y", "Y1")
36     local_put("node2", "y", "Y2")
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39 def scenario_4_out_of_order():
40     log_header("SCENARIO 4: Out-of-Order Arrival Simulation")
41     local_put("node2", "z", "Z2")
42     time.sleep(0.5)
43     local_put("node1", "z", "Z1")
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```
vector-clock-kv-store

PROBLEMS 1 OUTPUT TERMINAL PORTS SQL HISTORY TASK MONITOR DEBUG CONSOLE

=> [node1 internal] load build context
=> => transferring context: 1.97kB
=> CACHED [node3 2/4] WORKDIR /app
=> [node3 3/4] COPY src/ .
=> [node2 4/4] RUN pip install flask requests
=> [node2] exporting to image
=> => exporting layers
=> => writing image sha256:16e0bf71015119d5ba1b963d195d88c0d56f42682aaa9aac573247d8358cdd05
=> => naming to docker.io/library/vector-clock-kv-store-node2
=> [node3] exporting to image
=> => exporting layers
=> => writing image sha256:2d68c10fdcefa91305b923d5e61d9761f7c7a1led01285d94793f441af775247
=> => naming to docker.io/library/vector-clock-kv-store-node3
=> [node1] exporting to image
=> => exporting layers
=> => writing image sha256:29d663da777e39ace87821af8418f0068e0a6d2240d76d13124ab9c4e5a30318
=> => naming to docker.io/library/vector-clock-kv-store-node1
=> [node1] resolving provenance for metadata file
=> [node2] resolving provenance for metadata file
=> [node3] resolving provenance for metadata file
[+] Running 7/7
  ✓ node1 Built
  ✓ node2 Built
  ✓ node3 Built
  ✓ Network vector-clock-kv-store_default Created
  ✓ Container vector-clock-kv-store-node3-1 Created
  ✓ Container vector-clock-kv-store-node1-1 Created
  ✓ Container vector-clock-kv-store-node2-1 Created
Attaching to node1-1, node2-1, node3-1
node3-1 | initialising vector clock.. --> {'node1': 0, 'node2': 0, 'node3': 0}
node3-1 | * Serving Flask app 'node'
node3-1 | * Debug mode: off
node3-1 | WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
node3-1 | * Running on all addresses (0.0.0.0)
node3-1 | * Running on http://127.0.0.1:5000
node3-1 | * Running on http://172.19.0.2:5000
node3-1 | Press CTRL+C to quit
node2-1 | initialising vector clock.. --> {'node1': 0, 'node2': 0, 'node3': 0}
node2-1 | * Serving Flask app 'node'
node2-1 | * Debug mode: off
node2-1 | WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
node2-1 | * Running on all addresses (0.0.0.0)
node2-1 | * Running on http://127.0.0.1:5000
node2-1 | * Running on http://172.19.0.4:5000
node2-1 | Press CTRL+C to quit
node1-1 | initialising vector clock.. --> {'node1': 0, 'node2': 0, 'node3': 0}
node1-1 | * Serving Flask app 'node'
node1-1 | * Debug mode: off
node1-1 | WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
node1-1 | * Running on all addresses (0.0.0.0)
node1-1 | * Running on http://127.0.0.1:5000
node1-1 | * Running on http://172.19.0.3:5000
node1-1 | Press CTRL+C to quit
node1-1 | 192.168.65.1 -- [25/Jun/2025 17:53:17] "GET /status HTTP/1.1" 200 -

View in Docker Desktop View Config Enable Watch
```