

Report for Programming Assignment

System Design

```
msahitya14@dhcp-10-8-036-214 cs-253p-hw-hampr-machine-service % npm test
PASS test/simulation.test.ts
  ● Console

    console.log
      (index) Resource Run 1 Units Run 1 % Run 2 Units Run 2 % Run 3 Units Run 3 % Run 4 Units Run 4 %
      0 'IdentityProviderClient' 3840256 '69.47%' 3840256 '69.47%' 3840256 '69.09%' 3840256 '69.44%'
      1 'SmartMachineClient' 32256 '0.58%' 32256 '0.58%' 32256 '0.58%' 32256 '0.58%'
      2 'MachineStateTable' 1635200 '29.58%' 1635200 '29.58%' 1635200 '29.42%' 1635200 '29.57%'
      3 'DataCache' 22216 '0.40%' 22216 '0.40%' 22216 '0.40%' 22216 '0.40%'

      at Object.<anonymous> (test/simulation.test.ts:160:13)

    console.log
      (index) Run Cache Hits Cache Misses Hit Rate
      0 1 3837 2101 '64.62%'
      1 2 3839 2110 '64.53%'
      2 3 3726 2177 '63.12%'
      3 4 3829 2076 '64.84%'

      at Object.<anonymous> (test/simulation.test.ts:161:13)

    console.log
      (index) Run Cache Hits DB Accesses Hit/Access Ratio
      0 1 3837 6671 '0.5752'
      1 2 3839 6671 '0.5755'
      2 3 3726 6671 '0.5585'
      3 4 3829 6671 '0.5740'

      at Object.<anonymous> (test/simulation.test.ts:162:13)

PASS test/api.test.ts
Test Suites: 2 passed, 2 total
Tests: 12 passed, 12 total
Snapshots: 0 total
Time: 0.613 s, estimated 1 s
Ran all test suites.
```

In this, it is observed that the cache is used extensively, and the hit rate is around 64% - which is good, however it can be better if data processing and managing the pipeline better. However since we don't keep everything in the cache, certain database requests are necessary.

This being a simulation, changing the values in units.ts will change these values, however I have uploaded the logs with the default configuration.

To implement the functions, I looked through the classes and their functions in

```
MachineStateTable
IdentityProviderClient
```

To get the cache methods, I looked for the cache declaration as given in the constructor of the ApiHandler:

```
this.cache = DataCache.getInstance<MachineStateDocument>();
```