Test Report

DiemBFT Consensus Algorithm

Algomaniacs

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Test Case 1

```
{
   "test_name" : "Test 1 : Client 1 Nodes 4, 1 Transaction",
   "F": 1,
   "nodes": 4,
   "clients": 1,
   "delta" : 20000,
   "client_requests" : 1,
   "client_delay" : 1,
   "seed" : 1
},
```

Result:

1 Transaction is committed to the ledger by the committed leader.

Test Case 2

```
{
   "test_name" : "Test 2 : Client 1 Nodes 4, 4 Transactions",
   "F": 1,
   "nodes": 4,
   "clients": 1,
   "delta" : 20000,
   "client_requests" : 4,
   "client_delay" : 2,
   "seed" : 1
},
```

Result:

4 Transactions are committed to the ledger 1 and 3 transactions in other ledgers.

Test Case 3

```
{
  "test_name" : "Test 4 : Faulty Replica: 2, Client 1 Nodes: 7, 1
Transaction",
  "F": 2,
  "nodes": 7,
  "clients": 2,
  "delta" : 20000,
  "client_requests" : 1,
  "client_delay" : 2,
  "seed" : 1
},
```

Result:

As expected, 1 Transaction is committed to the ledger by the committed leader.

Test Case 4

```
{
  "test_name" : "Test 5 : F:2, Client 1  Nodes 7, 4 Transactions",
  "F": 2,
  "nodes": 7,
  "clients": 1,
  "delta" : 20000,
  "client_requests" : 1,
  "client_delay" : 2,
  "seed" : 1
},
```

Result:

As expected, 4 Transactions are committed to the ledger 4 and 3 transactions in other ledgers.

Test Case 5

```
{
  "test_name" : "Test 3 : Client 1 Nodes 4, 5 Transactions, 1 Node
Timeout",
  "F": 1,
  "nodes": 4,
  "clients": 1,
  "delta" : 20000,
  "client_requests" : 5,
  "client_delay" : 2,
  "seed" : 1
},
```

Result:

5 Transactions are committed to the ledger. 5th transaction is still committed as Quorum is still satisfied

Test Case 6

```
{
  "test_name" : "Test 6 : Client 2  Nodes 4, 1 Transaction",
  "F": 1,
  "nodes": 4,
  "clients": 2,
  "delta" : 20000,
  "client_requests" : 1,
  "client_delay" : 2,
  "seed" : 1
},
```

Result:

2 Transactions committed in 1 ledger, earlier transaction committed in all ledgers

Test Case 7

```
{
  "test_name" : "Test 7 : Client 2  Nodes 4, 4 Transactions",
  "F": 1,
  "nodes": 4,
  "clients": 2,
  "delta" : 20000,
  "client_requests" : 4,
  "client_delay" : 2,
  "seed" : 1
},
```

Result:

```
[10439] da.api<MainProcess>:INFO: Main process terminated.
→  diemBFT git:(main) ✗ cat ledger-0.txt
2021-10-18 03:08:01.614626 Transaction :0, initiated by client: 0
2021-10-18 03:08:02.616135 Transaction :0, initiated by client: 1
2021-10-18 03:08:03.615545 Transaction :1, initiated by client: 1
2021-10-18 03:08:03.664070 Transaction :2, initiated by client: 1
→  diemBFT git:(main) ✗ cat ledger-1.txt
2021-10-18 03:08:00.626224 Transaction :0, initiated by client: 0
2021-10-18 03:08:02.625860 Transaction :0, initiated by client: 1
2021-10-18 03:08:03.618452 Transaction :1, initiated by client: 1
→  diemBFT git:(main) ✗ cat ledger-2.txt
2021-10-18 03:08:01.615208 Transaction :0, initiated by client: 0
2021-10-18 03:08:01.660518 Transaction :0, initiated by client: 1
2021-10-18 03:08:03.632084 Transaction :1, initiated by client: 1
→  diemBFT git:(main) ✗ cat ledger-3.txt
2021-10-18 03:08:01.616268 Transaction :0, initiated by client: 0
2021-10-18 03:08:02.623833 Transaction :0, initiated by client: 1
2021-10-18 03:08:02.655833 Transaction :1, initiated by client: 1
→  diemBFT git:(main) ✗ cat ledger-4.txt
```

Test Case 8

```
{
  "test_name" : "Test 6 : F:2, Client 1  Nodes 7, 5 Transactions, 1 Node
Timeout",
  "F": 2,
  "nodes": 7,
  "clients": 1,
  "delta" : 20000,
  "client_requests" : 5,
  "client_delay" : 2,
  "seed" : 1
},
```

Result:

5 Transactions are committed to the ledger. 5th transaction is still committed as Quorum is still satisfied

Test Case 9

```
{
  "test_name" : "Test 7 : F:1, Client 1  Nodes 4, 6 Transactions, Multiple
Node Timeouts",
  "F": 1,
  "nodes": 4,
  "clients": 1,
  "delta" : 20000,
  "client_requests" : 6,
  "client_delay" : 2,
  "seed" : 1
},
```

Result:

5 Transactions are committed to the ledger. 6th transaction is not committed as Quorum is not satisfied.

Test Case 10

```
{
  "test_name" : "Test 8 : F:1, Client 1  Nodes 4, 7 Transactions,
Deduplication Detection",
  "F": 1,
  "nodes": 4,
  "clients": 1,
  "delta" : 20000,
  "client_requests" : 7,
  "client_delay" : 2,
  "seed" : 1
}
```

Result:

5 Transactions are committed to the ledger. 6th transaction is not committed as Quorum is not satisfied. 7th transaction is not committed as it is a duplicate transaction.

Other Test cases

Sync up Validators that are behind

Message Loss

Reputed Leaders

All Validator Timeouts

Forged Messages, signature invalidations

Timeout certificate causing advance round and being committed by the next round

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