CLOUD COMPUTING – UE20CS351

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Assignment 4 – Introduction to Apache Zookeeper

➢ 1a: Screenshot of Zookeeper Server having started.

```
pes1ug20cs825@VM:/opt/apache-zookeeper-3.8.0-bin$ bin/zkServer.sh start
/usr/bin/java
ZooKeeper JMX enabled by default
Using config: /opt/apache-zookeeper-3.8.0-bin/bin/../conf/zoo.cfg
Starting zookeeper ... STARTED
pes1ug20cs825@VM:/opt/apache-zookeeper-3.8.0-bin$
```

➢ 2a: Screenshot of Listing of the created ZNodes

```
[zk: localhost:2181(CONNECTED) 1] create -s /PES1UG20CS825__seq "a sequential node"
Created /PES1UG20CS825__seq0000000000
[zk: localhost:2181(CONNECTED) 2] create -e /PES1UG20CS825_eph "an ephemeral node"
Created /PES1UG20CS825_eph
[zk: localhost:2181(CONNECTED) 3] ls /
[PES1UG20CS825__seq0000000000, PES1UG20CS825_eph, zookeeper]
[zk: localhost:2181(CONNECTED) 4]
```

➢ 2b: Screenshot of Listing of the deleted ephemeral node

```
WATCHER::

WatchedEvent state:SyncConnected type:None path:null
[zk: localhost:2181(CONNECTED) 0] ls /
[PES1UG20CS825__seq0000000000, zookeeper]
[zk: localhost:2181(CONNECTED) 1]
```
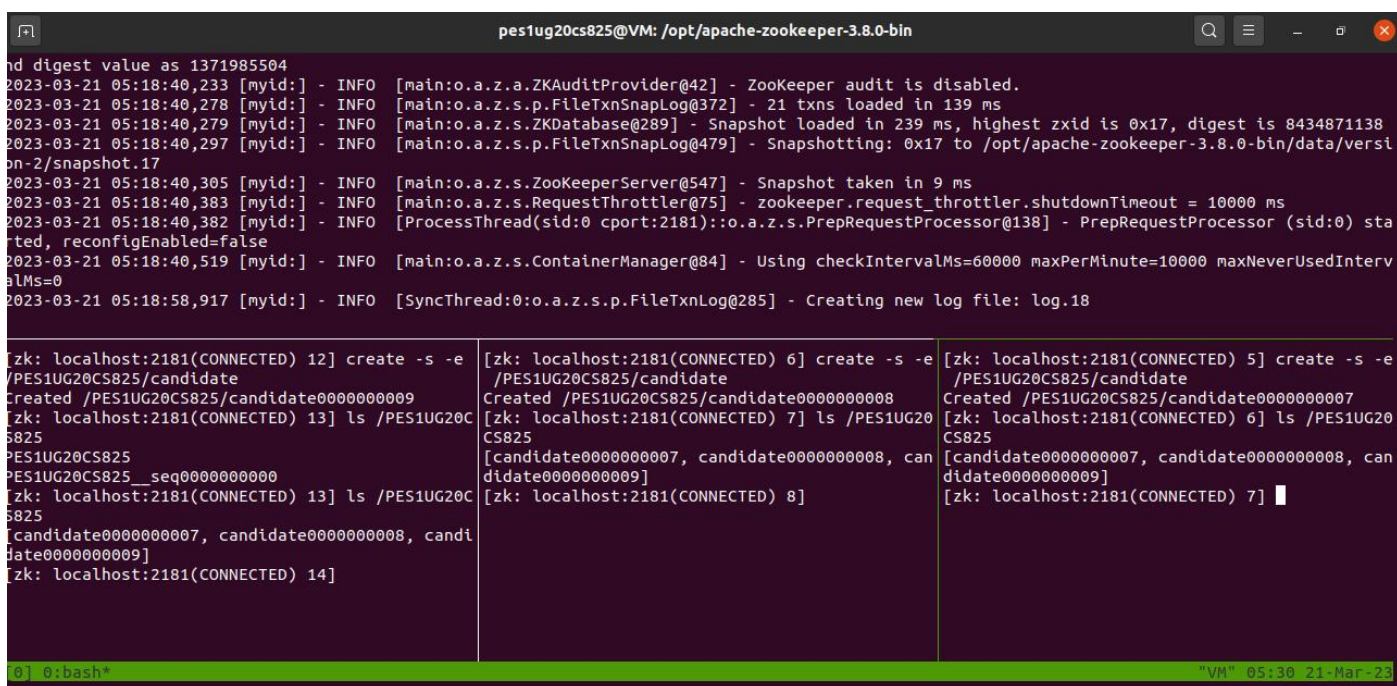
➢ 2c: Screenshot of Data and Metadata associated with the created sequential znode.

```
[zk: localhost:2181(CONNECTED) 2] set /PES1UG20CS825__seq0000000000 /"updated"
[zk: localhost:2181(CONNECTED) 3] get -s /PES1UG20CS825__seq0000000000
/"updated"
cZxid = 0x8
ctime = Tue Mar 21 04:55:29 EDT 2023
mZxid = 0xd
mtime = Tue Mar 21 05:00:05 EDT 2023
pZxid = 0x8
cversion = 0
dataVersion = 1
aclVersion = 0
ephemeralOwner = 0x0
dataLength = 10
numChildren = 0
[zk: localhost:2181(CONNECTED) 4]
```

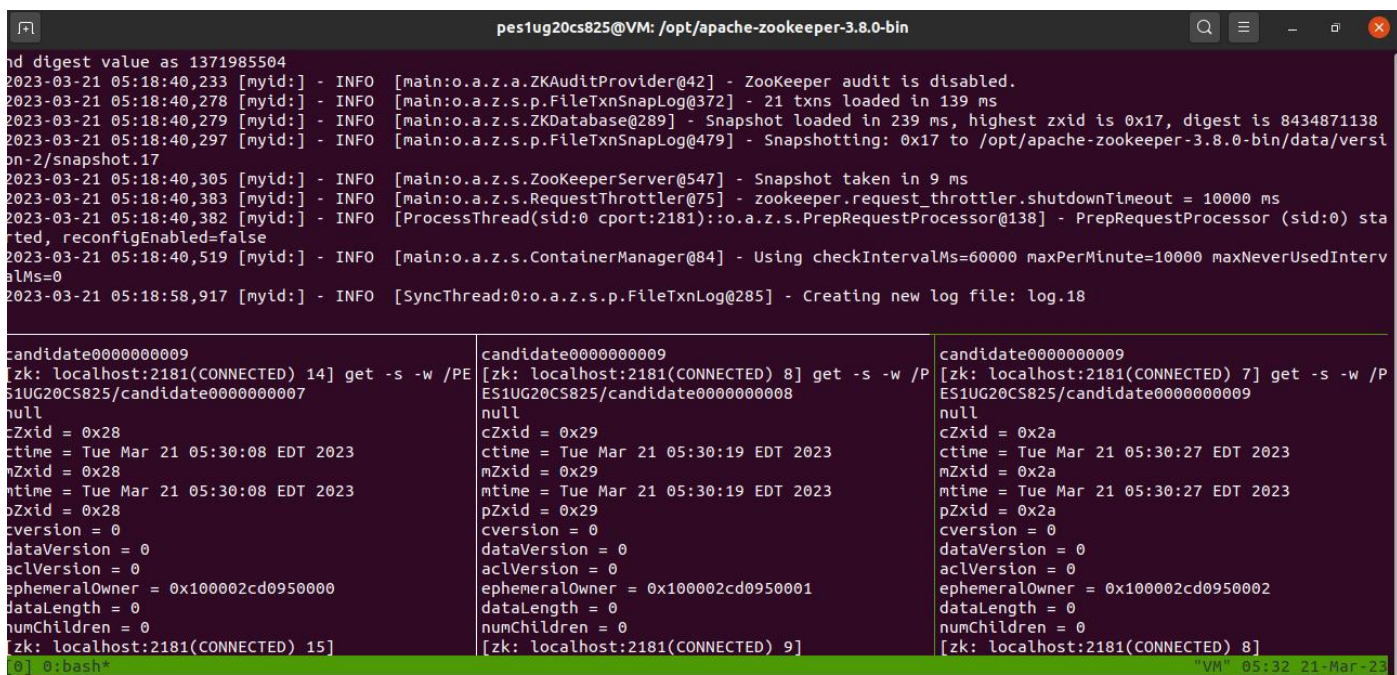➢ **2d: Screenshot of Listing of all the children nodes**

```
[zk: localhost:2181(CONNECTED) 12] create /PES1UG20CS825
Created /PES1UG20CS825
[zk: localhost:2181(CONNECTED) 13] create /PES1UG20CS825/PREM "chilnode"
Created /PES1UG20CS825/PREM
[zk: localhost:2181(CONNECTED) 14] create /PES1UG20CS825/SAGAR "chilnode"
Created /PES1UG20CS825/SAGAR
[zk: localhost:2181(CONNECTED) 15] ls /PES1UG20CS825
PES1UG20CS825                    PES1UG20CS825__seq0000000000
[zk: localhost:2181(CONNECTED) 15] ls /PES1UG20CS825
[PREM, SAGAR]
[zk: localhost:2181(CONNECTED) 16]
```

➢ **3a: Screenshot of each of the clients listing all the znodes**

```
pes1ug20cs825@VM: /opt/apache-zookeeper-3.8.0-bin

nd digest value as 1371985504
2023-03-21 05:18:40,233 [myid:] - INFO  [main:o.a.z.a.ZKAuditProvider@42] - ZooKeeper audit is disabled.
2023-03-21 05:18:40,278 [myid:] - INFO  [main:o.a.z.s.p.FileTxnSnapLog@372] - 21 txns loaded in 139 ms
2023-03-21 05:18:40,279 [myid:] - INFO  [main:o.a.z.s.ZKDatabase@289] - Snapshot loaded in 239 ms, highest zxid is 0x17, digest is 8434871138
2023-03-21 05:18:40,297 [myid:] - INFO  [main:o.a.z.s.p.FileTxnSnapLog@479] - Snapshotting: 0x17 to /opt/apache-zookeeper-3.8.0-bin/data/versi
on-2/snapshot.17
2023-03-21 05:18:40,305 [myid:] - INFO  [main:o.a.z.s.ZooKeeperServer@547] - Snapshot taken in 9 ms
2023-03-21 05:18:40,383 [myid:] - INFO  [main:o.a.z.s.RequestThrottler@75] - zookeeper.request_throttler.shutdownTimeout = 10000 ms
2023-03-21 05:18:40,382 [myid:] - INFO  [ProcessThread(sid:0 cport:2181)::o.a.z.s.PrepRequestProcessor@138] - PrepRequestProcessor (sid:0) sta
rted, reconfigEnabled=false
2023-03-21 05:18:40,519 [myid:] - INFO  [main:o.a.z.s.ContainerManager@84] - Using checkIntervalMs=60000 maxPerMinute=10000 maxNeverUsedInterv
alMs=0
2023-03-21 05:18:58,917 [myid:] - INFO  [SyncThread:0:o.a.z.s.p.FileTxnLog@285] - Creating new log file: log.18

[zk: localhost:2181(CONNECTED) 12] create -s -e    [zk: localhost:2181(CONNECTED) 6] create -s -e   [zk: localhost:2181(CONNECTED) 5] create -s -e
/PES1UG20CS825/candidate                            /PES1UG20CS825/candidate                         /PES1UG20CS825/candidate
Created /PES1UG20CS825/candidate0000000009         Created /PES1UG20CS825/candidate0000000008       Created /PES1UG20CS825/candidate0000000007
[zk: localhost:2181(CONNECTED) 13] ls /PES1UG20C   [zk: localhost:2181(CONNECTED) 7] ls /PES1UG20   [zk: localhost:2181(CONNECTED) 6] ls /PES1UG20
S825                                               CS825                                            CS825
PES1UG20CS825                                      [candidate0000000007, candidate0000000008, can   [candidate0000000007, candidate0000000008, can
PES1UG20CS825__seq0000000000                       didate0000000009]                                didate0000000009]
[zk: localhost:2181(CONNECTED) 13] ls /PES1UG20C   [zk: localhost:2181(CONNECTED) 8]                [zk: localhost:2181(CONNECTED) 7]
S825
[candidate0000000007, candidate0000000008, candi
date0000000009]
[zk: localhost:2181(CONNECTED) 14]

[0] 0:bash*                                                                                          "VM" 05:30 21-Mar-23
```

➢ **3b: Screenshot of the Watched Event and the Zookeeper Server logs.**

```
pes1ug20cs825@VM: /opt/apache-zookeeper-3.8.0-bin

nd digest value as 1371985504
2023-03-21 05:18:40,233 [myid:] - INFO  [main:o.a.z.a.ZKAuditProvider@42] - ZooKeeper audit is disabled.
2023-03-21 05:18:40,278 [myid:] - INFO  [main:o.a.z.s.p.FileTxnSnapLog@372] - 21 txns loaded in 139 ms
2023-03-21 05:18:40,279 [myid:] - INFO  [main:o.a.z.s.ZKDatabase@289] - Snapshot loaded in 239 ms, highest zxid is 0x17, digest is 8434871138
2023-03-21 05:18:40,297 [myid:] - INFO  [main:o.a.z.s.p.FileTxnSnapLog@479] - Snapshotting: 0x17 to /opt/apache-zookeeper-3.8.0-bin/data/versi
on-2/snapshot.17
2023-03-21 05:18:40,305 [myid:] - INFO  [main:o.a.z.s.ZooKeeperServer@547] - Snapshot taken in 9 ms
2023-03-21 05:18:40,383 [myid:] - INFO  [main:o.a.z.s.RequestThrottler@75] - zookeeper.request_throttler.shutdownTimeout = 10000 ms
2023-03-21 05:18:40,382 [myid:] - INFO  [ProcessThread(sid:0 cport:2181)::o.a.z.s.PrepRequestProcessor@138] - PrepRequestProcessor (sid:0) sta
rted, reconfigEnabled=false
2023-03-21 05:18:40,519 [myid:] - INFO  [main:o.a.z.s.ContainerManager@84] - Using checkIntervalMs=60000 maxPerMinute=10000 maxNeverUsedInterv
alMs=0
2023-03-21 05:18:58,917 [myid:] - INFO  [SyncThread:0:o.a.z.s.p.FileTxnLog@285] - Creating new log file: log.18

candidate0000000009                                candidate0000000009                              candidate0000000009
[zk: localhost:2181(CONNECTED) 14] get -s -w /PE   [zk: localhost:2181(CONNECTED) 8] get -s -w /P   [zk: localhost:2181(CONNECTED) 7] get -s -w /P
S1UG20CS825/candidate0000000007                    ES1UG20CS825/candidate0000000008                 ES1UG20CS825/candidate0000000009
null                                               null                                             null
cZxid = 0x28                                       cZxid = 0x29                                      cZxid = 0x2a
ctime = Tue Mar 21 05:30:08 EDT 2023               ctime = Tue Mar 21 05:30:19 EDT 2023             ctime = Tue Mar 21 05:30:27 EDT 2023
mZxid = 0x28                                        mZxid = 0x29                                     mZxid = 0x2a
mtime = Tue Mar 21 05:30:08 EDT 2023               mtime = Tue Mar 21 05:30:19 EDT 2023             mtime = Tue Mar 21 05:30:27 EDT 2023
pZxid = 0x28                                        pZxid = 0x29                                     pZxid = 0x2a
cversion = 0                                        cversion = 0                                     cversion = 0
dataVersion = 0                                     dataVersion = 0                                  dataVersion = 0
aclVersion = 0                                      aclVersion = 0                                   aclVersion = 0
ephemeralOwner = 0x100002cd0950000                  ephemeralOwner = 0x100002cd0950001               ephemeralOwner = 0x100002cd0950002
dataLength = 0                                      dataLength = 0                                   dataLength = 0
numChildren = 0                                     numChildren = 0                                  numChildren = 0
[zk: localhost:2181(CONNECTED) 15]                 [zk: localhost:2181(CONNECTED) 9]                [zk: localhost:2181(CONNECTED) 8]

[0] 0:bash*                                                                                          "VM" 05:32 21-Mar-23
```

In my Case Candidate node's sequences are
[candidate0000000007, candidate0000000008, candidate0000000009]

➢ 3c: Screenshot of the old leader coming back and having a new sequence number.

old leader coming back and having a new sequence number
PES1UG20CS825/candidate0000000010

Previous Sequence Numbers
[candidate0000000007, candidate0000000008, candidate0000000009]

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