## Assignment 4 - Introduction to Apache Zookeeper

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1a: Screenshot of Zookeeper Server having started.

```
pes2ug20cs045@ananya-VirtualBox:/opt/zookeeper$ sudo bin/zkServer.sh start
/usr/bin/java
ZooKeeper JMX enabled by default
Using config: /opt/zookeeper/bin/../conf/zoo.cfg
Starting zookeeper ... STARTED
pes2ug20cs045@ananya-VirtualBox:/opt/zookeeper$
```

2a: Screenshot of Listing of the created ZNodes

```
[zk: localhost:2181(CONNECTED) 2] create -e /pes2ug20cs045_eph "an ephemeral nod
e"
Created /pes2ug20cs045_eph
[zk: localhost:2181(CONNECTED) 3] ls /
[0000000000, pes2ug20cs045_eph, zookeeper]
```

2b: Screenshot of Listing of the deleted ephemeral node

```
WATCHER::

WatchedEvent state:SyncConnected type:None path:null

[zk: localhost:2181(CONNECTED) 0] ls /

[0000000000, zookeeper]

[zk: localhost:2181(CONNECTED) 1]
```

2c: Screenshot of Data and Metadata associated with the created sequential znode.

```
[zk: localhost:2181(CONNECTED) 11] get -s /zookeeper/pes2ug20cs045_seq
a sequential node
cZxid = 0x7
ctime = Sun Mar 26 12:22:30 IST 2023
mZxid = 0x7
mtime = Sun Mar 26 12:22:30 IST 2023
pZxid = 0x7
cversion = 0
dataVersion = 0
aclVersion = 0
ephemeralOwner = 0x0
dataLength = 17
numChildren = 0
[zk: localhost:2181(CONNECTED) 12]
```

2d: Screenshot of Listing of all the children nodes

```
[zk: localhost:2181(CONNECTED) 18] create /pes2ug20cs045
Created /pes2ug20cs045
[zk: localhost:2181(CONNECTED) 19] create /pes2ug20cs045/Ananya "first childnode"
"
Created /pes2ug20cs045/Ananya
[zk: localhost:2181(CONNECTED) 20] create /pes2ug20cs045/Bhat "second childnode"
Created /pes2ug20cs045/Bhat
[zk: localhost:2181(CONNECTED) 21] ls /pes2ug20cs045
[Ananya, Bhat]
[zk: localhost:2181(CONNECTED) 22]
```

## 3a: Screenshot of each of the clients listing all the znodes

```
[main:o.a.z.s.ZKDatabase@132] - zookeeper.snapshotSizeFactor = 0.33
[main:o.a.z.s.ZKDatabase@152] - zookeeper.conmitiogCount=500
[main:o.a.z.s.p.SnapStream@61] - zookeeper.snapshot.compression.method = CHECKED
[main:o.a.z.s.p.FileTxmSnapLog@479] - Snapshotting: 0x0 to /opt/apache-zookeeper-3.
2023-03-26 23:25:24,218 [mytd:] - INFO
2023-03-26 23:25:24,221 [mytd:] - INFO
2023-03-26 23:25:24,271 [mytd:] - INFO
2023-03-26 23:25:24,287 [mytd:] - INFO
.0-bin/data/version-2/snapshot.0
2023-03-26 23:25:24,302 [myid:] - INFO [main:o.a.z.s.ZKDatabaseg289] - Snapshot loaded in 80 ms, highest zxid is 0x0, diges
 t Es 1371985504
2023-03-26 23:25:24,307 [myld:] - INFO [maln:o.a.z.s.p.FileTxnSnapLog@479] - Snapshotting: 0x0 to /opt/apache-zookeeper-3.8
.0-bin/data/version-Z/snapshot.0
2023-03-26 23:25:24,309 [myld:] - INFO [maln:o.a.z.s.ZooKeeperServer@547] - Snapshot taken in 3 ms
2023-03-26 23:25:24,300 [myld:] - INFO [maln:o.a.z.s.RequestThrottler@75] - zookeeper.request_throttler.shutdownTimeout = 1
2023-03-26 23:23:24,371 [myld:] - INFO [main:o.a.z.s.kequest:nrottlerg/s] - Zookeeper.request_throttler,snutdown/thedut = 1 0000 ms 2023-03-26 23:25:24,371 [myld:] - INFO [ProcessThread(sld:0 cport:2181)::o.a.z.s.PrepRequestProcessor@138] - PrepRequestProcessor (sld:0) started, reconfigEnabled=false 2023-03-26 23:25:24,477 [myld:] - INFO [main:o.a.z.s.ContainerManager@84] - Using checkIntervalMs=00000 maxPerMinute=10000 maxNeverUsedIntervalMs=0
2023-03-26 23:25:24,479 [myid:] - INFO [main:o.a.z.a.ZKAuditProvider@4Z] - ZooKeeper audit is disabled.
2023-03-26 23:27:47,280 [myid:] - INFO [SyncThread:0:o.a.z.s.p.FileTxnLog@285] - Creating new log file: log.1
n$$endThread@1444] - Session establishment complete
on server localhost/127.8.0.1:2181, session id = 6
x100003281800002, negotiated timeout = 30000 WATCHER::
                                                                                                                                                                                                                    MATCHER::
                                                                                                                                                                                                                   WatchedEvent state:SyncConnected
type:None path:null
[zk: localhost:2181(CONNECTED) 0
                                                                                                                       WatchedEvent state
one path:null
Jine support is enabled
[zk: localhost:2181(CONNECTED) 0] creat
c - s - e /pes2ug20cs045/candidate
coopoooooo:
rk: localhost:2181(CONNECTED) 1
                                                                                                                        WatchedEvent state:SyncConnected type:N
WatchedEvent state:SyncConnected type:None path:nul
[zk: localhost:2181(CONNECTED) 0] create /pes2ug20c
5045
Created /pes2ug20cs845
[zk: localhost:2181(CONNECTED) 1]
                                                                                                                       [zk: localhost:2181(CONNECTED) 1]
```

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

```
pes2ug20cs045@ananya-VirtualBox: -/Downloads/apache-zookeeper-3.8.0-bin
                                                                                                                                                                                                                                                                   Q = - - x
 2023-03-26 23:25:24,135 [myld:] + INFO [main:o.a.z.s.ServerCnxnFactory@169] - Using org.apache.zookeeper.server.N10ServerCnxnFactory as
server connection factory
2823-03-26 23:25:24,142 [myid:] - MARN [main:o.a.z.s.ServerCnxnFactory@309] - maxCnxns is not configured, using default value 0.
2823-03-26 23:25:24,146 [myid:] - INFO [main:o.a.z.s.NIOServerCnxnFactory@552] - Configuring NIO connection handler with 10s sessionless
connection threout, 1 selector thread(s), 4 worker threads, and 64 kB direct buffers.
2823-03-26 23:25:24,156 [myid:] - INFO [main:o.a.z.s.NIOServerCnxnFactory@600] - binding to port 0.0.0.0/8.0.0.0:2181
2823-03-26 23:25:24,217 [myid:] - INFO [main:o.a.z.s.w.WatchManagerfactory@600] - Using org.apache.zookeeper.server.watch.MatchManager as
 watch manager
2023-03-26 23:25:24,218 [mytd:] - INFO
watch manager
2023-03-26 23:25:24,218 [mytd:] - INFO
2023-03-26 23:25:24,221 [mytd:] - INFO
2023-03-26 23:25:24,271 [mytd:] - INFO
2023-03-26 23:25:24,207 [mytd:] - INFO
                                                                                        [main:o.a.z.s.w.WatchManagerFactory@42] Using org.apache.zookeeper.server.watch.WatchManager as
                                                                                        [main:o.a.z.s.ZKDatabasegi32] - zookeeper.snapshotSizeFactor = 0.33
[main:o.a.z.s.ZKDatabasegi32] - zookeeper.commitlogCount=580
[main:o.a.z.s.p.SnapStreamg01] - zookeeper.snapshot.compression.method = CHECKED
[main:o.a.z.s.p.ShapStreamg01] - Snapshotting: 0x0 to /opt/apache-zookeeper-3.0.0-bin/data/v
 cezs-or-z/snapshot.0
resion-z/snapshot.0
2023-03-20 23:25:24,302 [myid:] - INFO [main:o.a.z.s.ZKDatabase@289] - Snapshot loaded in 80 ms, highest zxid is 0x0, digest is 13719855
 2023-03-26 23:25:24,307 [myld:] - INFO [maln:o.a.z.s.p.FlleTxmSnapLog@479] - Snapshotting: 0x0 to /opt/apache-zookeeper-3.0.0-bln/data/v
 ersion-2/snapshot.8
2023-03-26 23:25:24,309 [myld:] - INFO [main:o.a.z.s.ZooKeeperServerg547] - Snapshot taken in 3 ms
2023-03-26 23:25:24,309 [myld:] - INFO [main:o.a.z.s.ZooKeeperServerg547] - Snapshot taken in 3 ms
2023-03-26 23:25:24,368 [myld:] - INFO [main:o.a.z.s.RequestThrottlerg75] - zooKeeper.request_throttler.shutdownTimeout = 18000 ms
2023-03-26 23:25:24,371 [myld:] - INFO [ProcessThread(sid:0 cport:2181)::o.a.z.s.PrepRequestProcessorg138] - PrepRequestProcessor (sid:0)
3 started, reconfigEnabled=false
2023-03-26 23:25:24,477 [myld:] - INFO [main:o.a.z.s.ContainerManagerg84] - Using checkIntervalMs=60000 maxPerMinute=10000 maxNeverUsedI
attervalMs=80
  18823-03-26 23:25:24,479 [myld:] - INFO [main:o.a.z.a.ZKAuditProvider842] - ZonKeeper audit is disabled.
1823-03-26 23:27:47,280 [myld:] - INFO [SyncThread:8:o.a.z.s.p.FileTxnLog8285] - Creating new log file: log.1
Galaversion = 0
actVersion = 0
epheneralOwner = 0x1000032810c0000
dataLength = 0
nunChildren = 0
[zk: localhost:2181(COMNECTED) 3]
create -s -e /pes2ug20cs045/candid
                                                                                                                                       cverston = 0
 WatchedEvent state:SyncConnected type:None path;null
[zk: localhost:2181(CONNECTED) 0] create /pes2ug20cs045
Created /pes2ug20cs045
[zk: localhost:2181(CONNECTED) 1] ls /pes2ug20cs045
[candidate0000000000, candidate000000001]
[zk: localhost:2181(CONNECTED) 2]
                                                                                                                                      dataVersion = 0
aclVersion = 0
                                                                                                                                       epheneralOwner = 0x1000032810c0081
                                                                                                                                      dataLength = 8
numChlldren = 0
                                                                                                                                      numChildren = 0
[zk: localhost:2181(CONNECTED) 4]
                                                                                                                                                                                                                                       áte
```

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

```
Q E - 0
                                                                                                                         pes2ug20cs045@ananya-VirtualBox: ~/Downloads/apache-zookeeper-3.8.0-bin
2023-03-26 23:25:24,142 [Myid:] - WARN | Main:o.a.z.s.ServerCnxnFactory0309] - maxCnxns is not configured, using default value 0.
2023-03-26 23:25:24,146 [Myid:] - INFO | Inain:o.a.z.s.NIOServerCnxnFactory0652] - Configuring NIO connection handler with 10s sessionless
connection timeout, 1 selector thread(s), 4 worker threads, and 64 kB direct buffers.
2023-03-26 23:25:24,150 [Myid:] - INFO | Inain:o.a.z.s.NIOServerCnxnFactory0600] - binding to port 0.0.0.0/0,0.0.0.0:2181
2023-03-26 23:25:24,217 [Myid:] - INFO | Inain:o.a.z.s.NIOServerCnxnFactory0600] - binding to port 0.0.0.0/0,0.0.0:0:2181
  823-63-26 23:25:24,218 [mytd:] - INFO [main:o.a.z.s.w.WatchManagerFactory@42] - Using org.apache.zookeeper.server.watch.WatchManager as
 watth manager

2023-03-26 23:25:24,218 [mytd:] - INFO

2023-03-26 23:25:24,221 [mytd:] - INFO

1023-03-26 23:25:24,271 [mytd:] - INFO

1023-03-26 23:25:24,287 [mytd:] - INFO

erstan-2/snapshot.0
  watch manager
                                                                                                                            [naln:o.a.z.s.ZKDatabase@132] - zookeeper.snapshotSizeFactor = 0.33
[nain:o.a.z.s.ZKDatabase@152] - zookeeper.commtLogCount=500
[nain:o.a.z.s.p.SnapStream@01] - zookeeper.snapshot.compression.method = CHECKED
[nain:o.a.z.s.p.FileTxnSnapLog@479] - Snapshotting: 0x0 to /opt/apache-zookeeper-3.0.0-bin/data/v
 ersion-z/snapsnot.0
2023-03-20 23:25:24,302 [myid:] - INFO [main:o.a.z.s.ZKDatabaseg209] - Snapshot loaded in 80 ms, highest zxid is 0x0, digest is 13719655
  923-03-26 23:25:24,307 [myid:] - INFO [main:o.a.z.s.p.FileTxnSnapLog@479] - Snapshotting: 0x0 to /opt/apache-zookeeper-3.8.0-bin/data/
 restan-2/snapshot.0

2023-03-26 23:25:24,300 [myld:] - INFO [main:o.a.z.s./conkeeperServerg547] - Snapshot taken in 3 ms
2023-03-26 23:25:24,300 [myld:] - INFO [main:o.a.z.s./conkeeperServerg547] - Snapshot taken in 3 ms
2023-03-26 23:25:24,300 [myld:] - INFO [main:o.a.z.s.RequestThrottlerg75] - zookeeper.request throttler.shutdownTimeout = 10000 ms
2023-03-26 23:25:24,371 [myld:] - INFO [ProcessThread(sid:0 cport:2101)::o.a.z.s.PrepRequestProcessor(9100] - PrepRequestProcessor (sid:0)
2023-03-26 23:25:24,477 [myld:] - INFO [main:o.a.z.s.ContainerManager@84] - Using checkIntervalMs=60000 maxPerMinute=10000 maxNeverUsedIntervalMs=0.0000 maxPerMinute=10000 maxNeverUsedIntervalMs=0.0000 maxPerMinute=10000 maxNeverUsedIntervalMs=0.0000 maxPerMinute=10000 maxNeverUsedIntervalMs=0.0000 maxNeverUsedIntervalMs=0.0000 maxPerMinute=10000 maxNeverUsedIntervalMs=0.0000 maxNev
 ntervalna=0
2023-03-26 23:25:24,479 [myld:] - INFO
2023-03-26 23:27:47,280 [myld:] - INFO
2023-03-26 23:46:32,499 [myld:] - INFO
                                                                                                                           [main:o.a.z.a.ZKAuditProvider@42] - ZocKeeper audit is disabled.
[SyncThread:0:o.a.z.s.p.FileTxnLog@285] - Creating new log file: log.1
[SessionTracker:o.a.z.s.ZocKeeperServer@632] - Expiring session 0x1000032010c0002, timeout of 300
                                                                                                                                                                                           [zk: localhost:2181(CONNECTED) 3] get -s - ctime = Sun Mar 26 23:33:27 IST 26 w/fpes2ug20cs045/candidate86080000000 null nZsid = 0x6
  zk: localhost:2181(CONNECTED) 2] create /pes2ug28cs845
 Node already exists: /pes2ug20cs045
[zk: localhost:2181(CONNECTED) 3] create -e /pes2ug20cs045/
                                                                                                                                                                                                                                                                                                                                   mZxid = 0x6
mtlme = Sun Mar 26 23:33:27 IST 28
 23
pZxid = 0x6
                                                                                                                                                                                                                                                                                                                                   cversion = 0
dataVersion = 0
aclVersion = 8
```