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### 1(a)- Successful installation of etcd

```
nagavenigowda@ubuntu-1:~$ /tmp/etcd-download-test/etcd --version
etcd Version: 3.5.12
Git SHA: e7b3bb6cc
Go Version: go1.20.13
Go OS/Arch: linux/amd64
nagavenigowda@ubuntu-1:~$ /tmp/etcd-download-test/etcdctl version
etcdctl version: 3.5.12
API version: 3.5
nagavenigowda@ubuntu-1:~$ /tmp/etcd-download-test/etcdctl version
etcdctl version: 3.5.12
API version: 3.5
nagavenigowda@ubuntu-1:~$
```

### 2(a)- Etcd logs after starting

```
nagavenigowda@ubuntu-1:~$ cd /tmp
nagavenigowda@ubuntu-1:/tmp$ etcd-download-test/etcd
{"level":"warn","ts":"2024-04-11T13:32:42.610695+0530","caller":"embed/config.go:679","msg":"Running http and grpc server on single port. This is not recommended for production."}
{"level":"info","ts":"2024-04-11T13:32:42.612602+0530","caller":"etcdmain/etcd.go:73","msg":"Running: ","args":["etcd-downlad-test/etcd"]}
{"level":"warn","ts":"2024-04-11T13:32:42.612648+0530","caller":"etcdmain/etcd.go:105","msg":"'data-dir' was empty; using default","data-dir":"default.etcd"}
{"level":"warn","ts":"2024-04-11T13:32:42.612714+0530","caller":"embed/config.go:679","msg":"Running http and grpc server on single port. This is not recommended for production."}
{"level":"info","ts":"2024-04-11T13:32:42.612766+0530","caller":"embed/etcd.go:127","msg":"configuring peer listeners","listen-peer-urls":["http://localhost:2380"]}
 {"level":"info","ts":"2024-04-11T13:32:42.61615+0530","caller":"embed/etcd.go:135","msg":"configuring client listeners","listen-client-urls":["http://localhost:2379"]}
 {"level":"info","ts":"2024-04-11T13:32:42.617632+0530","caller":"embed/etcd.go:308","msg":"starting an etcd server","etcd-version":"3.5.12","git-sha":"e7b3bb6cc","go-version":"go1.20.13","go-os":"linux","go-arch":"amd64","max-cpu-set":3,"max-cpu-available":3,"member-initialized":false,"name":"default","data-dir":"default.etcd","wal-dir":"","wal-dir-dedicated":"","member-dir":"default.etcd/member","force-new-cluster":false,"heartbeat-interval":"100ms","election-timeout":"1s","initial-election-tick-advance":true,"snapshot-count":100000,"max-wals":5,"max-snapshots":5,"snapshot-catchup-entries":5000,"initial-advertise-peer-urls":["http://localhost:2380"],"listen-client-urls":["http://localhost:2379"],"advertise-client-urls":["http://localhost:2379"],"listen-peer-urls":["http://localhost:2380"],"initial-cluster-state":"new","initial-cluster-token":"etcd-cluster","quota-backend-bytes":2147483648,"max-request-bytes":1572864,"max-concurrent-streams":14294967295,"pre-vote":true,"initial-correct-up-check":false,"corrupt-check-time-interval":"0s","compact-check-time-enabled":false,"compact-check-time-interval":"1m0s","auto-compaction-mode":"periodic","auto-compaction-retention":"0s","auto-compaction-interval":"0s","discovery-url":"","discovery-proxy":"","downgrade-check-interval":"5s"}
 {"level":"info","ts":"2024-04-11T13:32:42.622787+0530","caller":"etcdserver/backend.go:81","msg":"opened backend db","path":"default.etcd/member/snap/db","took":4.088796ms}
 {"level":"info","ts":"2024-04-11T13:32:42.641785+0530","caller":"etcdserver/raft.go:495","msg":"starting local member","local-member-id":"8e9e05c52164694d","cluster-id":"cdf818194e3a8c32"}
 {"level":"info","ts":"2024-04-11T13:32:42.642344+0530","logger":"raft","caller":"etcdserver/zap_raft.go:77","msg":"8e9e05c52164694d switched to configuration voters=(*)"}
 {"level":"info","ts":"2024-04-11T13:32:42.643022+0530","logger":"raft","caller":"etcdserver/zap_raft.go:77","msg":"8e9e05c52164694d became follower at term 0"}
 {"level":"info","ts":"2024-04-11T13:32:42.643094+0530","logger":"raft","caller":"etcdserver/zap_raft.go:77","msg":newRaft 8e9e05c52164694d [peers: [], term: 0, commit: 0, applied: 0, lastindex: 0, lastterm: 0]}
 {"level":"info","ts":"2024-04-11T13:32:42.643124+0530","logger":"raft","caller":"etcdserver/zap_raft.go:77","msg":8e9e05c52164694d became follower at term 1}
 {"level":"info","ts":"2024-04-11T13:32:42.643279+0530","logger":"raft","caller":"etcdserver/zap_raft.go:77","msg":8e9e05c52164694d switched to configuration voters=(10276657743932975437)}
 {"level":"warn","ts":"2024-04-11T13:32:42.676257+0530","caller":"auth/store.go:1241","msg":"simple token is not cryptographically signed"}
 {"level":"info","ts":"2024-04-11T13:32:42.688189+0530","caller":"mvcc/kvstore.go:407","msg":"kvstore restored","current-rev":1}
 {"level":"info","ts":"2024-04-11T13:32:42.697437+0530","caller":"etcdserver/quota.go:94","msg":"enabled backend quota with default value","quota-name":"v3-applier","quota-size-bytes":2147483648,"quota-size":"2.1 GB"}
 {"level":"info","ts":"2024-04-11T13:32:42.699929+0530","caller":"etcdserver/server.go:860","msg":"starting etcd server","local-member-id":"8e9e05c52164694d","local-server-version":"3.5.12","cluster-version":"to be decided"}
```

## 2(b)- get/put SRN

```
nagavenigowda@ubuntu-1:/tmp$ etcd-download-test/etcdctl --endpoints=localhost:2379 put srn PES2UG21CS315
OK
nagavenigowda@ubuntu-1:/tmp$ etcd-download-test/etcdctl --endpoints=localhost:2379 get srn
SRN
PES2UG21CS315
nagavenigowda@ubuntu-1:/tmp$ etcd-download-test/etcdctl watch srn
PUT
SRN
PES2UG21CS315
DELETE
SRN
```

  

```
nagavenigowda@ubuntu-1: $ cd /tmp
nagavenigowda@ubuntu-1:/tmp$ etcd-download-test/etcdctl --endpoints=localhost:2379 put srn PES2UG21CS315
OK
nagavenigowda@ubuntu-1:/tmp$ etcd-download-test/etcdctl del srn
1
nagavenigowda@ubuntu-1:/tmp$
```

## 3(a)- All three nodes up and running in the cluster

```
nagavenigowda@ubuntu-1: $ sudo /tmp/etcd-download-test/etcd --config-file /tmp/etcd2/etcd2.conf.yml
[sudo] password for nagavenigowda:
{"level":"warn","ts":2024-04-11T13:44:33.886212+0530,"caller":"embed/config.go:679","msg":"Running http and grpc server on single port. This is not recommended for production."}
{"level":"info","ts":2024-04-11T13:44:33.887035+0530,"caller":"etcdmain/config.go:351","msg":"loaded server configuration, other configuration command line flags and environment variables will be ignored if provided", "path":"/tmp/etcd2/etcd2.conf.yml"}
{"level":"info","ts":2024-04-11T13:44:33.887065+0530,"caller":"etcdmain/etcd.go:73","msg":"Running: ", "args":["[ /tmp/etcd-download-test/etcd","--config-file","/tmp/etcd2/etcd2.conf.yml"]]}
{"level":"warn","ts":2024-04-11T13:44:33.887402+0530,"caller":"embed/config.go:679","msg":"Running http and grpc server on single port. This is not recommended for production."}
{"level":"info","ts":2024-04-11T13:44:33.887436+0530,"caller":"embed/etcd.go:127","msg":"configuring peer listeners", "listen-peer-urls":["http://127.0.0.1:2389"]}
{"level":"info","ts":2024-04-11T13:44:33.887807+0530,"caller":"embed/etcd.go:135","msg":"configuring client listeners", "listen-client-urls": [ "http://127.0.0.1:2359", "http://localhost:2359" ]}
{"level":"info","ts":2024-04-11T13:44:33.888521+0530,"caller":"embed/etcd.go:308","msg":"starting an etcd server", "etcd-version": "3.5.12", "git-sha": "e7b3bb0cc", "go-version": "go1.20.13", "go-os": "linux", "go-arch": "amd64", "max-cpu-set": "3", "member-initialize": false, "name": "etcd3", "data-dir": "/etc/etcd3", "wal-dir": "/etc/etcd3/wal", "force-new-cluster": false, "heartbeat-interval": "100ms", "election-timeout": "1s", "initial-election-tick-advance": true, "snapshot-count": "10000", "max-wals": 5, "max-snapshots": 5, "snapshot-catchup-entries": 5000, "initial-advertise-peer-urls": ["http://127.0.0.1:2389"]}]
```

  

```
nagavenigowda@ubuntu-1: $ sudo /tmp/etcd-download-test/etcd --config-file /tmp/etcd3/etcd3.conf.yml
[sudo] password for nagavenigowda:
{"level":"warn","ts":2024-04-11T13:44:54.454633+0530,"caller":"embed/config.go:679","msg":"Running http and grpc server on single port. This is not recommended for production."}
{"level":"info","ts":2024-04-11T13:44:54.455043+0530,"caller":"etcdmain/config.go:351","msg":"loaded server configuration, other configuration command line flags and environment variables will be ignored if provided", "path":"/tmp/etcd3/etcd3.conf.yml"}
{"level":"info","ts":2024-04-11T13:44:54.455108+0530,"caller":"etcdmain/etcd.go:73","msg":"Running: ", "args":["[ /tmp/etcd-download-test/etcd","--config-file","/tmp/etcd3/etcd3.conf.yml"]]}
{"level":"warn","ts":2024-04-11T13:44:54.455134+0530,"caller":"embed/config.go:679","msg":"Running http and grpc server on single port. This is not recommended for production."}
{"level":"info","ts":2024-04-11T13:44:54.455141+0530,"caller":"embed/etcd.go:127","msg":"configuring peer listeners", "listen-peer-urls":["http://127.0.0.1:2389"]}
 {"level":"info","ts":2024-04-11T13:44:54.455309+0530,"caller":"embed/etcd.go:135","msg":"configuring client listeners", "listen-client-urls": [ "http://127.0.0.1:2359", "http://localhost:2359" ]}
 {"level":"info","ts":2024-04-11T13:44:54.455309+0530,"caller":"embed/etcd.go:308","msg":"starting an etcd server", "etcd-version": "3.5.12", "git-sha": "e7b3bb0cc", "go-version": "go1.20.13", "go-os": "linux", "go-arch": "amd64", "max-cpu-set": 3, "member-initialize": false, "name": "etcd3", "data-dir": "/etc/etcd3", "wal-dir": "/etc/etcd3/wal", "force-new-cluster": false, "heartbeat-interval": "100ms", "election-timeout": "1s", "initial-election-tick-advance": true, "snapshot-count": 10000, "max-wals": 5, "max-snapshots": 5, "snapshot-catchup-entries": 5000, "initial-advertise-peer-urls": ["http://127.0.0.1:2389"]}]}
```

## 4(a)- Output of etcdctl endpoint status before leader termination

```
nagavenigowda@ubuntu-1:/tmp$ etcdctl --endpoints=http://127.0.0.2:2359 endpoint status --write-out=table
+-----+-----+-----+-----+-----+-----+-----+-----+
| ENDPOINT | ID | VERSION | DB SIZE | IS LEADER | IS LEARNER | RAFT TERM | RAFT INDEX | RAFT APPLIED INDEX | ERRORS |
+-----+-----+-----+-----+-----+-----+-----+-----+
| http://127.0.0.2:2359 | 366952c5ece74e7c | 3.5.12 | 20 kB | false | false | 2 | 9 | 9 | |
nagavenigowda@ubuntu-1:/tmp$ etcdctl --endpoints=http://127.0.0.2:2369 endpoint status --write-out=table
+-----+-----+-----+-----+-----+-----+-----+-----+
| ENDPOINT | ID | VERSION | DB SIZE | IS LEADER | IS LEARNER | RAFT TERM | RAFT INDEX | RAFT APPLIED INDEX | ERRORS |
+-----+-----+-----+-----+-----+-----+-----+-----+
| http://127.0.0.2:2369 | 80f0dfea5ea0c542 | 3.5.12 | 20 kB | true | false | 2 | 9 | 9 | |
nagavenigowda@ubuntu-1:/tmp$ etcdctl --endpoints=http://127.0.0.2:2389 endpoint status --write-out=table
+-----+-----+-----+-----+-----+-----+-----+-----+
| ENDPOINT | ID | VERSION | DB SIZE | IS LEADER | IS LEARNER | RAFT TERM | RAFT INDEX | RAFT APPLIED INDEX | ERRORS |
+-----+-----+-----+-----+-----+-----+-----+-----+
| http://127.0.0.2:2389 | f42c8c852ecdaa90 | 3.5.12 | 20 kB | false | false | 2 | 9 | 9 | |
nagavenigowda@ubuntu-1:/tmp$
```

#### 4(b)- Output of etcdctl endpoint status after leader termination

```
nagavenigowda@ubuntu-1:/tmp$ etcdctl --endpoints=http://127.0.0.2:2359 endpoint status --write-out=table
+-----+-----+-----+-----+-----+-----+-----+-----+
| ENDPOINT | ID | VERSION | DB SIZE | IS LEADER | IS LEARNER | RAFT TERM | RAFT INDEX | RAFT APPLIED INDEX | ERRORS |
+-----+-----+-----+-----+-----+-----+-----+-----+
| http://127.0.0.2:2359 | 366952c5ece74e7c | 3.5.12 | 20 kB | true | false | 3 | 10 | 10 | |
nagavenigowda@ubuntu-1:/tmp$ etcdctl --endpoints=http://127.0.0.2:2389 endpoint status --write-out=table
+-----+-----+-----+-----+-----+-----+-----+-----+
| ENDPOINT | ID | VERSION | DB SIZE | IS LEADER | IS LEARNER | RAFT TERM | RAFT INDEX | RAFT APPLIED INDEX | ERRORS |
+-----+-----+-----+-----+-----+-----+-----+-----+
| http://127.0.0.2:2389 | f42c8c852ecdaa90 | 3.5.12 | 20 kB | false | false | 3 | 10 | 10 | |
nagavenigowda@ubuntu-1:/tmp$
```

THANK YOU 😊