## PostgreSQL Installation:

### 1. Create Directory:

mkdir postgresql-15
cd postgresql-15

```
mkdir postgresql-15
cd postgresql-15
```

### 2. Download and Extract PostgreSQL Source:

wget https://ftp.postgresql.org/pub/source/v15.6/postgresql-15.6.tar.gz
tar -xzvf postgresql-15.6.tar.gz
cd postgresql-15.6

```
wget https://ftp.postgresql.org/pub/source/v15.6/postgresql-15.6.tar.gz
tar -xzvf postgresql-15.6.tar.gz
cd postgresql-15.6
```

### 3. Add PostgreSQL User:

sudo adduser postgres

```
sudo adduser postgres
```

### 3. Install Dependencies:

sudo apt-get update
sudo apt-get install -y libreadline-dev build-essential zlib1g-dev libxml2 libxml2-dev libxslt-dev libssl-dev libldap2-dev

sudo apt-get install -y libreadline-dev build-essential zlib1g-dev libldap2-dev libxml2 libxml2-dev libxslt-dev libssl-dev uuid-dev libossp-uuid-dev

```
sudo apt-get update
sudo apt-get install -y libreadline-dev build-essential zlib1g-dev libxml2 libxml2-dev
```

### 4. Create Installation Directory:

sudo mkdir -p /usr/lib/pgsql-15.6
sudo chown postgres:postgres /usr/lib/pgsql-15.6

```
sudo mkdir -p /usr/lib/pgsql-15.6
sudo chown postgres:postgres /usr/lib/pgsql-15.6
```

## 5. Configure and Compile PostgreSQL:

./configure --prefix=/usr/lib/pgsql-15.6 --with-ldap --with-libxml --with-libxslt --with-openssl --with-uuid=e2fs

make

sudo make install

```
./configure --prefix=/usr/lib/pgsql-15.6 --with-ldap --with-libxml --with-libxslt -
make
sudo make install
```

## 6. Setup Data Directory:

sudo mkdir -p /data/patroni

sudo chown -R postgres:postgres /data

sudo chmod -R 750 /data/patroni

```
sudo mkdir -p /data/patroni
sudo chown -R postgres:postgres /data
sudo chmod -R 750 /data/patroni
```

## 7. Initialize Database:

sudo su - postgres

/usr/lib/pgsql-15.6/bin/initdb -D /data/patroni

```
sudo su - postgres
/usr/lib/pgsql-15.6/bin/initdb -D /data/patroni
```

## 8. Start PostgreSQL:

/usr/lib/pgsql-15.6/bin/pg_ctl -D /data/patroni start -l log_file

```
/usr/lib/pgsql-15.6/bin/pg_ctl -D /data/patroni start -l log_file
```

## 9. vi .bash_profile

export PATH=/usr/lib/pgsql-15.6/bin:$PATH

export PGDATA=/data/patroni

export PGPORT=4702

export PGDATABASE=postgres

export PGHOST=/tmp

```
export PATH=/usr/lib/pgsql-15.6/bin:$PATH
export PGDATA=/data/patroni
export PGPORT=4702
export PGDATABASE=postgres
export PGHOST=/tmp
```

## etcd Installation:

## 1. Add Hosts

vi /etc/hosts

```
vi /etc/hosts

10.10.66.42 patroni1
10.10.66.69 patroni2
10.10.66.132 patroni3
```

## 2. Install etcd:

sudo apt -y install etcd
sudo systemctl stop etcd
sudo rm -rf /var/lib/etcd/default
sudo mv /etc/default/etcd /etc/default/etcd-orig

```
sudo apt -y install etcd
sudo systemctl stop etcd
sudo rm -rf /var/lib/etcd/default
sudo mv /etc/default/etcd /etc/default/etcd-orig
```

## 3. Configure etcd:

vi /etc/default/etcd

```
sudo vi /etc/default/etcd
```

**Add the following configuration:**

ETCD_NAME="aemlhesdbn3dcvm3"
ETCD_DATA_DIR="/var/lib/etcd/aemlhesdbn3dcvm3"
ETCD_LISTEN_PEER_URLS="http://10.11.3.23:2380"
ETCD_LISTEN_CLIENT_URLS="http://10.11.3.23:2379"
ETCD_INITIAL_ADVERTISE_PEER_URLS="http://10.11.3.23:2380"
ETCD_INITIAL_CLUSTER="aemlhesdbn1dcvm1=http://10.11.3.21:2380,aemlhesdbn2
dcvm2=http://10.11.3.22:2380,aemlhesdbn3dcvm3=http://10.11.3.23:2380"
ETCD_INITIAL_CLUSTER_STATE="new"
ETCD_INITIAL_CLUSTER_TOKEN="etcd-cluster"
ETCD_ADVERTISE_CLIENT_URLS="http://10.11.3.23:2379"
ETCD_ENABLE_V2="true"

```
ETCD_NAME="aemlhesdbn3dcvm3"
ETCD_DATA_DIR="/var/lib/etcd/aemlhesdbn3dcvm3"
ETCD_LISTEN_PEER_URLS="http://10.11.3.23:2380"
ETCD_LISTEN_CLIENT_URLS="http://10.11.3.23:2379"
ETCD_INITIAL_ADVERTISE_PEER_URLS="http://10.11.3.23:2380"
ETCD_INITIAL_CLUSTER="aemlhesdbn1dcvm1=http://10.11.3.21:2380,aemlhesdbn2dcvm2=http://
ETCD_INITIAL_CLUSTER_STATE="new"
ETCD_INITIAL_CLUSTER_TOKEN="etcd-cluster"
ETCD_ADVERTISE_CLIENT_URLS="http://10.11.3.23:2379"
ETCD_ENABLE_V2="true"
```

4. Start etcd:

sudo systemctl start etcd
sudo systemctl enable etcd
sudo systemctl status etcd

```
sudo systemctl start etcd
sudo systemctl enable etcd
sudo systemctl status etcd
```

## Patroni Installation

1. Install Dependencies:

sudo apt -y install python3 python3-pip python3-dev libpq-dev
sudo pip3 install --upgrade setuptools psycopg2
sudo apt -y install python3-etcd patroni

```
sudo apt -y install python3 python3-pip python3-dev libpq-dev
sudo pip3 install --upgrade setuptools psycopg2
sudo apt -y install python3-etcd patroni
```

2. Configure Patroni:

vi/etc/patroni/config.yml

```
sudo nano /etc/patroni/config.yml
```

**Example configuration for config.yml:**

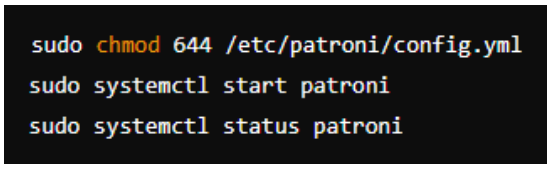
```
scope: pg_cluster
namespace: /service/
name: aemlhesdbn3dcvm3

restapi:
    listen: 10.11.3.23:8008
    connect_address: 10.11.3.23:8008

etcd:
    hosts: 10.11.3.21:2379,10.11.3.22:2379,10.11.3.23:2379
```

```
bootstrap:
  dcs:
    ttl: 30
    loop_wait: 10
    retry_timeout: 10
    maximum_lag_on_failover: 1048576
    synchronous_mode: false
    postgresql:
      use_pg_rewind: true
      use_slots: true
      parameters:

  initdb:
  - encoding: UTF8
  - data-checksums

  pg_hba:
  - host replication replicator 127.0.0.1/24 trust
  - host replication replicator 10.11.3.21/24 trust
  - host replication replicator 10.11.3.22/24 trust
  - host replication replicator 10.11.3.23/24 trust
  - host all all 0.0.0.0/0 trust

  users:
    admin:
      password: admin
      options:
        - createrole
        - createdb

postgresql:
  listen: 10.11.3.23:4702
  connect_address: 10.11.3.23:4702
  data_dir: /data/patroni
  bin_dir: /usr/lib/pgsql-15.6/bin/
  pgpass: /tmp/pgpass
  authentication:
    replication:
      username: replicator
      password: replicator
    superuser:
      username: postgres
      password: India@123456
```

```
tags:
    nofailover: false
    noloadbalance: false
  clonefrom: false
    nosync: false
```

3. Set Permissions and Start Patroni:

```
sudo chmod 644 /etc/patroni/config.yml
sudo systemctl start patroni
sudo systemctl status patroni
```




## PostgreSQL and Patroni Configuration on Master Node

1. PostgreSQL Configuration:

```
vi /data/patroni/postgresql.conf
```

Add the following settings: include 'postgresql.base.conf'

```
cluster_name = 'pg_cluster_1'
hot_standby = 'on'
listen_addresses = '10.10.195.22'
log_autovacuum_min_duration = '0'
log_checkpoints = 'True'
log_connections = 'True'
log_destination = 'stderr'
log_directory = 'pg_log'
log_disconnections = 'True'
log_error_verbosity = 'default'
log_filename = 'postgresql-%F_%a_%H.log'
log_hostname = 'False'
log_line_prefix = '%t [%p]: [%l-1] db=%d,user=%u'
log_lock_waits = 'True'
log_min_duration_statement = '1s'
log_min_error_statement = 'error'
log_min_messages = 'warning'
log_rotation_age = '60'
log_rotation_size = '1GB'
log_temp_files = '0'
log_truncate_on_rotation = 'True'
logging_collector = 'True'
max_connections = '1000'
max_locks_per_transaction = '64'
```

```
max_prepared_transactions = '0'
max_replication_slots = '10'
max_wal_senders = '10'
max_worker_processes = '8'
port = '4702'
track_commit_timestamp = 'off'
wal_keep_size = '10GB'
wal_level = 'replica'
wal_log_hints = 'on'
hba_file = '/data/patroni/pg_hba.conf'
ident_file = '/data/patroni/pg_ident.conf'
```

```
include 'postgresql.base.conf'
cluster_name = 'pg_cluster_1'
hot_standby = 'on'
listen_addresses = '10.10.195.22'
log_autovacuum_min_duration = '0'
log_checkpoints = 'True'
log_connections = 'True'
log_destination = 'stderr'
log_directory = 'pg_log'
log_disconnections = 'True'
log_error_verbosity = 'default'
log_filename = 'postgresql-%F_%a_%H.log'
log_hostname = 'False'
log_line_prefix = '%t [%p]: [%l-1] db=%d,user=%u'
log_lock_waits = 'True'
log_min_duration_statement = '1s'
log_min_error_statement = 'error'
log_min_messages = 'warning'
log_rotation_age = '60'
log_rotation_size = '1GB'
log_temp_files = '0'
log_truncate_on_rotation = 'True'
logging_collector = 'True'
max_connections = '1000'
max_locks_per_transaction = '64'
max_prepared_transactions = '0'
max_replication_slots = '10'
max_wal_senders = '10'
max_worker_processes = '8'
port = '4702'
track_commit_timestamp = 'off'
wal_keep_size = '10GB'
wal_level = 'replica'
wal_log_hints = 'on'
hba_file = '/data/patroni/pg_hba.conf'
ident_file = '/data/patroni/pg_ident.conf'
```

## 2. pg_hba.conf Configuration:

vi /data/patroni/pg_hba.conf

```
vi /data/patroni/pg_hba.conf
```

Add the following settings:

```
# TYPE  DATABASE        USER            ADDRESS                 METHOD
local   all             all                                     trust
host    all             all             127.0.0.1/32            trust
host    all             all             ::1/128                 trust
local   replication     all                                     trust
host    replication     all             127.0.0.1/32            trust
```

```
host    replication     all             ::1/128                 trust
host    replication     all             10.10.195.22/32         trust
host    replication     all             10.10.195.23/32         trust
host    replication     all             10.10.195.24/32         trust
```

```
# TYPE  DATABASE        USER            ADDRESS                 METHOD
local   all             all                                     trust
host    all             all             127.0.0.1/32            trust
host    all             all             ::1/128                 trust
local   replication     all                                     trust
host    replication     all             127.0.0.1/32            trust
host    replication     all             ::1/128                 trust
host    replication     all             10.10.195.22/32         trust
host    replication     all             10.10.195.23/32         trust
host    replication     all             10.10.195.24/32         trust
```

## Cloning the Extensions

### 1. Clone pg_partman and pg_cron Repositories:

```
git clone https://github.com/pgpartman/pg_partman.git
git clone https://github.com/citusdata/pg_cron.git
```

```
git clone https://github.com/pgpartman/pg_partman.git
git clone https://github.com/citusdata/pg_cron.git
```

### 2. Build and Install pg_partman, pg_cron & UUID

```
cd pg_partman
make && sudo make install

cd ../pg_cron
make && sudo make install
```

```
cd pg_partman
make && sudo make install

cd ../pg_cron
make && sudo make install
```

```
cd ../UUID
make && sudo make install
```

```
cd /data/postgresql-15/postgresql-15.7/contrib/uuid-ossp
make && sudo make install
```

```
CREATE EXTENSION "uuid-ossp";
CREATE EXTENSION pg_partman;
CREATE EXTENSION pg_cron;
```

```
CREATE EXTENSION "uuid-ossp";
CREATE EXTENSION pg_partman;
CREATE EXTENSION pg_cron;
```