

PostgreSQL Replication and Tablespaces

Tonight's agenda

- Replication
- Tablespaces

Replication:

The use of redundant resources to improve reliability, fault-tolerance, or performance

- Synchronous
- Asynchronous
- Multi-Master
- Master-Slave

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- Asynchronous
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- Master-Slave

- Log-Shipping standby servers
- Streaming Replication

Transactions

```
UPDATE accounts
  SET balance = balance - 10.00
  WHERE code = 'checking';
```

```
UPDATE accounts
  SET balance = balance + 10.00
  WHERE code = 'savings';
```

Transactions

```
BEGIN WORK;
```

```
UPDATE accounts  
    SET balance = balance - 10.00  
    WHERE code = 'checking';
```

```
UPDATE accounts  
    SET balance = balance + 10.00  
    WHERE code = 'savings';
```

```
COMMIT;
```


Transactions - Perl

```
eval {
    $dbh->begin_work();

    my $sth = $dbh->prepare( q{
        UPDATE accounts
           SET balance = balance + $1
        WHERE code = $2
    } );

    $sth->execute( 10.0, 'checking' );
    $sth->execute( -10.0, 'savings' );

    $dbh->commit();
};
if( $@ ){
    $dbh->rollback();
    warn("Updating accounts failed: $@");
}
```

Our Environment

PostgreSQL version	9.6.3 (released May 11, 2017)
Operating System	Ubuntu 16.04 - 64-bit
Master server	test-db-master 192.168.242.70
Slave server	test-db-slave 192.168.242.71
Database directory	/srv/database/pgsql_9.6

pg_hba.conf

```
host    replication  postgres  192.168.242.71/32  trust    # test-db-slave
```

postgresql.conf

```
listen_addresses      = '*'  
wal_level             = 'hot_standby'  
max_wal_senders      = 5  
wal_keep_segments    = 30  
max_replication_slots = 5
```

Restart database process

```
pg_ctl -D /srv/database/pgsql_9.6 restart
```

Create Replication Slot

```
$ psql mug
```

```
mug=# SELECT pg_create_physical_replication_slot( 'test_db_slave' );
```

Initial copy of the data

```
pg_basebackup -D /srv/database/postgresql_9.6 \
  --progress \
  --host 192.168.242.70 \
  --port 5432 \
  --xlog-method stream \
  --slot test_db_slave \
  --write-recovery-conf
```

recovery.conf

```
standby_mode          = 'on'  
primary_conninfo      = 'user=postgres host=192.168.242.70 port=5432 sslmode=prefer sslcompression=1'  
primary_slot_name     = 'test_db_slave'  
  
trigger_file       = '/tmp/pg_trigger_file'
```


Start the Slave Database

```
pg_ctl -D /srv/database/pgsql_9.6 start
```

Monitor Replication

```
SELECT * from pg_replication_slots;
```

```
SELECT * from pg_stat_replication;
```

Let's take it for a spin!

Examples of database activity

```
CREATE TABLE my_data (  
    id INTEGER,  
    PRIMARY KEY( id )  
);
```

```
INSERT INTO my_data ( id )  
    SELECT * FROM generate_series( 1, 100 );
```

Tablespaces:

Tablespaces in PostgreSQL allow database administrators to define locations in the file system where the files representing database objects can be stored

Tablespace commands

```
CREATE TABLESPACE my_tblspace LOCATION '/srv/slow_disk/data';  
(directory must exist)
```

```
CREATE TABLE foo( i integer ) TABLESPACE my_tblspace;
```

```
ALTER TABLE my_data SET TABLESPACE my_tblspace;
```

```
ALTER INDEX my_data_pkey SET TABLESPACE my_tblspace;
```

```
\db
```

```
DROP TABLESPACE my_tblspace;
```

- Double-check permissions on new tablespace directories
- Tablespaces ARE REPLICATED
- Once created, tablespaces are are just as important as all database files