Simple SQL Change Management with Sqitch

David E. Wheeler

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Whats Wrong with Migrations?

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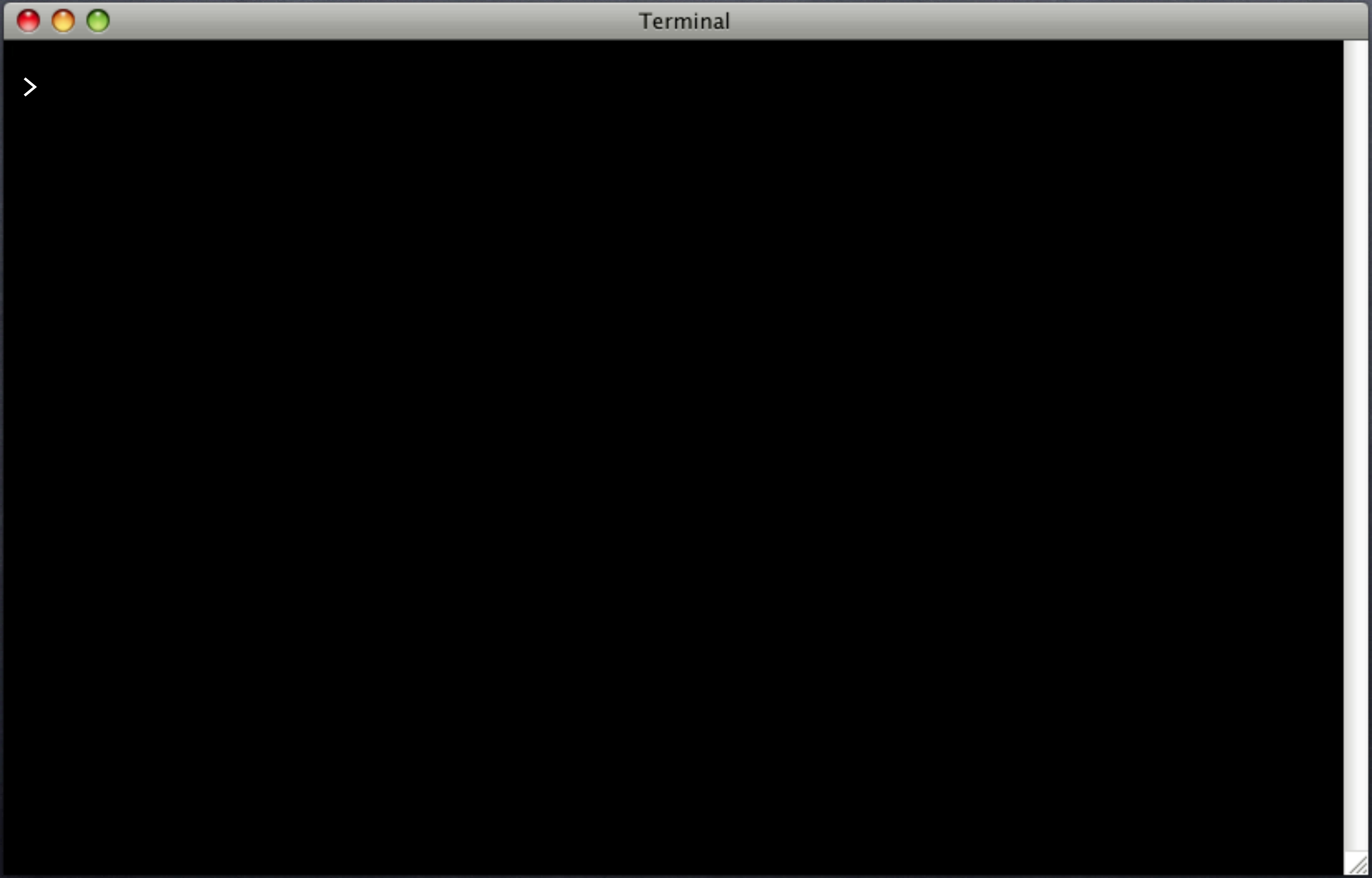
- Numbered scripts hard to track
- No VCS awareness
- Managing procedures is a PITA

Imagine this Change



```
>
```

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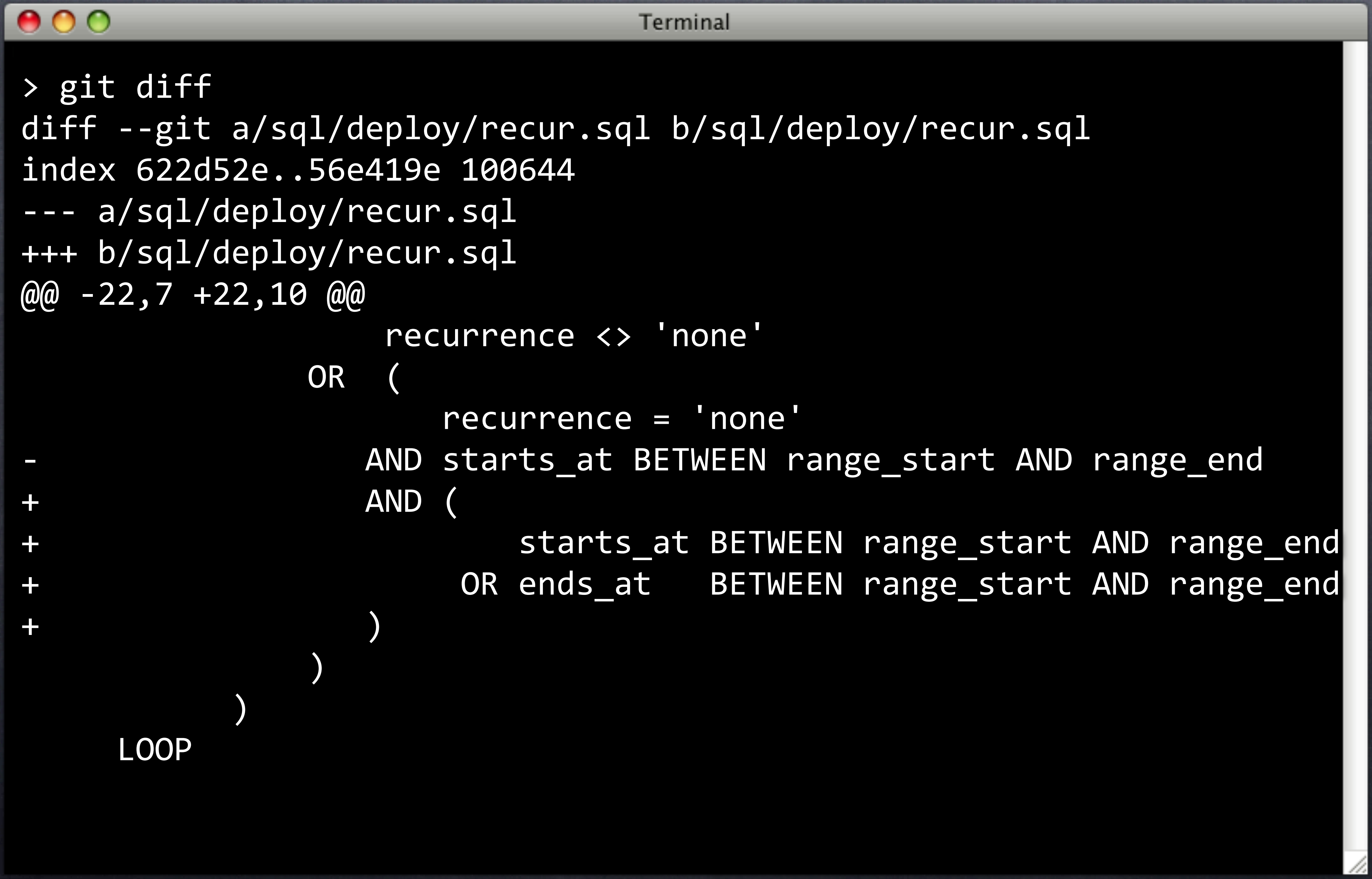

```
> git diff
diff --git a/sql/deploy/recur.sql b/sql/deploy/recur.sql
index 622d52e..56e419e 100644
--- a/sql/deploy/recur.sql
+++ b/sql/deploy/recur.sql
@@ -22,7 +22,10 @@
                   recurrence <> 'none'
               OR  (
                      recurrence = 'none'
-                 AND starts_at BETWEEN range_start AND range_end
+                 AND (
+                         starts_at BETWEEN range_start AND range_end
+                      OR ends_at   BETWEEN range_start AND range_end
+                 )
               )
           )
     LOOP
```

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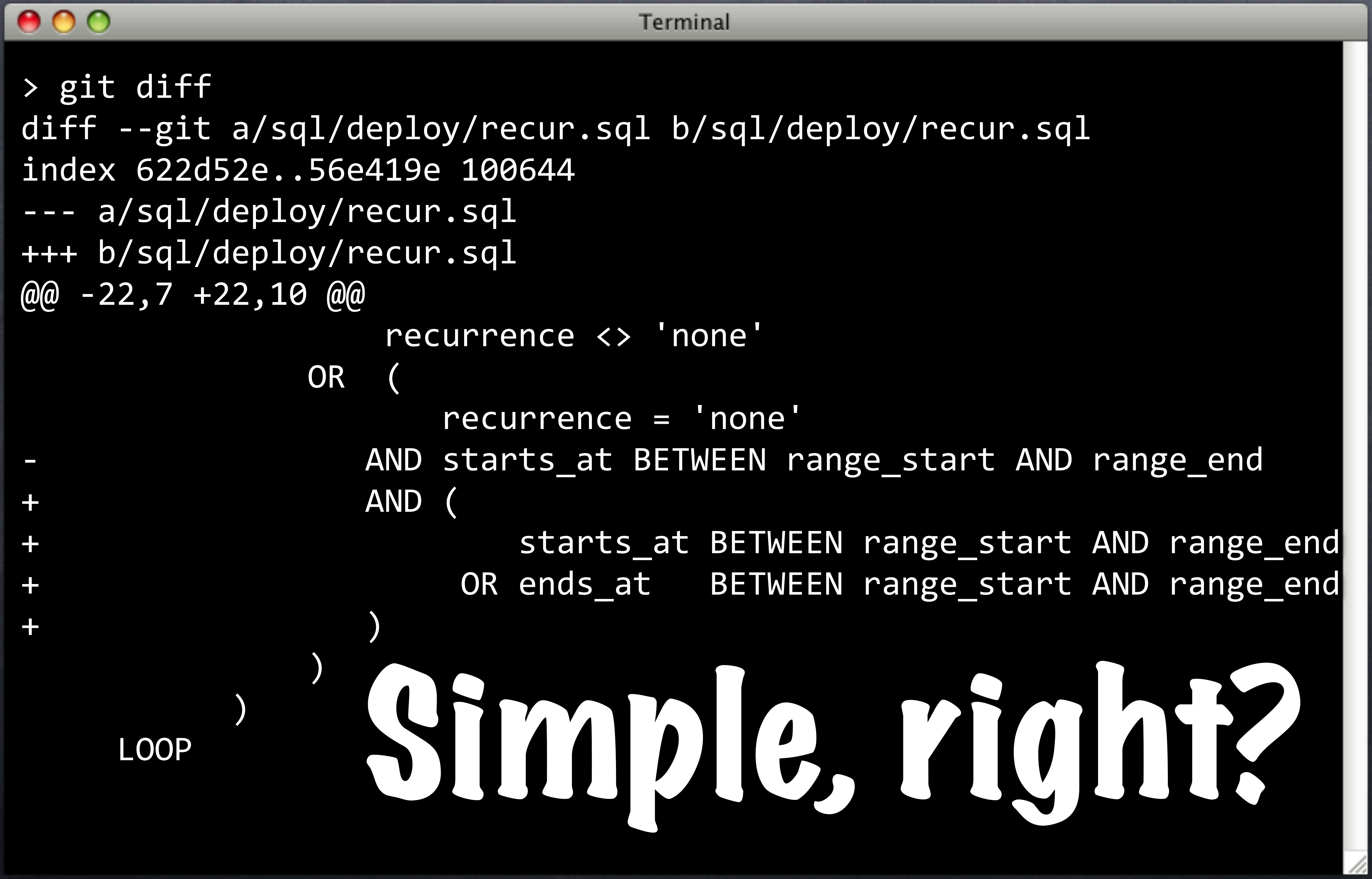

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Simple, right?

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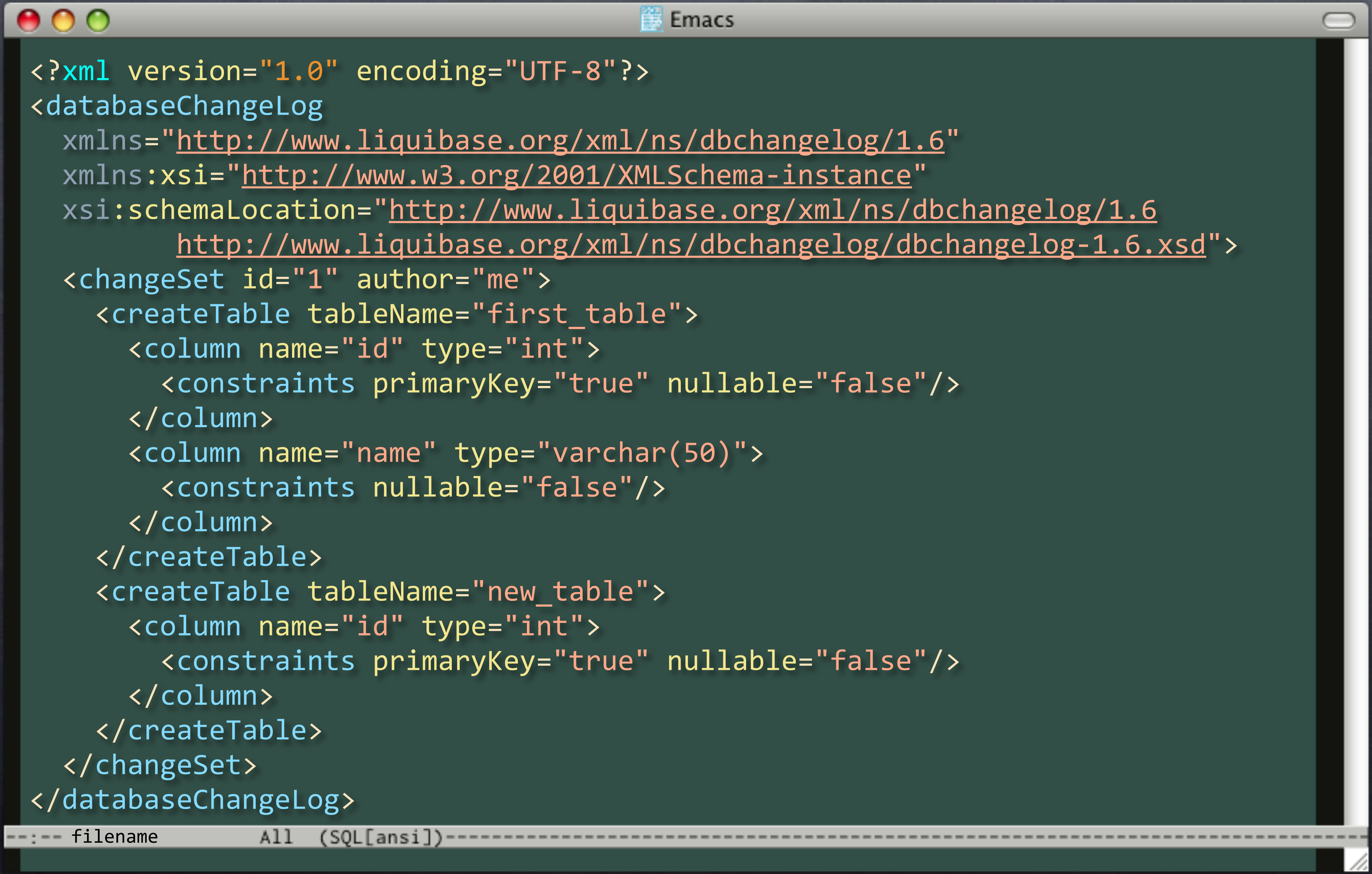
- Edit the new file
- Copy the function to the new “down” script
- Three copies of the function!
- No real source code management
- This sucks

What about Liquibase?

```
--:-- filename         All   (SQL[ansi])-----------------------------------------------------------------------------
```

What about Liquibase?



```xml
<?xml version="1.0" encoding="UTF-8"?>
<databaseChangeLog
  xmlns="http://www.liquibase.org/xml/ns/dbchangelog/1.6"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.liquibase.org/xml/ns/dbchangelog/1.6
         http://www.liquibase.org/xml/ns/dbchangelog/dbchangelog-1.6.xsd">
  <changeSet id="1" author="me">
    <createTable tableName="first_table">
      <column name="id" type="int">
        <constraints primaryKey="true" nullable="false"/>
      </column>
      <column name="name" type="varchar(50)">
        <constraints nullable="false"/>
      </column>
    </createTable>
    <createTable tableName="new_table">
      <column name="id" type="int">
        <constraints primaryKey="true" nullable="false"/>
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  </changeSet>
</databaseChangeLog>
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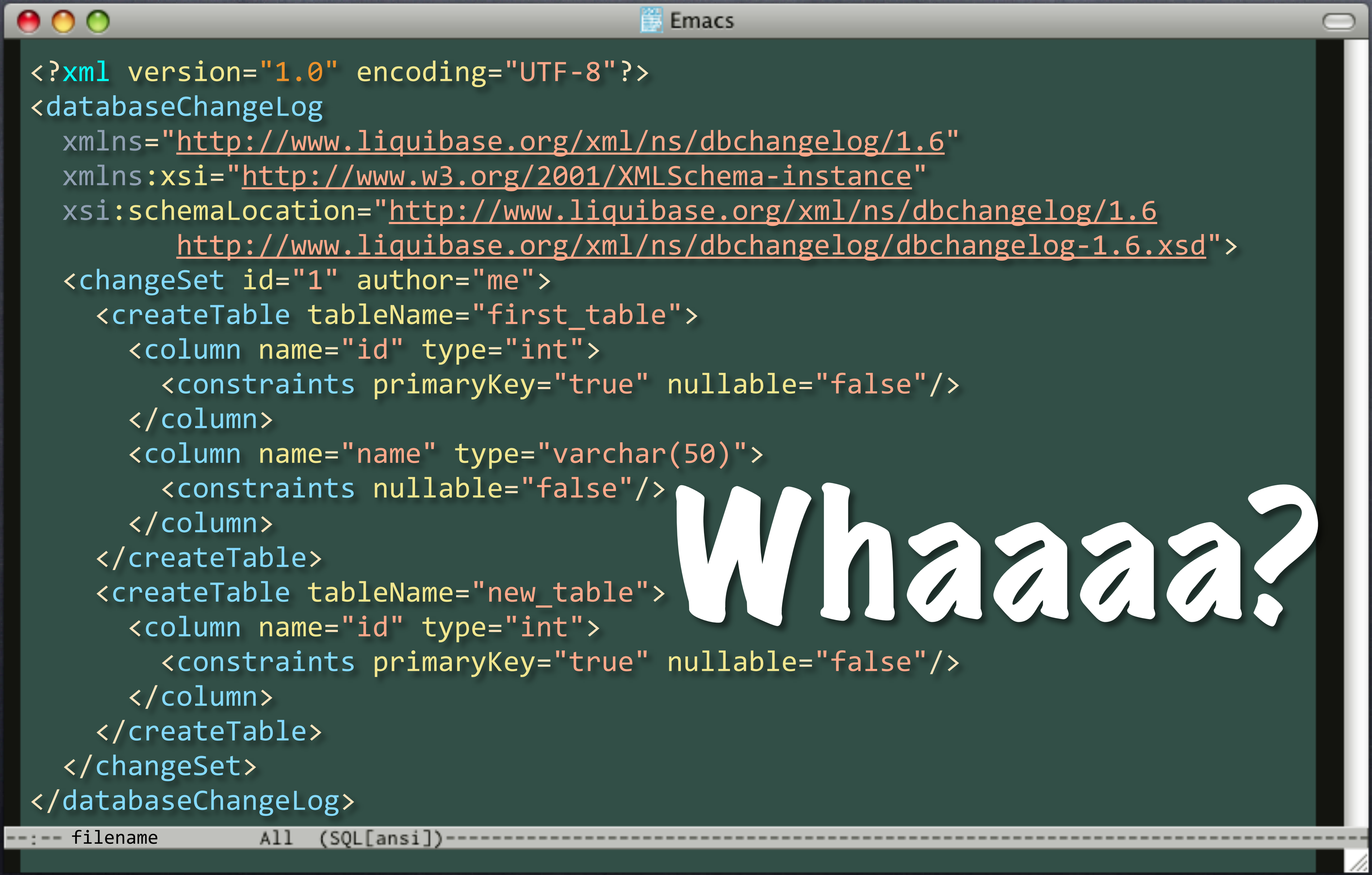

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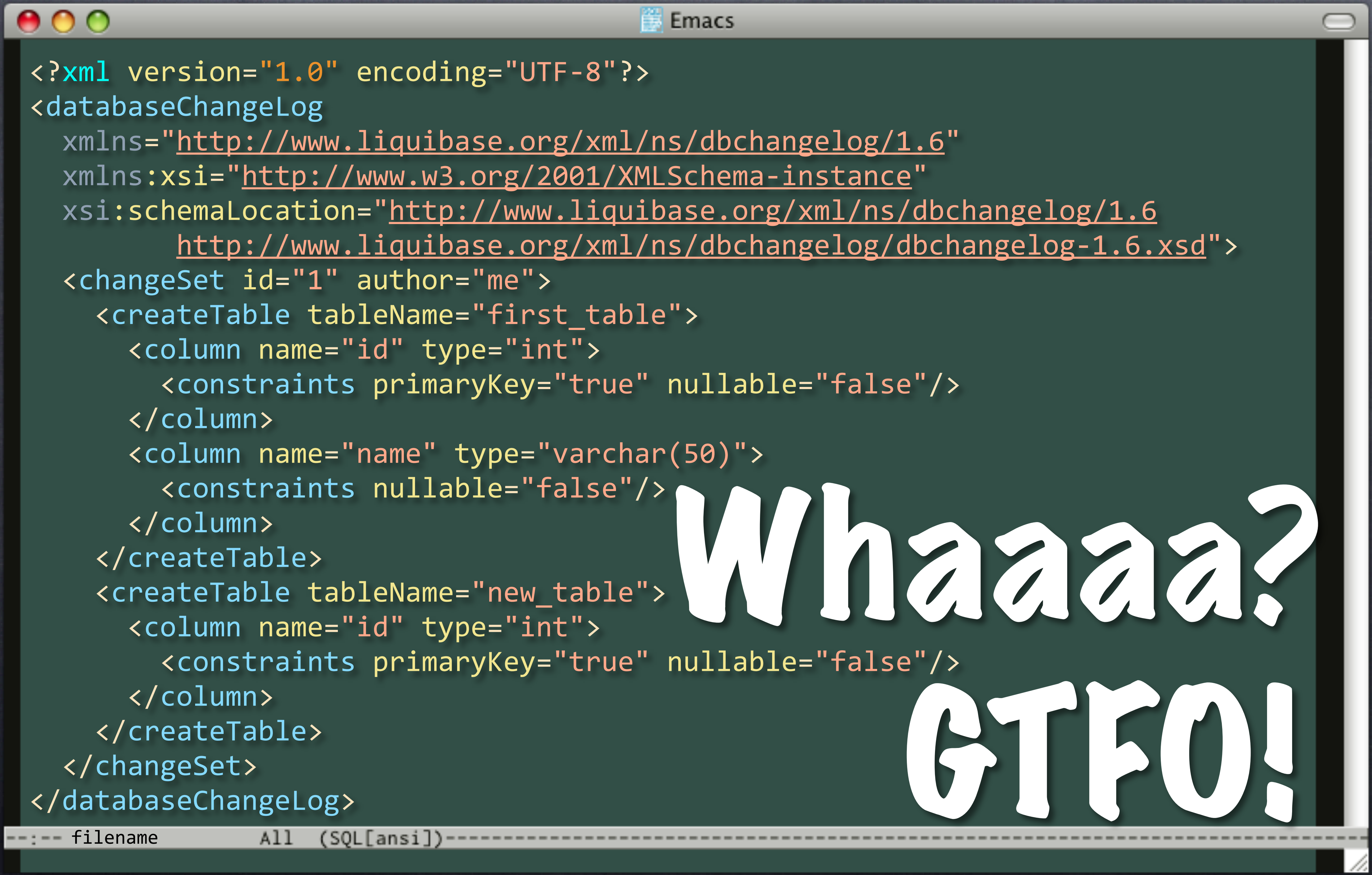

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Whaaaa?

GTFO!

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- Managing procedures still a PITA

Introducing Sqitch

Sq—what?

SQL changes

Sq—what?

SQ ch

Sq—what?

SQitch

Sq—what?

SQitch

There is no “u”

Sqitch Philosophy

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- No opinions

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- Native scripting

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Sqitch Terminology

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- step

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- step
- tag

Sqitch Terminology

- step
- tag
- plan

Sqitch Terminology

- step
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- plan
- deploy

Sqitch Terminology

- step
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- plan
- deploy
- revert

Caveats

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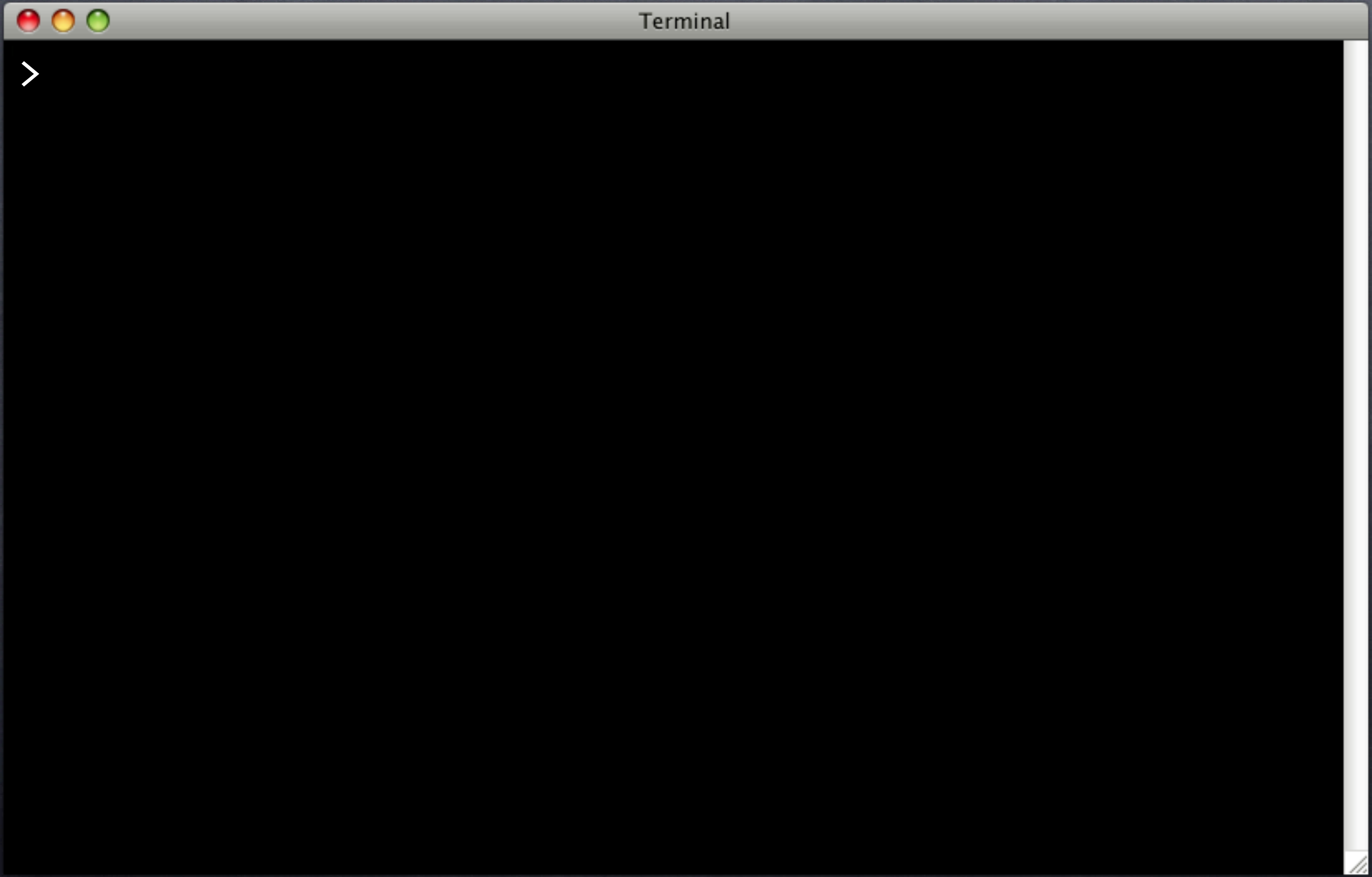
- VCS integration in flux

How it Works



```
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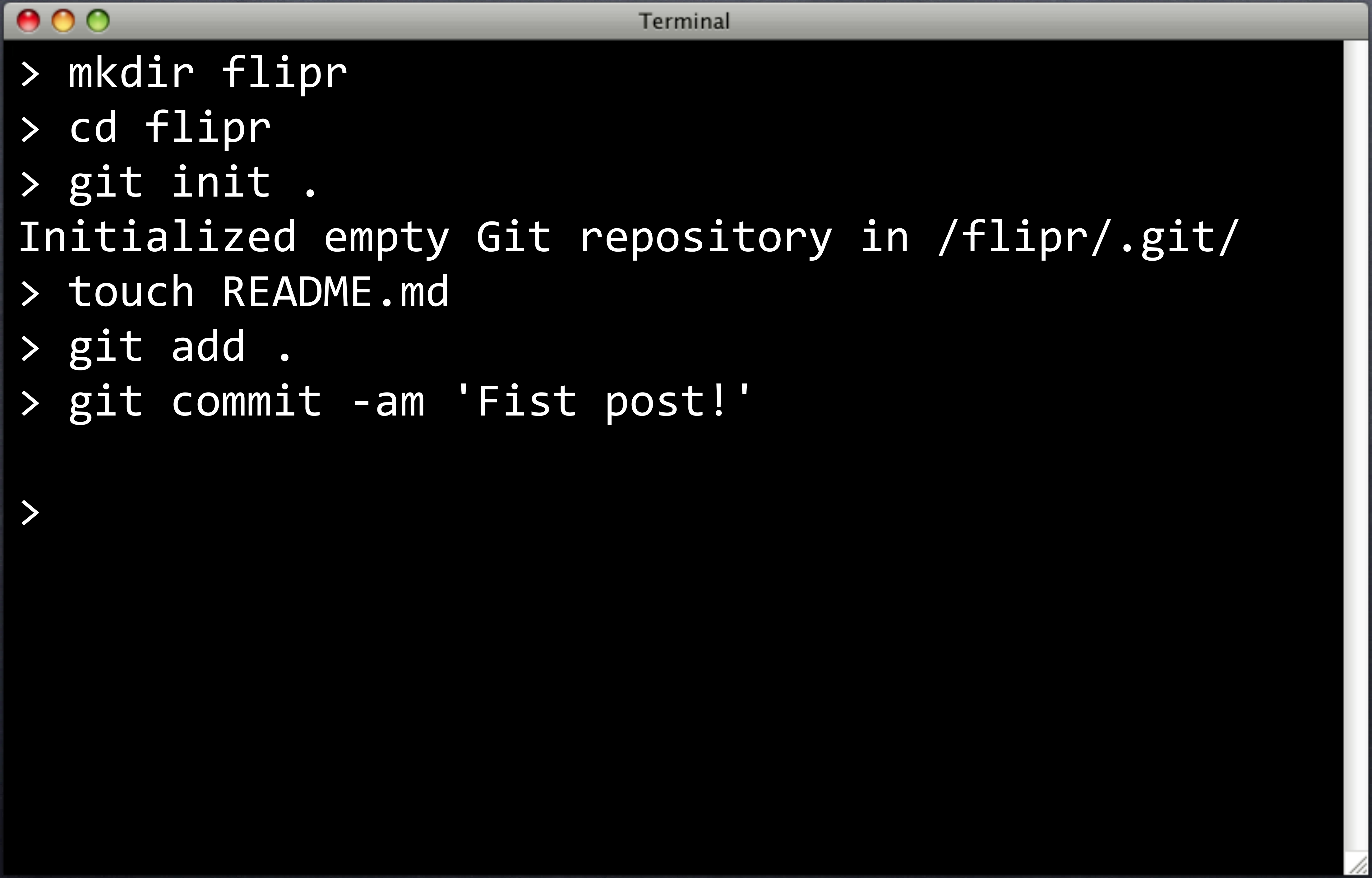

```
> mkdir flipr
> cd flipr
> git init .
Initialized empty Git repository in /flipr/.git/
> touch README.md
> git add .
> git commit -am 'Fist post!'


>
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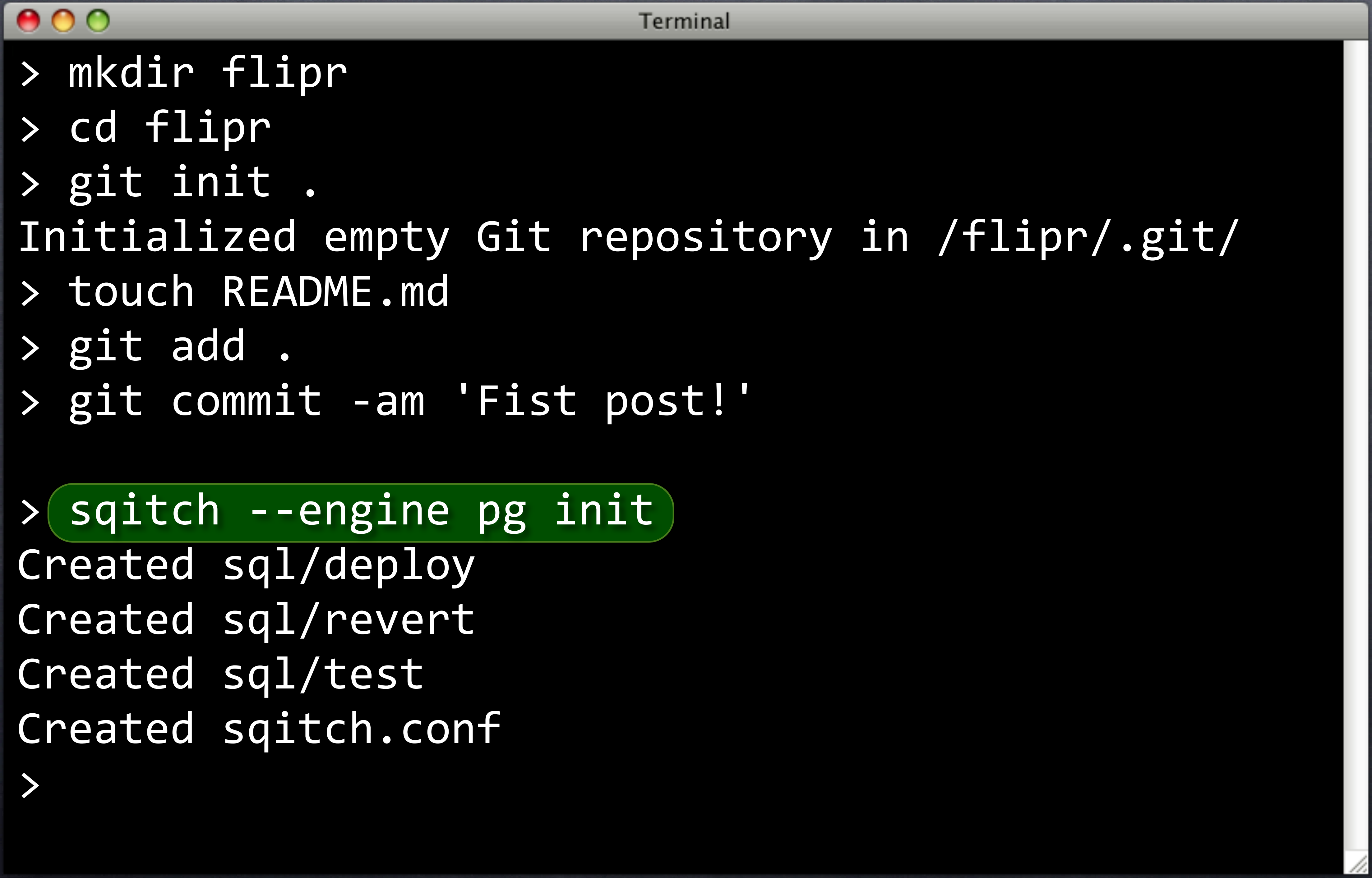

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Created sql/deploy
Created sql/revert
Created sql/test
Created sqitch.conf
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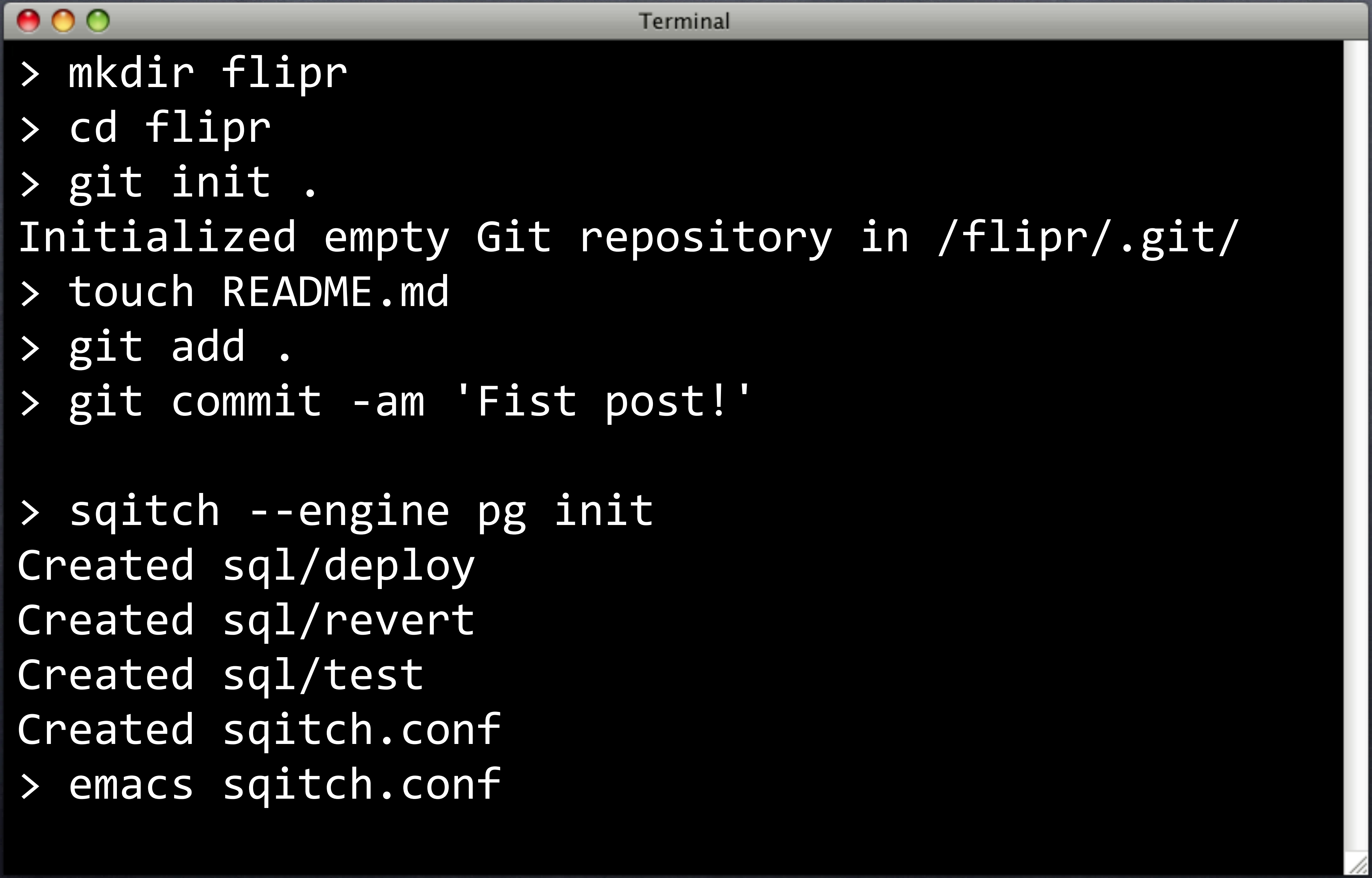

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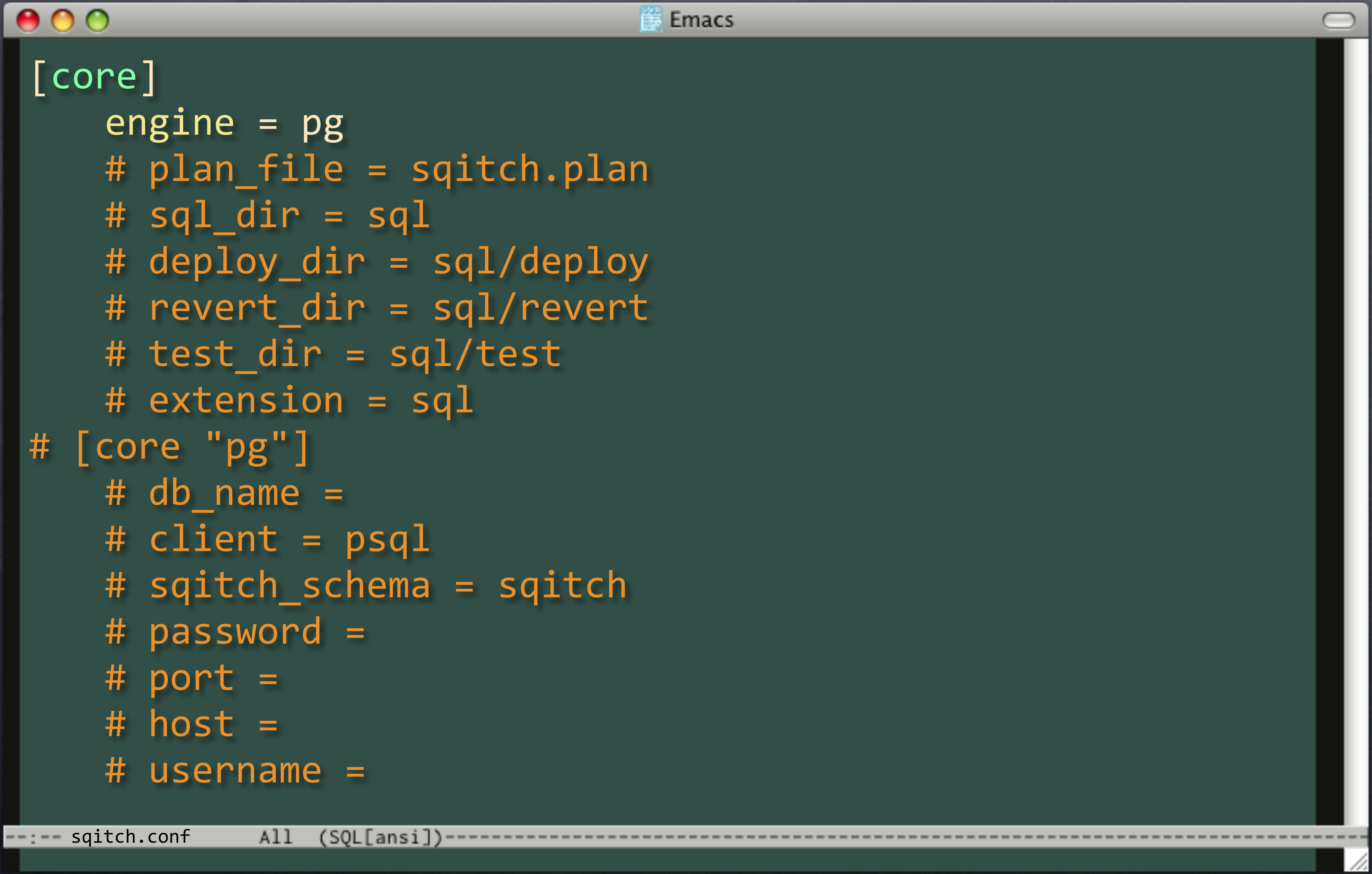
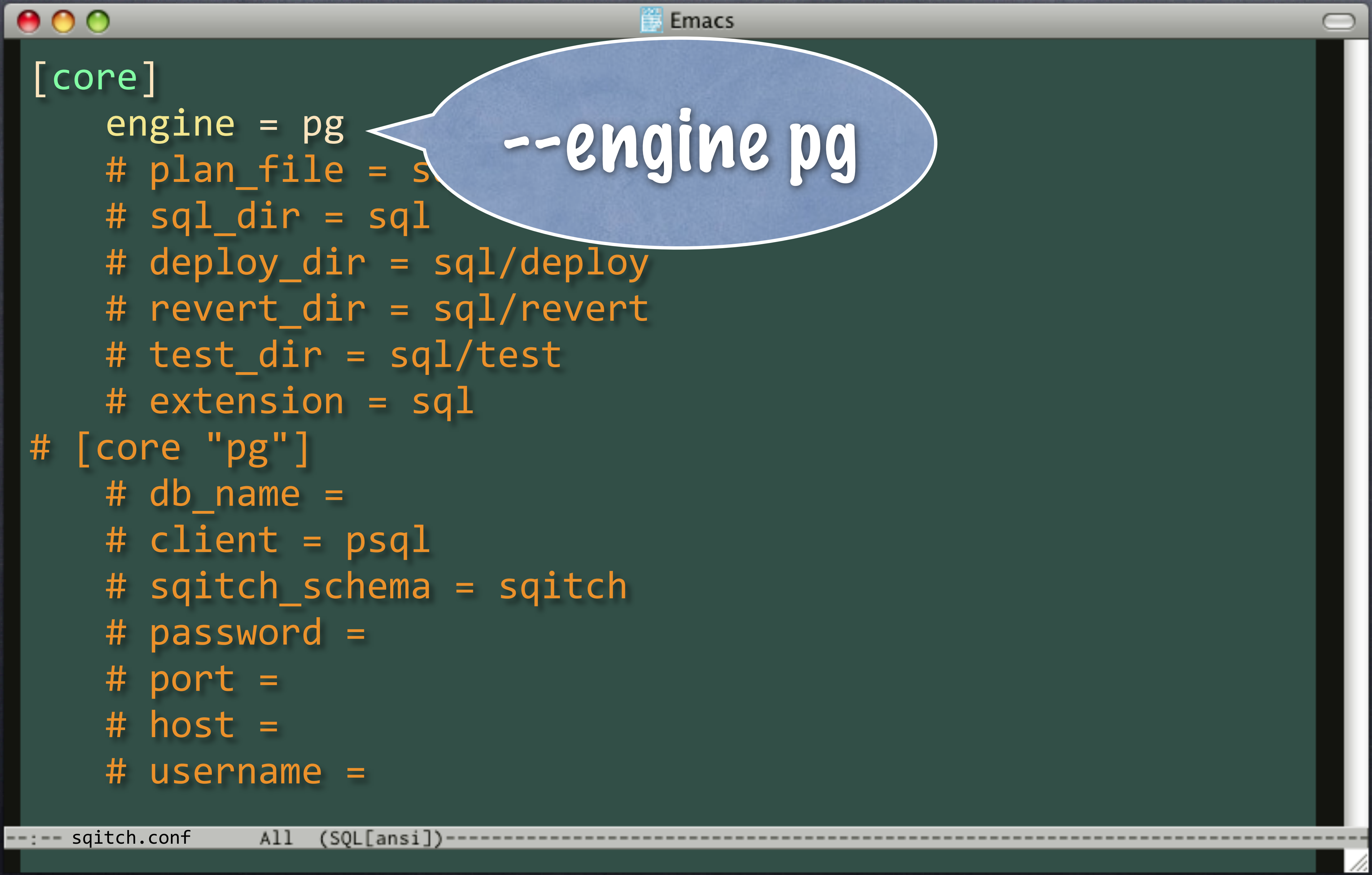
sqitch.conf



```
[core]
    engine = pg
    # plan_file = sqitch.plan
    # sql_dir = sql
    # deploy_dir = sql/deploy
    # revert_dir = sql/revert
    # test_dir = sql/test
    # extension = sql
# [core "pg"]
    # db_name =
    # client = psql
    # sqitch_schema = sqitch
    # password =
    # port =
    # host =
    # username =
```

```
--:--  sqitch.conf      All   (SQL[ansi])--------------------------------------------------------
```

sqitch.conf



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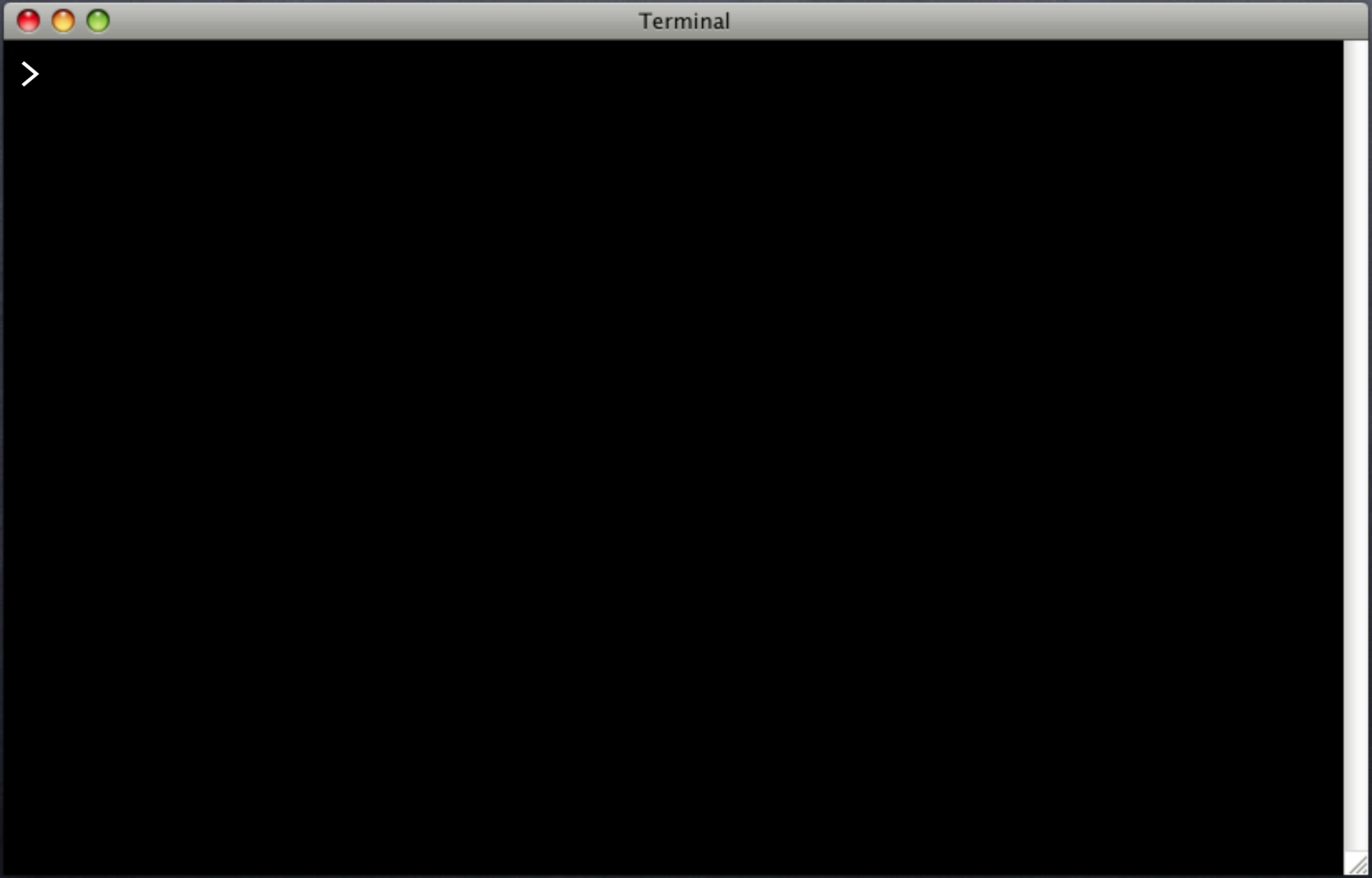
--engine pg

Add User Config



```
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```

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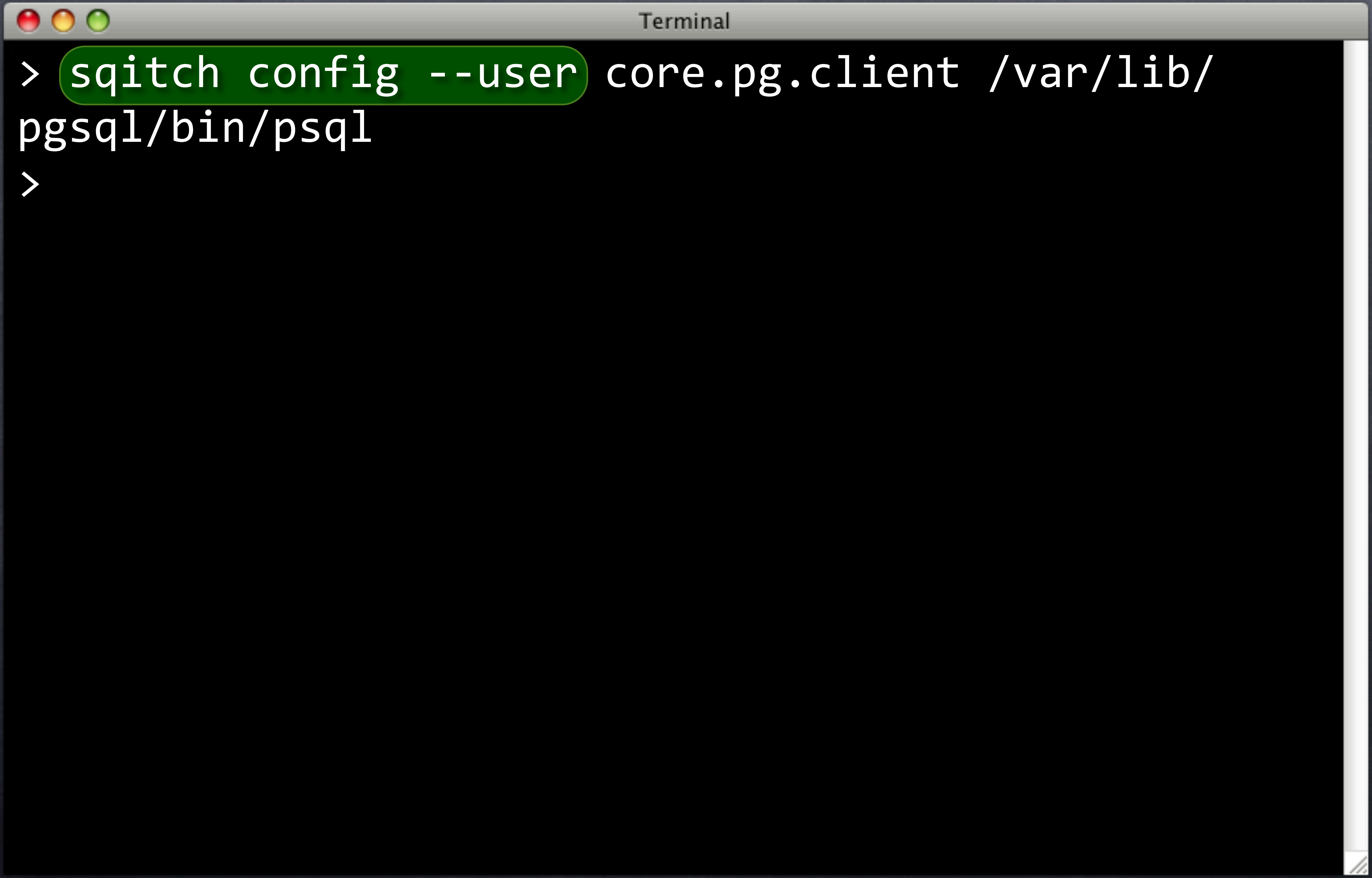

```
> sqitch config --user core.pg.client /var/lib/
pgsql/bin/psql
>
```

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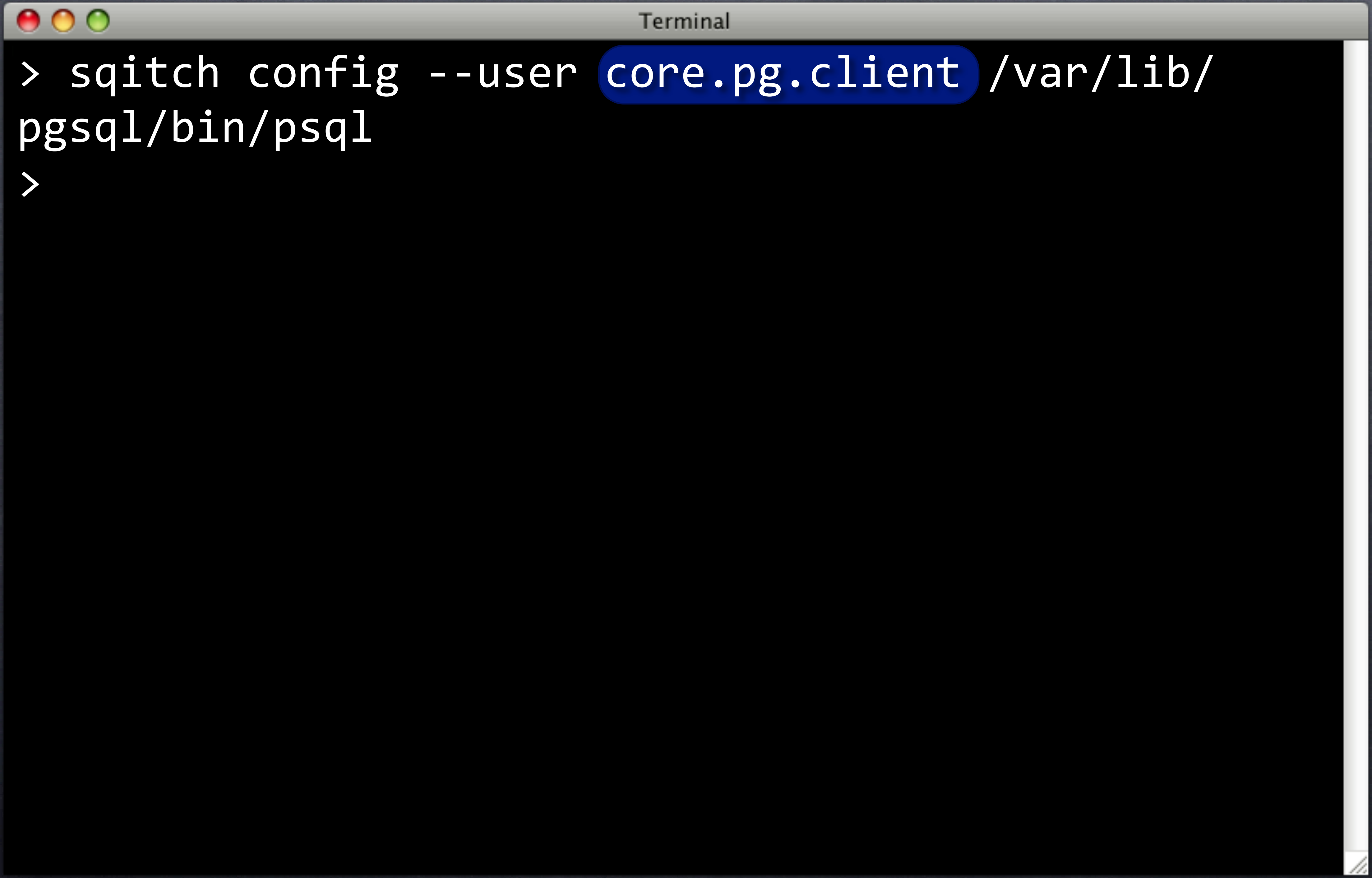

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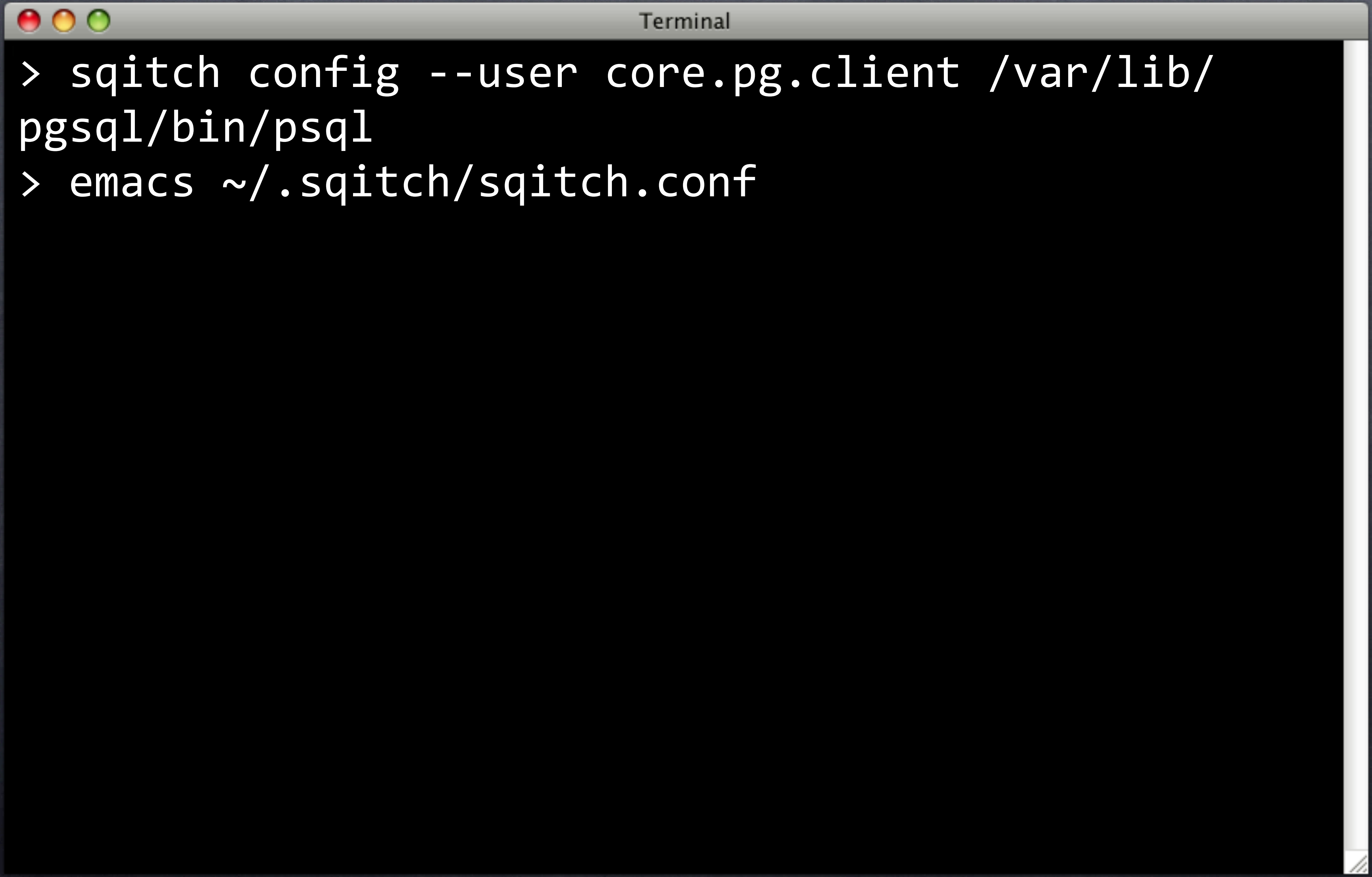

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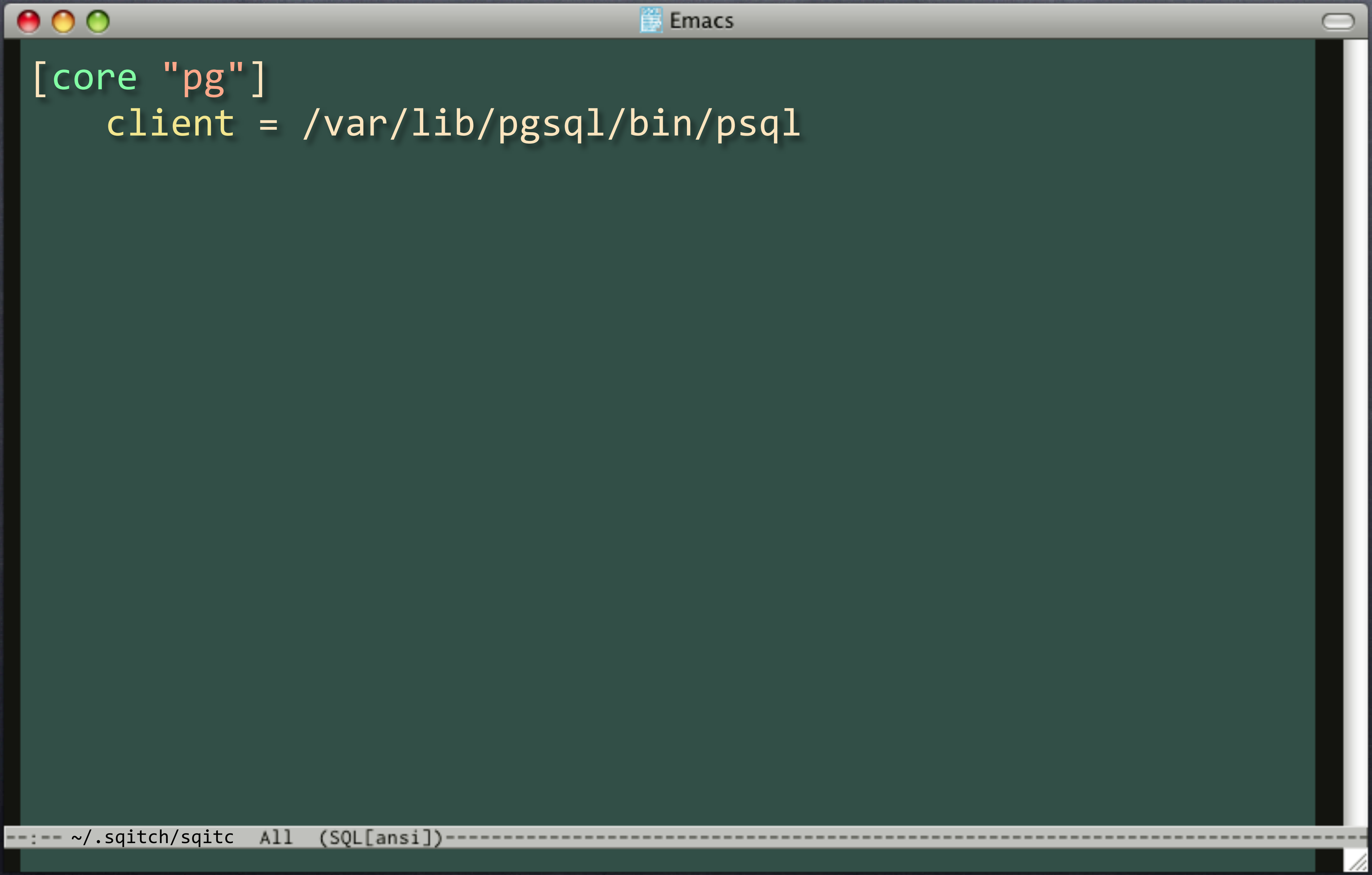
> sqitch config --user core.pg.client /var/lib/
pgsql/bin/psql
> emacs ~/.sqitch/sqitch.conf
```

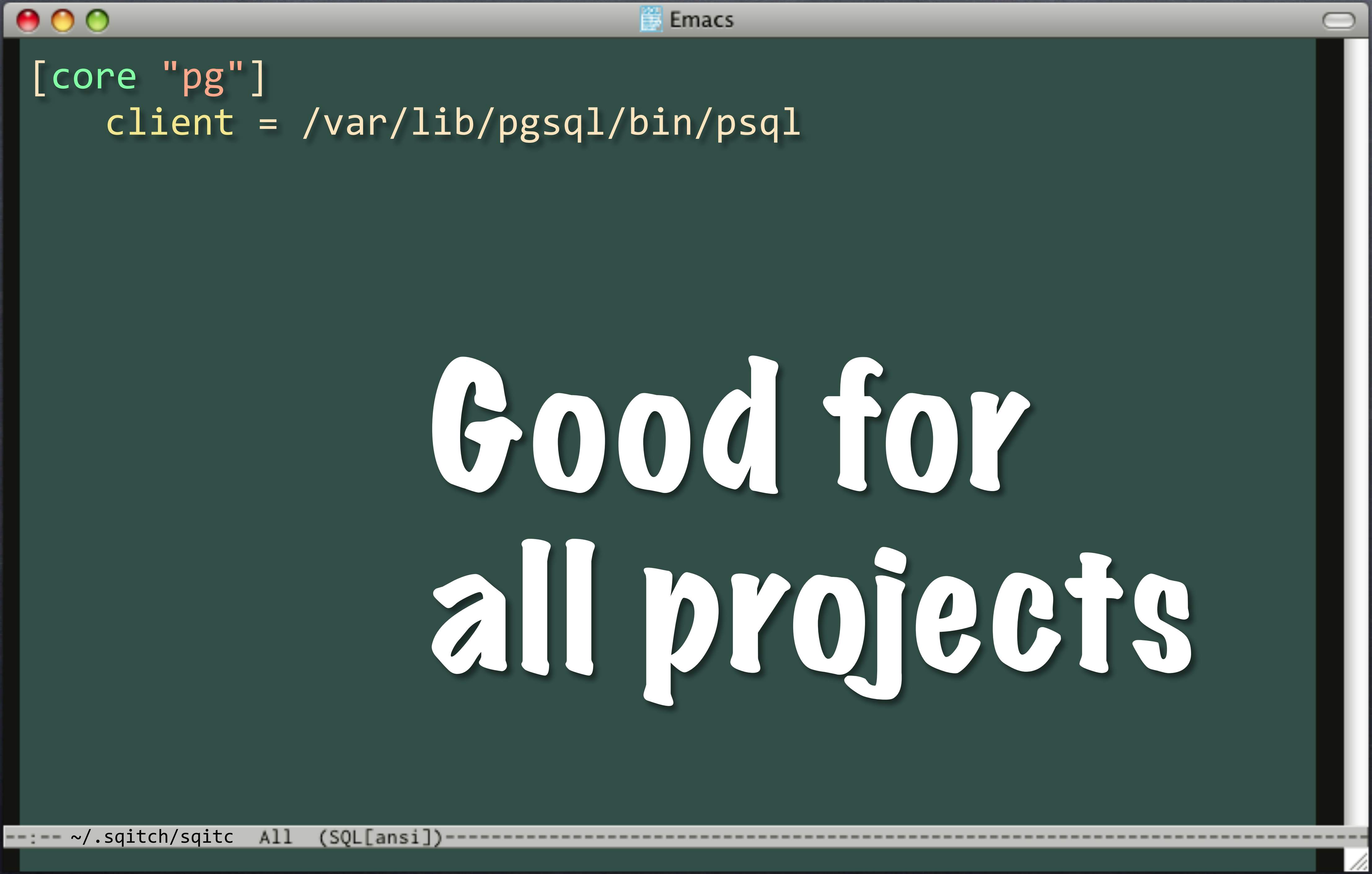
~/.sqitch/sqitch.conf



```
[core "pg"]
    client = /var/lib/pgsql/bin/psql
```

```
--:-- ~/.sqitch/sqitc   All   (SQL[ansi])----------------------------------------------------------------------
```

~/.sqitch/sqitch.conf



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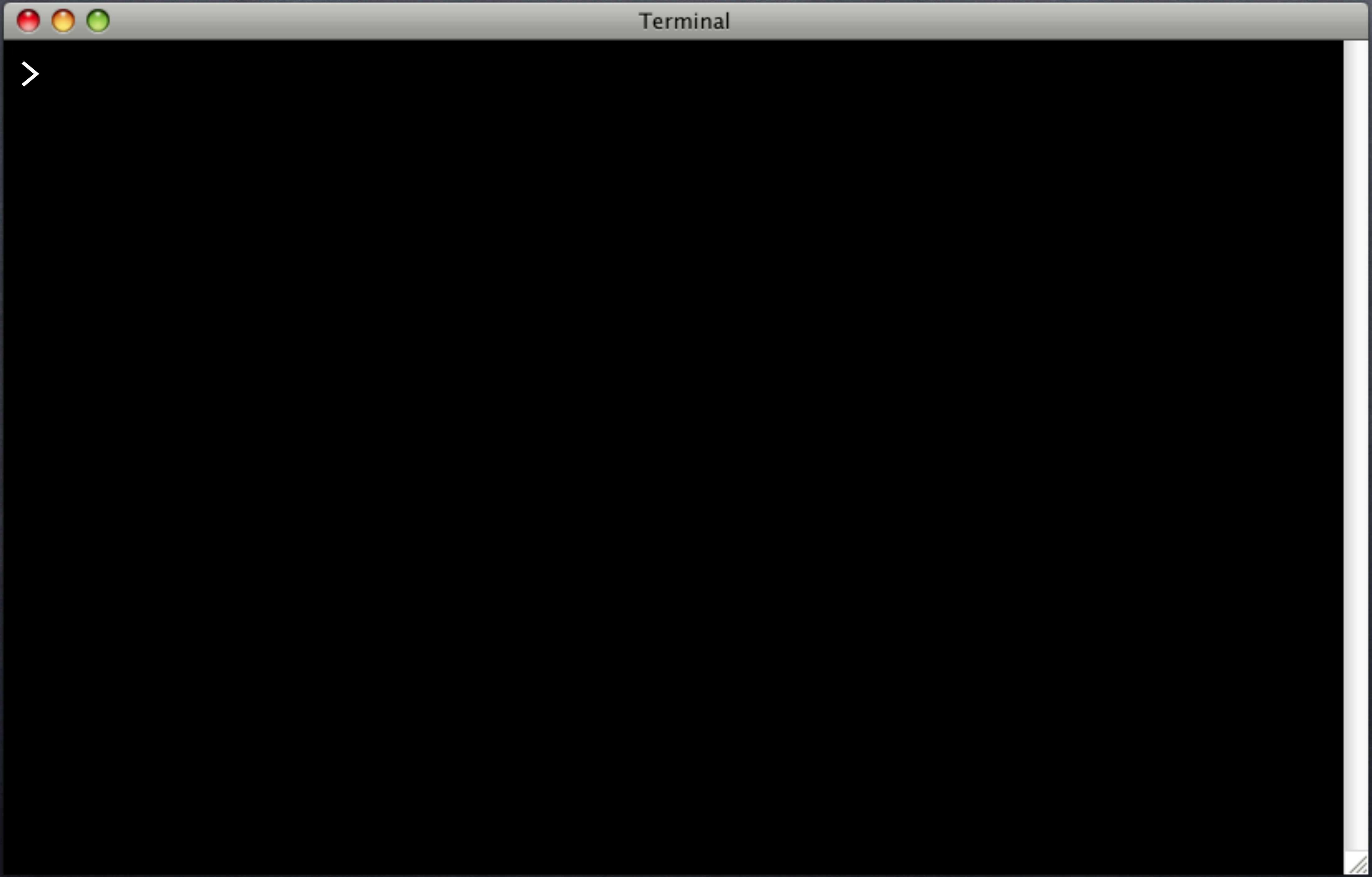
Good for
all projects

Make It So



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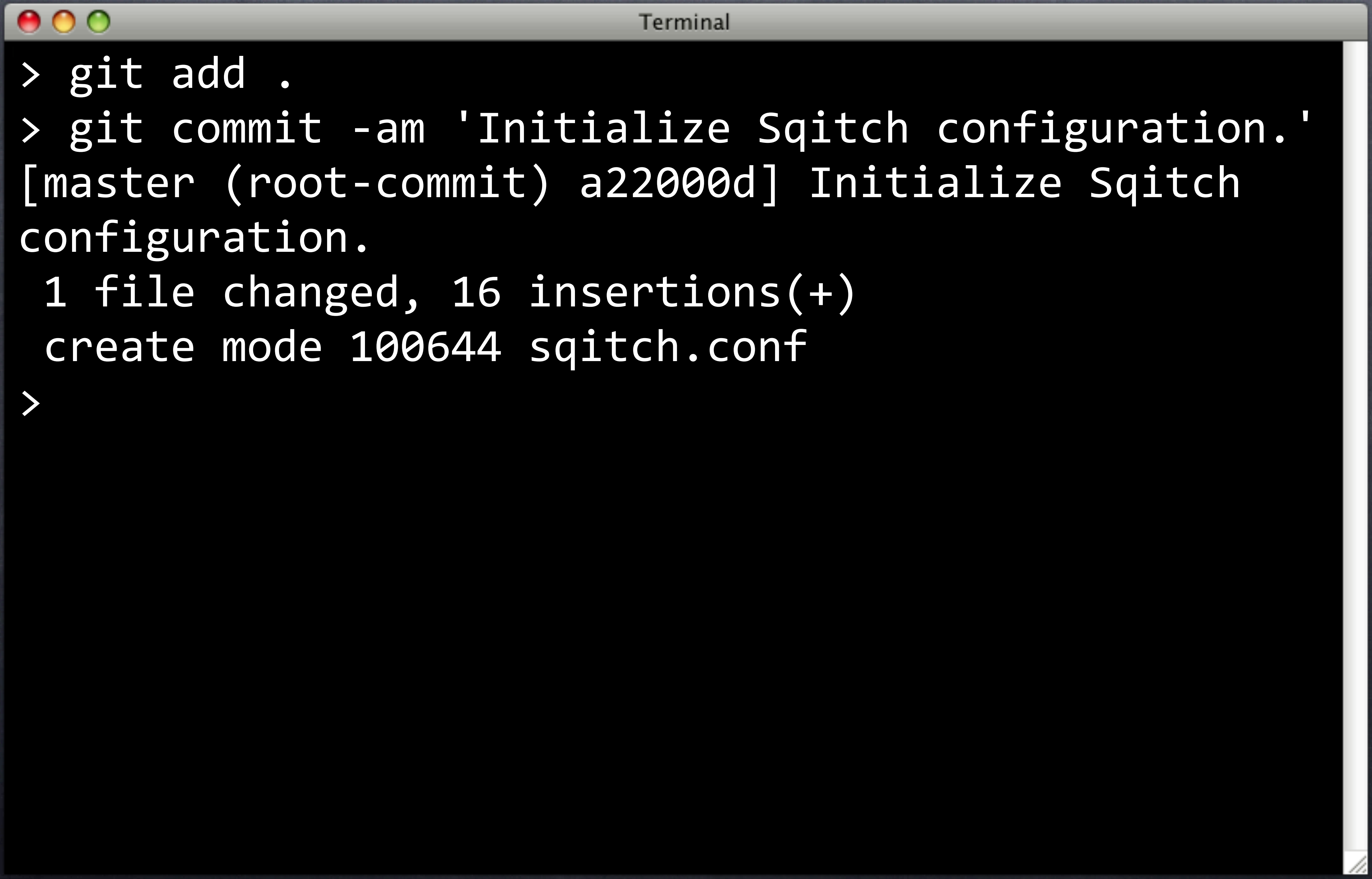
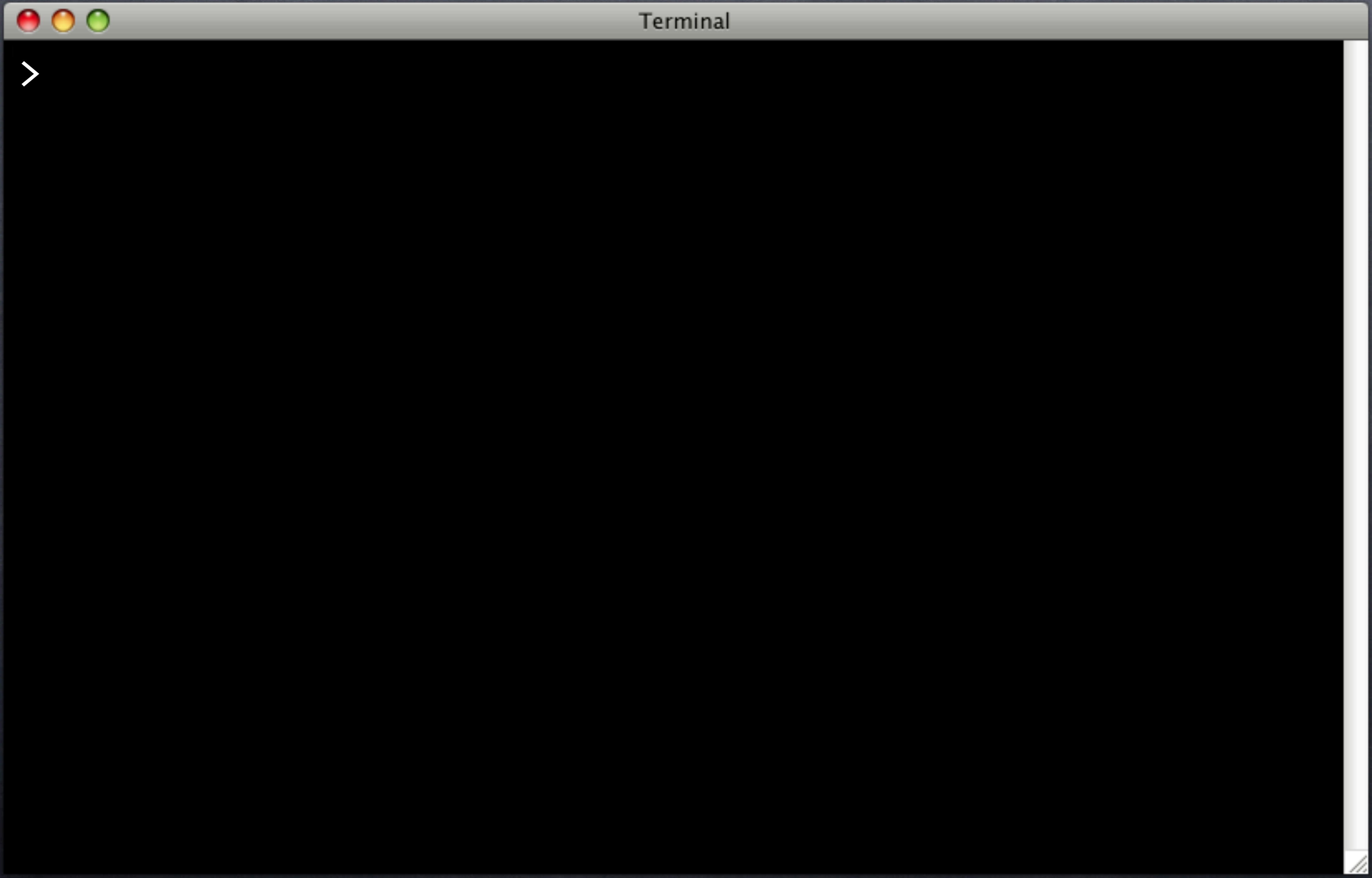


```
> git add .
> git commit -am 'Initialize Sqitch configuration.'
[master (root-commit) a22000d] Initialize Sqitch
configuration.
 1 file changed, 16 insertions(+)
 create mode 100644 sqitch.conf
>
```

First Deployment



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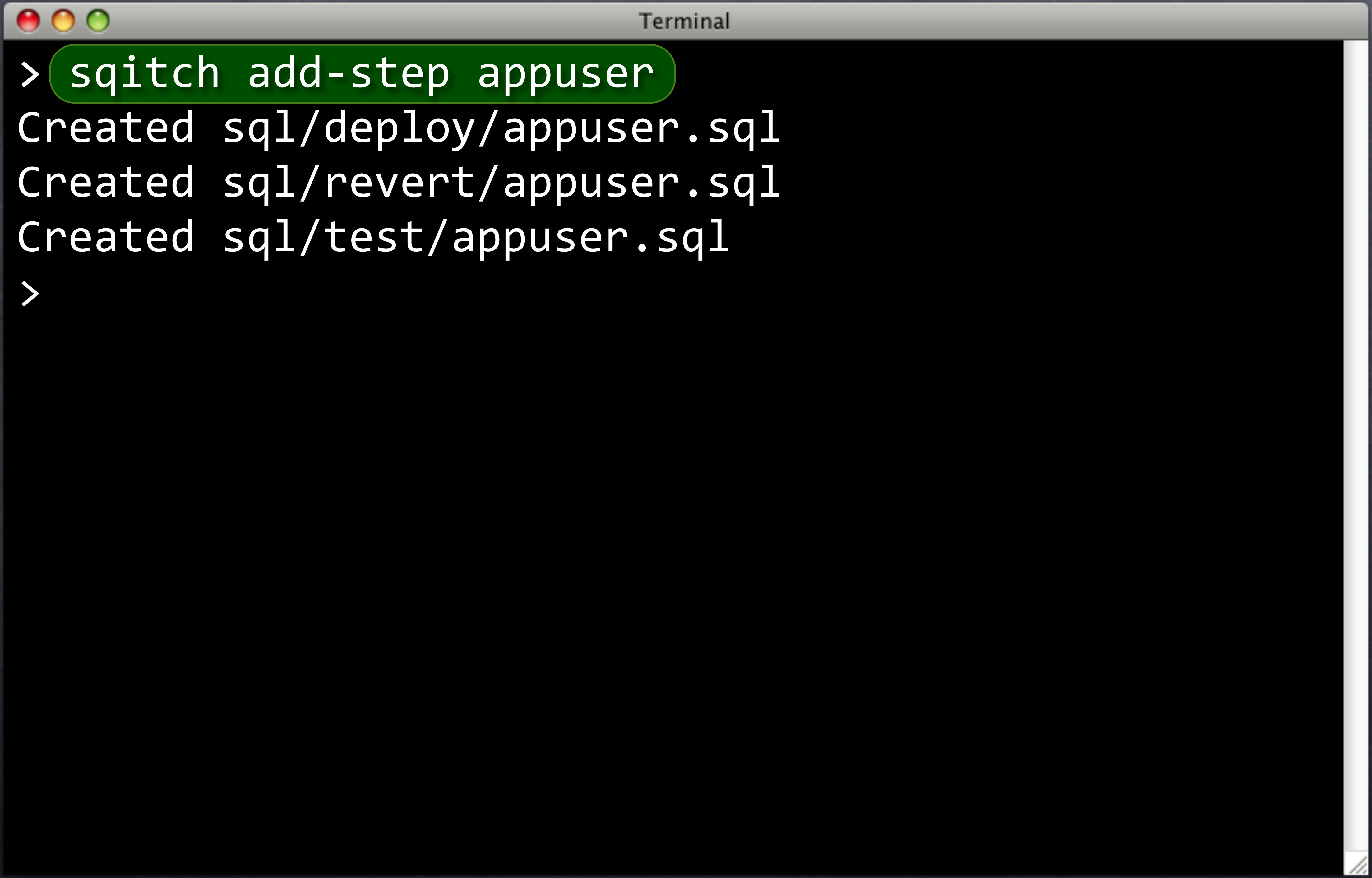
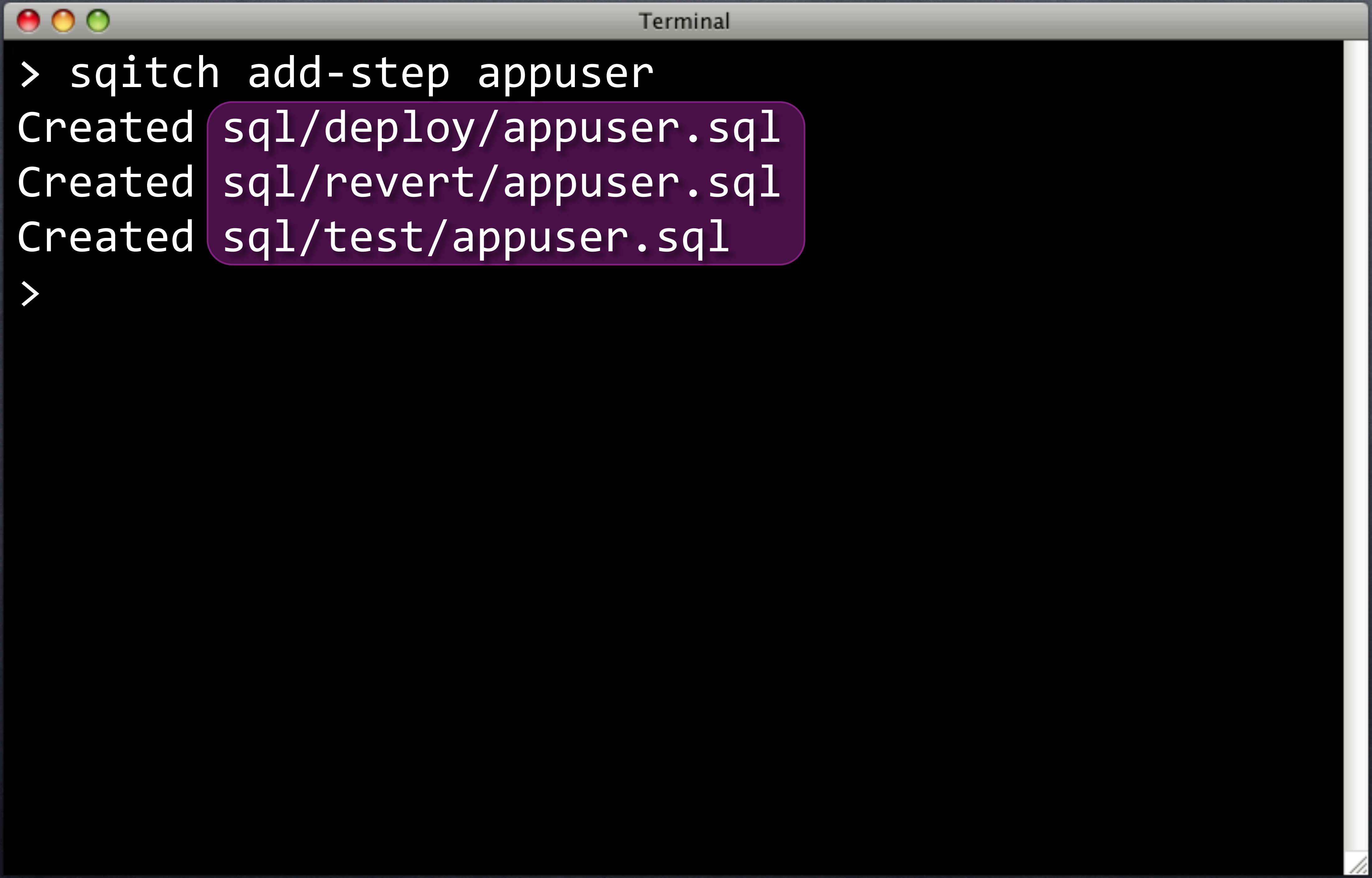


```
> sqitch add-step appuser
Created sql/deploy/appuser.sql
Created sql/revert/appuser.sql
Created sql/test/appuser.sql
>
```

First Deployment



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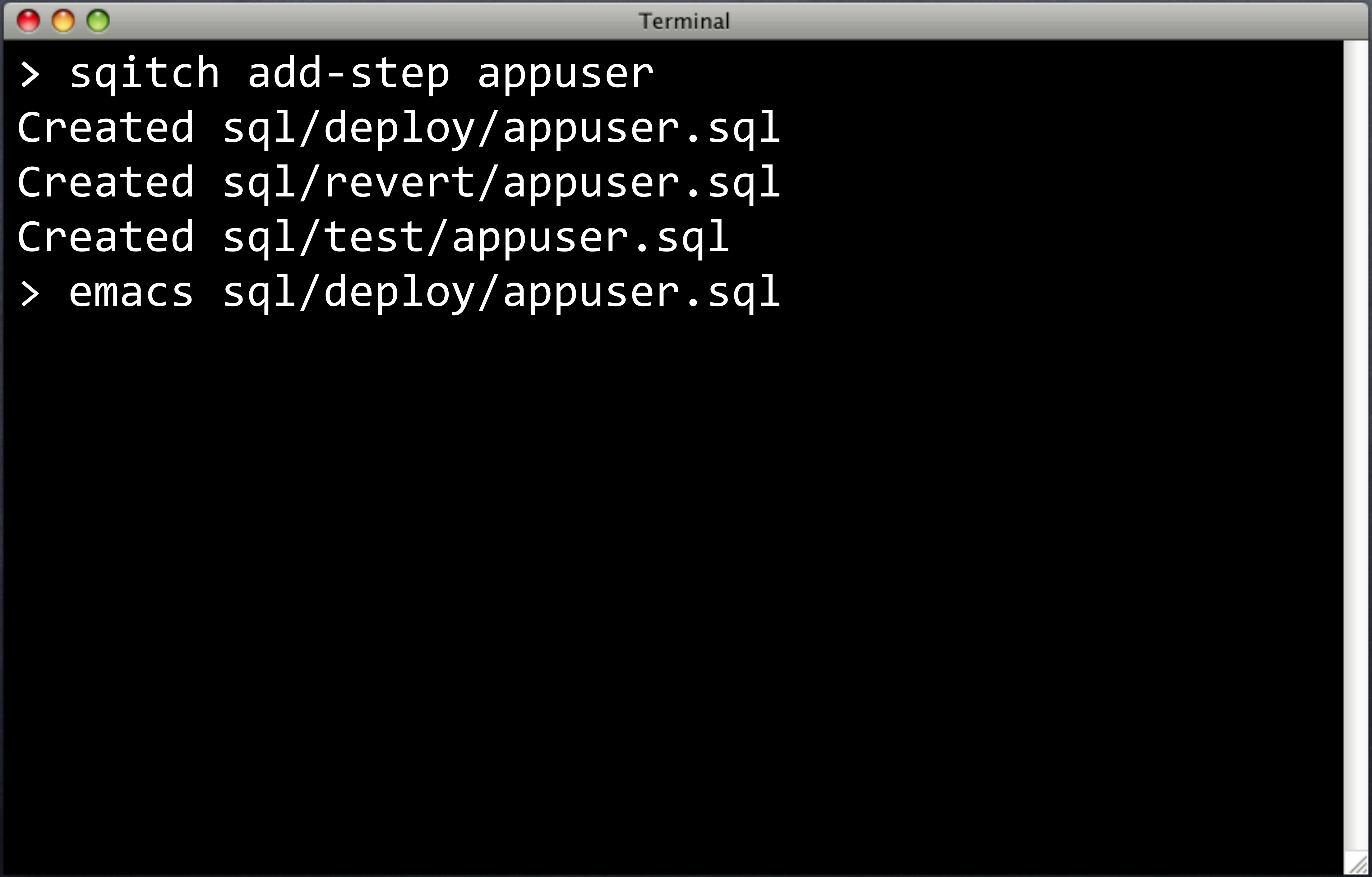

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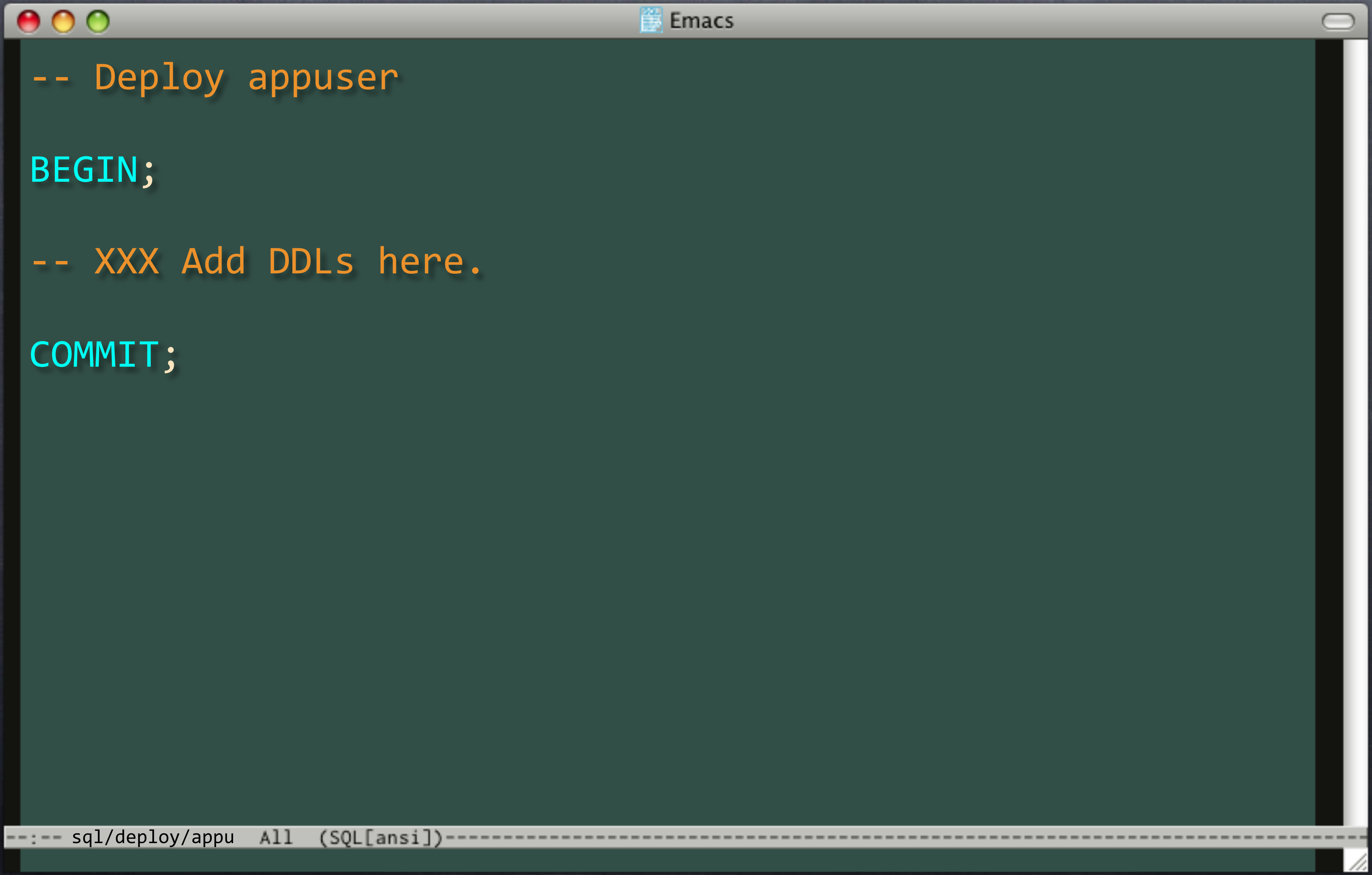


```
-- Deploy appuser

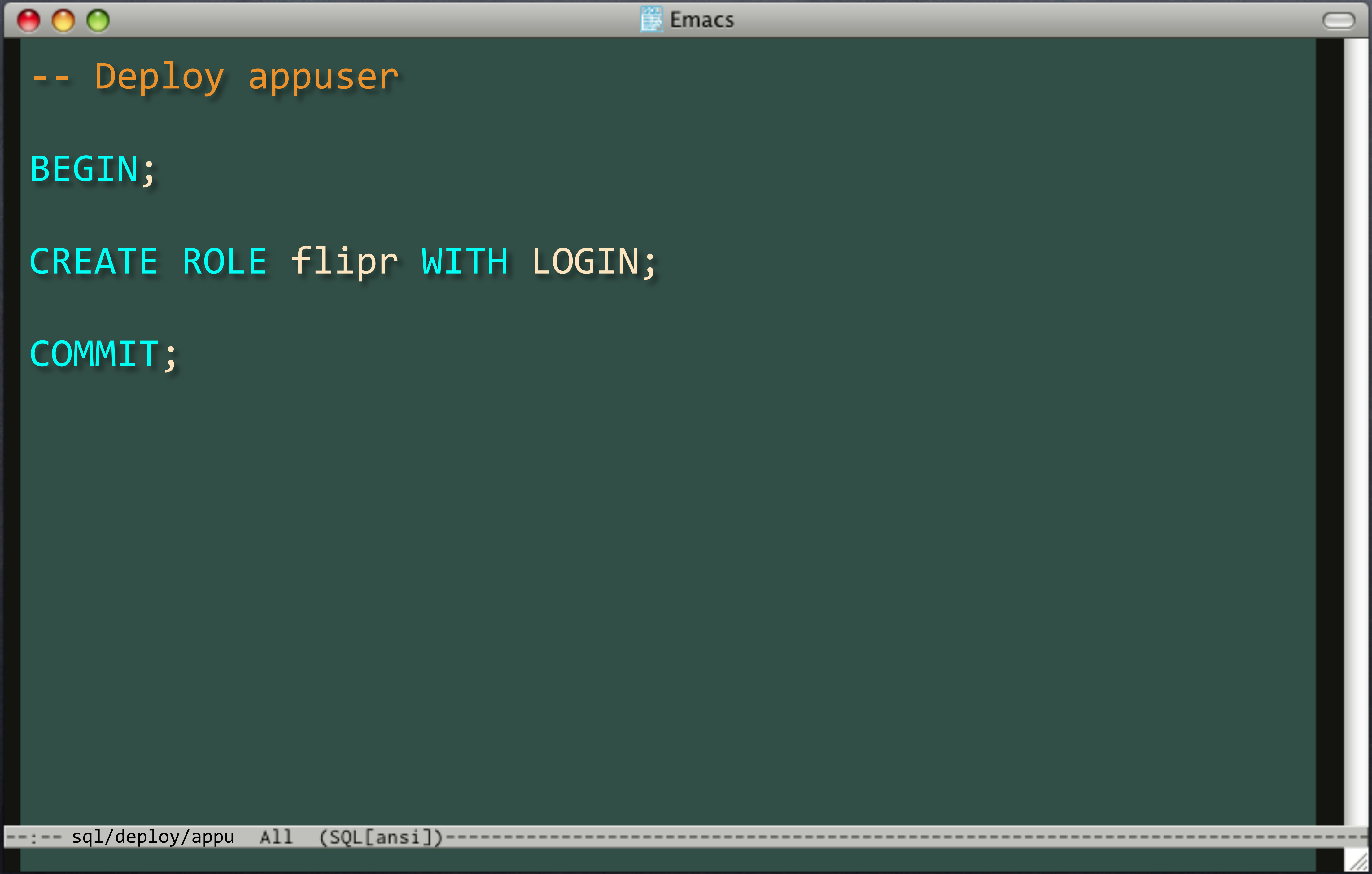
BEGIN;

-- XXX Add DDLs here.

COMMIT;
```

--:-- sql/deploy/appu   All   (SQL[ansi])--

sql/deploy/appuser.sql



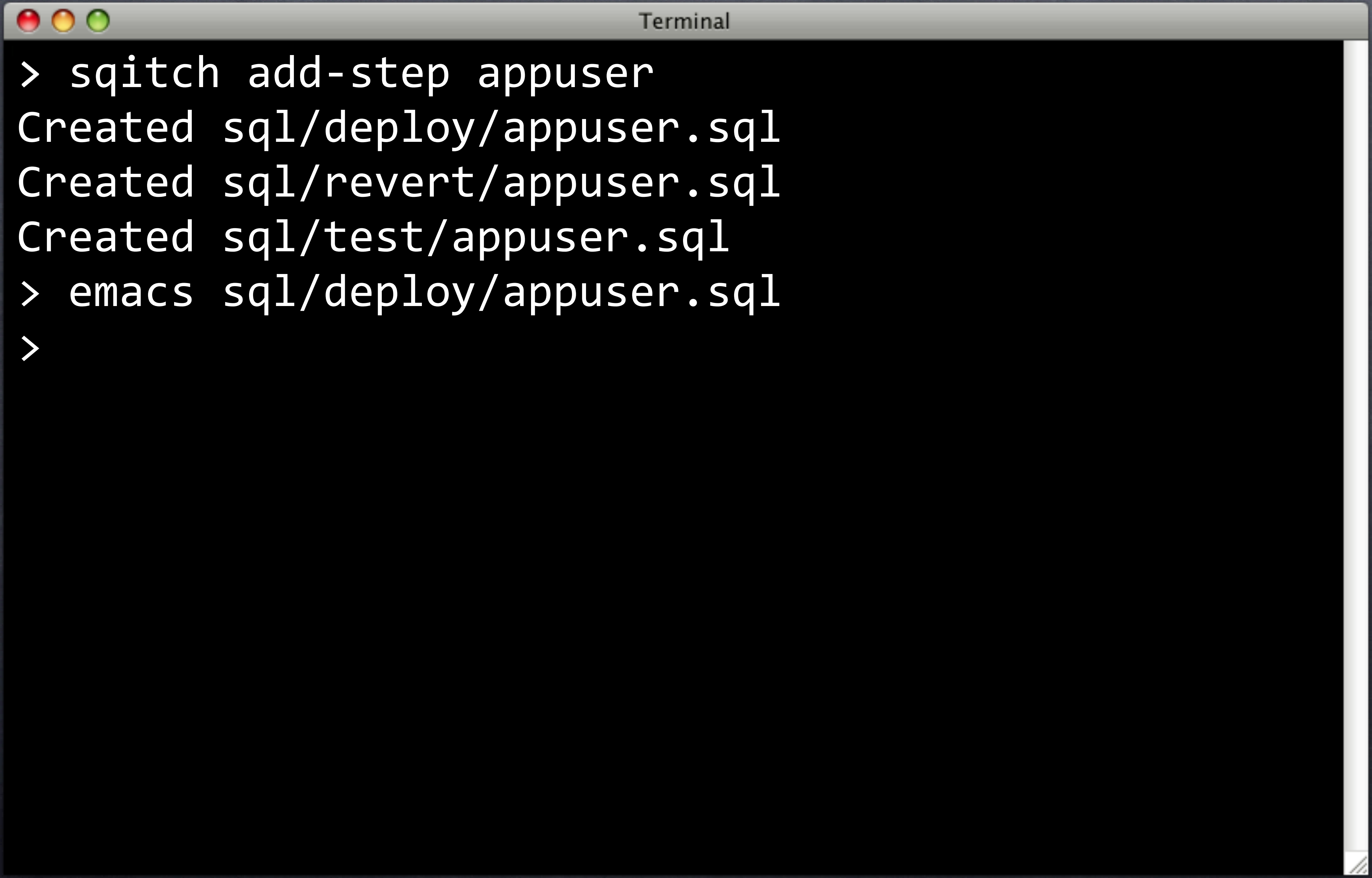
```
-- Deploy appuser

BEGIN;

CREATE ROLE flipr WITH LOGIN;

COMMIT;
```

First Deployment



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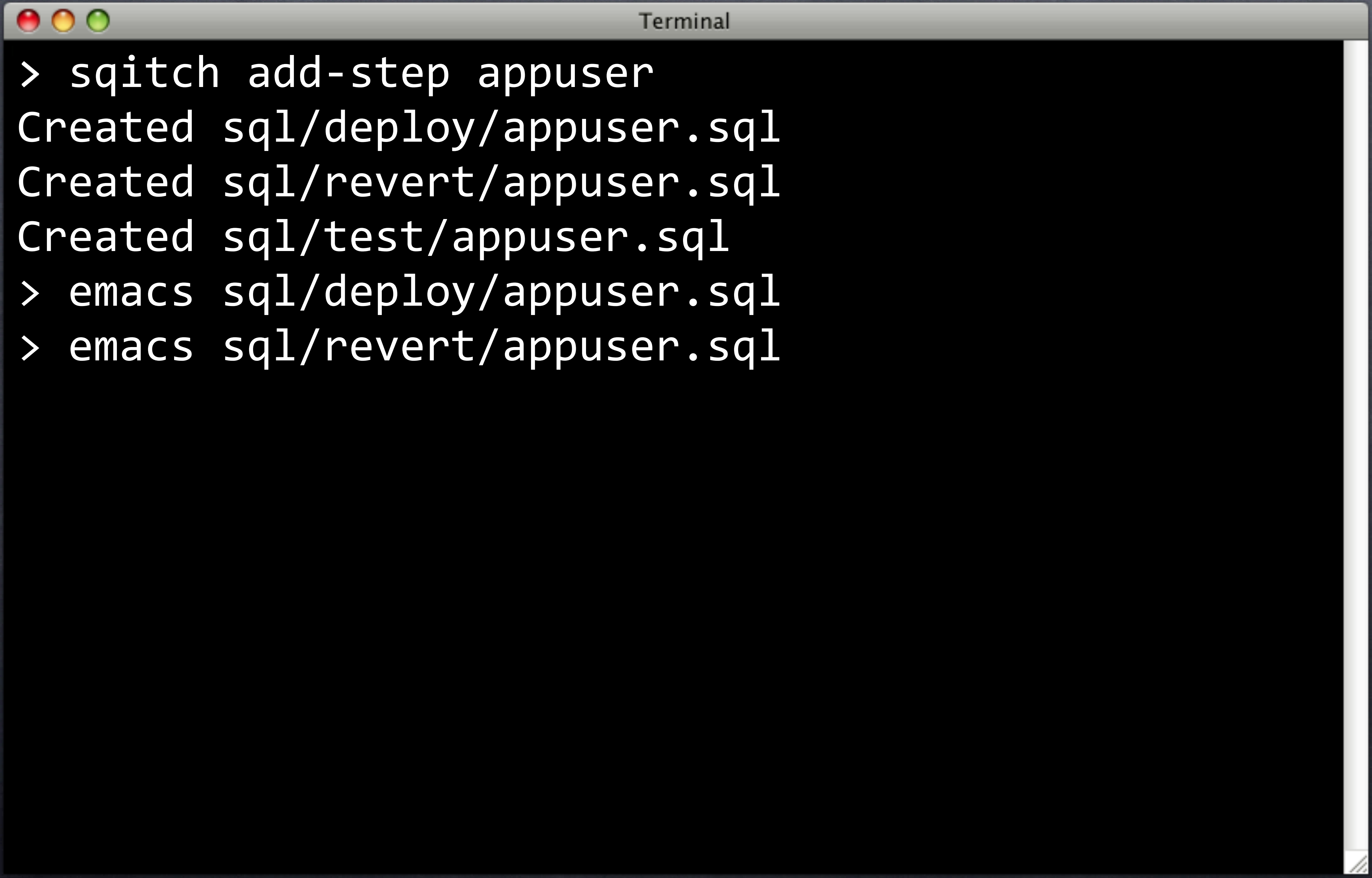

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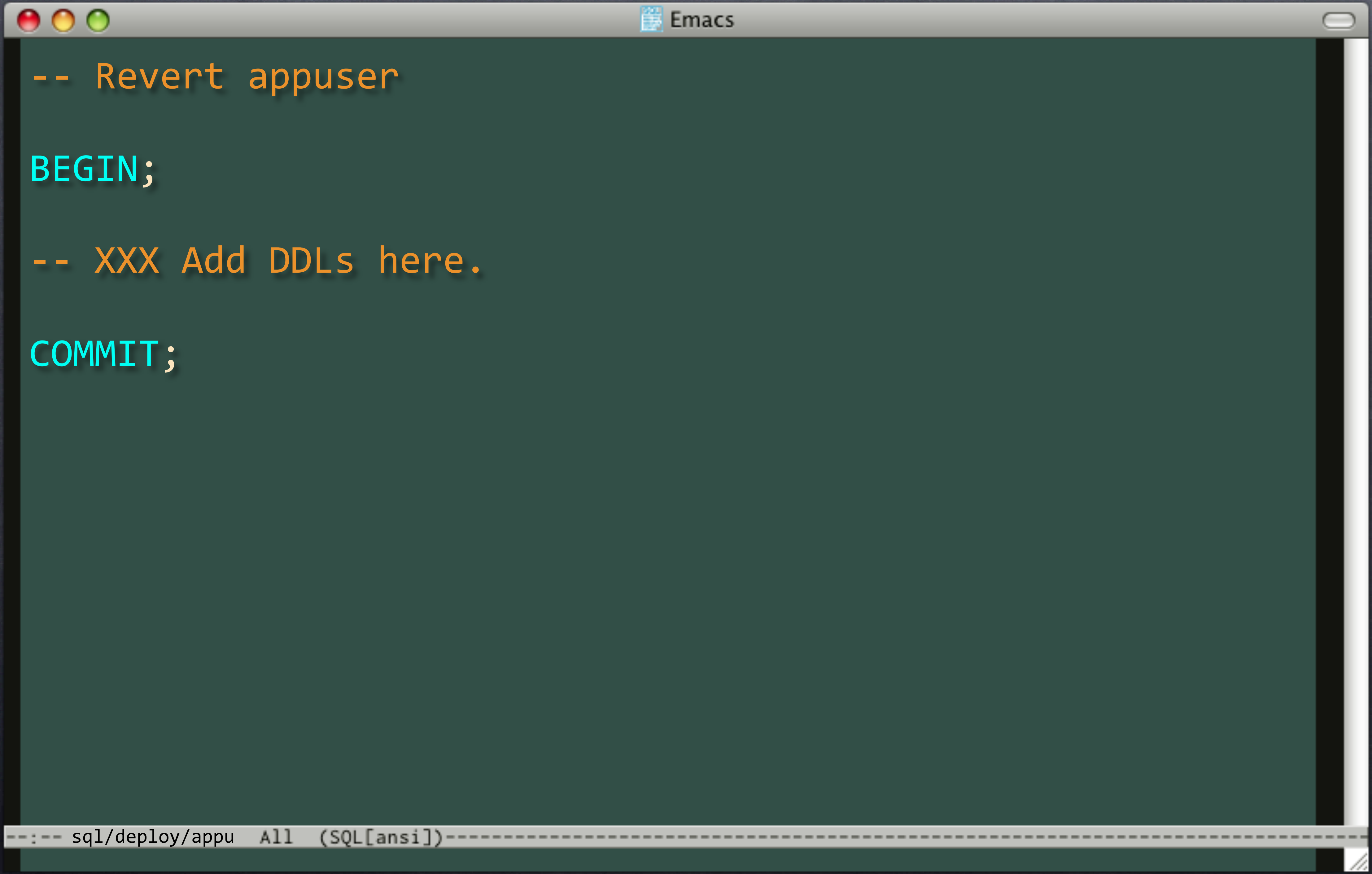

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-- Revert appuser

BEGIN;

-- XXX Add DDLs here.

COMMIT;
```

```
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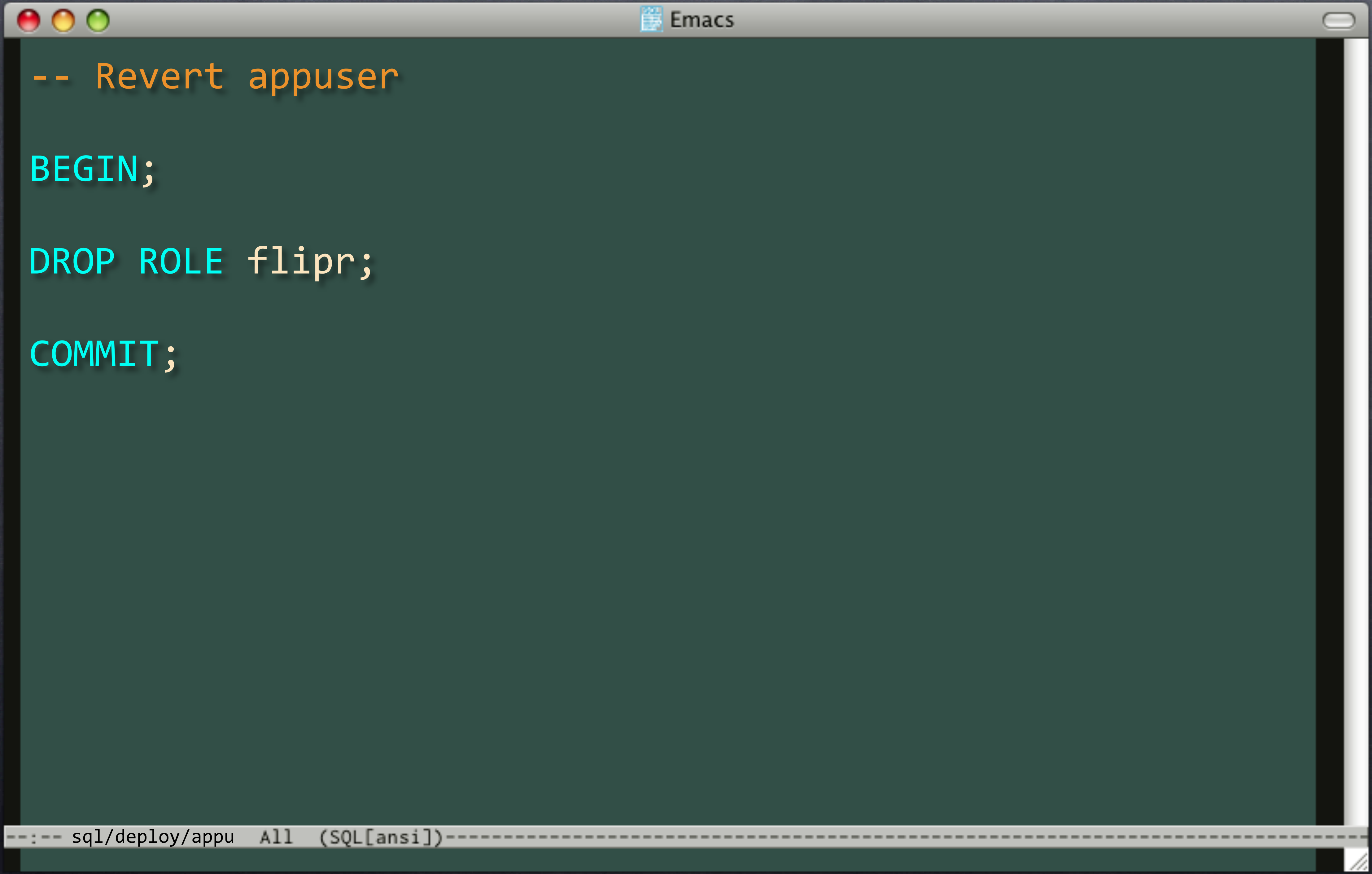
```

sql/revert/appuser.sql



```
-- Revert appuser

BEGIN;

DROP ROLE flipr;

COMMIT;
```

```
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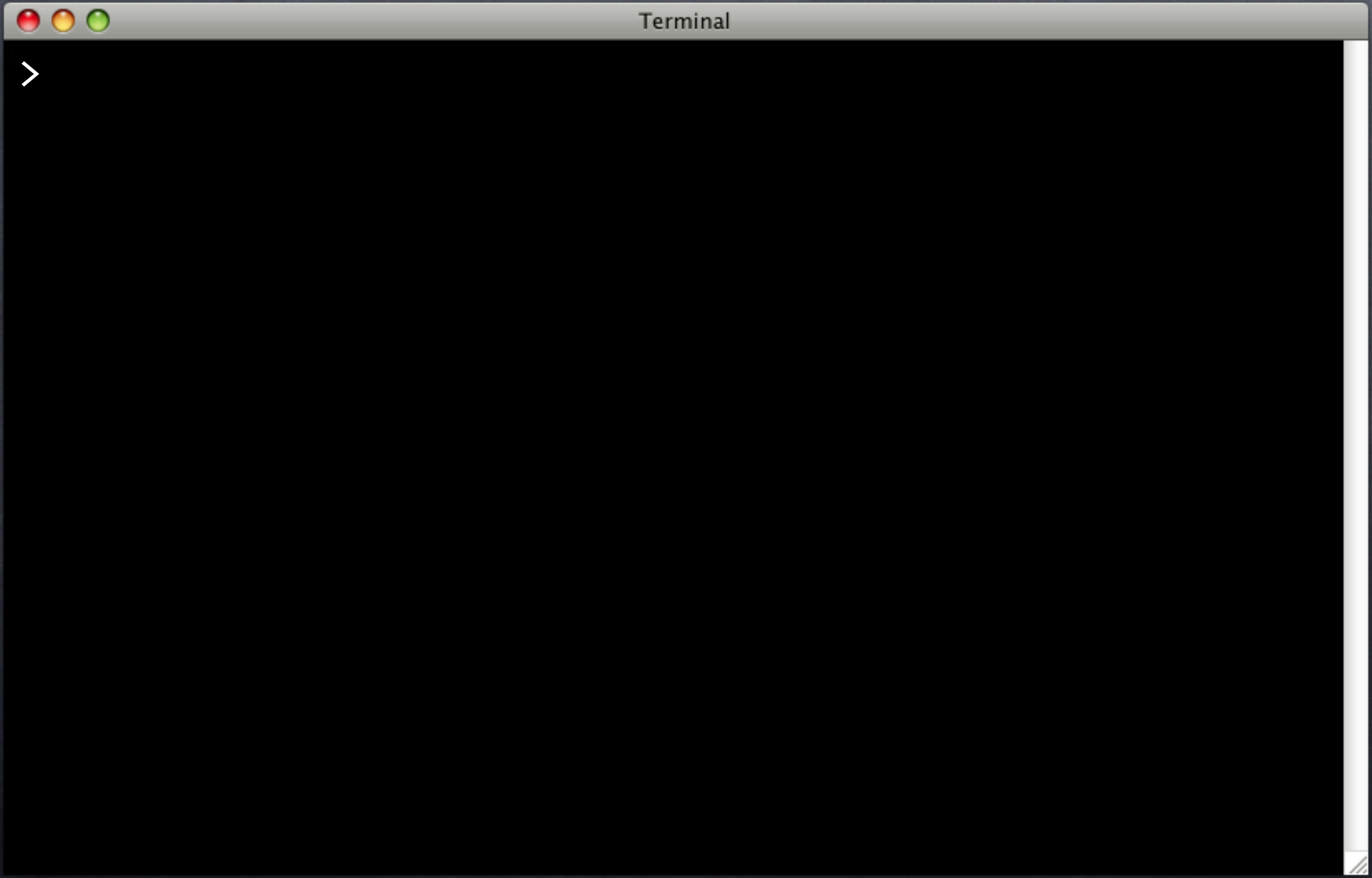
```

Make it So!



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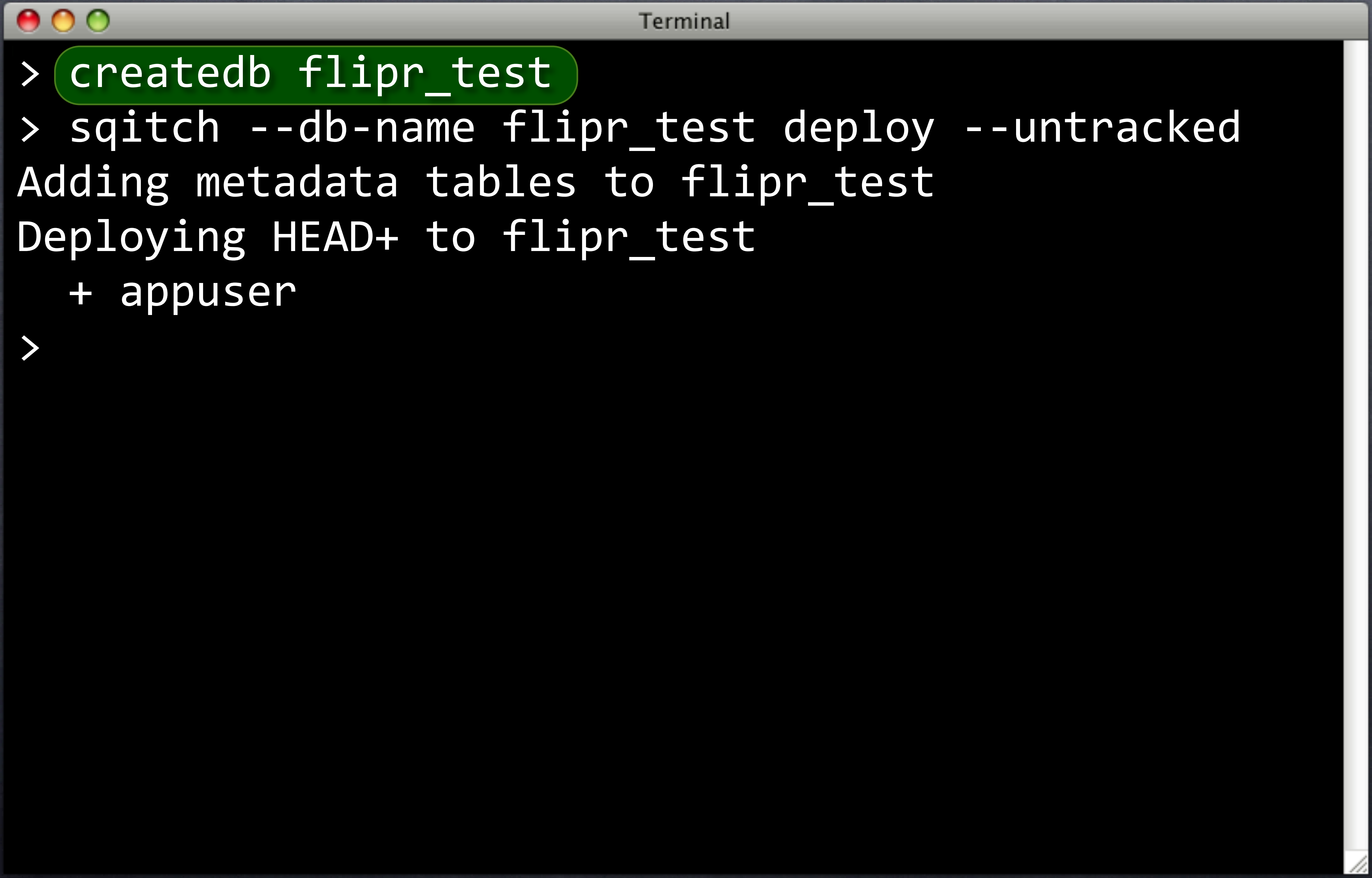
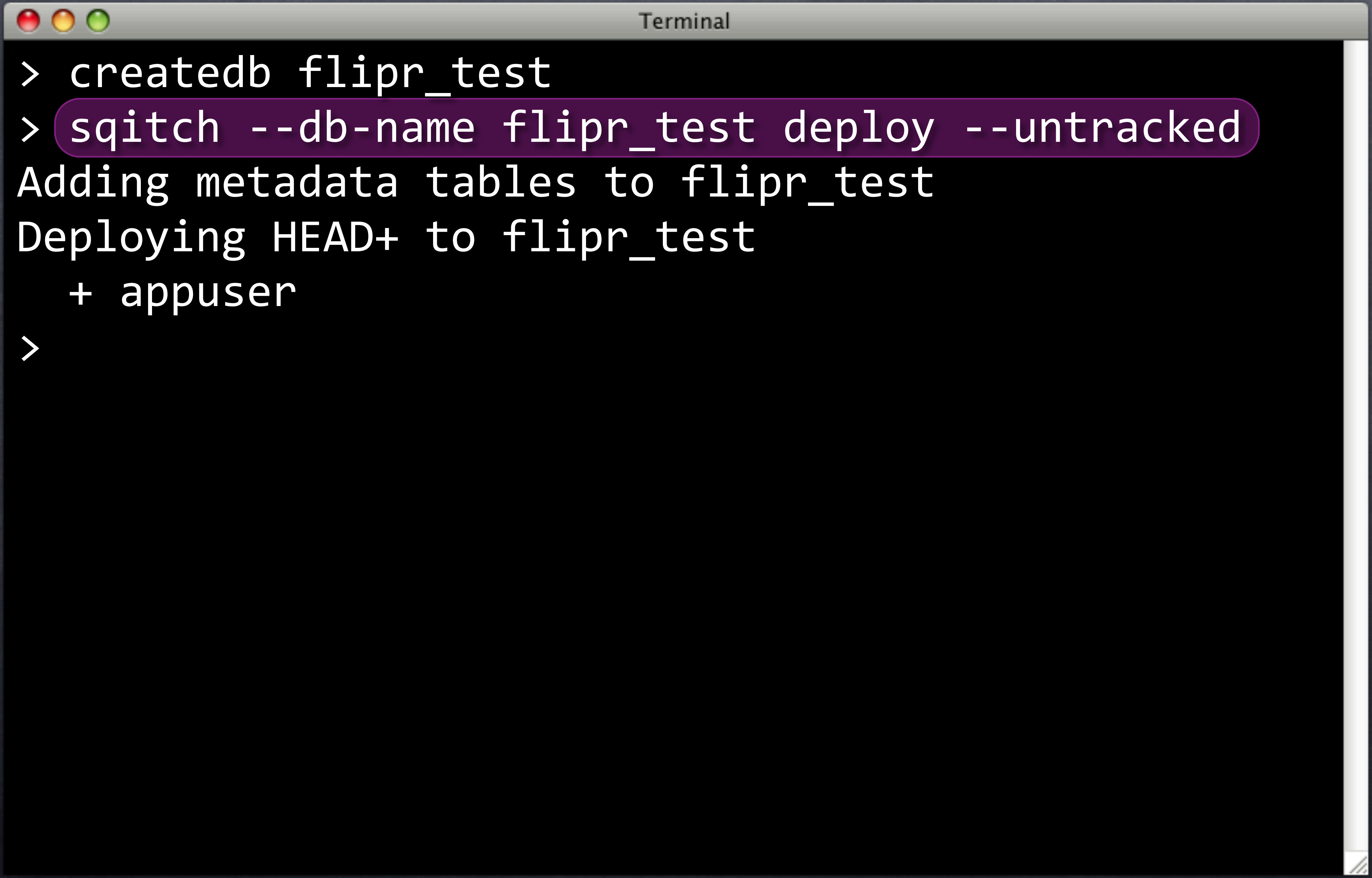


```
> createdb flipr_test
> sqitch --db-name flipr_test deploy --untracked
Adding metadata tables to flipr_test
Deploying HEAD+ to flipr_test
  + appuser
>
```

Make it So!



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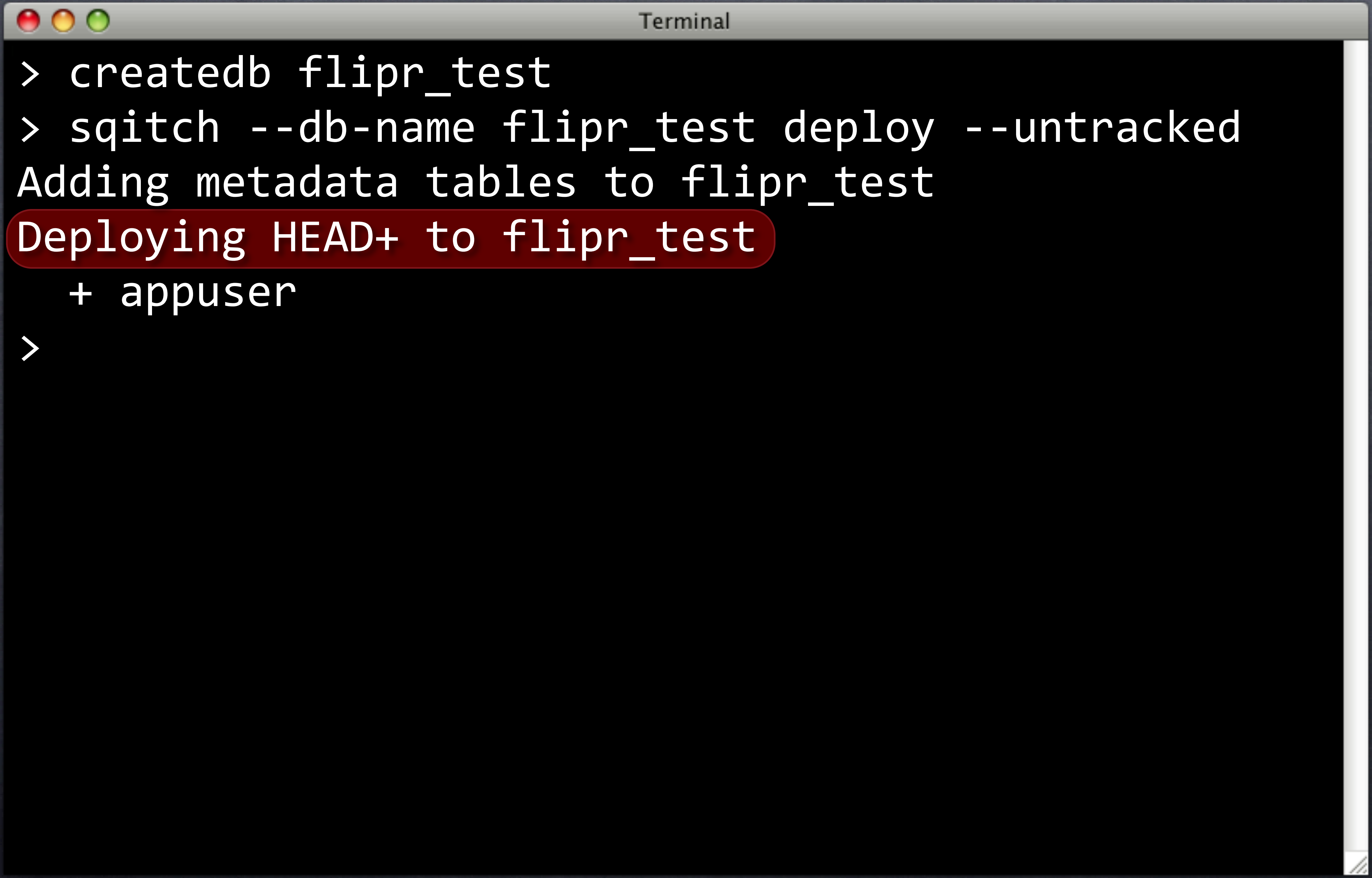
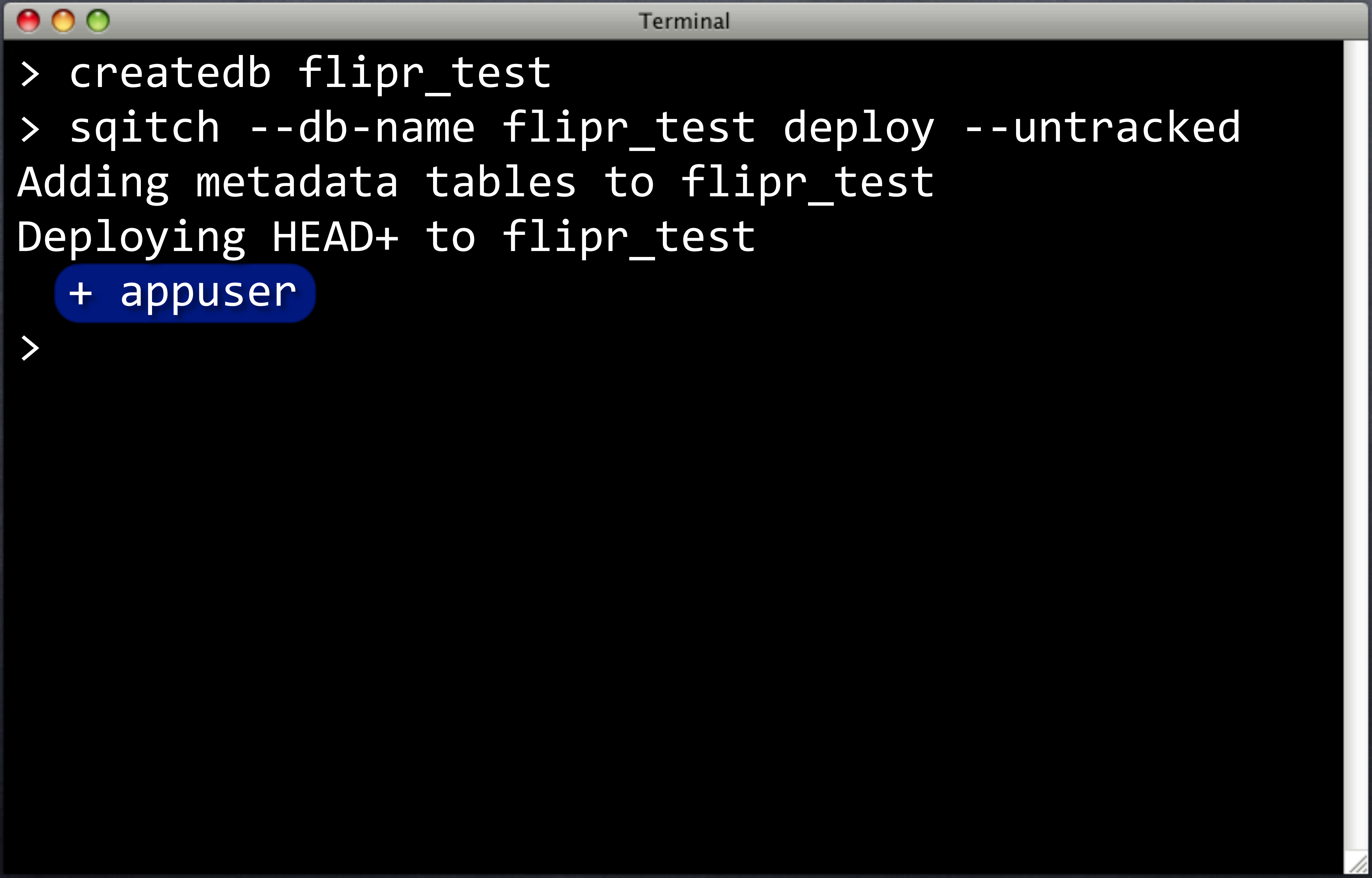
```

Make it So!



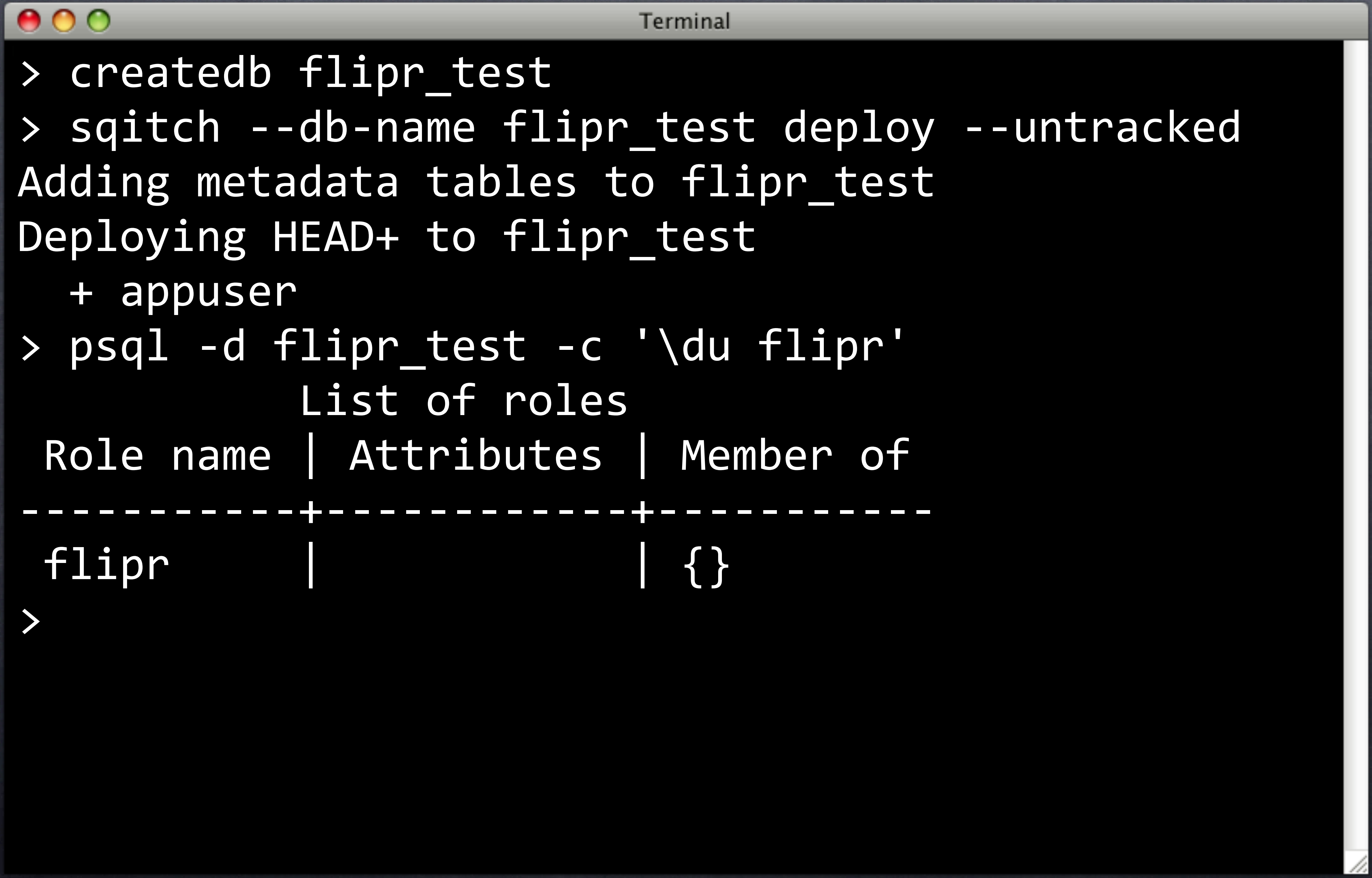
```
> createdb flipr_test
> sqitch --db-name flipr_test deploy --untracked
Adding metadata tables to flipr_test
Deploying HEAD+ to flipr_test
  + appuser
>
```

Make it So!



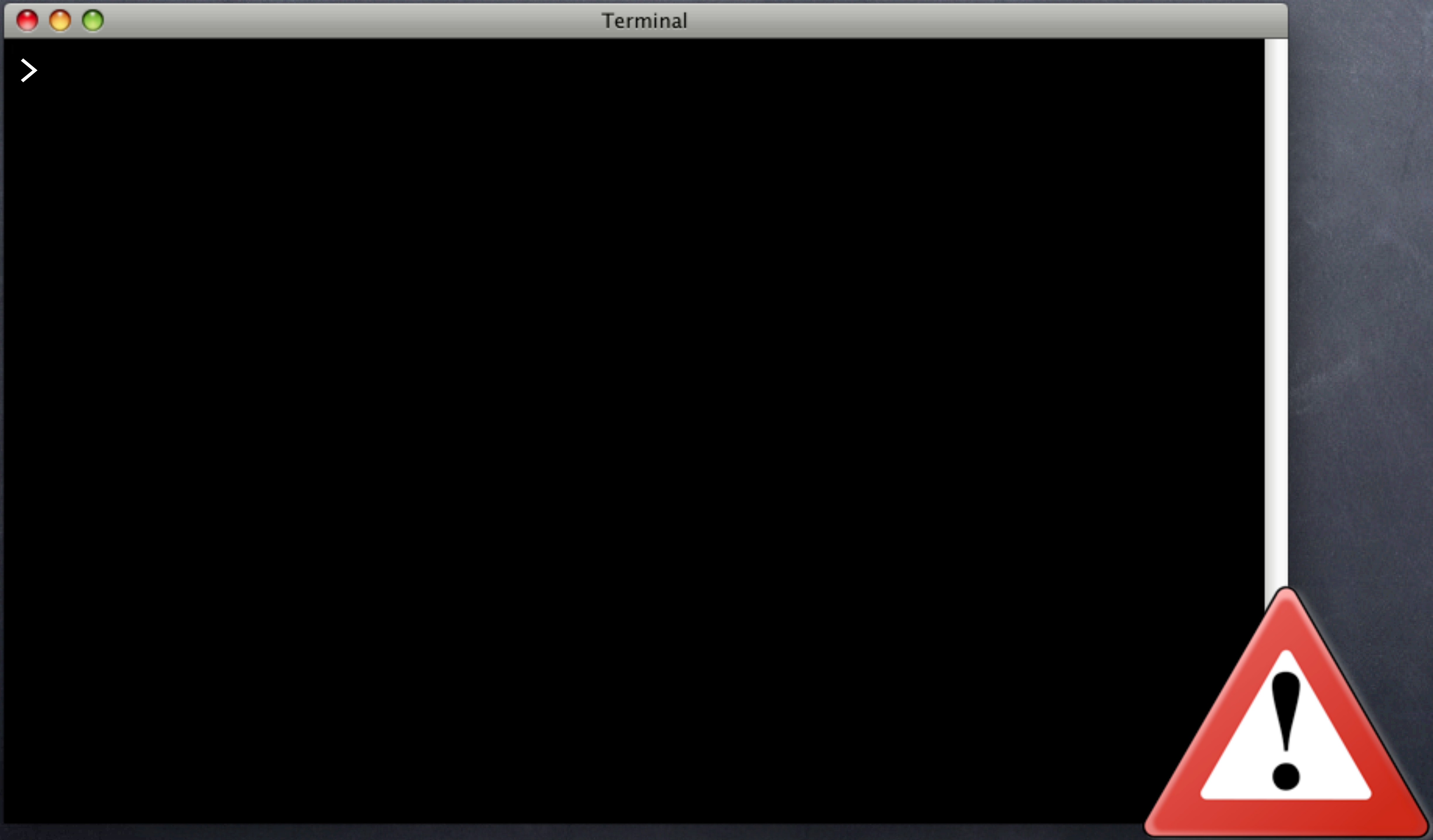
```
> createdb flipr_test
> sqitch --db-name flipr_test deploy --untracked
Adding metadata tables to flipr_test
Deploying HEAD+ to flipr_test
  + appuser
>
```

Make it So!



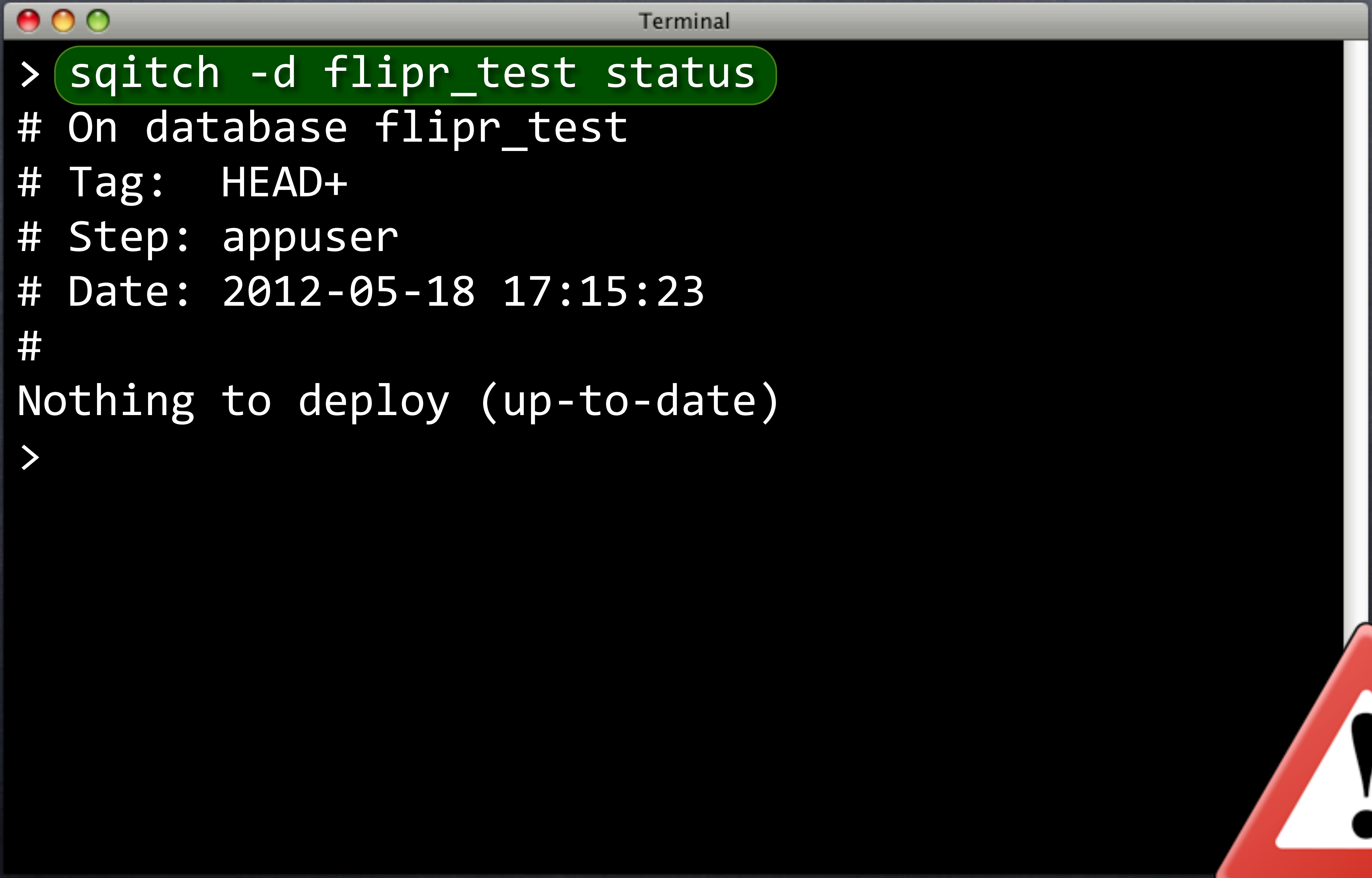
```
> createdb flipr_test
> sqitch --db-name flipr_test deploy --untracked
Adding metadata tables to flipr_test
Deploying HEAD+ to flipr_test
  + appuser
> psql -d flipr_test -c '\du flipr'
           List of roles
 Role name | Attributes | Member of
-----------+------------+-----------
 flipr     |            | {}
>
```

How's it Look?



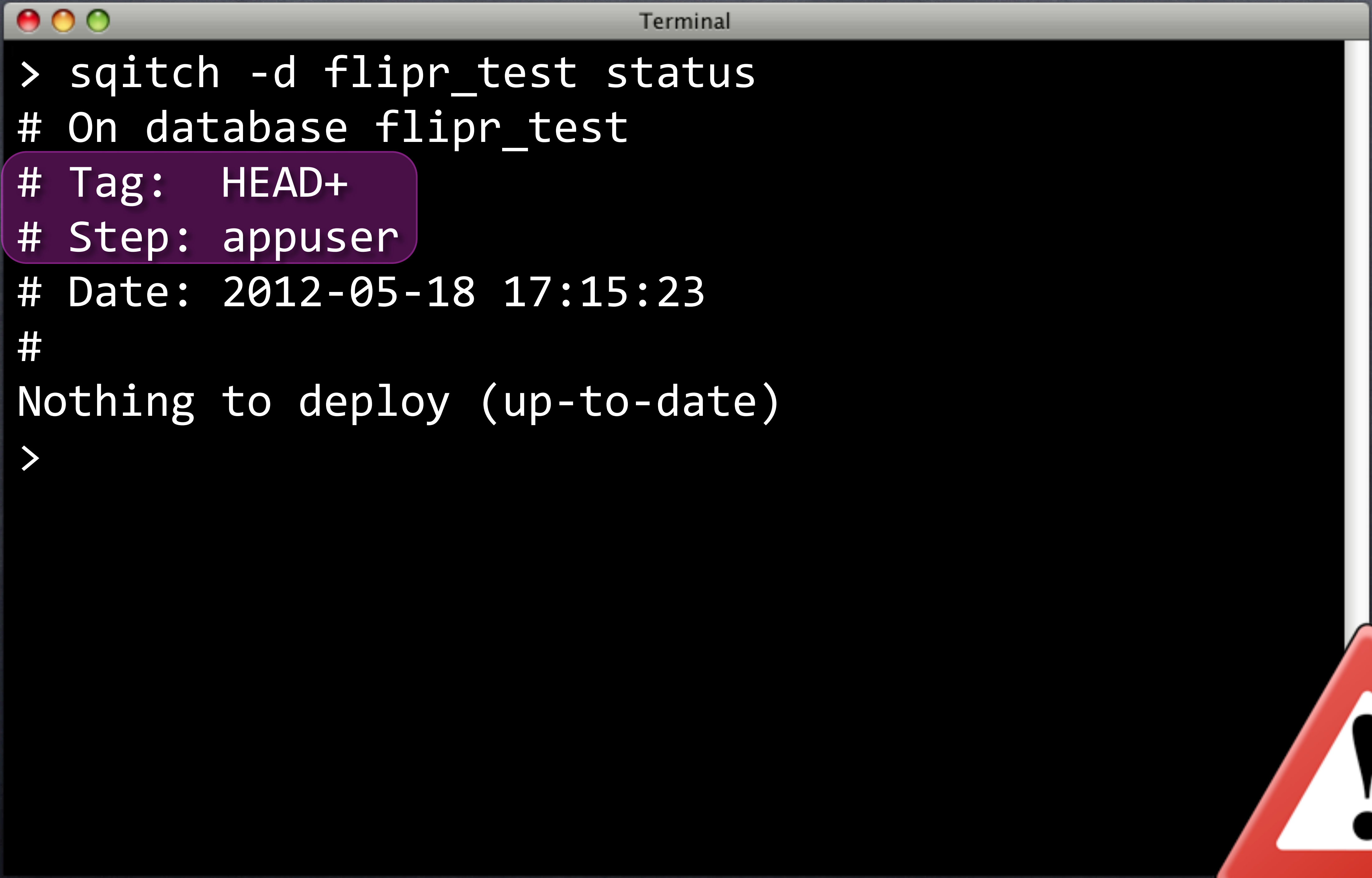
```
>
```

How's it Look?



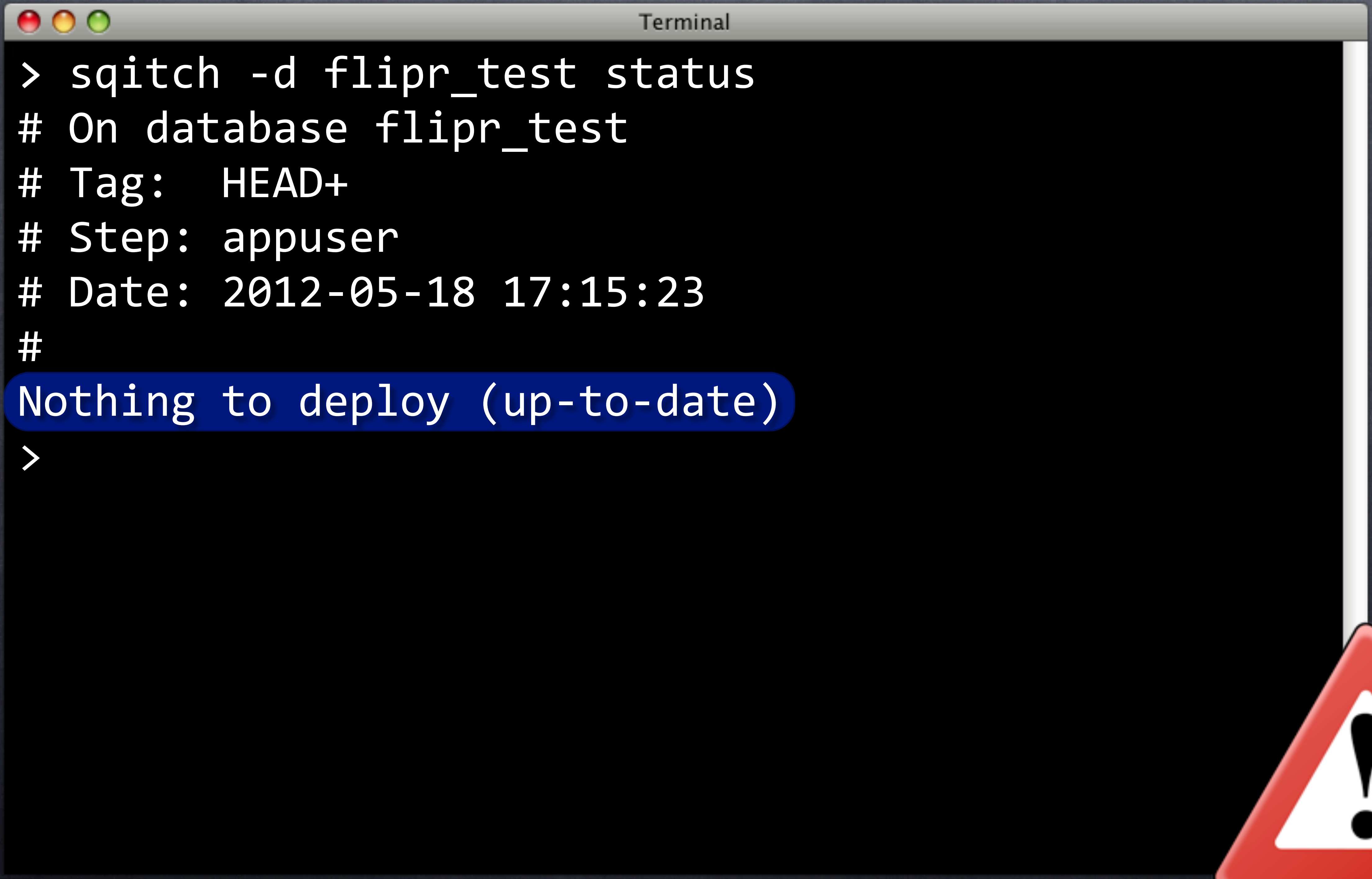
```
> sqitch -d flipr_test status
# On database flipr_test
# Tag:   HEAD+
# Step: appuser
# Date: 2012-05-18 17:15:23
#
Nothing to deploy (up-to-date)
>
```

How's it Look?



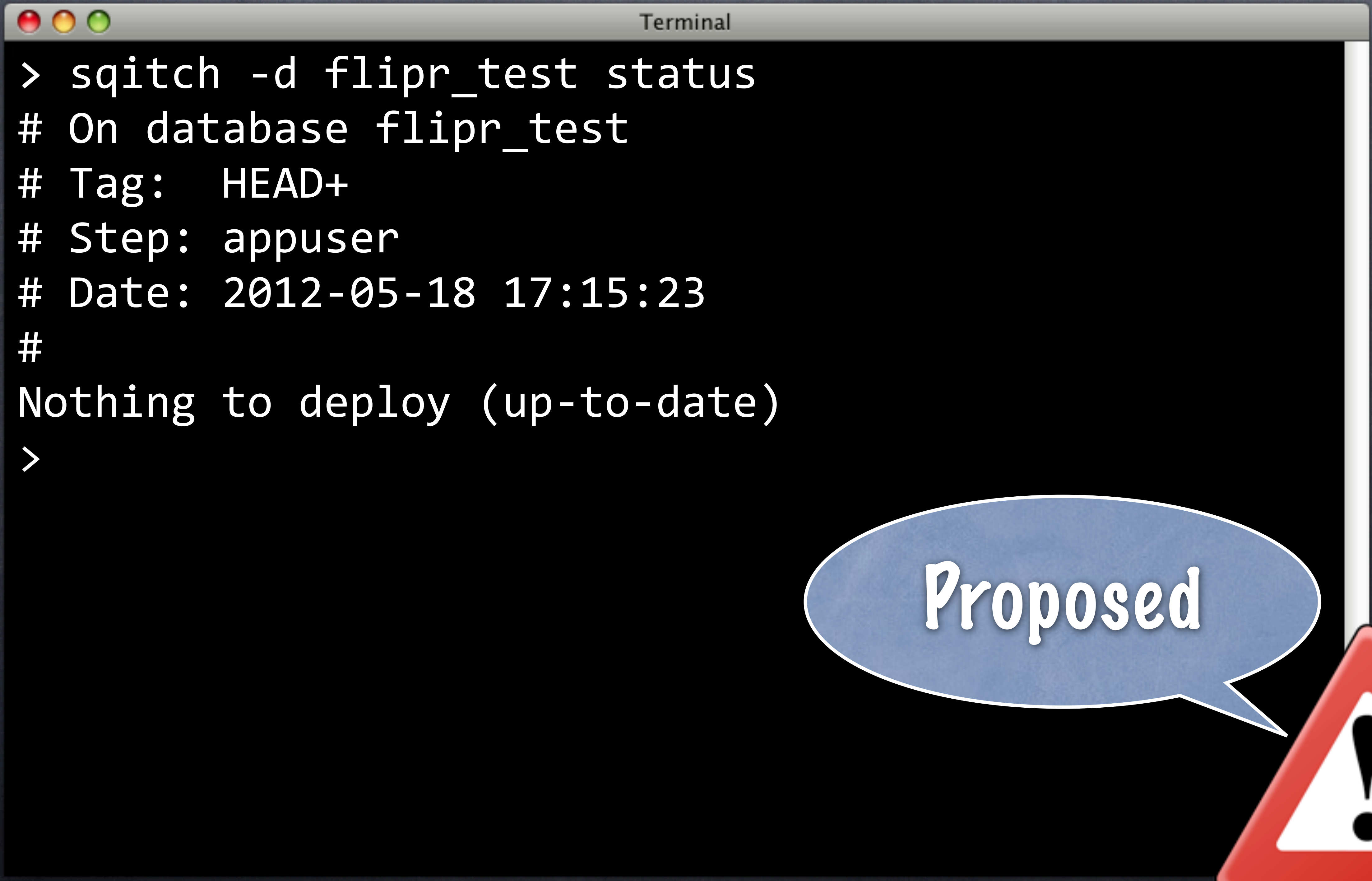
```
> sqitch -d flipr_test status
# On database flipr_test
# Tag:  HEAD+
# Step: appuser
# Date: 2012-05-18 17:15:23
#
Nothing to deploy (up-to-date)
>
```

How's it Look?



```
> sqitch -d flipr_test status
# On database flipr_test
# Tag:   HEAD+
# Step:  appuser
# Date:  2012-05-18 17:15:23
#
Nothing to deploy (up-to-date)
>
```

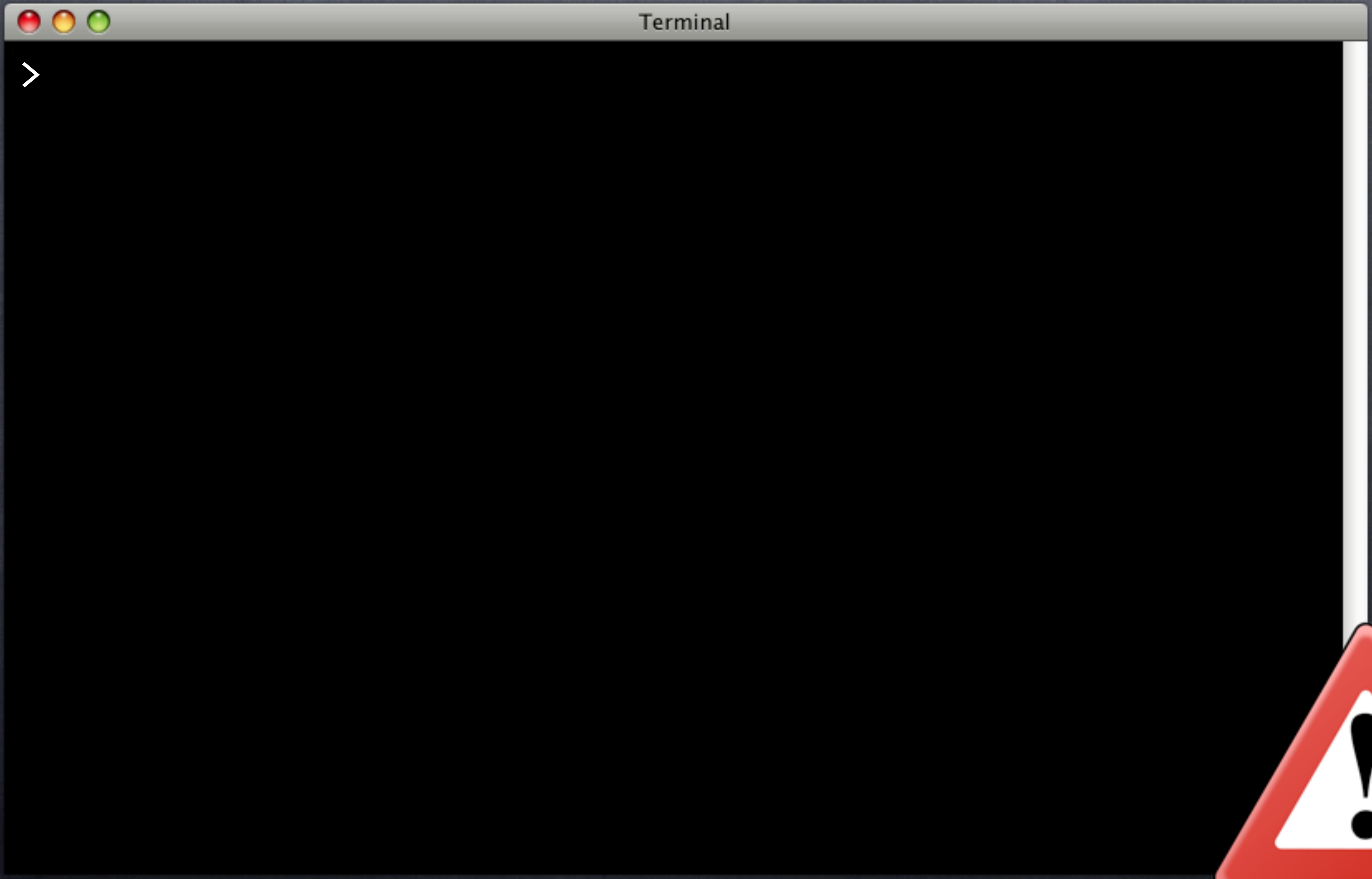
How's it Look?



```
> sqitch -d flipr_test status
# On database flipr_test
# Tag:  HEAD+
# Step: appuser
# Date: 2012-05-18 17:15:23
#
Nothing to deploy (up-to-date)
>
```

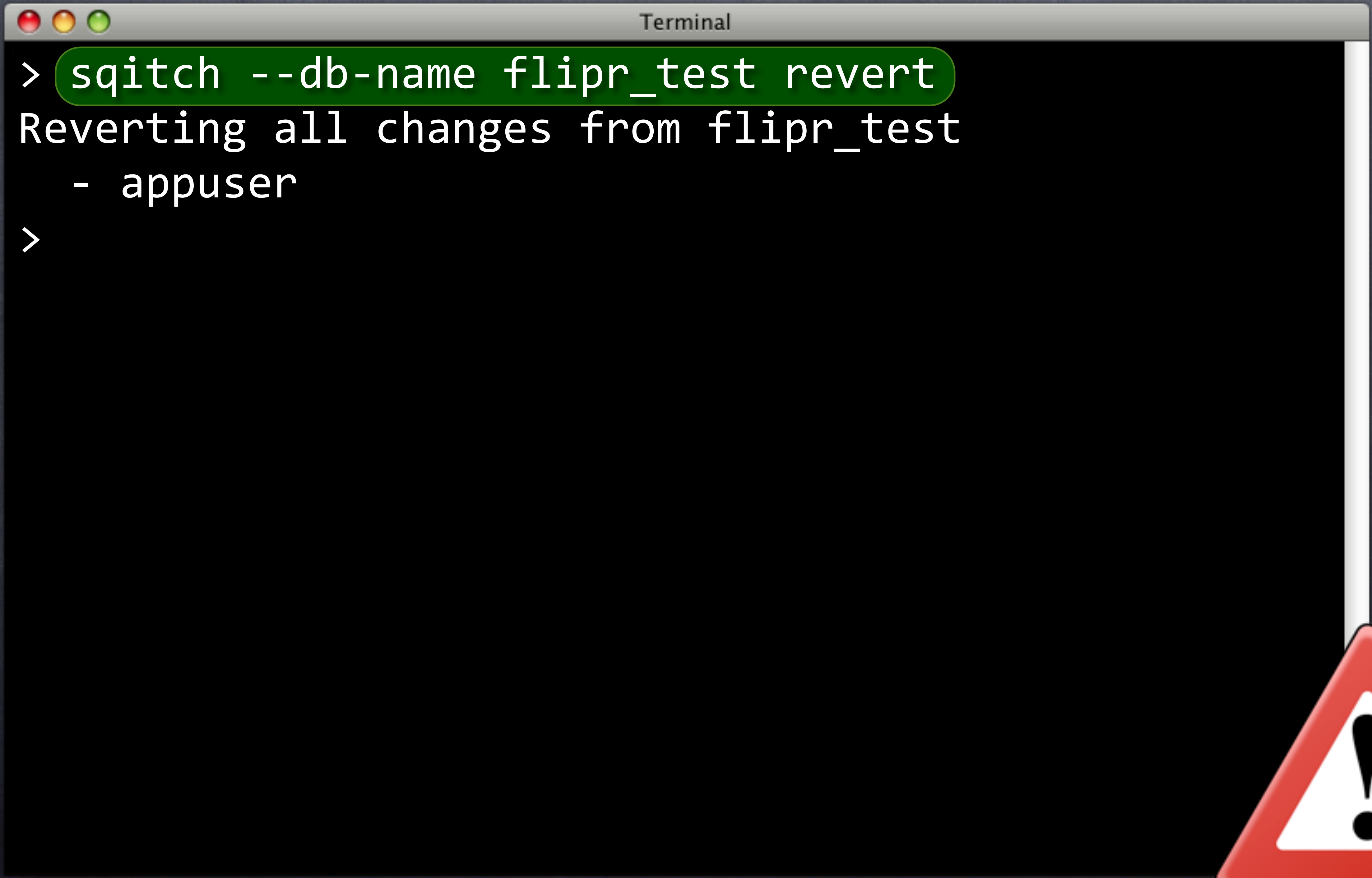
Proposed

Go Back



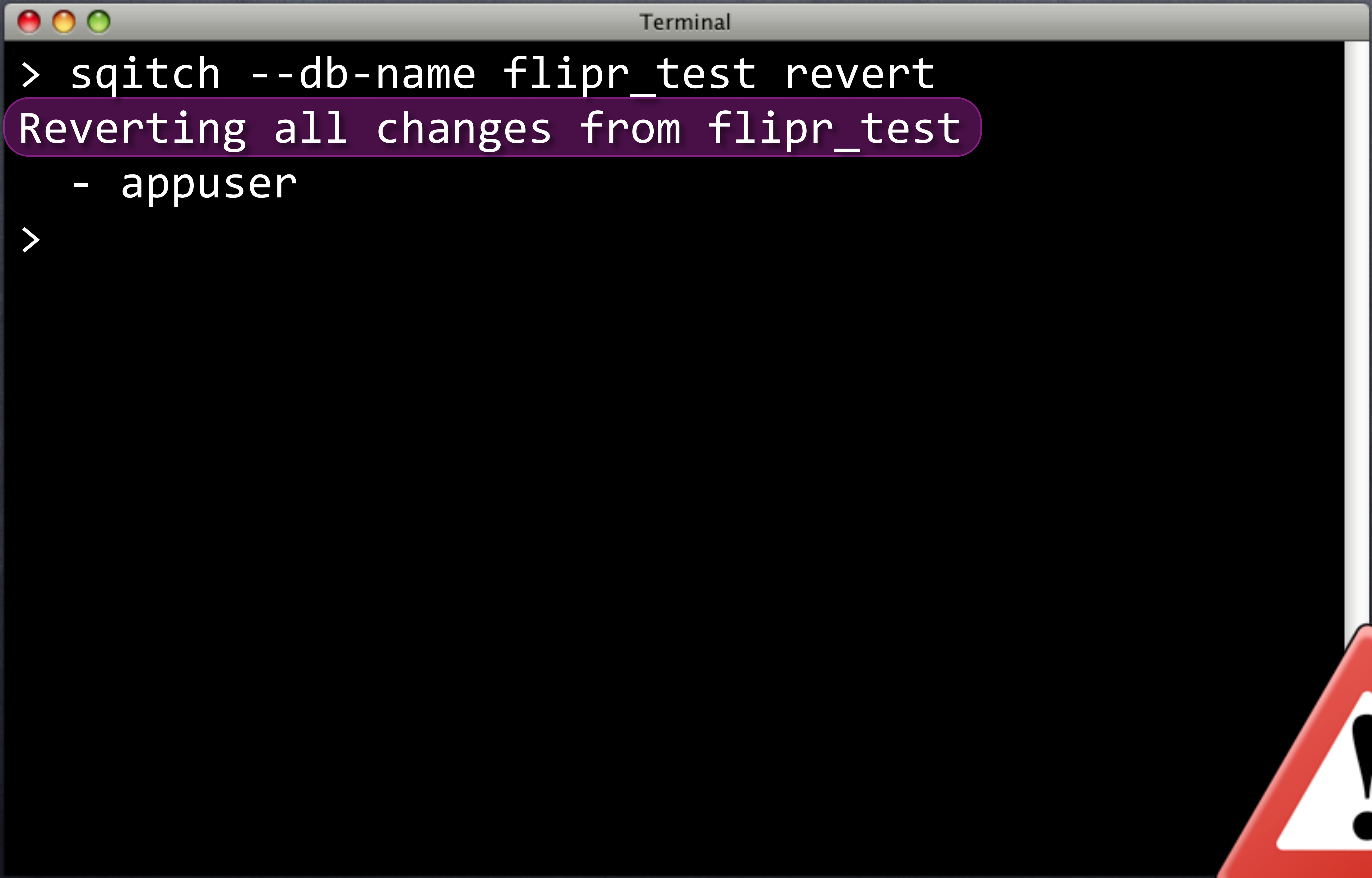
```
>
```

Go Back



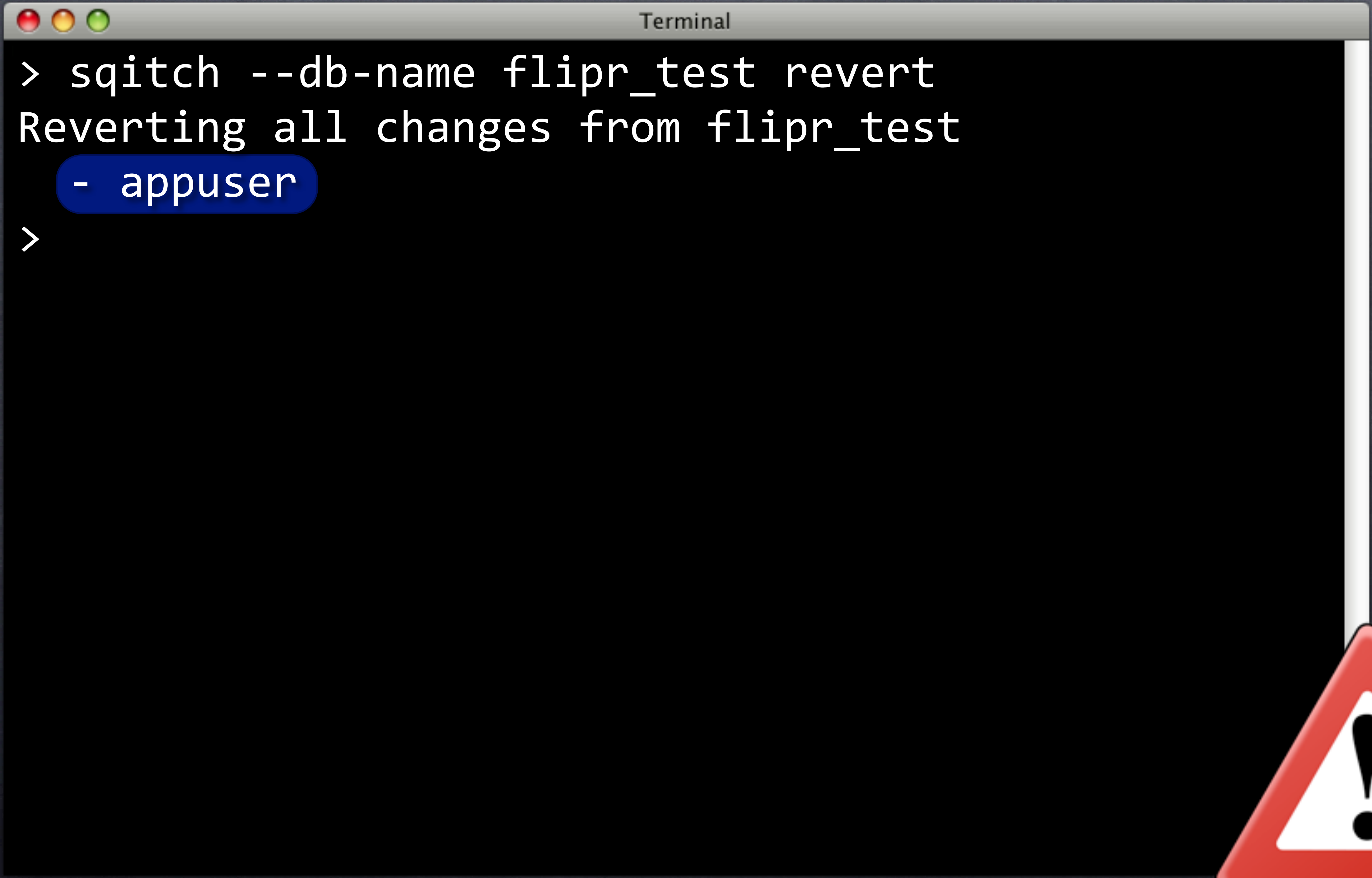
```
> sqitch --db-name flipr_test revert
Reverting all changes from flipr_test
  - appuser
>
```

Go Back



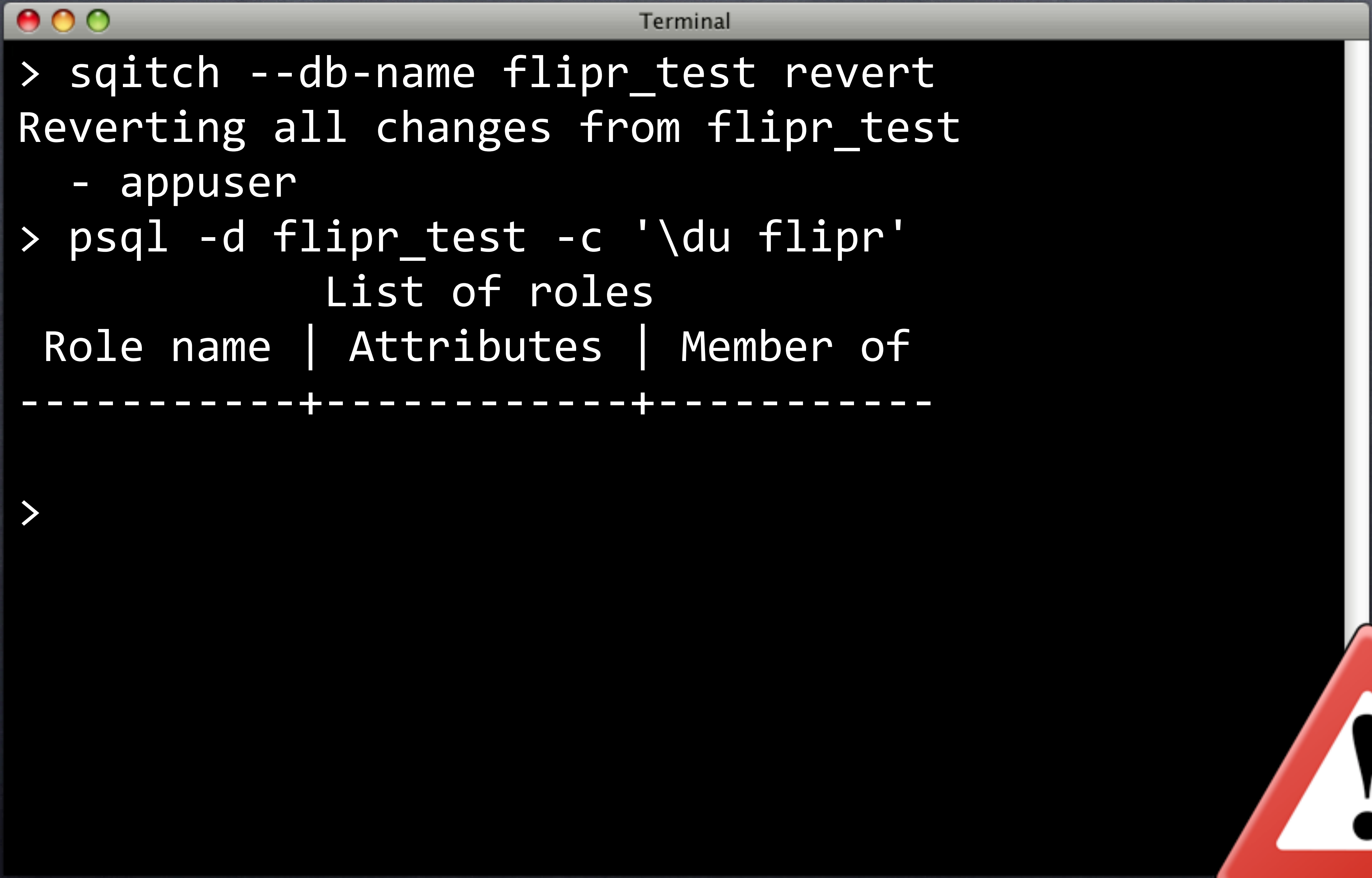
```
> sqitch --db-name flipr_test revert
Reverting all changes from flipr_test
  - appuser
>
```

Go Back



```
> sqitch --db-name flipr_test revert
Reverting all changes from flipr_test
  - appuser
>
```

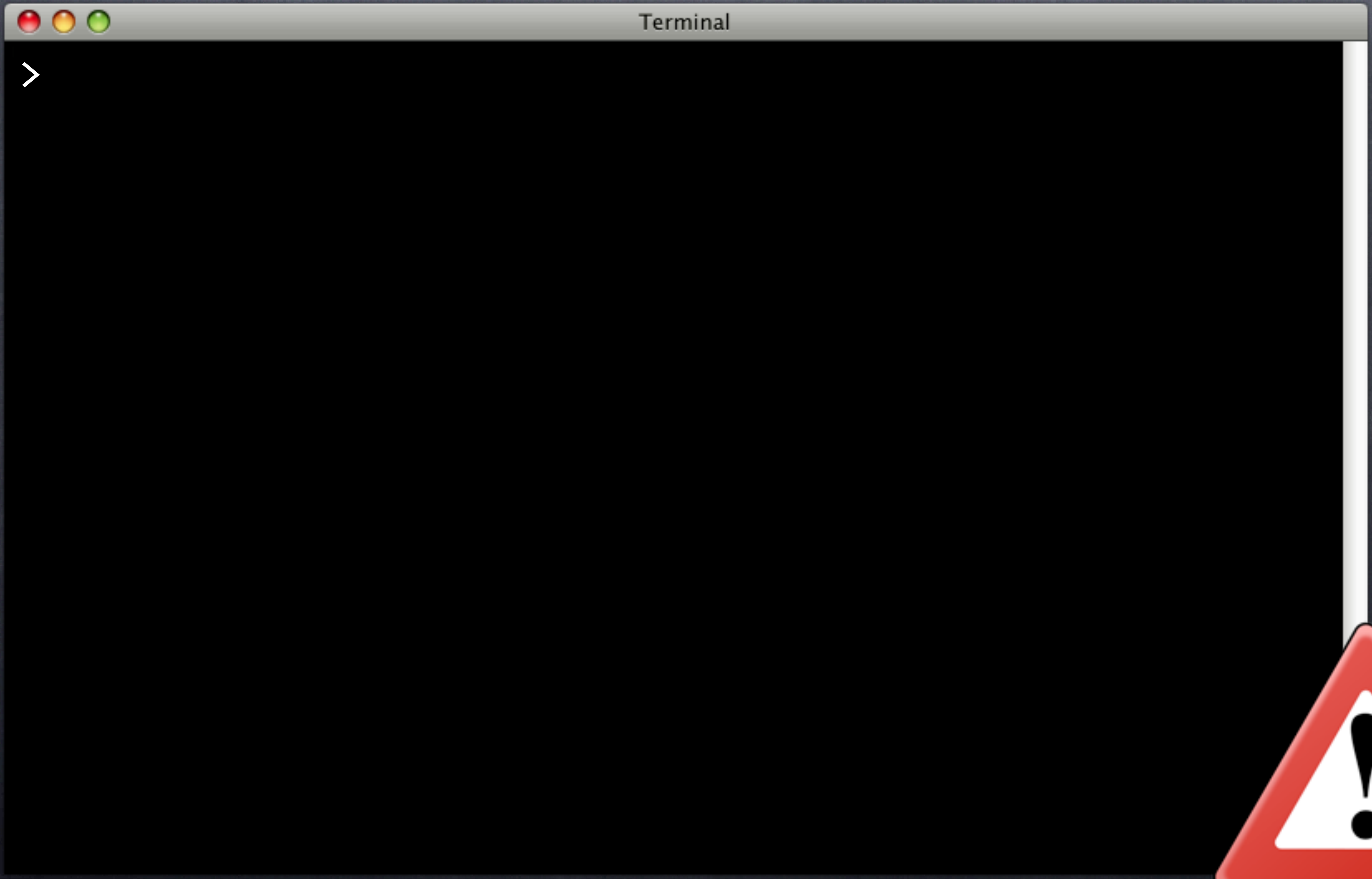
Go Back



```
> sqitch --db-name flipr_test revert
Reverting all changes from flipr_test
  - appuser
> psql -d flipr_test -c '\du flipr'
            List of roles
 Role name | Attributes | Member of
-----------+------------+-----------

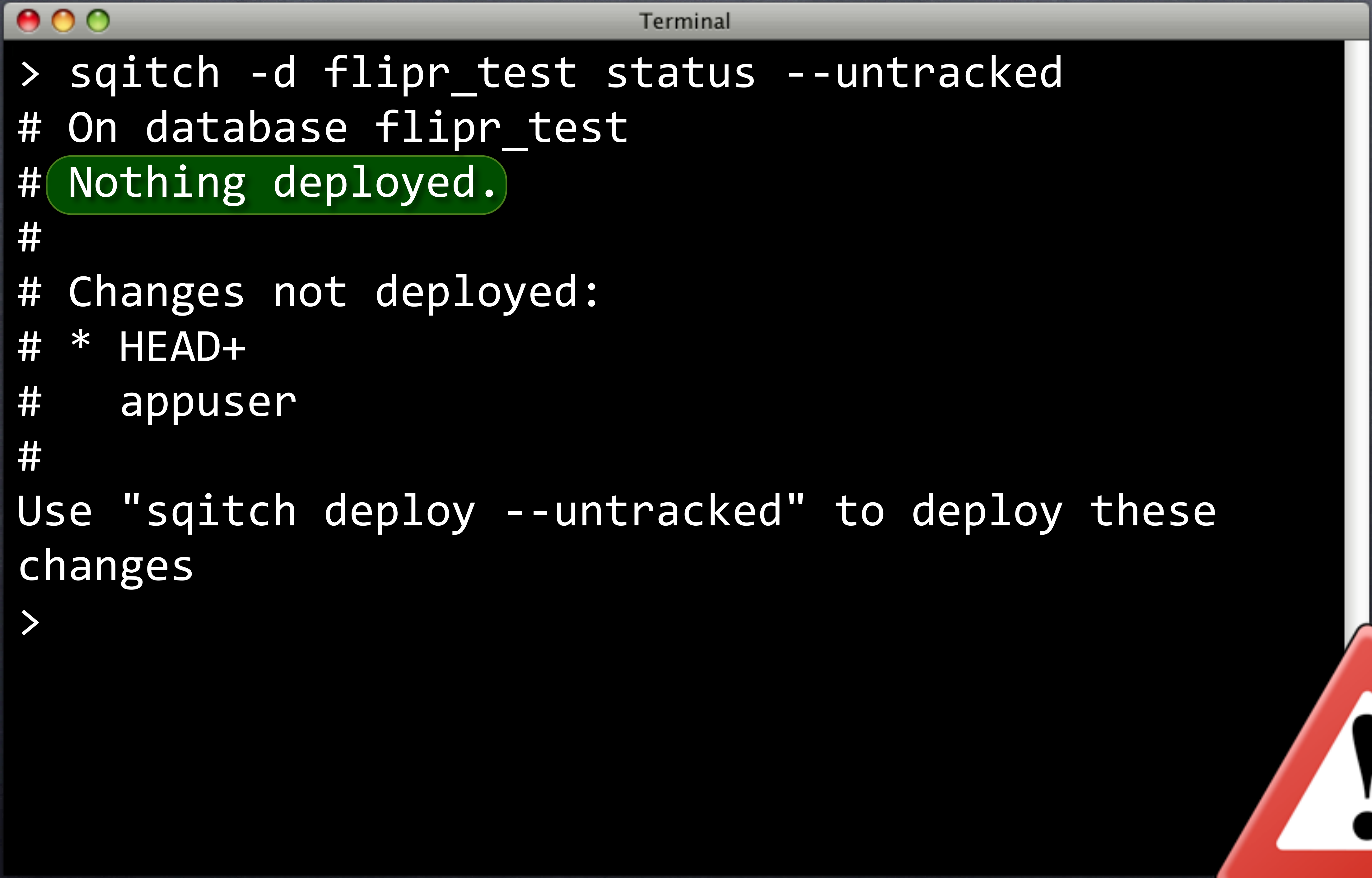

>
```

What's The Status?



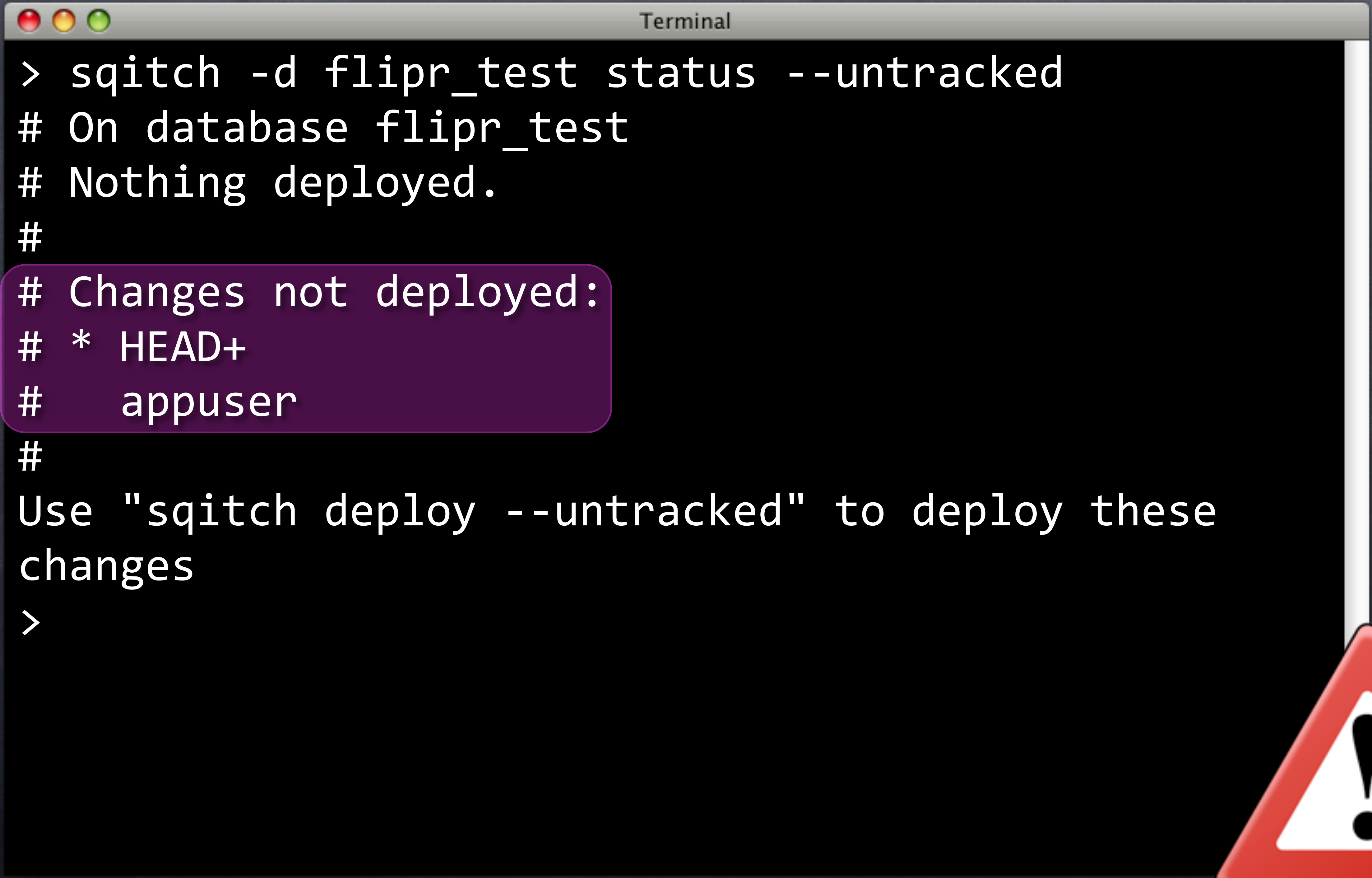
```
>
```

What's The Status?



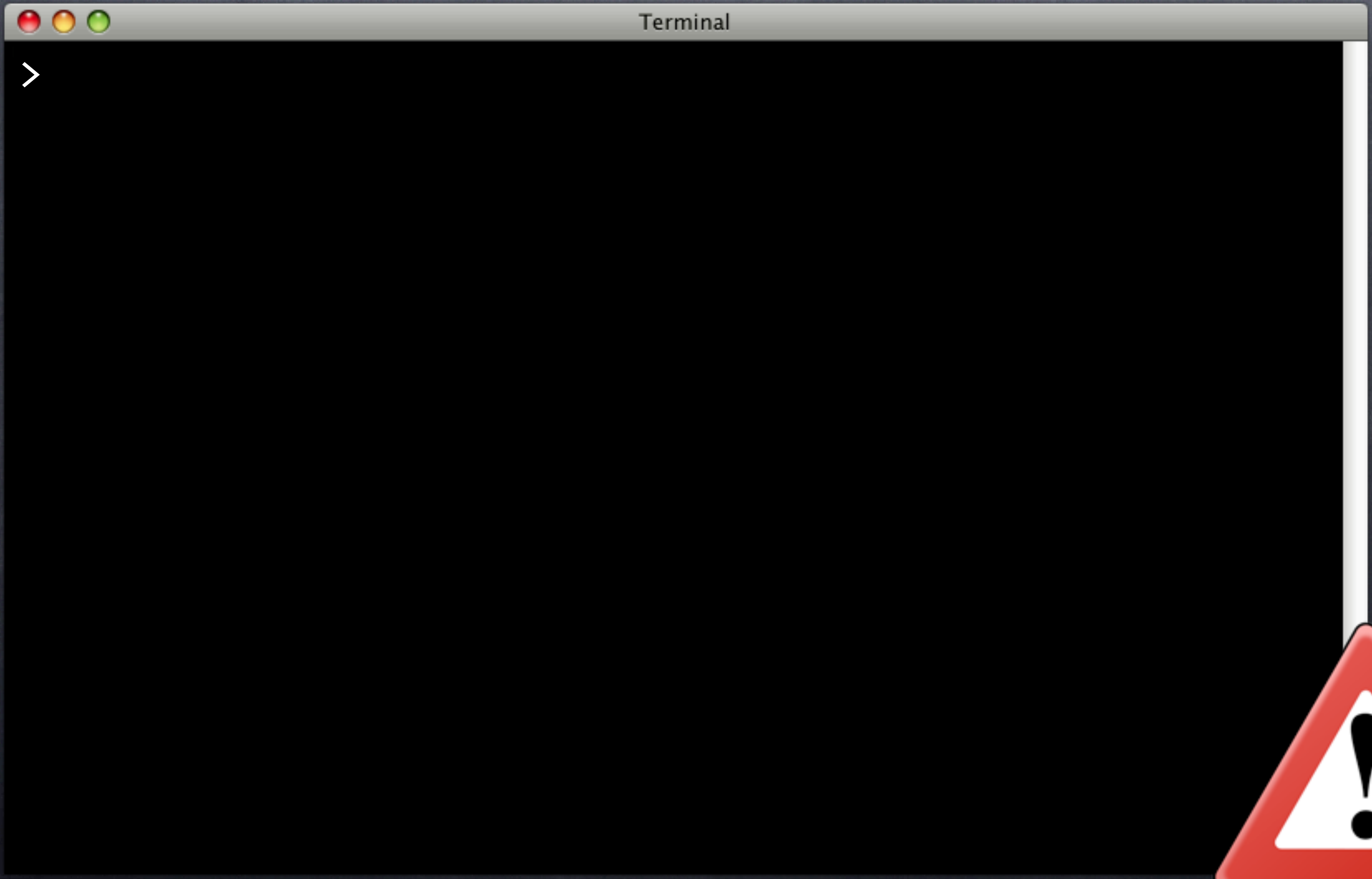
```
> sqitch -d flipr_test status --untracked
# On database flipr_test
# Nothing deployed.
#
# Changes not deployed:
# * HEAD+
#   appuser
#
Use "sqitch deploy --untracked" to deploy these
changes
>
```

What's The Status?



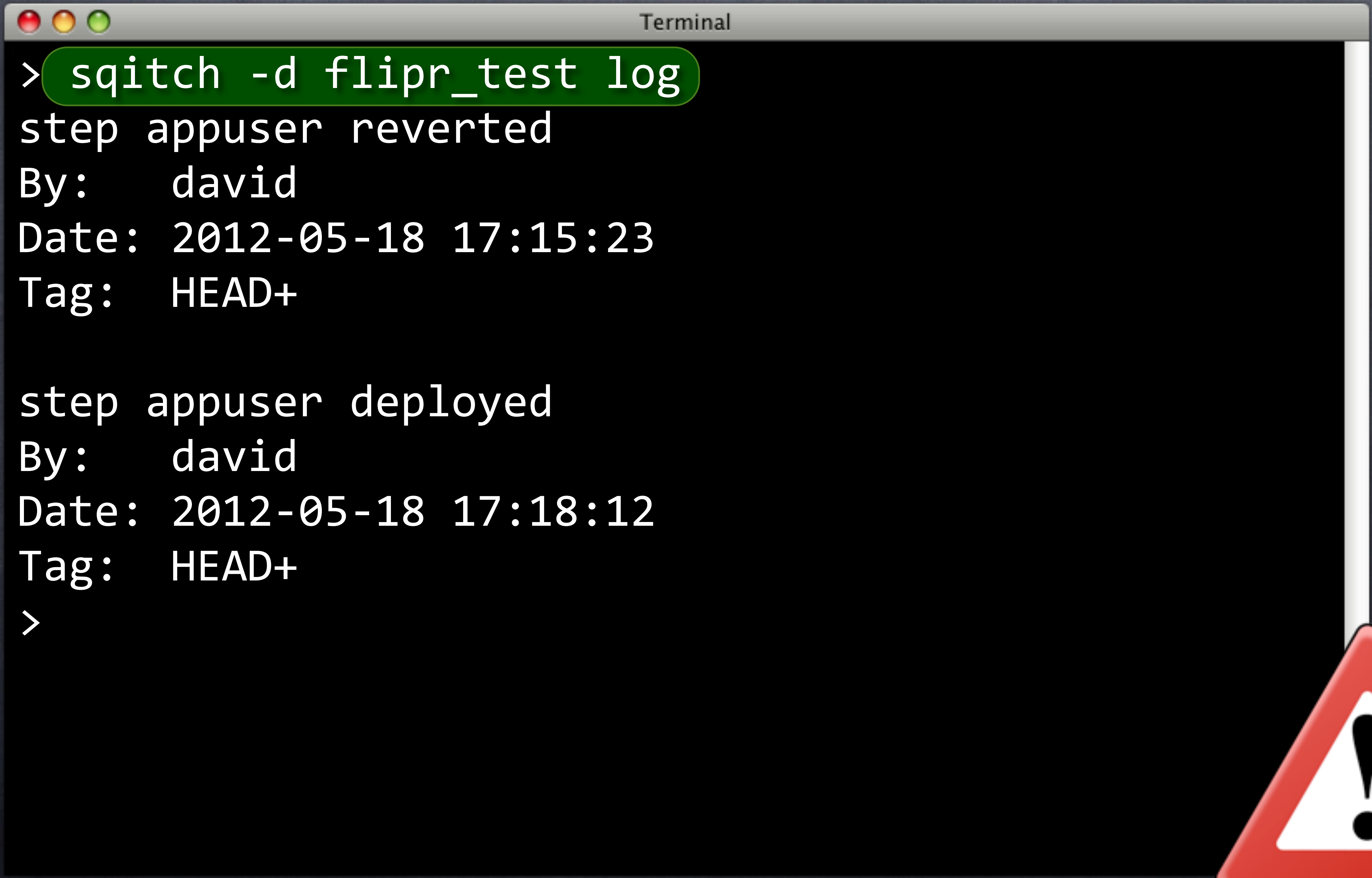
```
> sqitch -d flipr_test status --untracked
# On database flipr_test
# Nothing deployed.
#
# Changes not deployed:
# * HEAD+
#   appuser
#
Use "sqitch deploy --untracked" to deploy these
changes
>
```

History



```
>
```

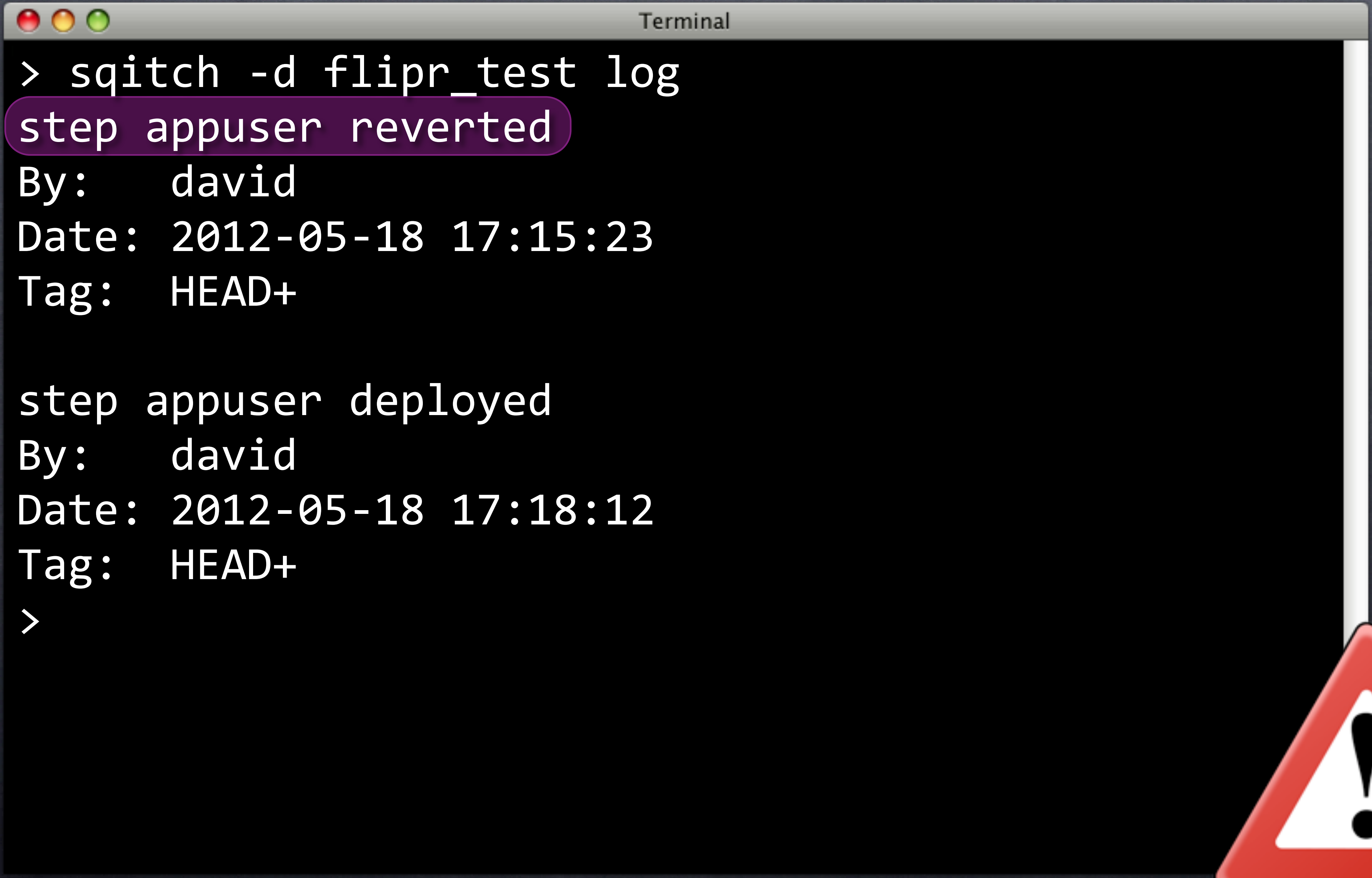
History



```
> sqitch -d flipr_test log
step appuser reverted
By:    david
Date: 2012-05-18 17:15:23
Tag:   HEAD+

step appuser deployed
By:    david
Date: 2012-05-18 17:18:12
Tag:   HEAD+
>
```

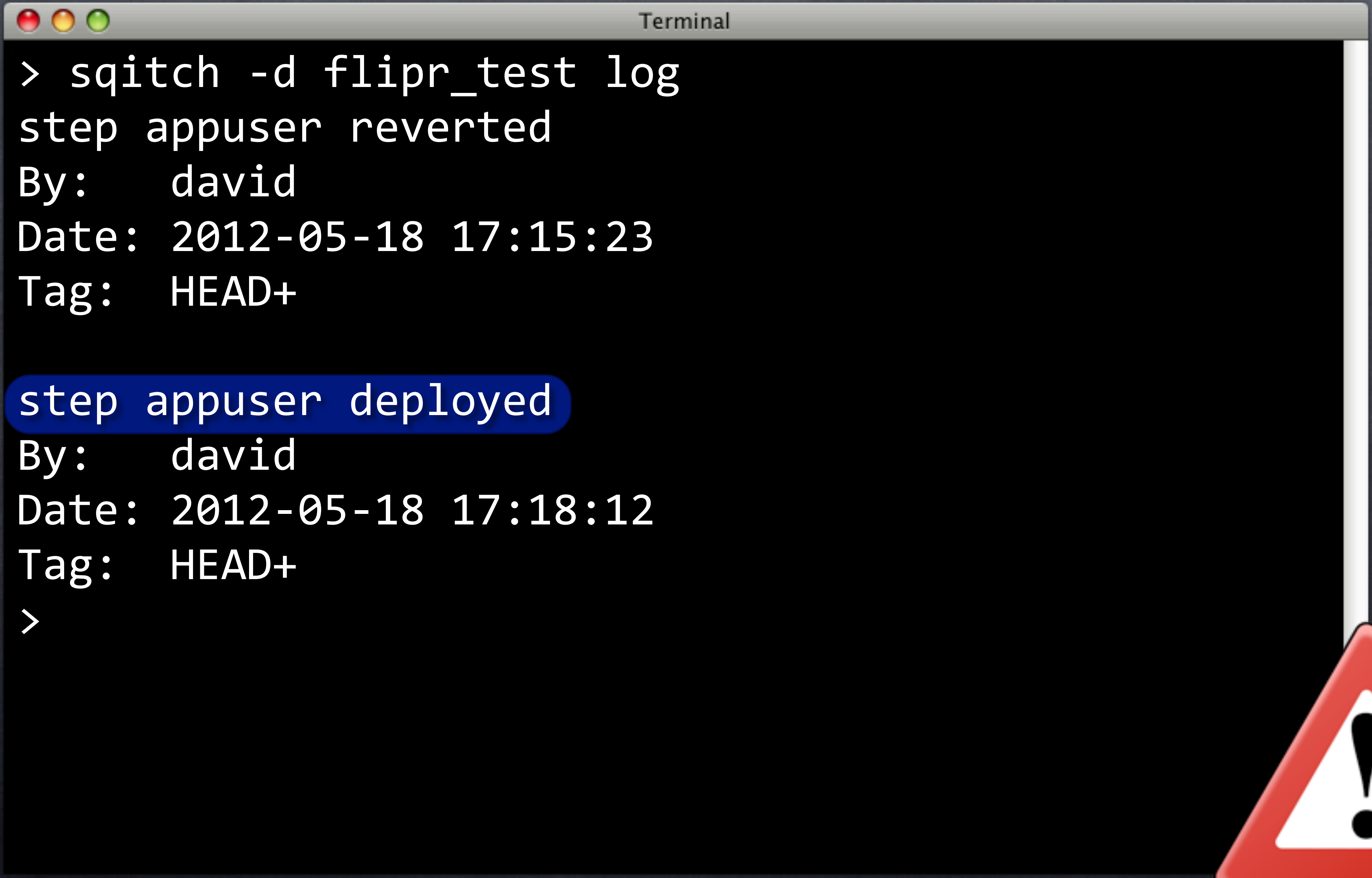
History



```
> sqitch -d flipr_test log
step appuser reverted
By:    david
Date:  2012-05-18 17:15:23
Tag:   HEAD+

step appuser deployed
By:    david
Date:  2012-05-18 17:18:12
Tag:   HEAD+
>
```

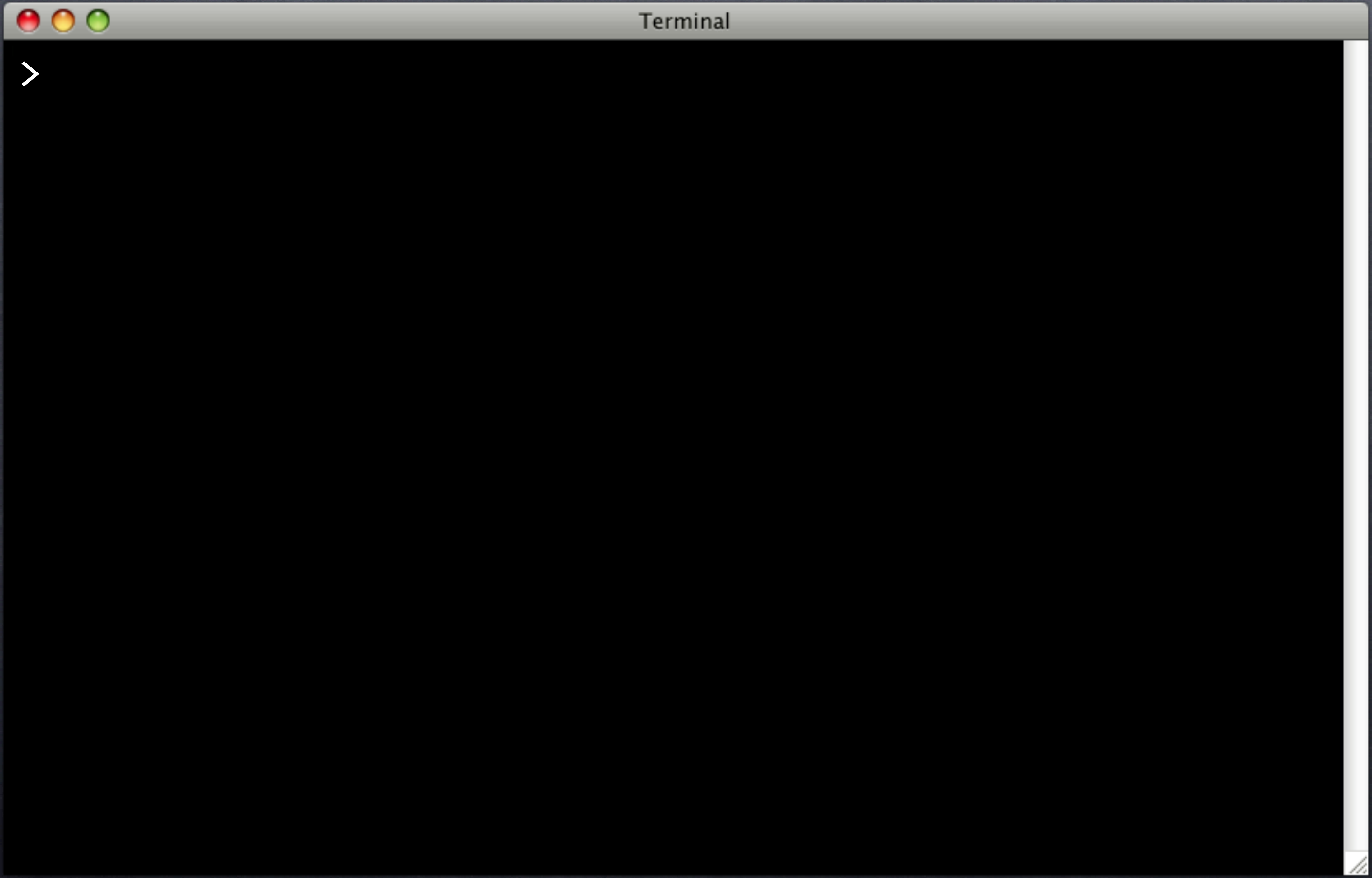
History



```
> sqitch -d flipr_test log
step appuser reverted
By:    david
Date:  2012-05-18 17:15:23
Tag:   HEAD+

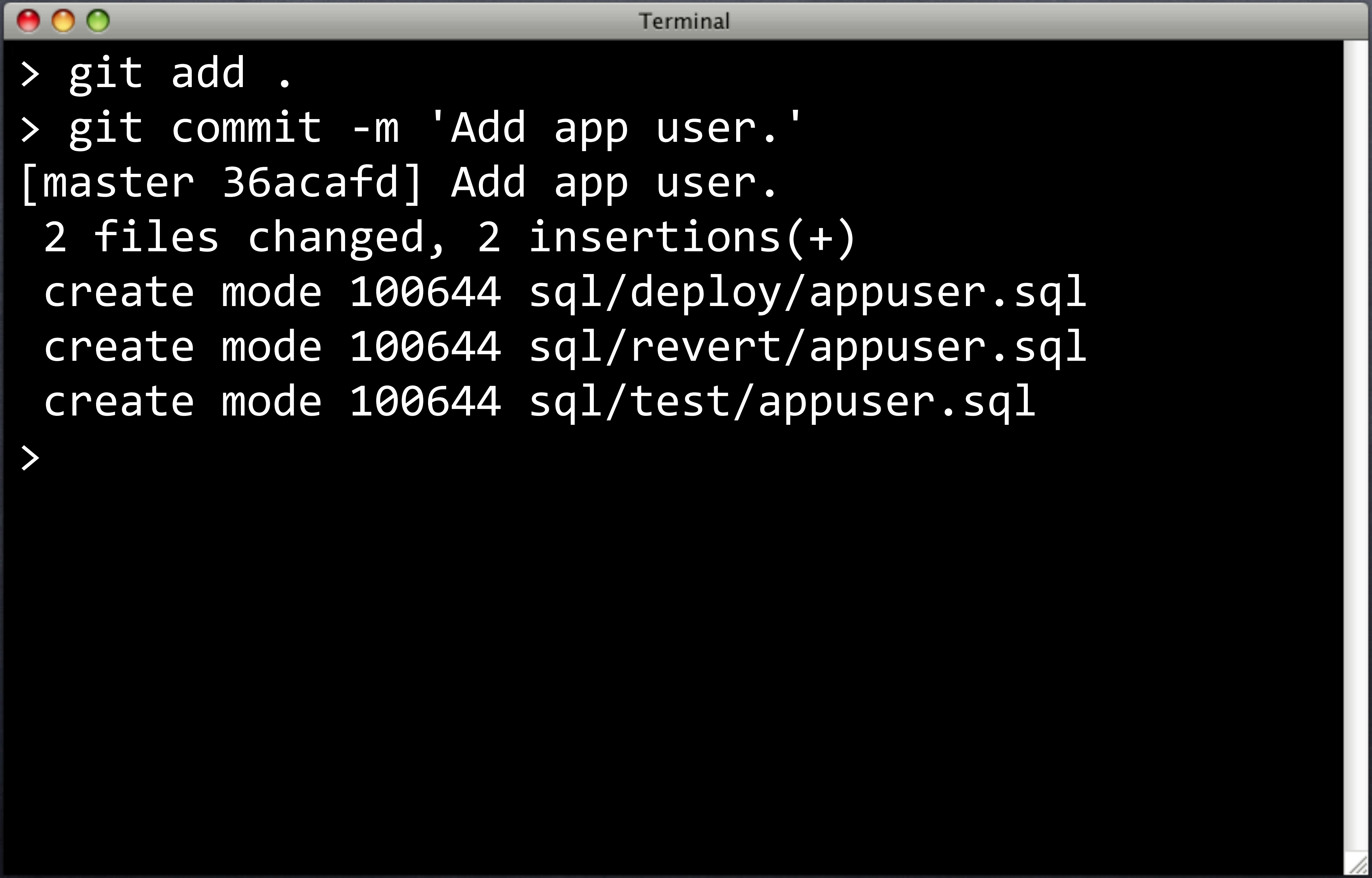
step appuser deployed
By:    david
Date:  2012-05-18 17:18:12
Tag:   HEAD+
>
```

Commit It!



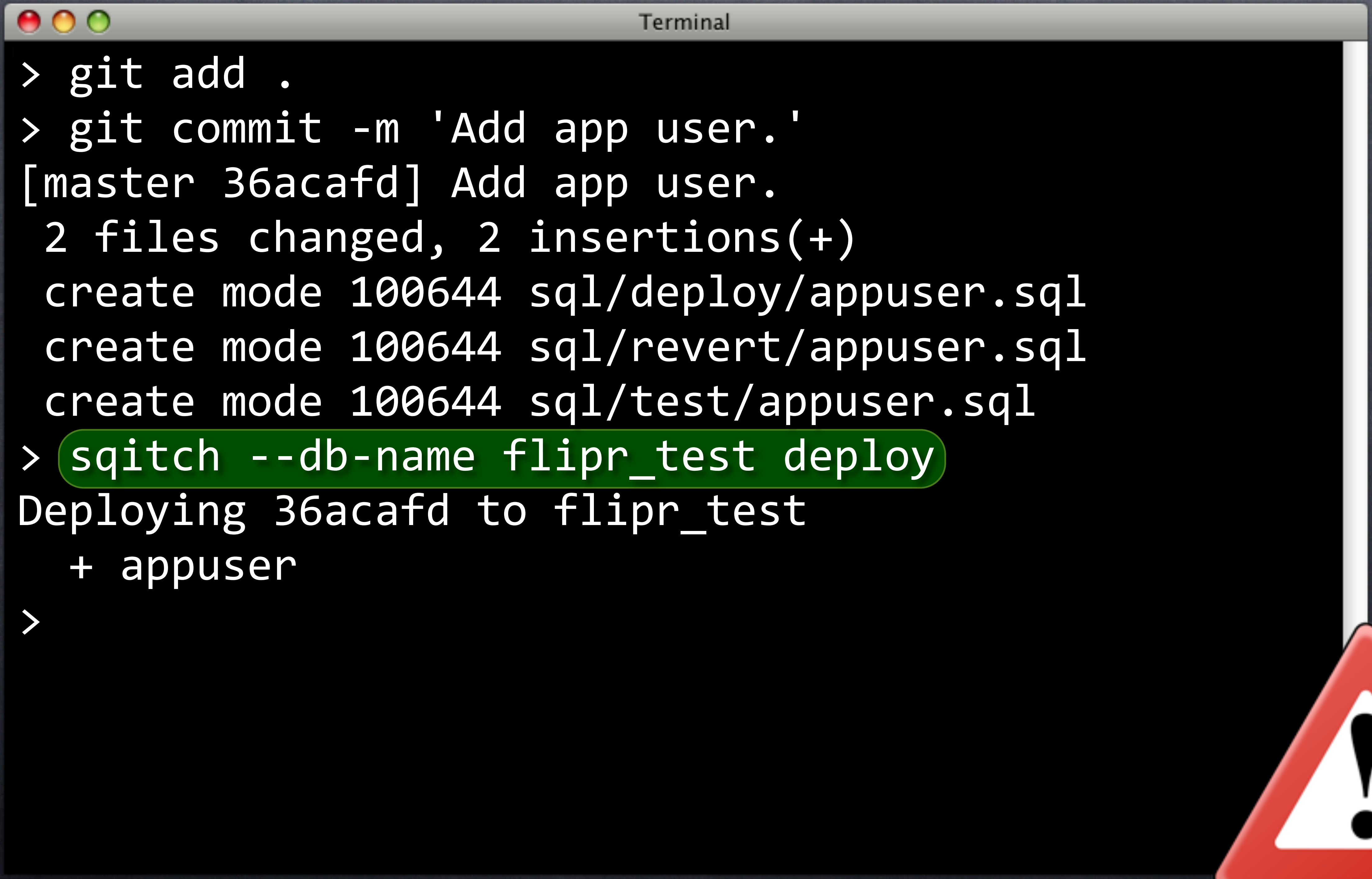
```
>
```

Commit It!



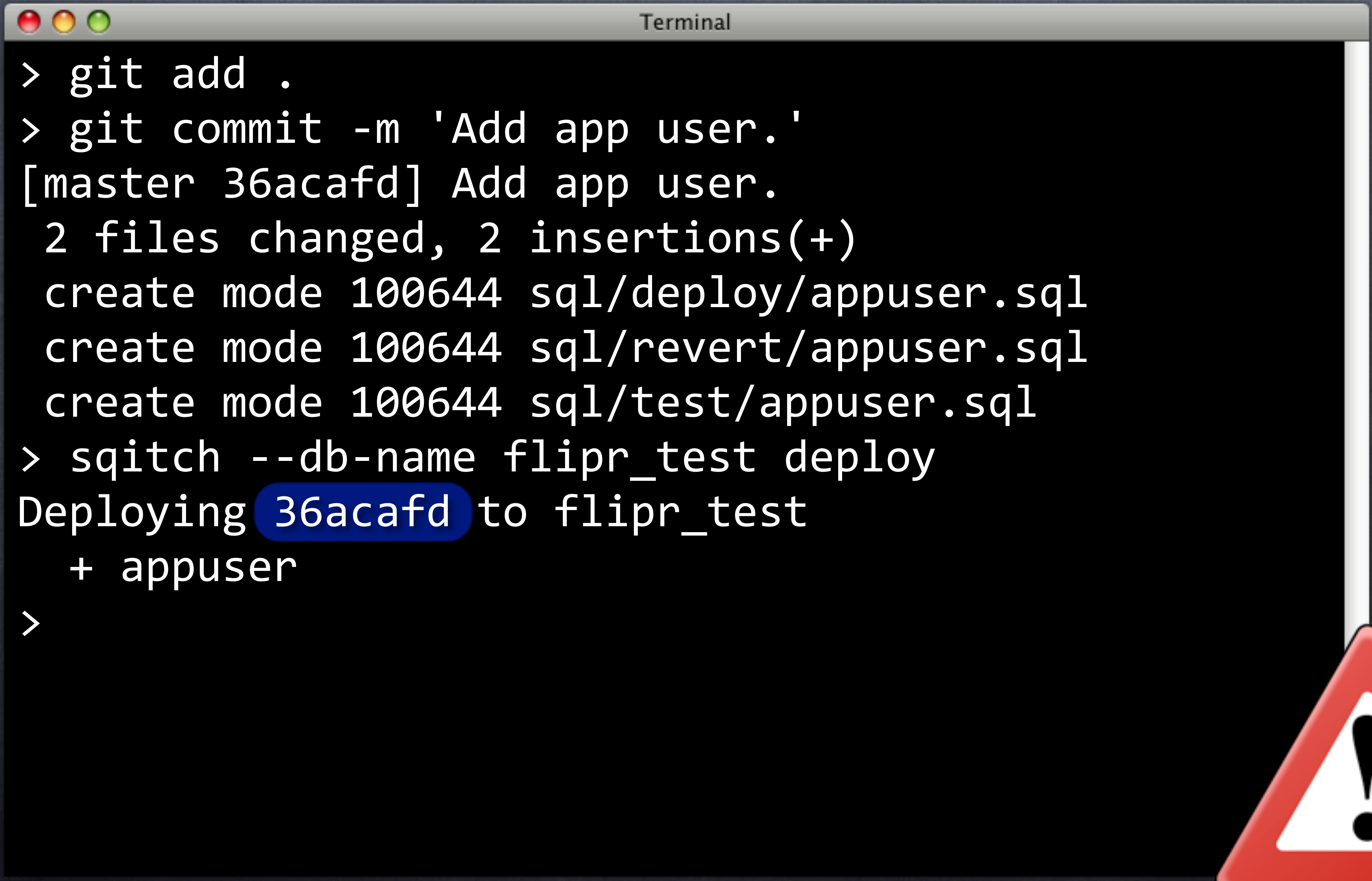
```
> git add .
> git commit -m 'Add app user.'
[master 36acafd] Add app user.
 2 files changed, 2 insertions(+)
 create mode 100644 sql/deploy/appuser.sql
 create mode 100644 sql/revert/appuser.sql
 create mode 100644 sql/test/appuser.sql
>
```

Commit It!



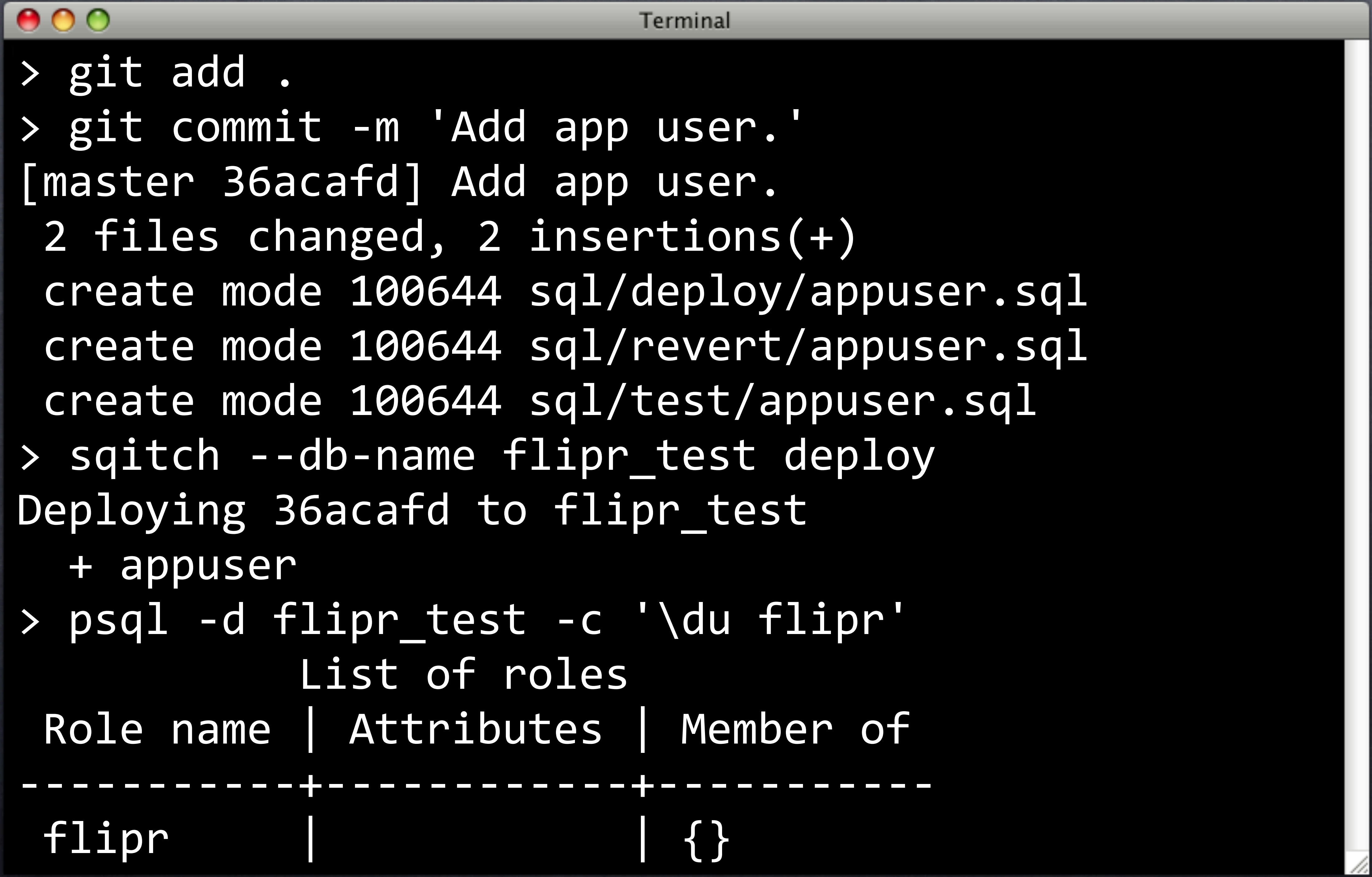
```
> git add .
> git commit -m 'Add app user.'
[master 36acafd] Add app user.
 2 files changed, 2 insertions(+)
 create mode 100644 sql/deploy/appuser.sql
 create mode 100644 sql/revert/appuser.sql
 create mode 100644 sql/test/appuser.sql
> sqitch --db-name flipr_test deploy
Deploying 36acafd to flipr_test
  + appuser
>
```

Commit It!



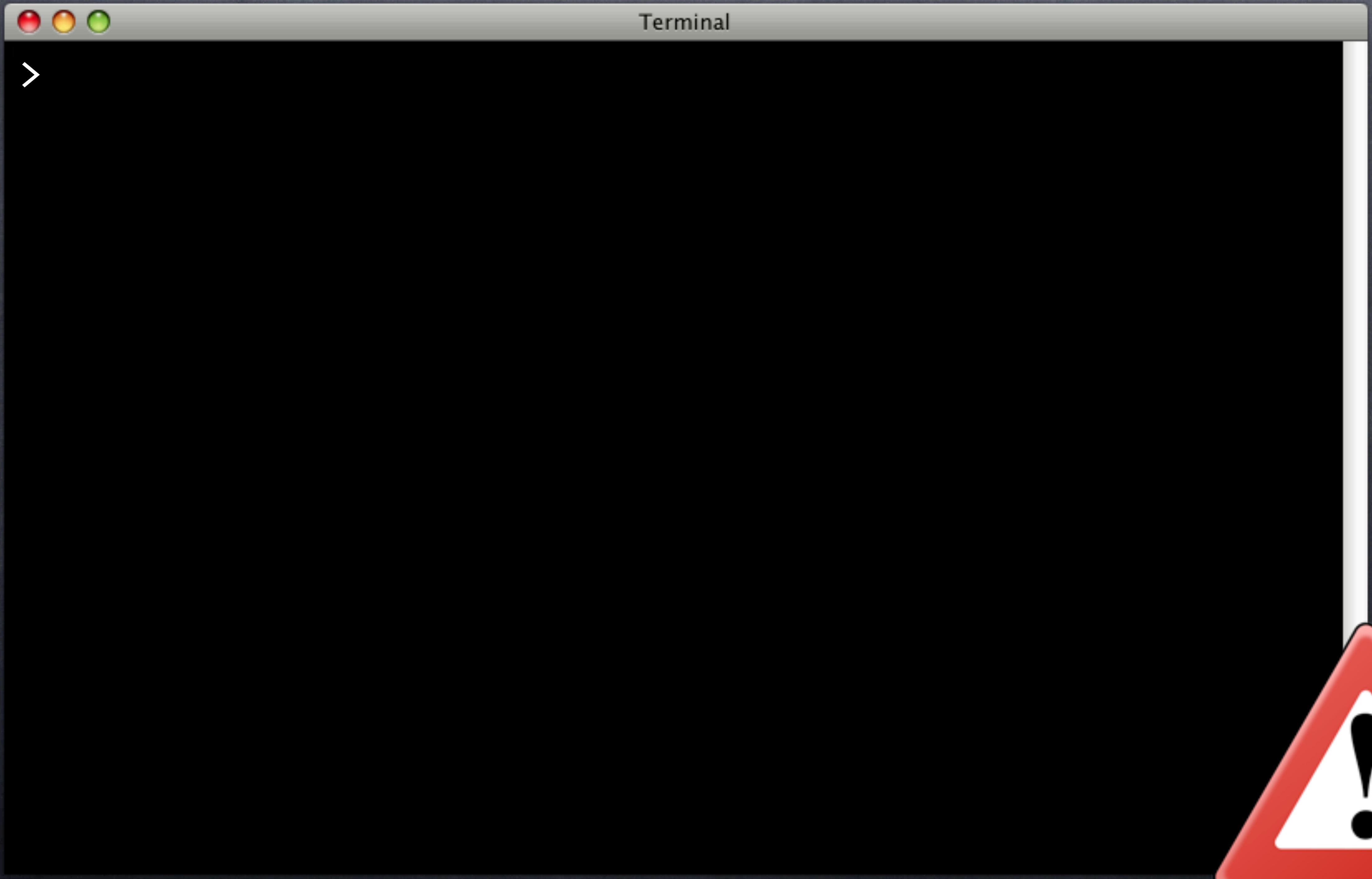
```
> git add .
> git commit -m 'Add app user.'
[master 36acafd] Add app user.
 2 files changed, 2 insertions(+)
 create mode 100644 sql/deploy/appuser.sql
 create mode 100644 sql/revert/appuser.sql
 create mode 100644 sql/test/appuser.sql
> sqitch --db-name flipr_test deploy
Deploying 36acafd to flipr_test
  + appuser
>
```

Commit It!



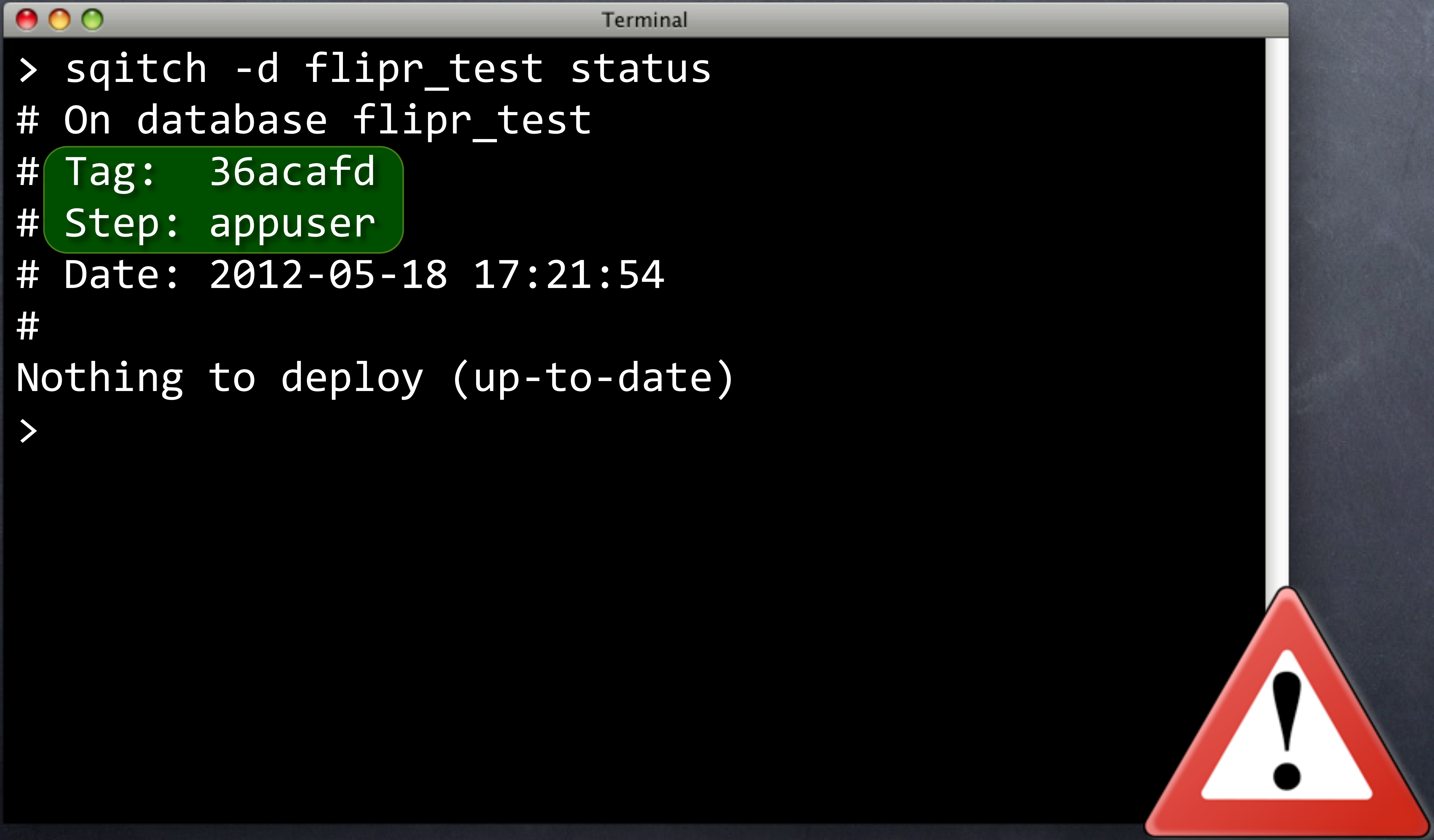
```
> git add .
> git commit -m 'Add app user.'
[master 36acafd] Add app user.
 2 files changed, 2 insertions(+)
 create mode 100644 sql/deploy/appuser.sql
 create mode 100644 sql/revert/appuser.sql
 create mode 100644 sql/test/appuser.sql
> sqitch --db-name flipr_test deploy
Deploying 36acafd to flipr_test
  + appuser
> psql -d flipr_test -c '\du flipr'
           List of roles
 Role name | Attributes | Member of
-----------+------------+-----------
 flipr     |            | {}
```

Status Update



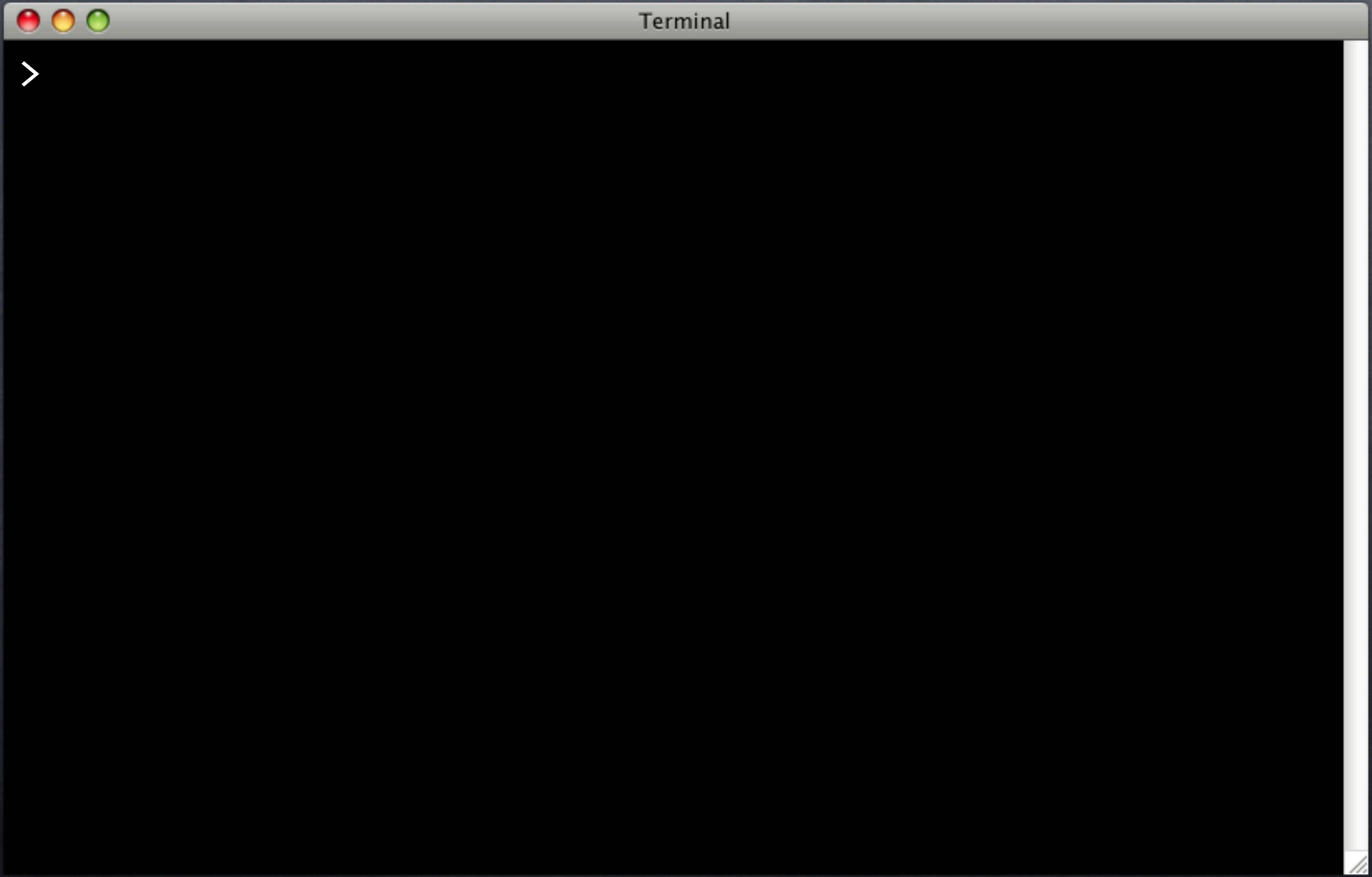
```
>
```

Status Update



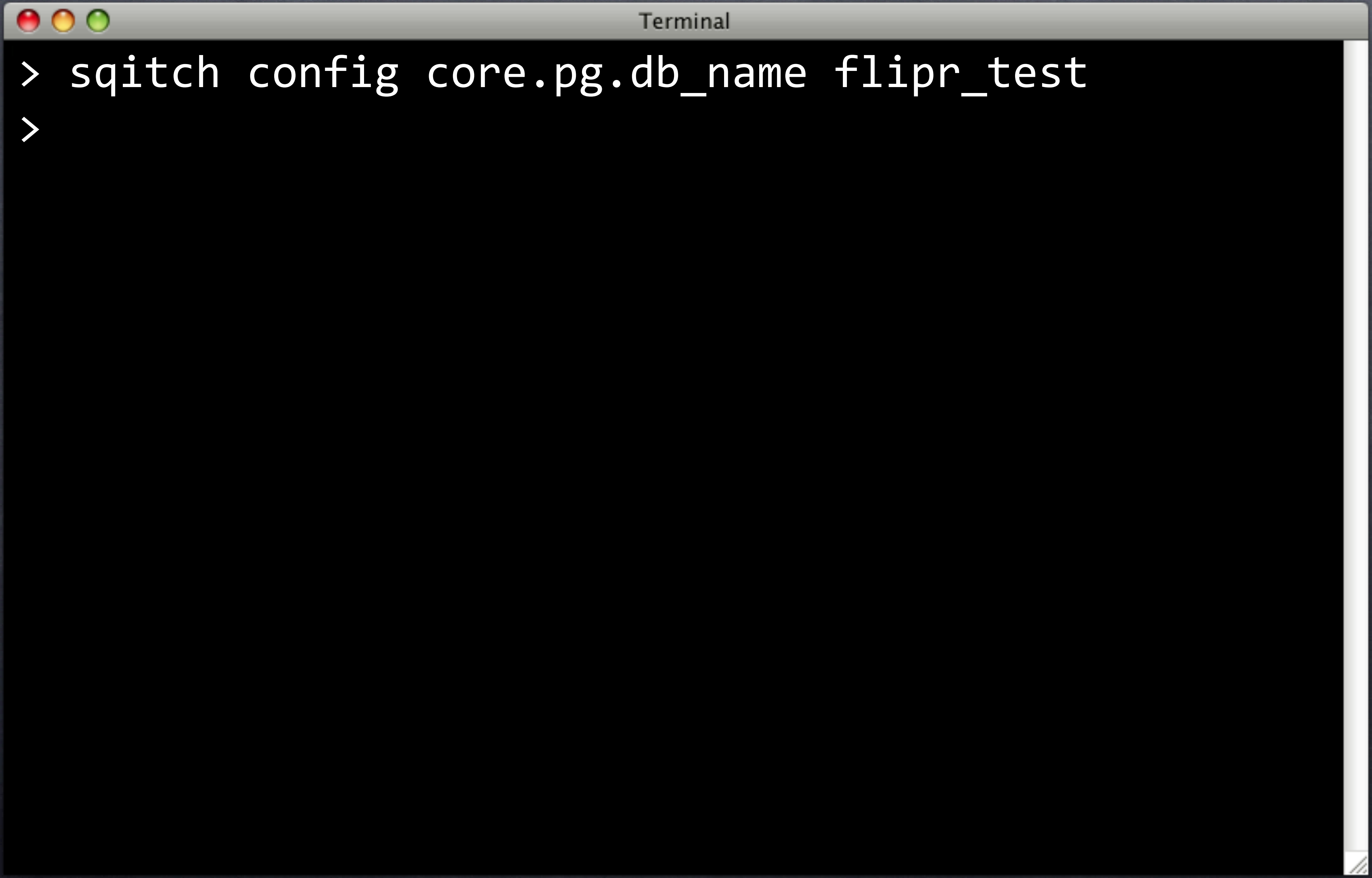
```
> sqitch -d flipr_test status
# On database flipr_test
# Tag:  36acafd
# Step: appuser
# Date: 2012-05-18 17:21:54
#
Nothing to deploy (up-to-date)
>
```

Save My Fingers



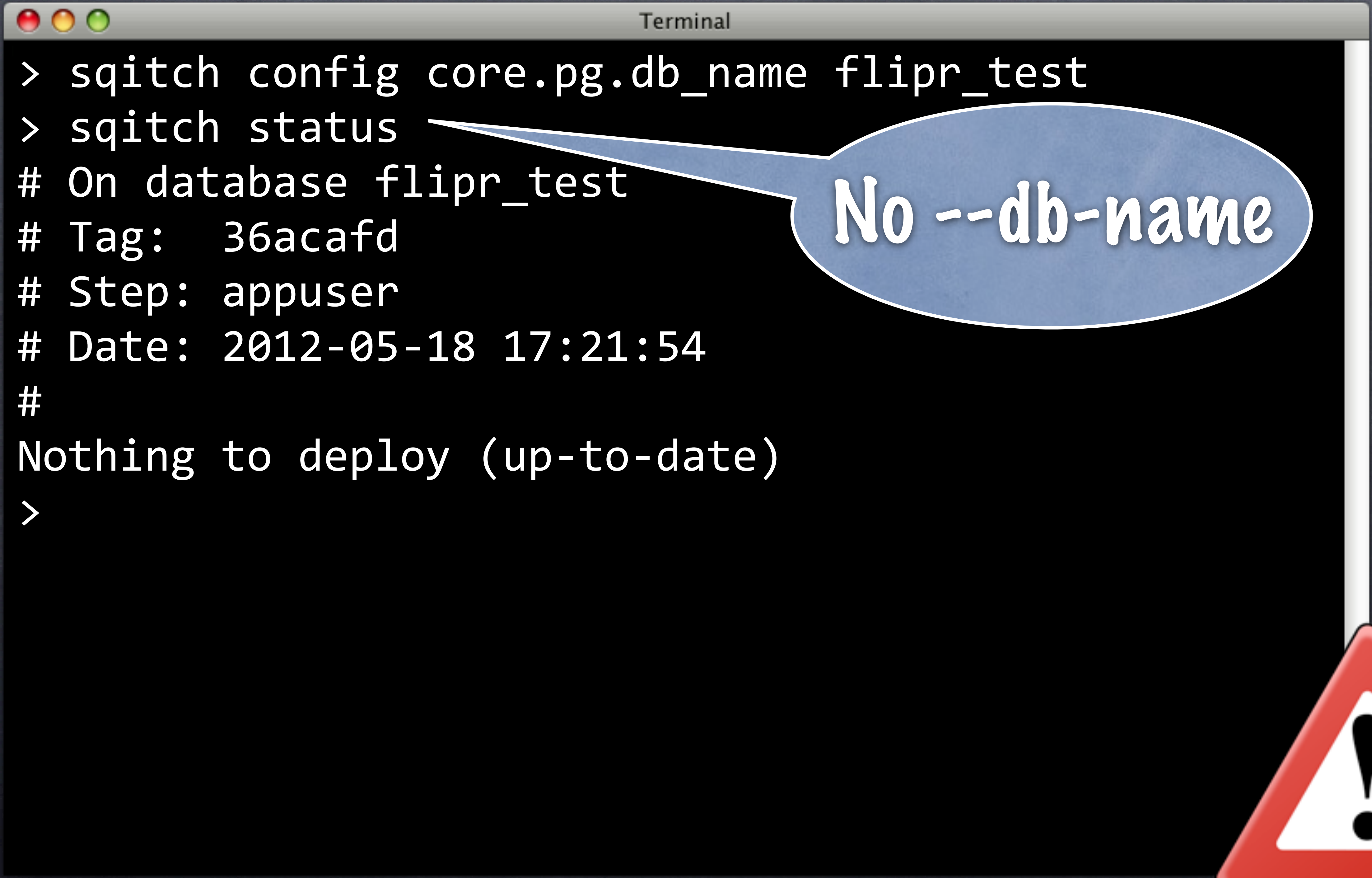
```
>
```

Save My Fingers



```
> sqitch config core.pg.db_name flipr_test
>
```

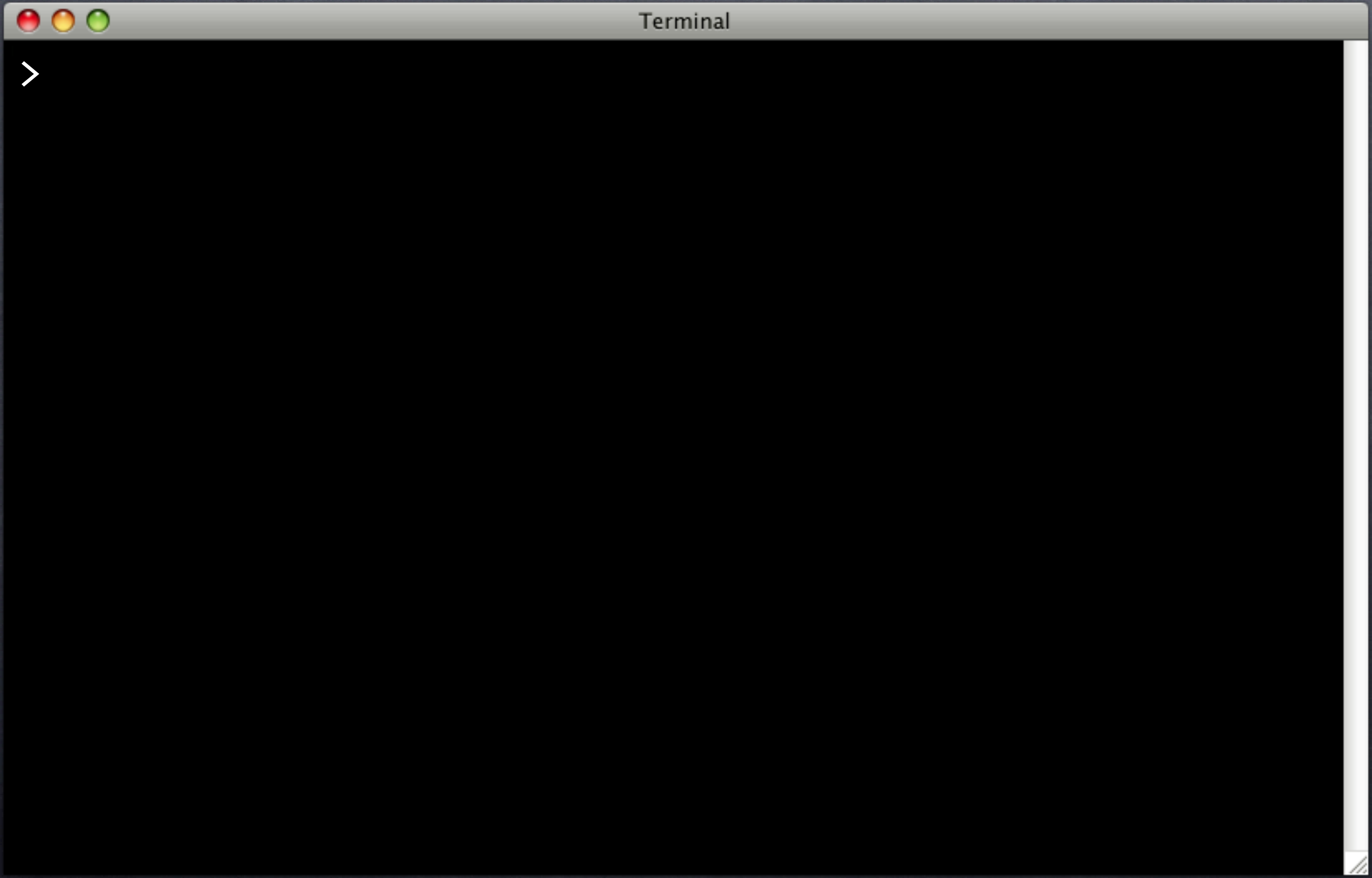
Save My Fingers



```
> sqitch config core.pg.db_name flipr_test
> sqitch status
# On database flipr_test
# Tag:  36acafd
# Step: appuser
# Date: 2012-05-18 17:21:54
#
Nothing to deploy (up-to-date)
>
```

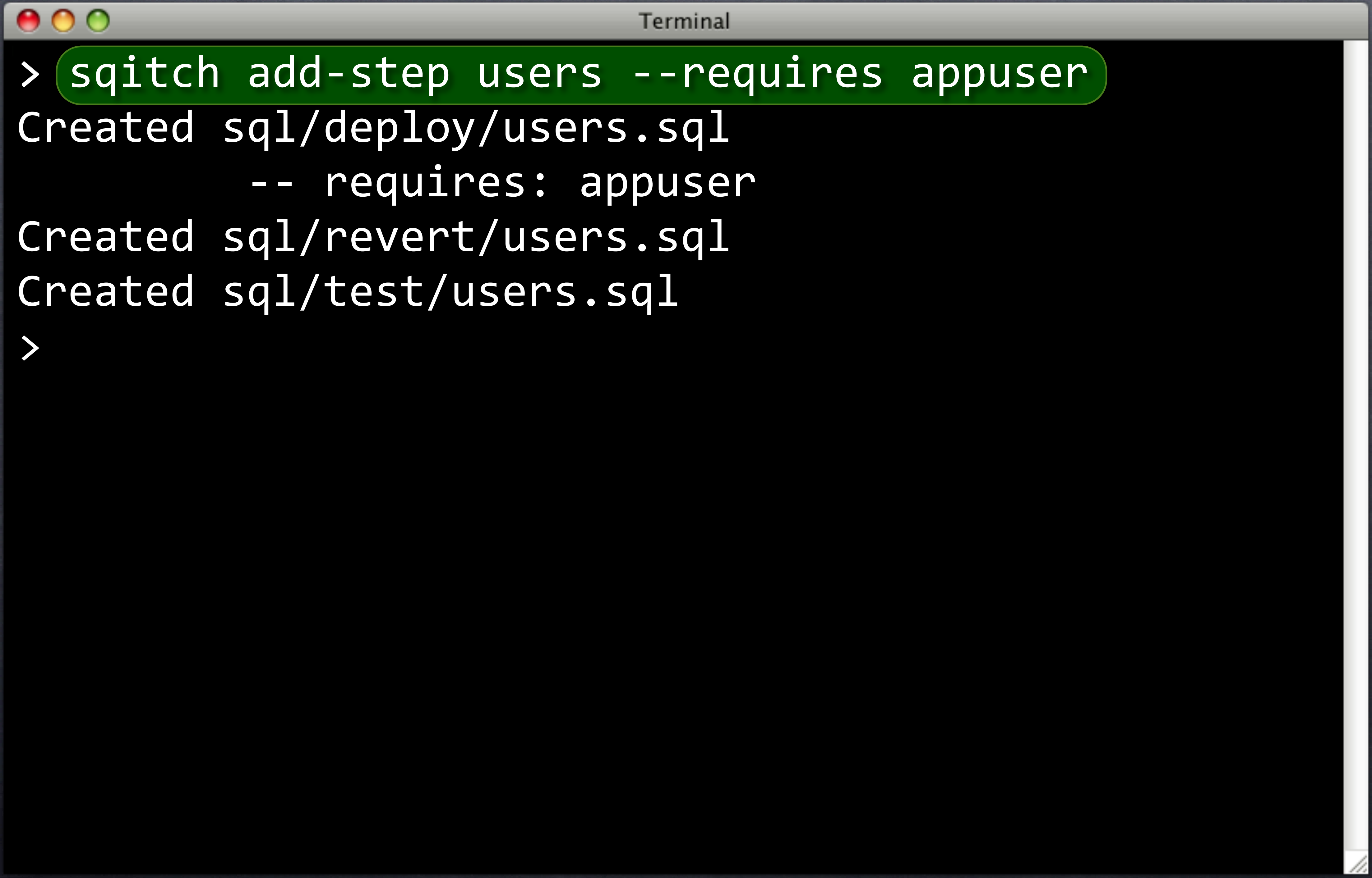
No --db-name

Dependencies!



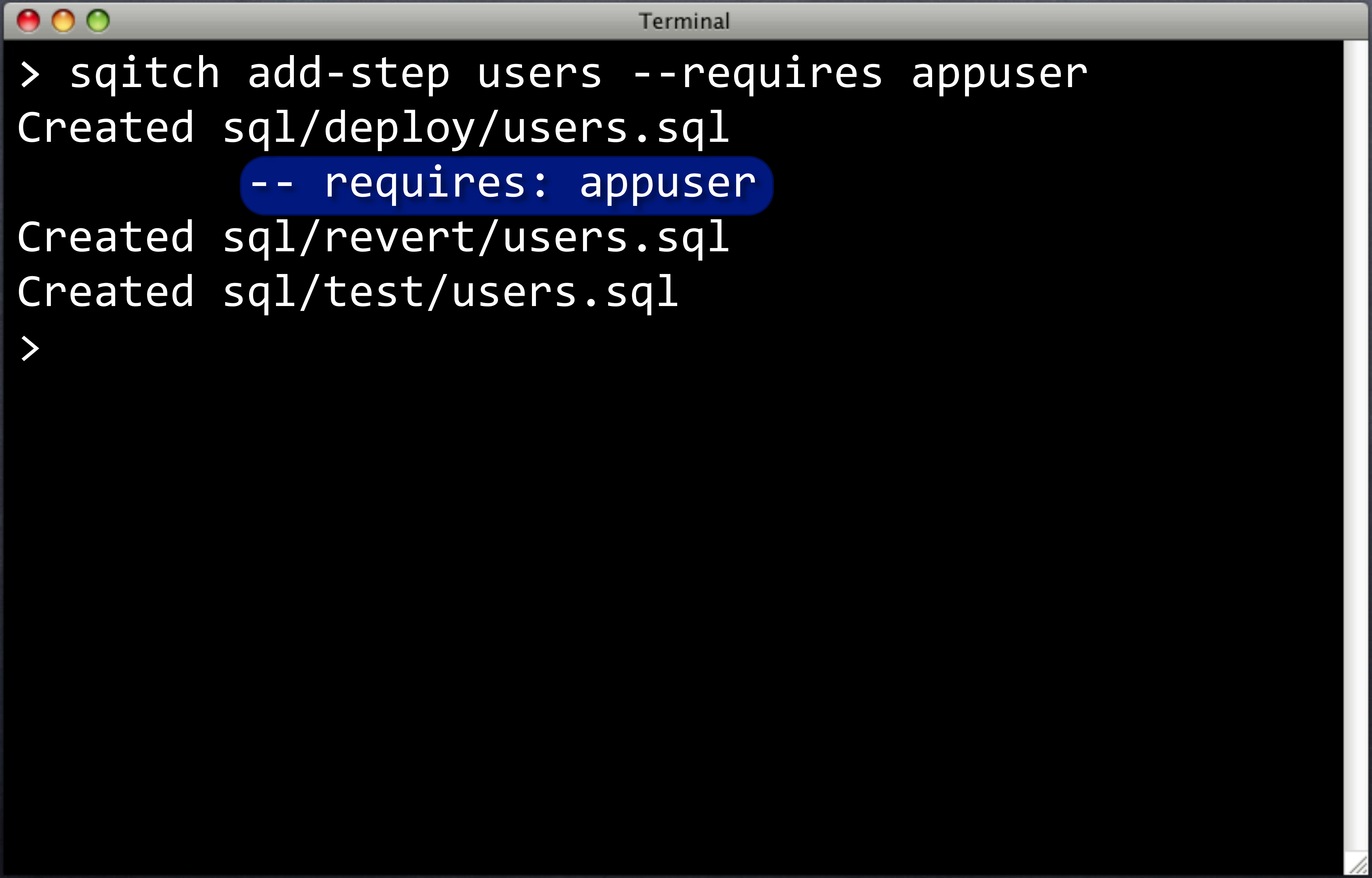
```
>
```

Dependencies!



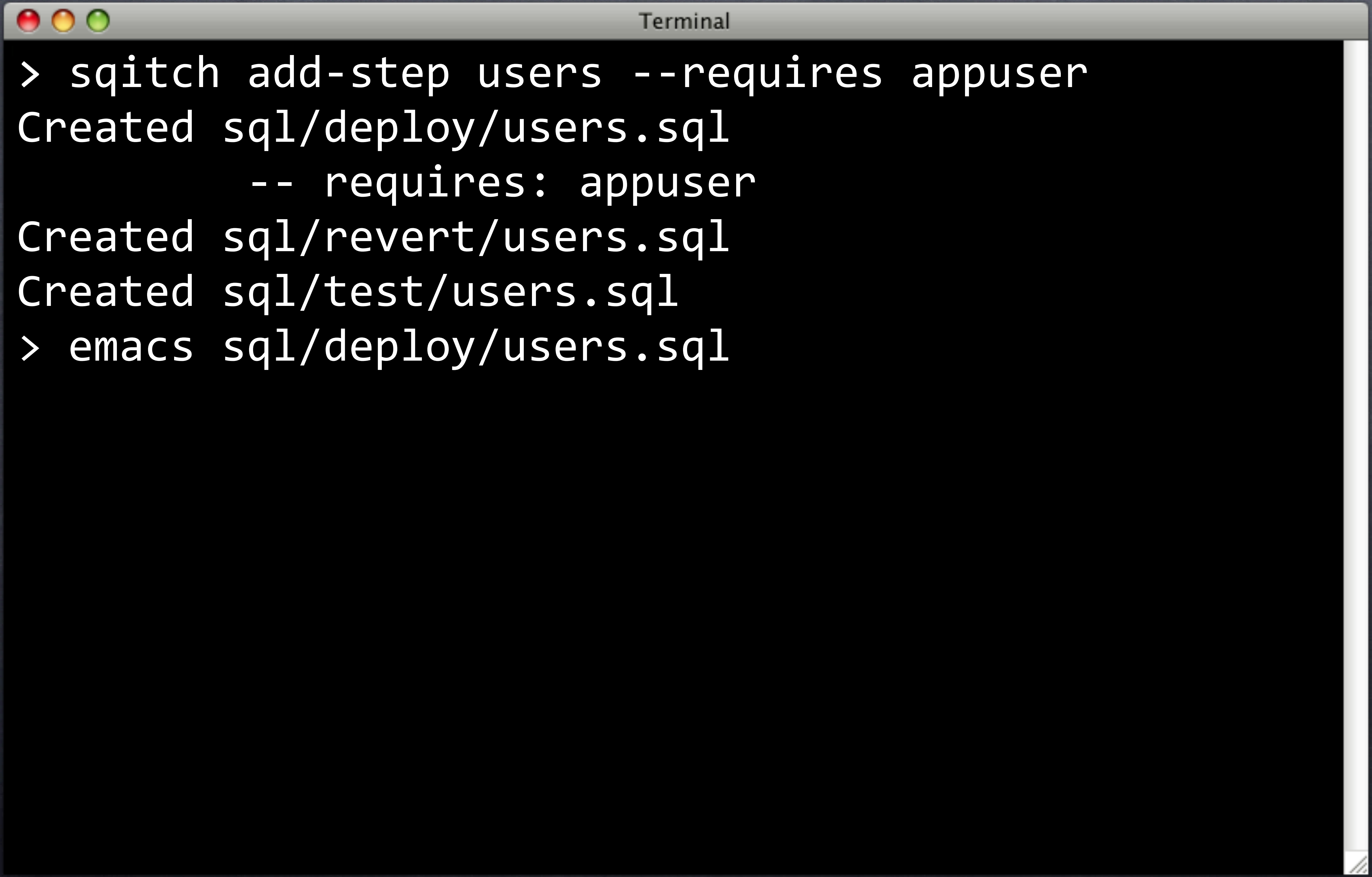
```
> sqitch add-step users --requires appuser
Created sql/deploy/users.sql
         -- requires: appuser
Created sql/revert/users.sql
Created sql/test/users.sql
>
```

Dependencies!



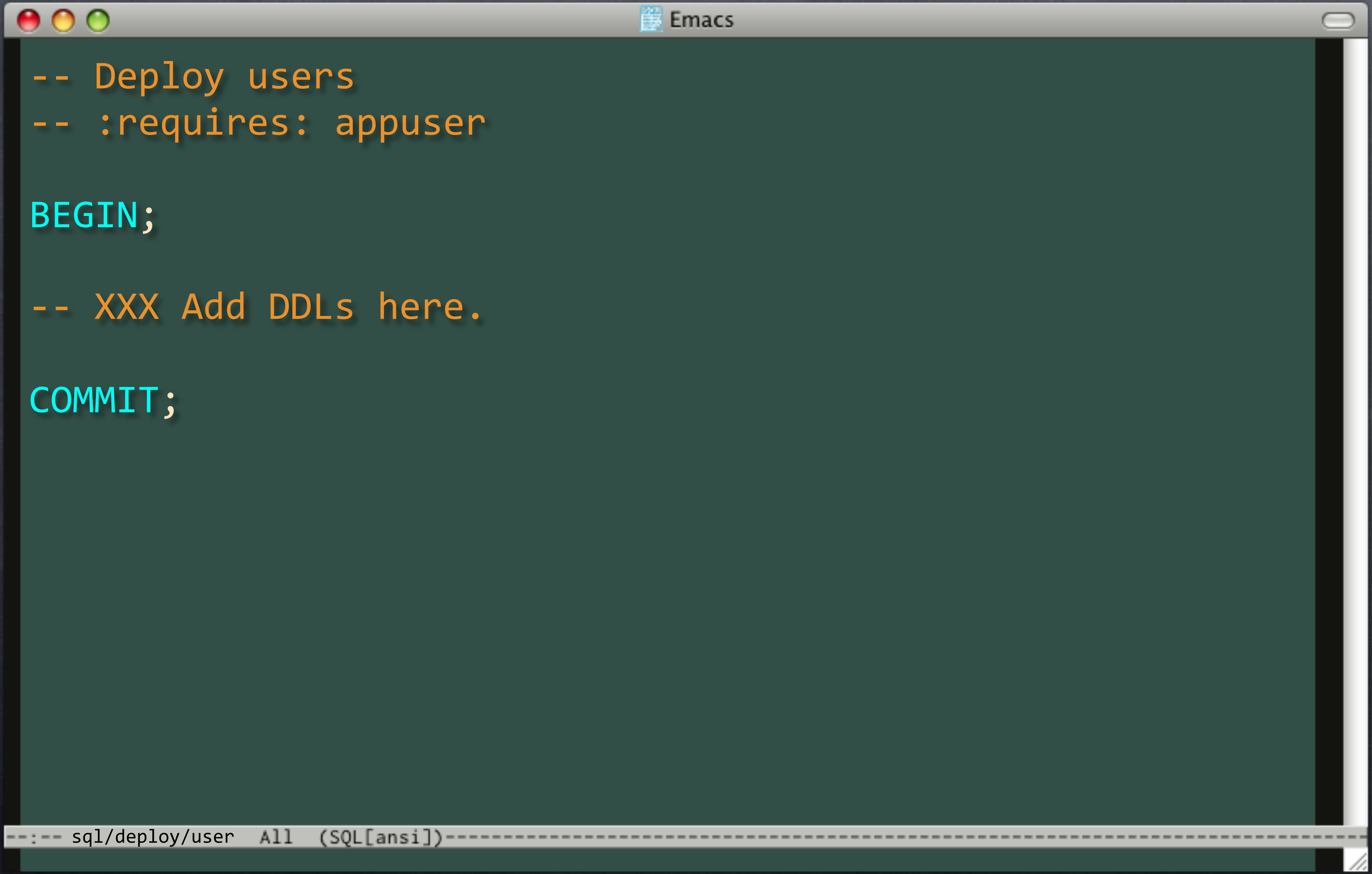
```
> sqitch add-step users --requires appuser
Created sql/deploy/users.sql
         -- requires: appuser
Created sql/revert/users.sql
Created sql/test/users.sql
>
```

Dependencies!



```
> sqitch add-step users --requires appuser
Created sql/deploy/users.sql
         -- requires: appuser
Created sql/revert/users.sql
Created sql/test/users.sql
> emacs sql/deploy/users.sql
```

sql/deploy/users.sql



```
-- Deploy users
-- :requires: appuser

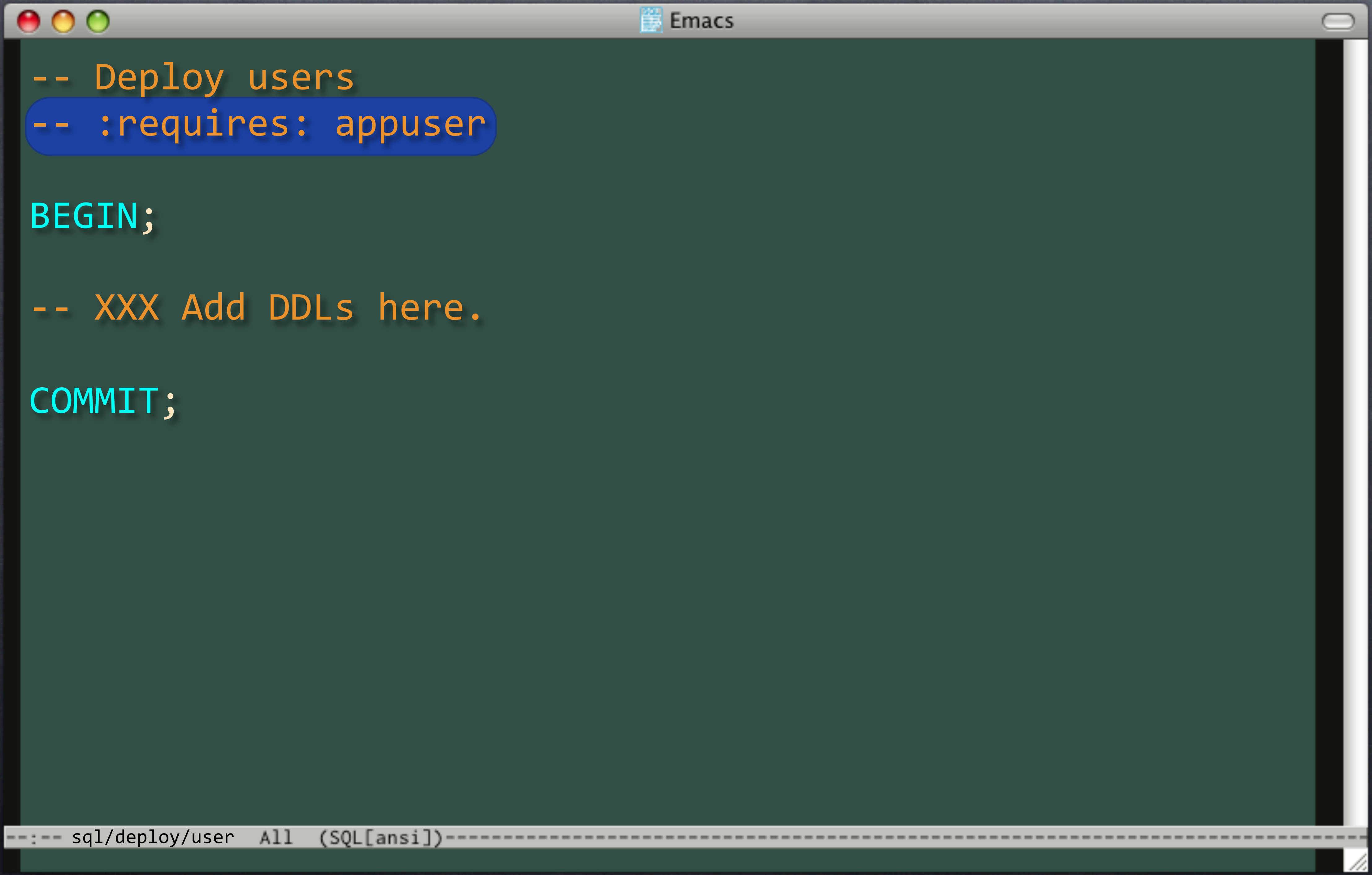
BEGIN;

-- XXX Add DDLs here.

COMMIT;
```

```
--:-- sql/deploy/user   All   (SQL[ansi])---------------------------------------------------------
```

sql/deploy/users.sql



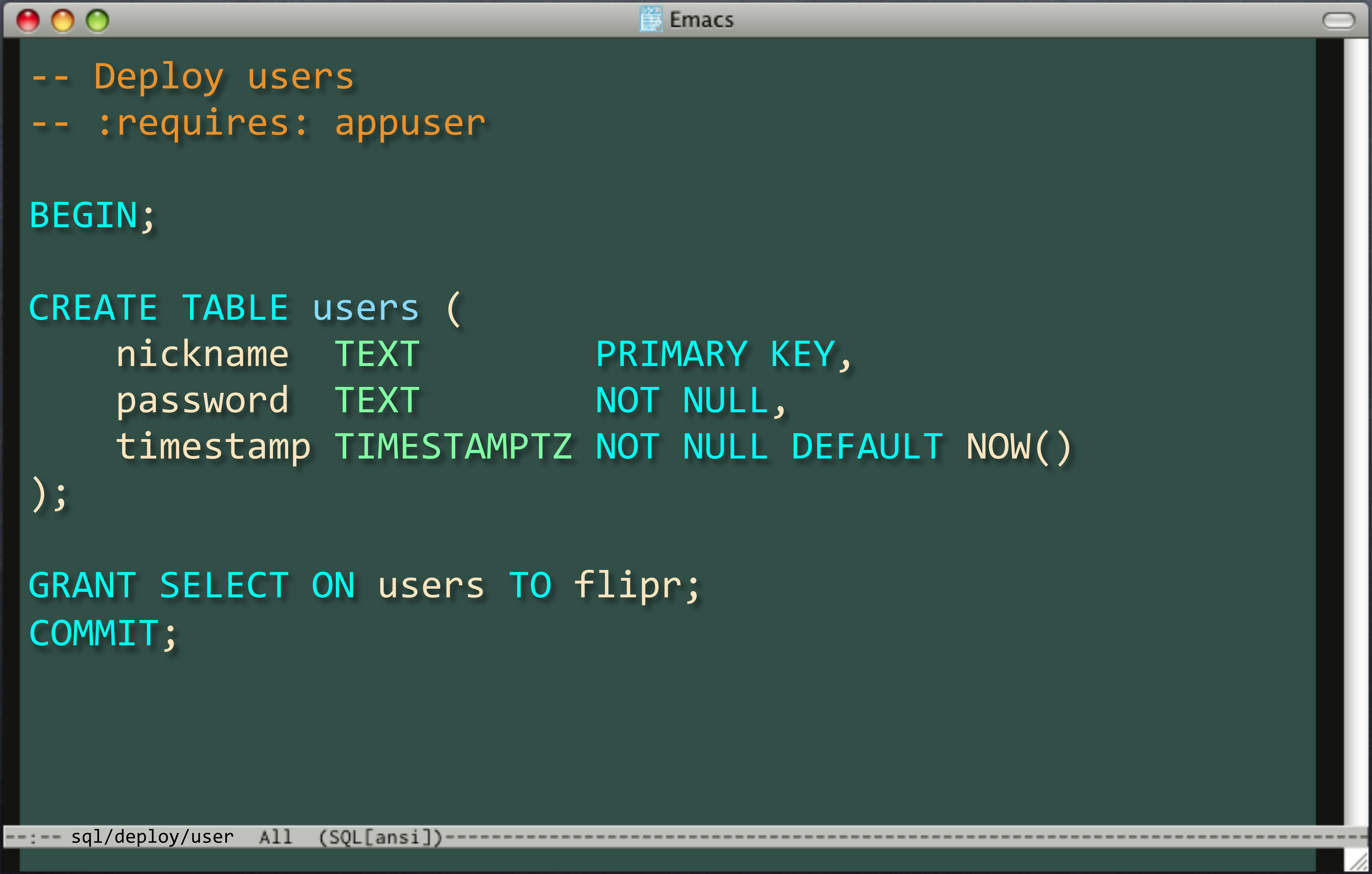
```
-- Deploy users
-- :requires: appuser

BEGIN;

-- XXX Add DDLs here.

COMMIT;
```

sql/deploy/users.sql



```
-- Deploy users
-- :requires: appuser

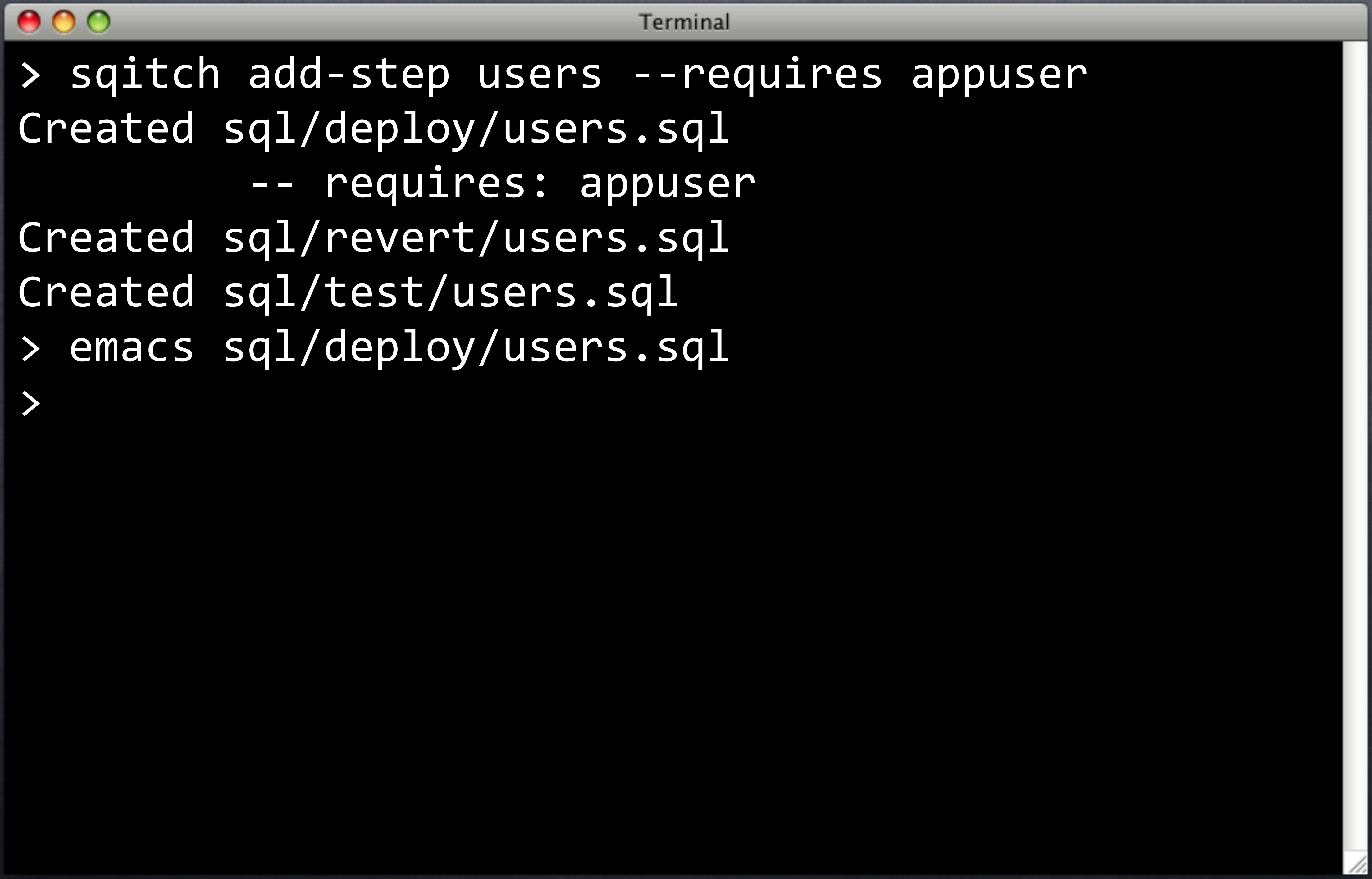
BEGIN;

CREATE TABLE users (
    nickname  TEXT        PRIMARY KEY,
    password  TEXT        NOT NULL,
    timestamp TIMESTAMPTZ NOT NULL DEFAULT NOW()
);

GRANT SELECT ON users TO flipr;
COMMIT;
```

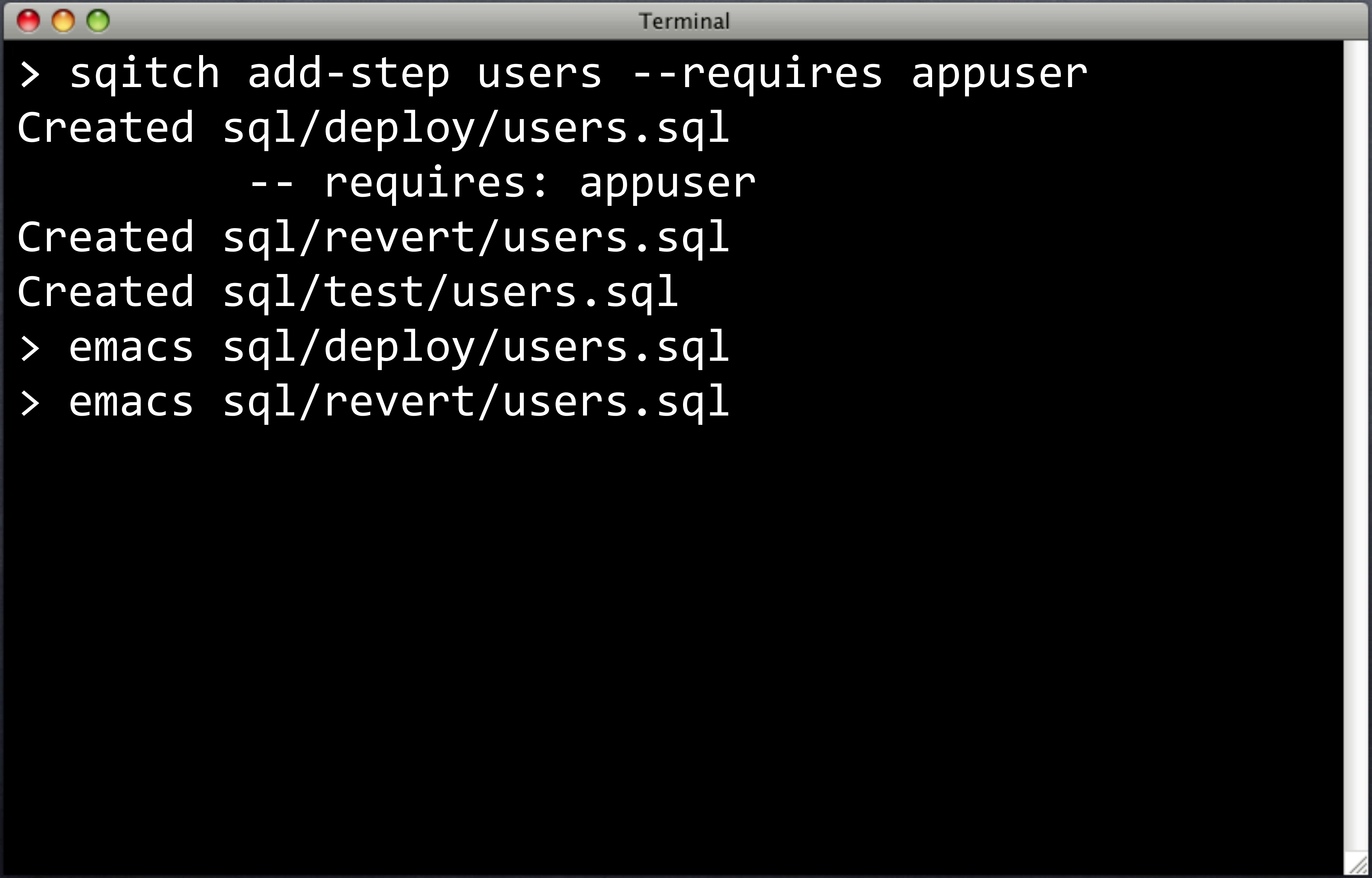
```
--:-- sql/deploy/user   All   (SQL[ansi])-----------------------------------------------------------------------
```

Dependencies!



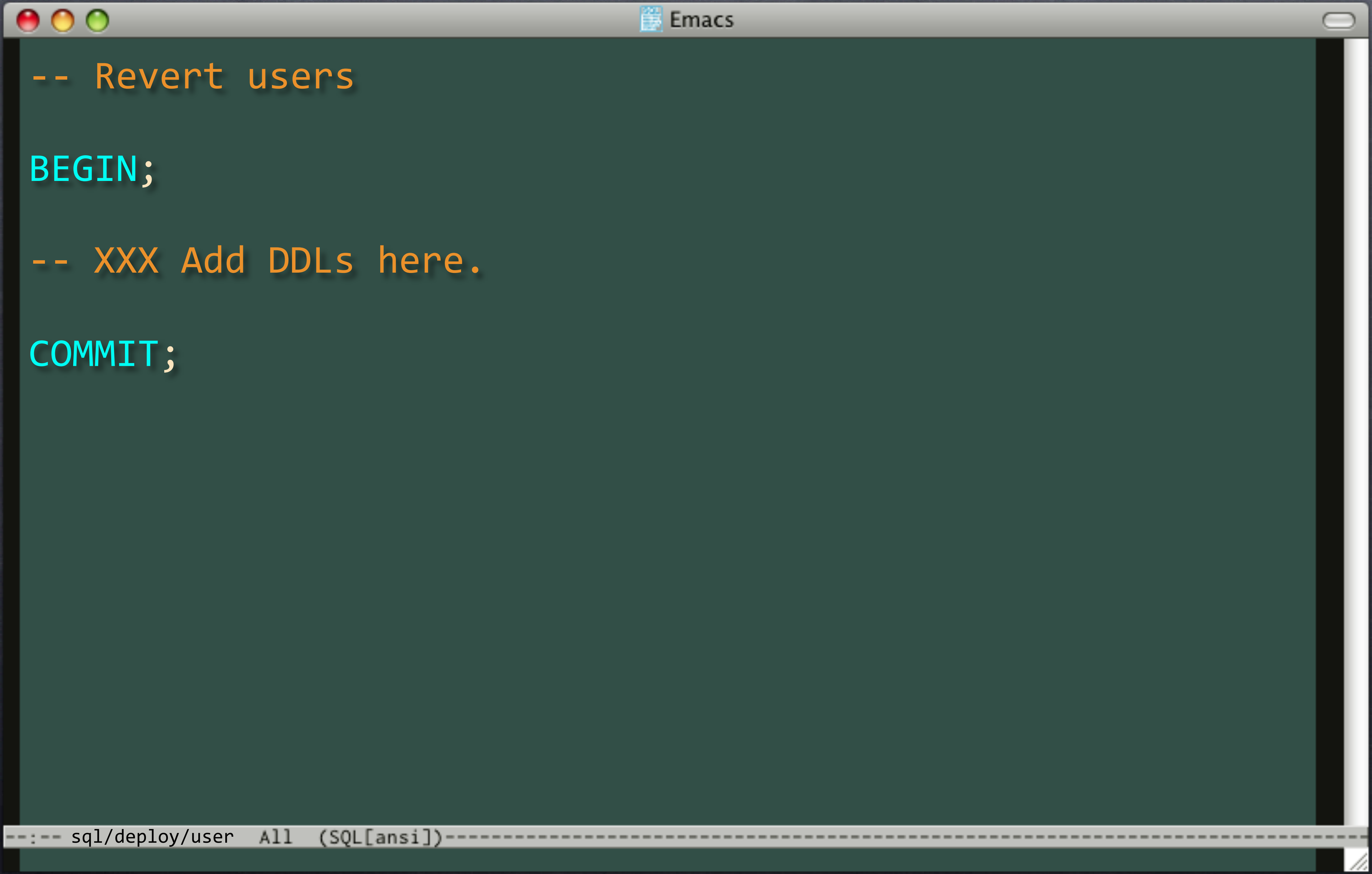
```
> sqitch add-step users --requires appuser
Created sql/deploy/users.sql
         -- requires: appuser
Created sql/revert/users.sql
Created sql/test/users.sql
> emacs sql/deploy/users.sql
>
```

Dependencies!



```
> sqitch add-step users --requires appuser
Created sql/deploy/users.sql
         -- requires: appuser
Created sql/revert/users.sql
Created sql/test/users.sql
> emacs sql/deploy/users.sql
> emacs sql/revert/users.sql
```

sql/revert/users



```
-- Revert users

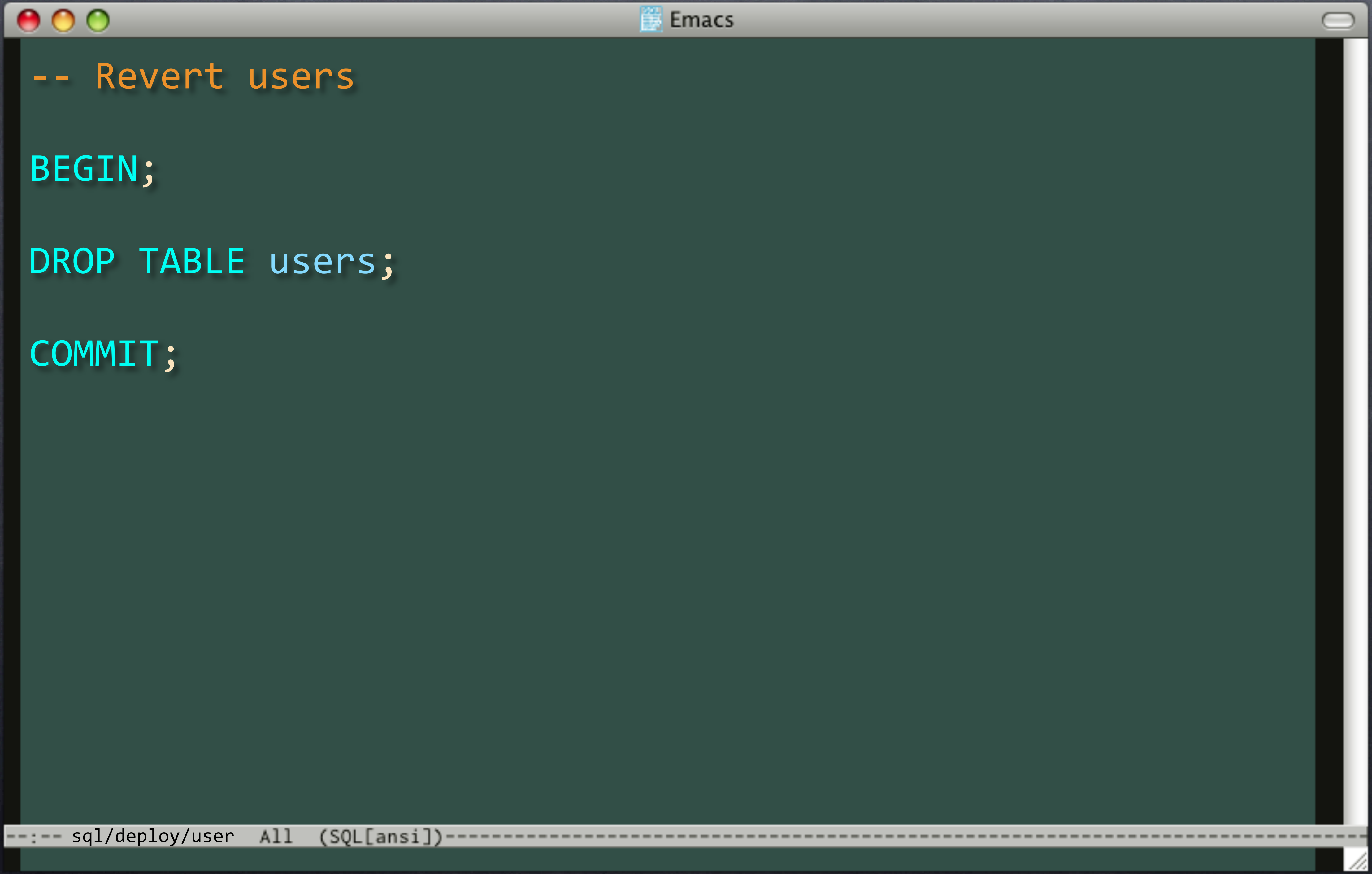
BEGIN;

-- XXX Add DDLs here.

COMMIT;
```

```
--:-- sql/deploy/user   All   (SQL[ansi])----------------------------------------------------------------
```

sql/revert/users



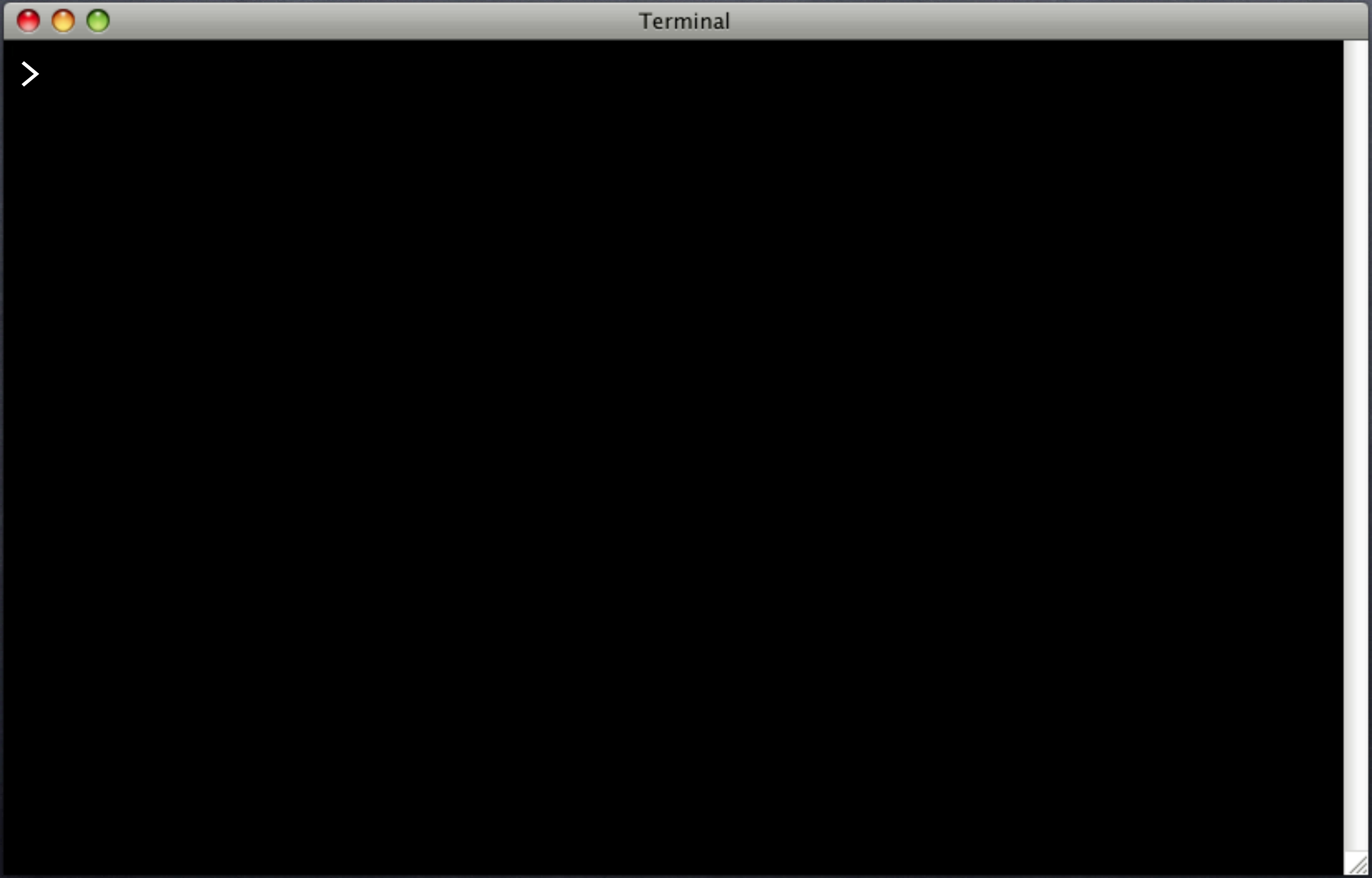
```
-- Revert users

BEGIN;

DROP TABLE users;

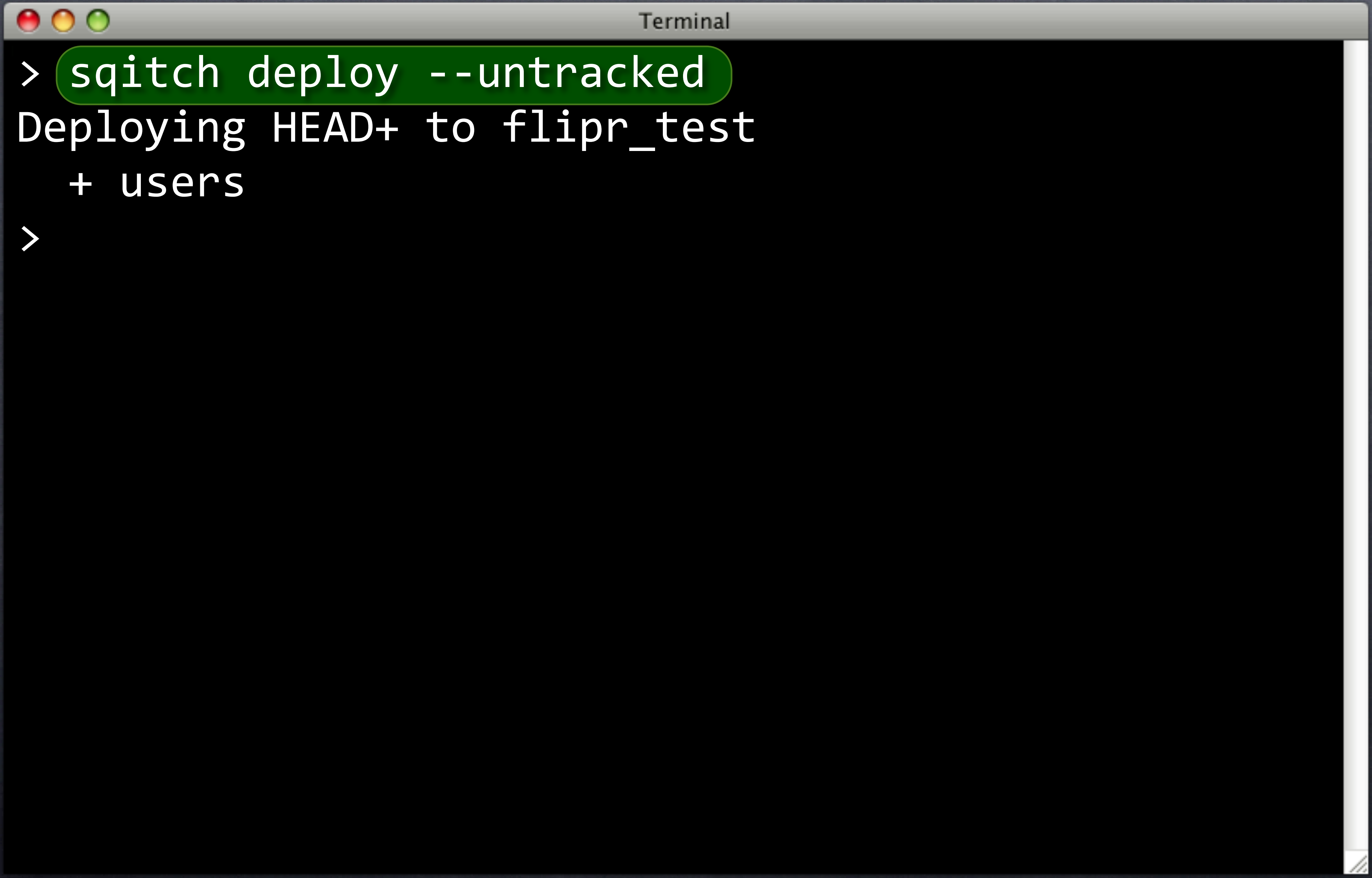
COMMIT;
```

Make Users



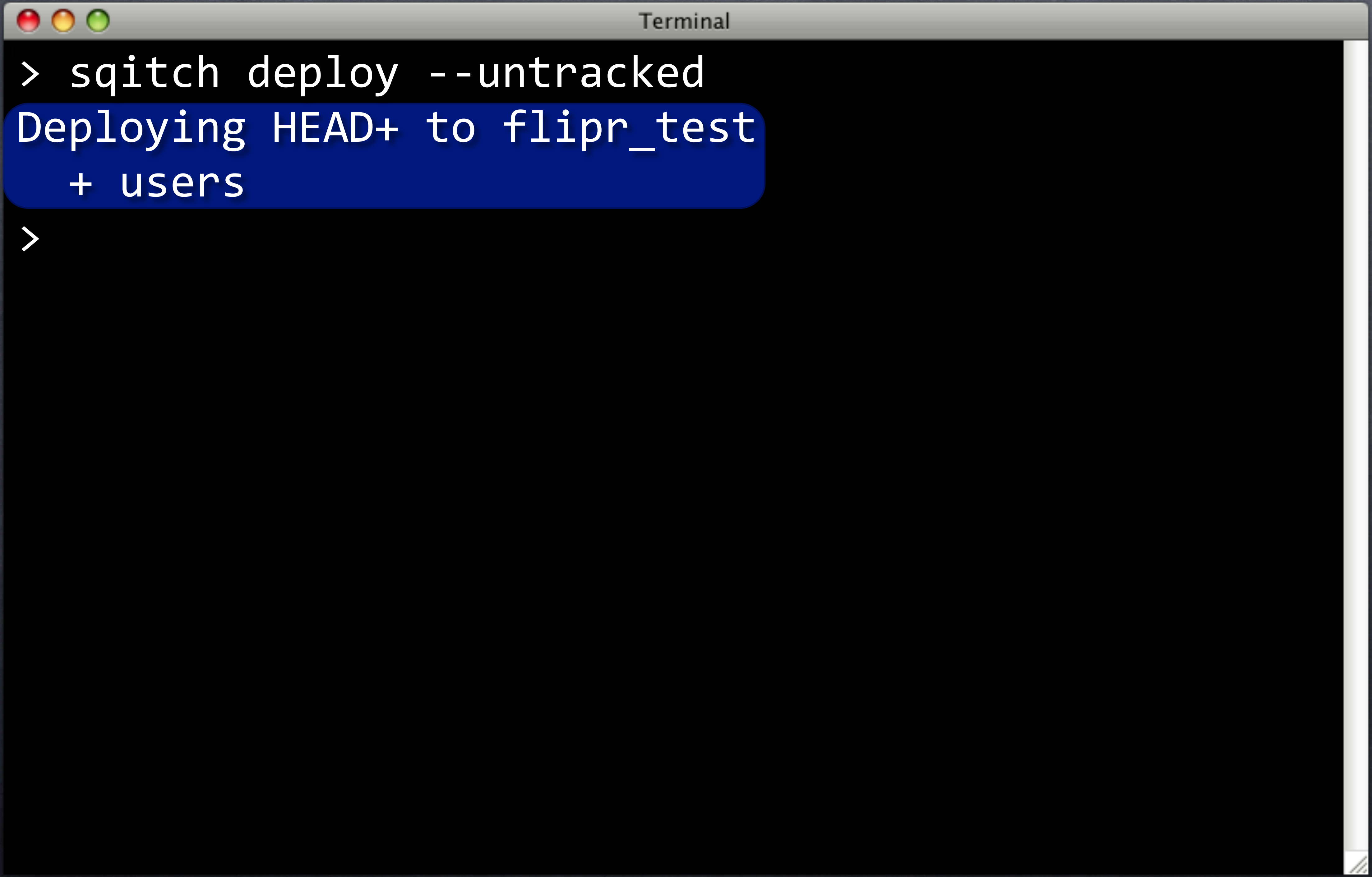
```
>
```

Make Users



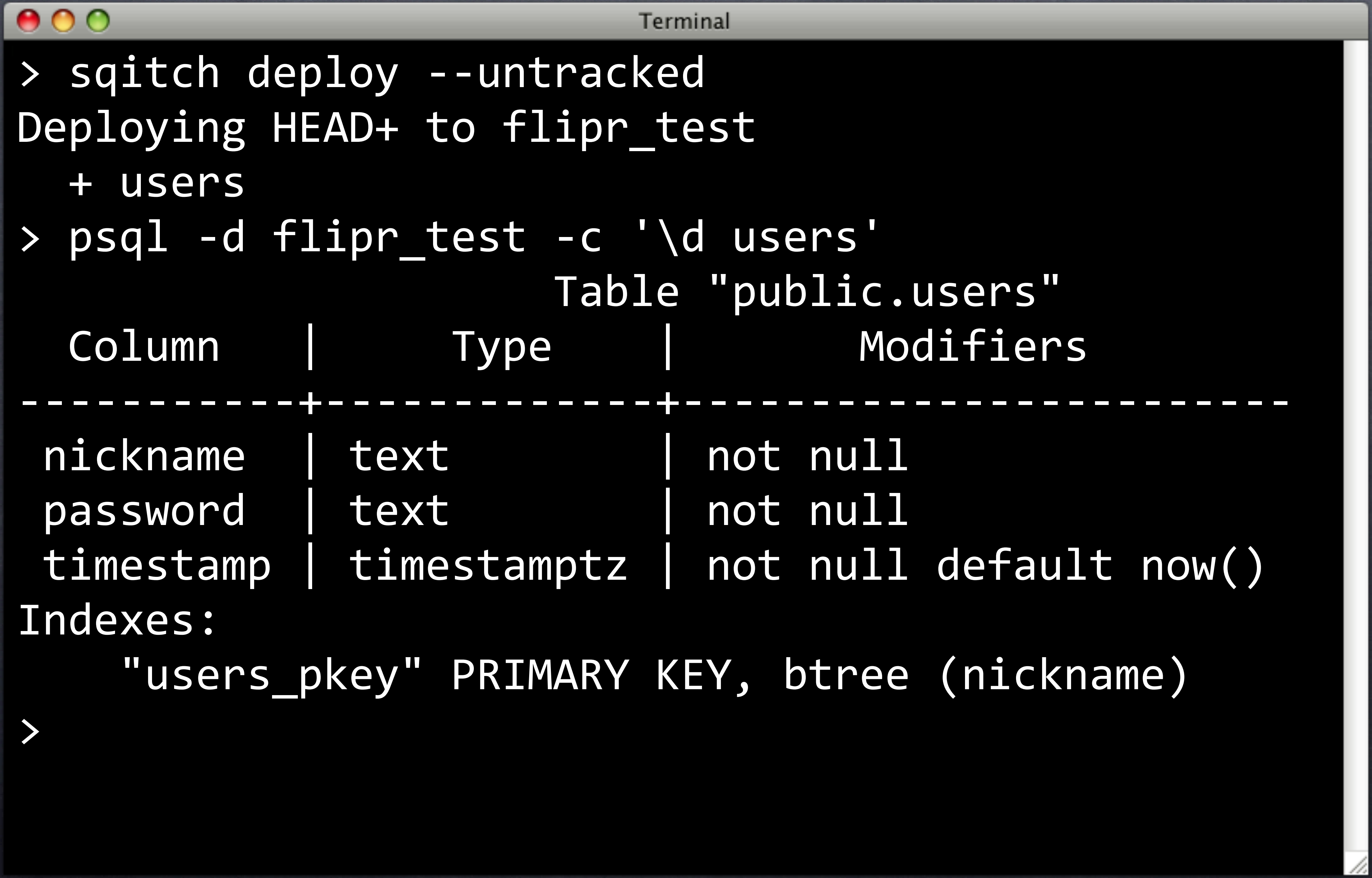
```
> sqitch deploy --untracked
Deploying HEAD+ to flipr_test
  + users
>
```

Make Users



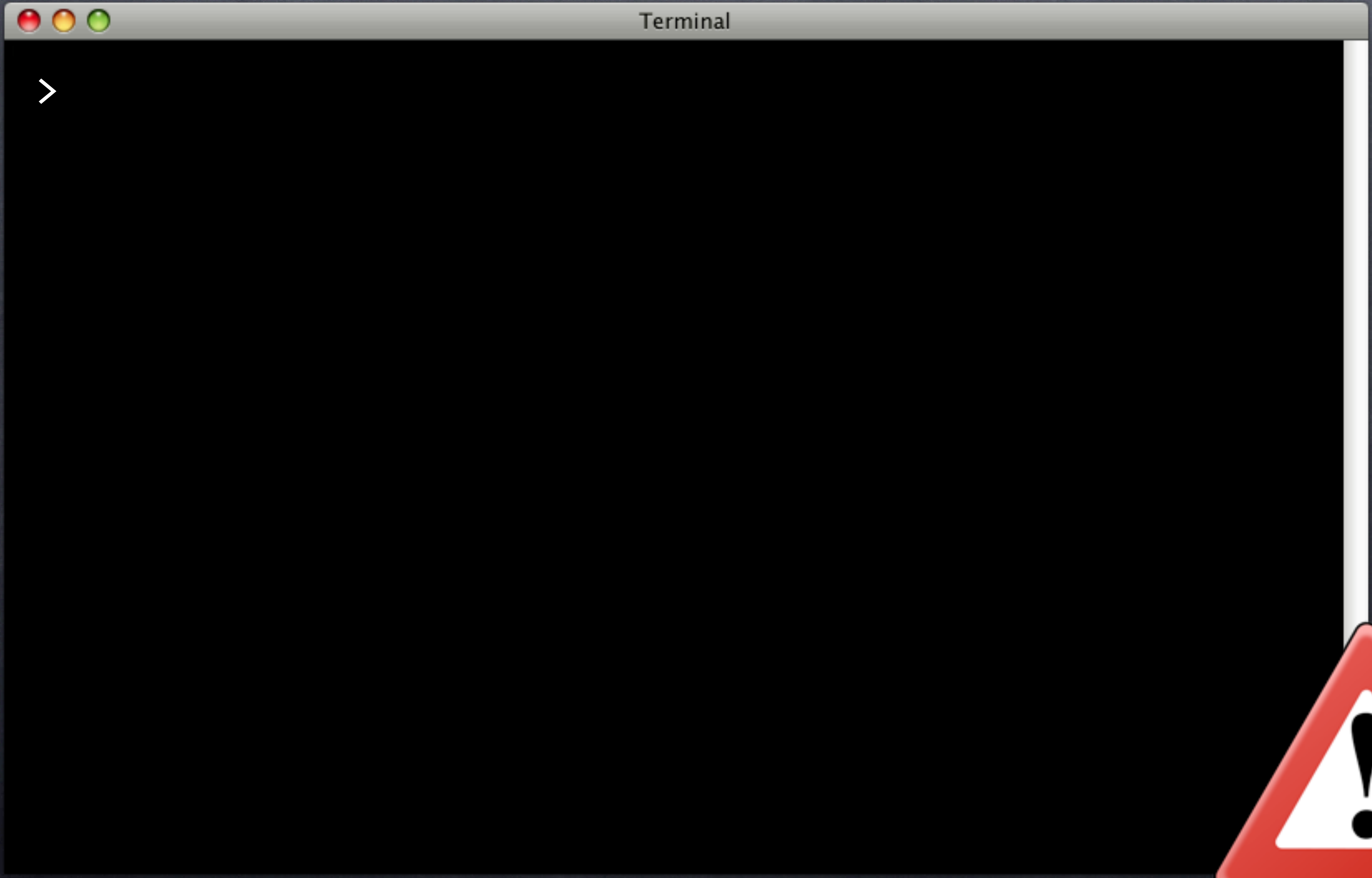
```
> sqitch deploy --untracked
Deploying HEAD+ to flipr_test
  + users
>
```

Make Users



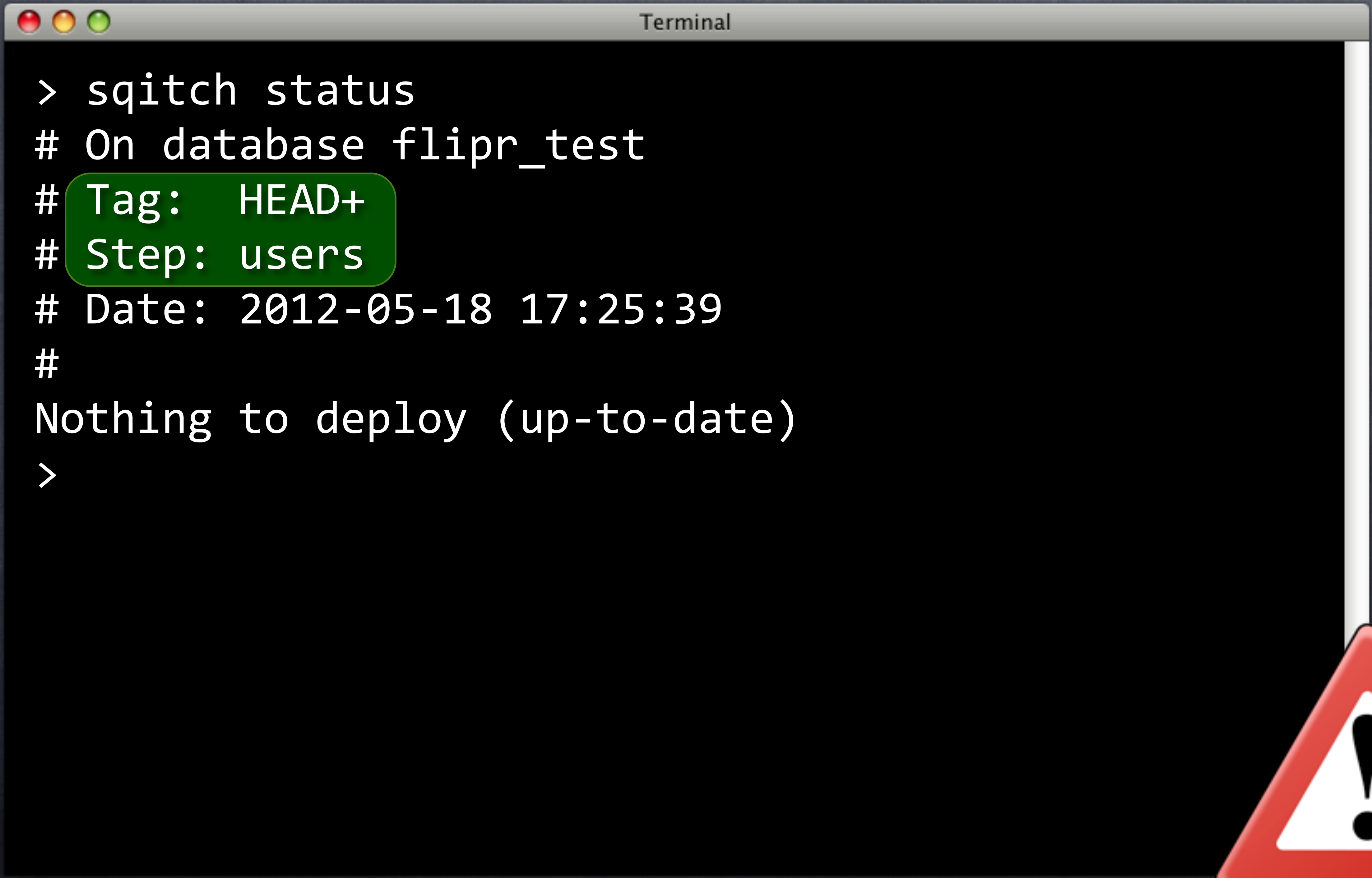
```
> sqitch deploy --untracked
Deploying HEAD+ to flipr_test
  + users
> psql -d flipr_test -c '\d users'
                     Table "public.users"
  Column   |     Type      |       Modifiers
-----------+---------------+------------------------
 nickname  | text          | not null
 password  | text          | not null
 timestamp | timestamptz   | not null default now()
Indexes:
    "users_pkey" PRIMARY KEY, btree (nickname)
>
```

Status Update



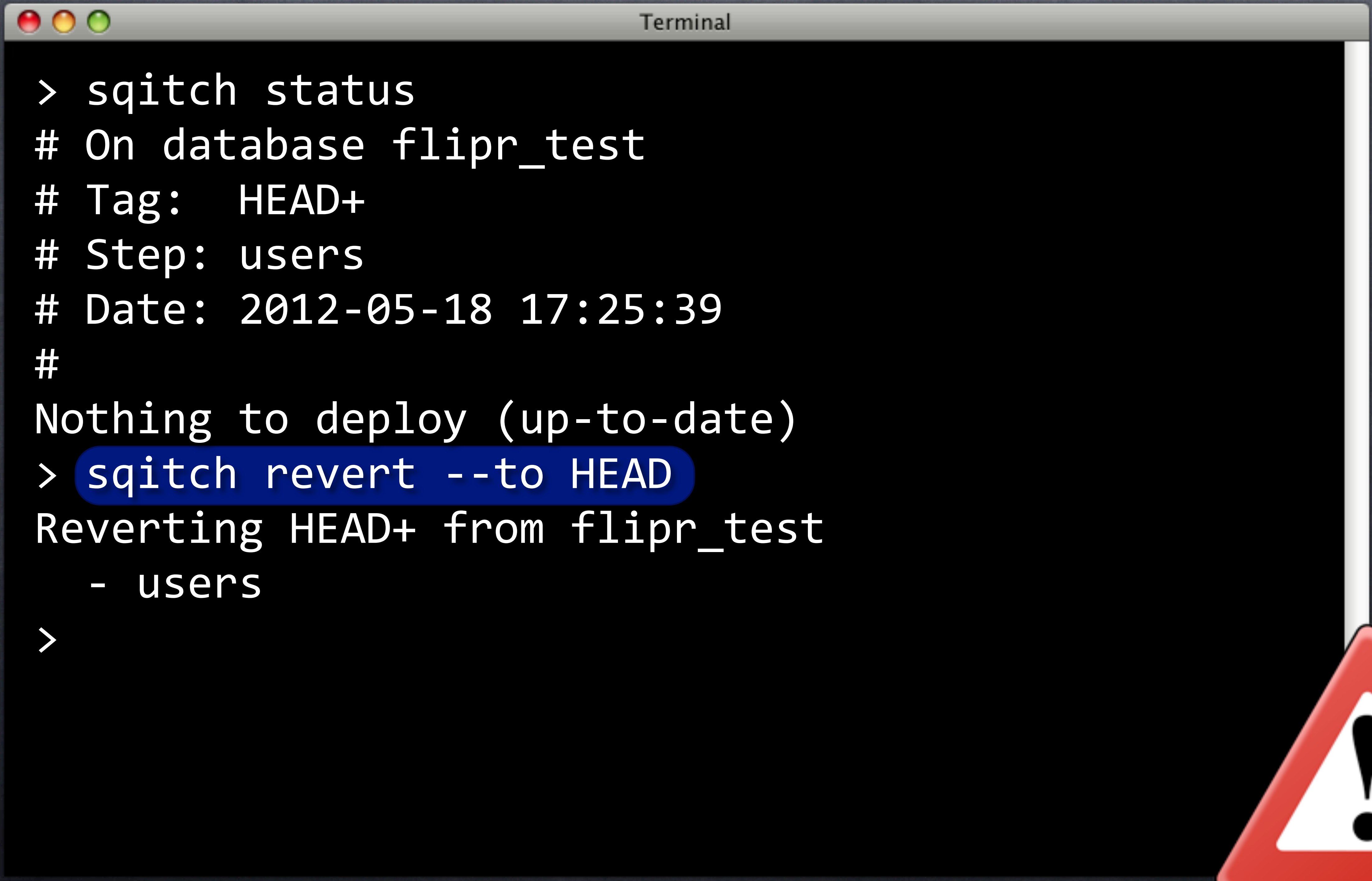
```
>
```

Status Update



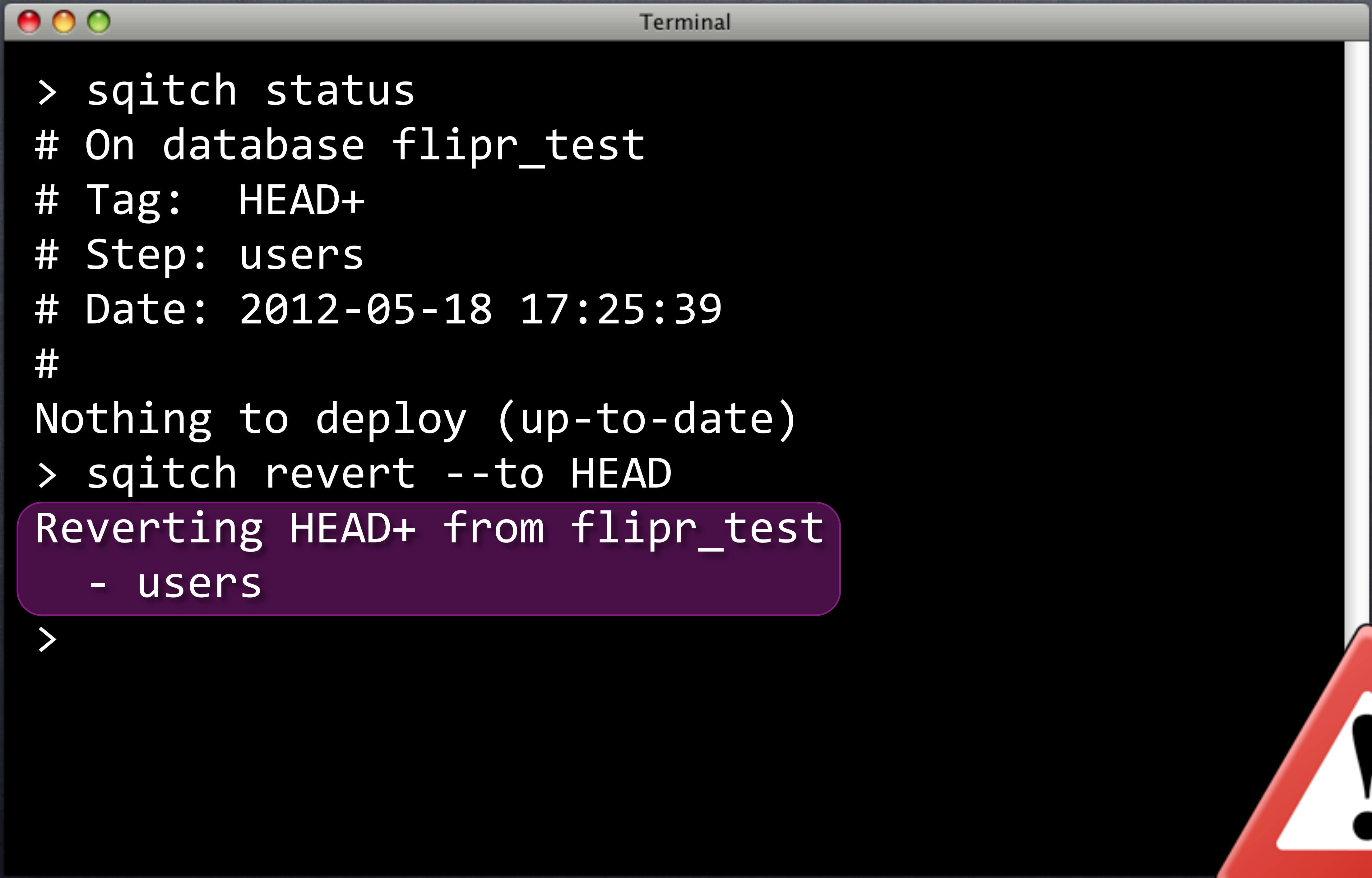
```
> sqitch status
# On database flipr_test
# Tag:   HEAD+
# Step: users
# Date: 2012-05-18 17:25:39
#
Nothing to deploy (up-to-date)
>
```

Status Update



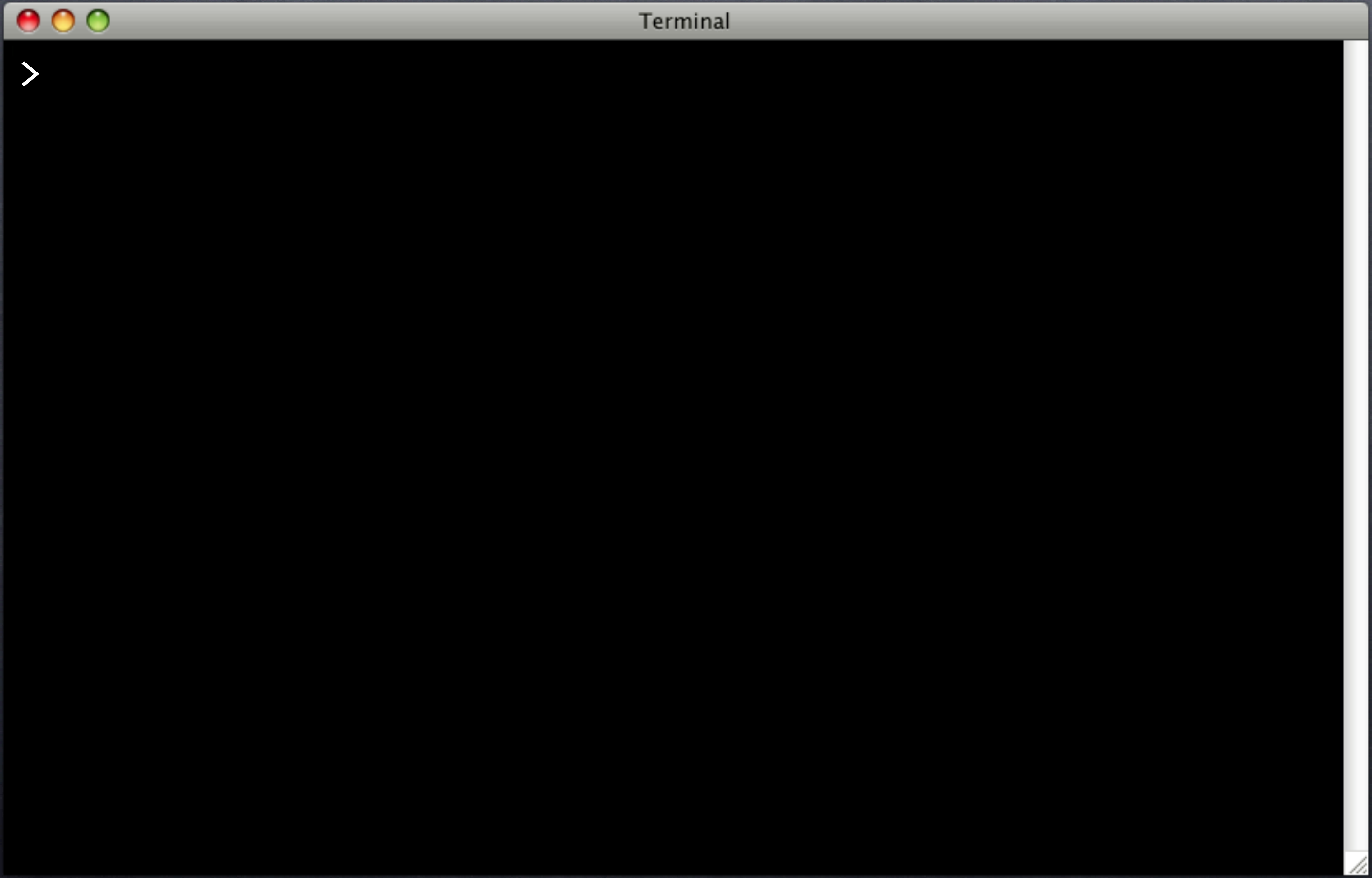
```
> sqitch status
# On database flipr_test
# Tag:  HEAD+
# Step: users
# Date: 2012-05-18 17:25:39
#
Nothing to deploy (up-to-date)
> sqitch revert --to HEAD
Reverting HEAD+ from flipr_test
  - users
>
```

Status Update



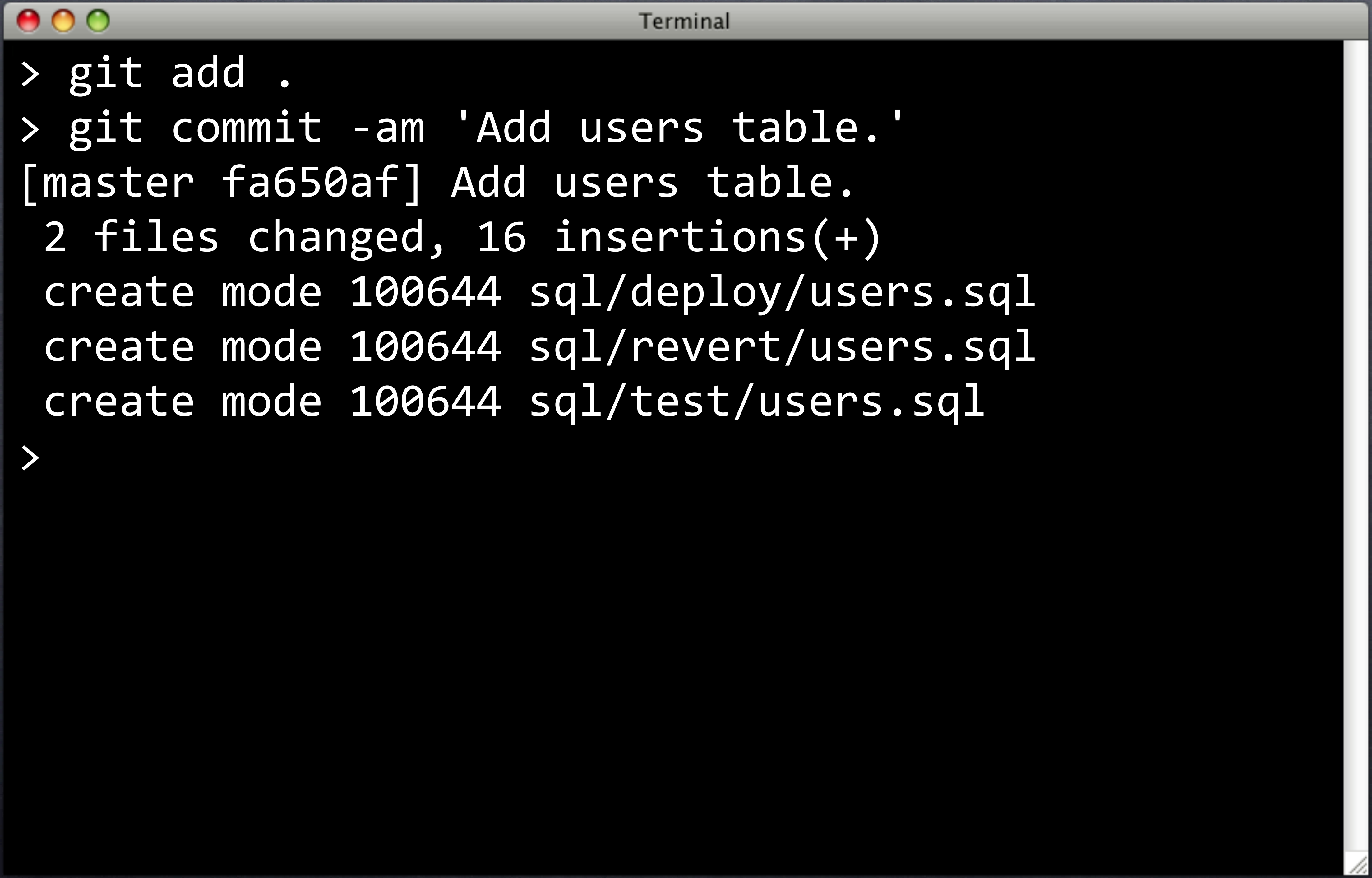
```
> sqitch status
# On database flipr_test
# Tag:   HEAD+
# Step: users
# Date: 2012-05-18 17:25:39
#
Nothing to deploy (up-to-date)
> sqitch revert --to HEAD
Reverting HEAD+ from flipr_test
  - users
>
```

Check in and Deploy



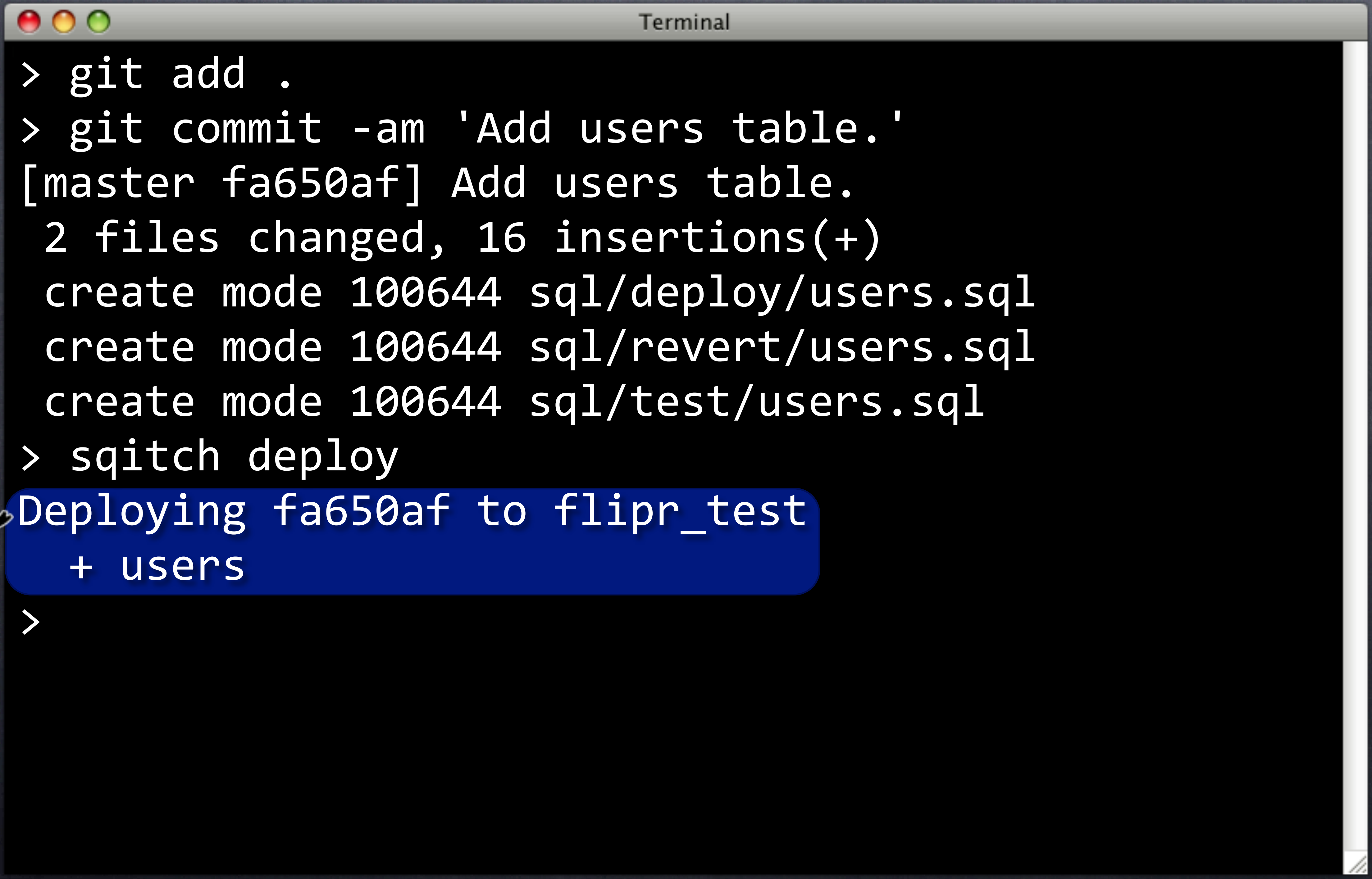
```
>
```

Check in and Deploy



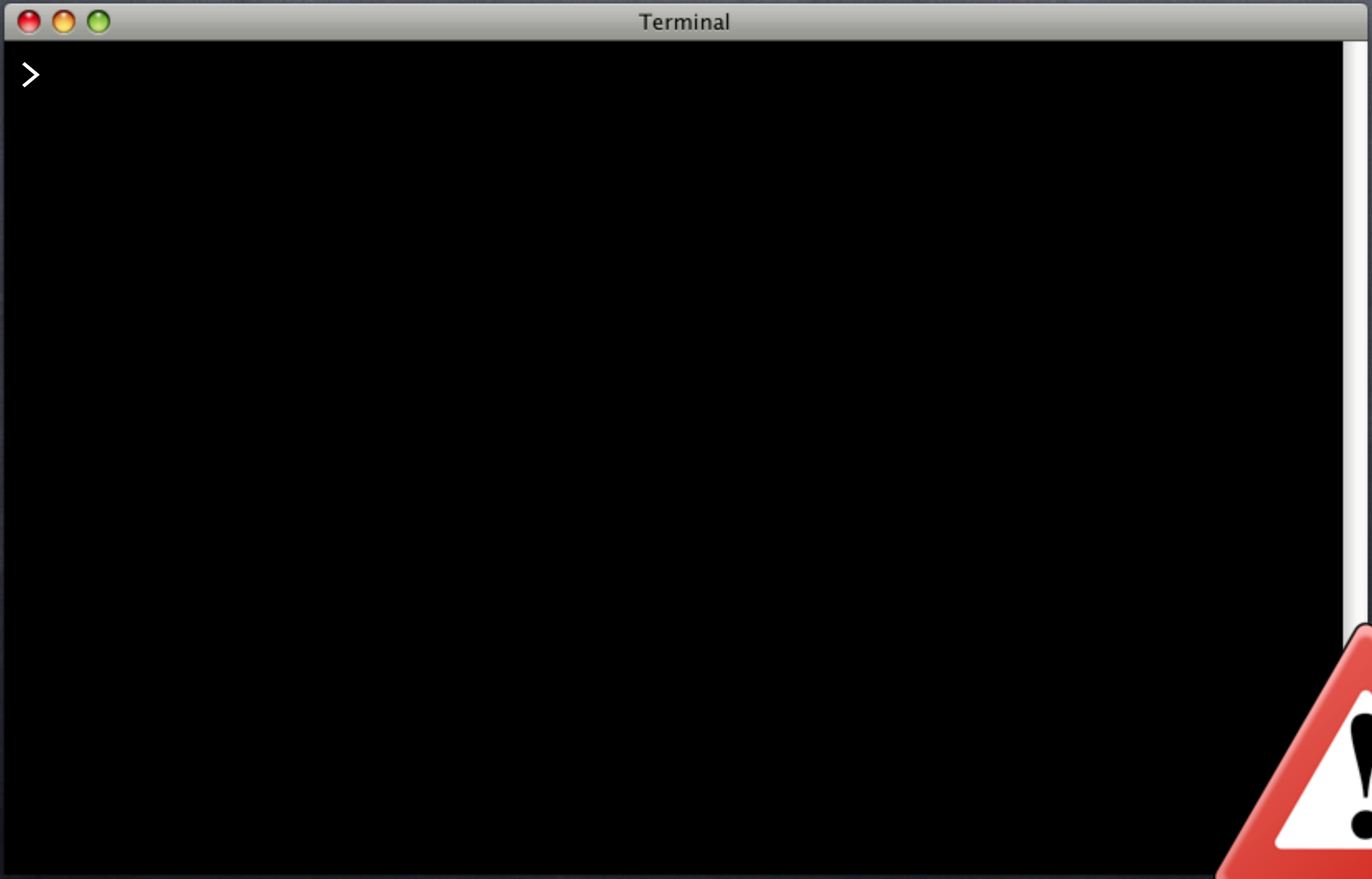
```
> git add .
> git commit -am 'Add users table.'
[master fa650af] Add users table.
 2 files changed, 16 insertions(+)
 create mode 100644 sql/deploy/users.sql
 create mode 100644 sql/revert/users.sql
 create mode 100644 sql/test/users.sql
>
```

Check in and Deploy



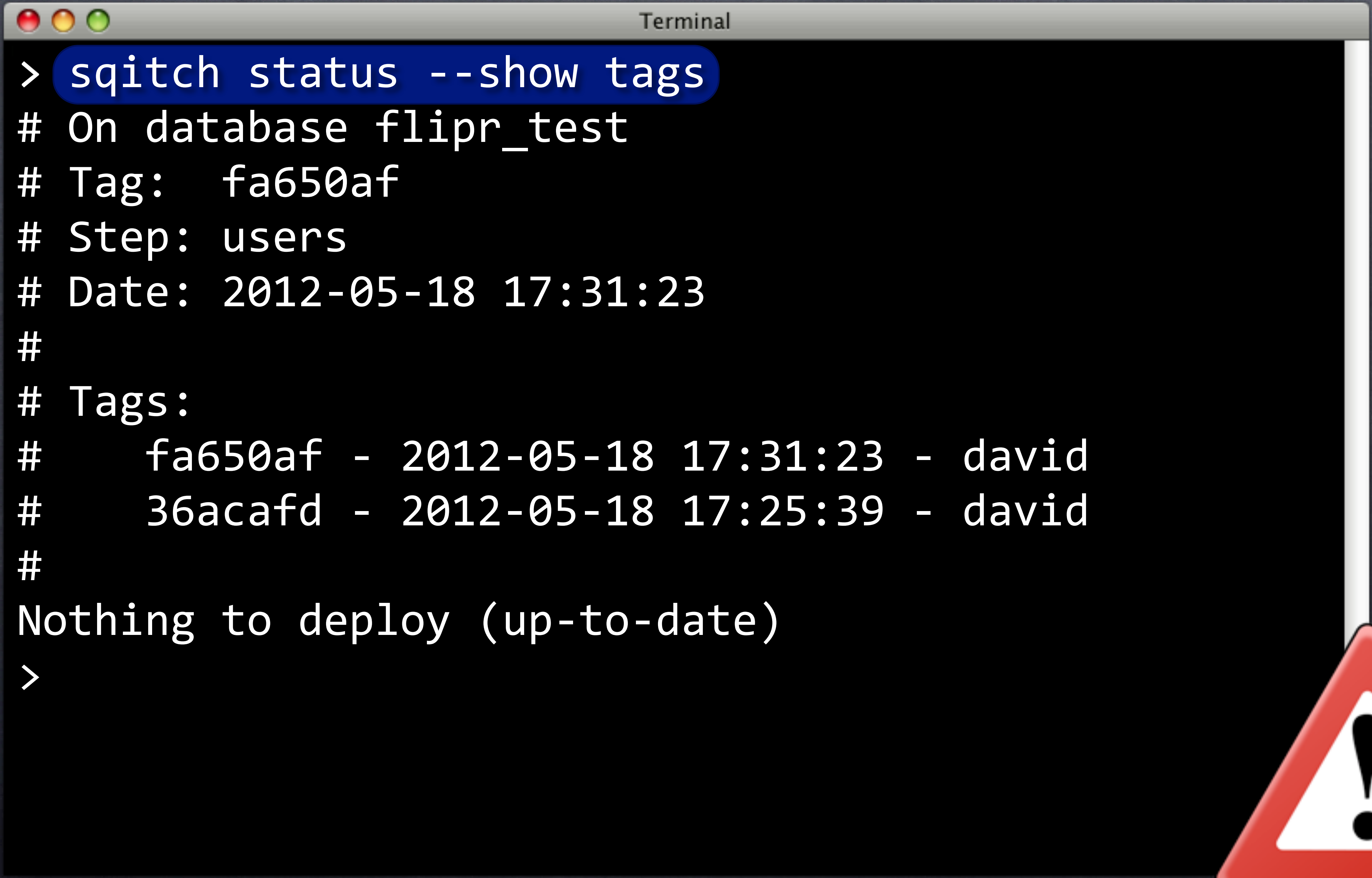
```
> git add .
> git commit -am 'Add users table.'
[master fa650af] Add users table.
 2 files changed, 16 insertions(+)
 create mode 100644 sql/deploy/users.sql
 create mode 100644 sql/revert/users.sql
 create mode 100644 sql/test/users.sql
> sqitch deploy
Deploying fa650af to flipr_test
  + users
>
```

Up to Date



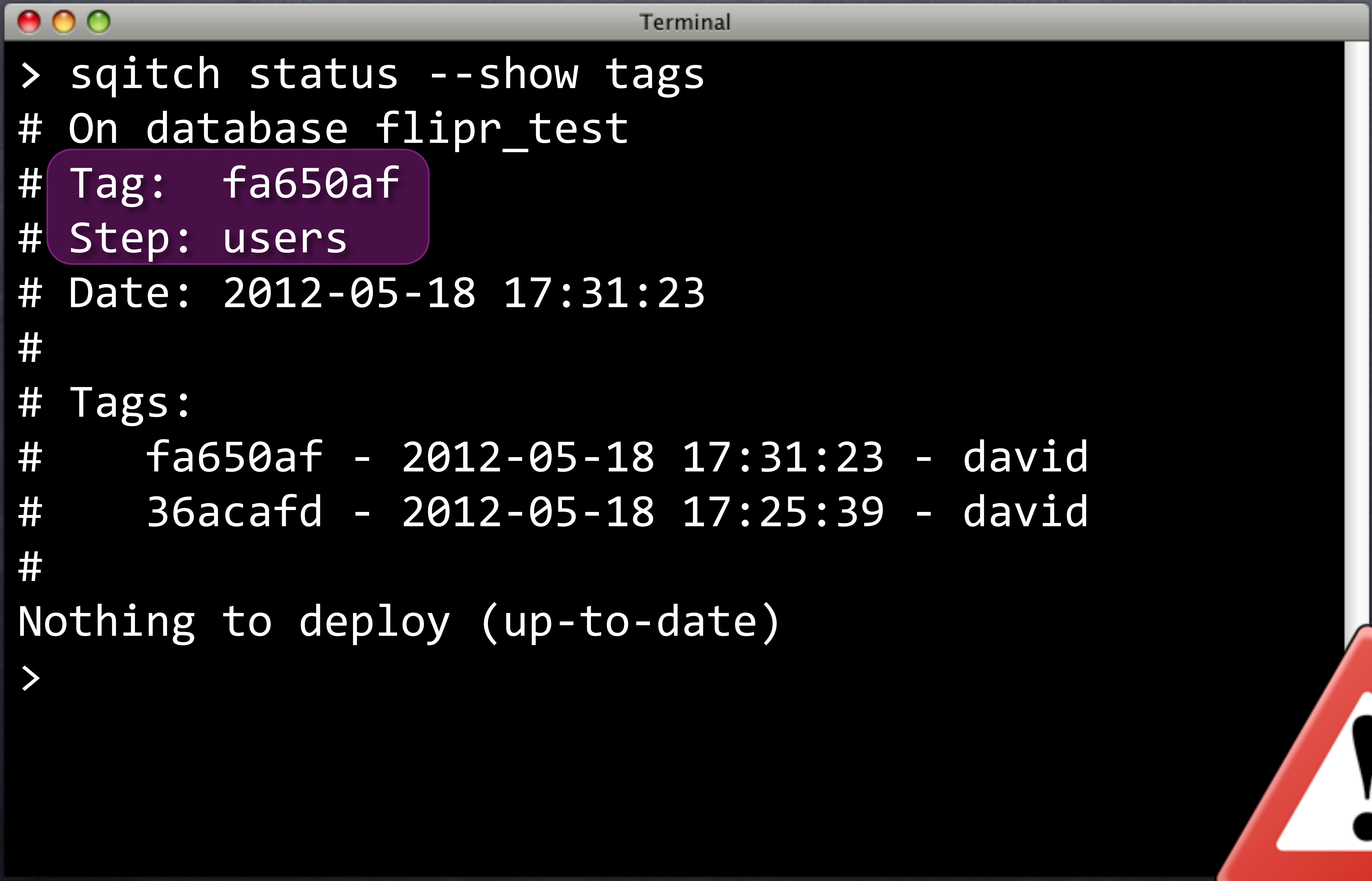
```
>
```

Up to Date



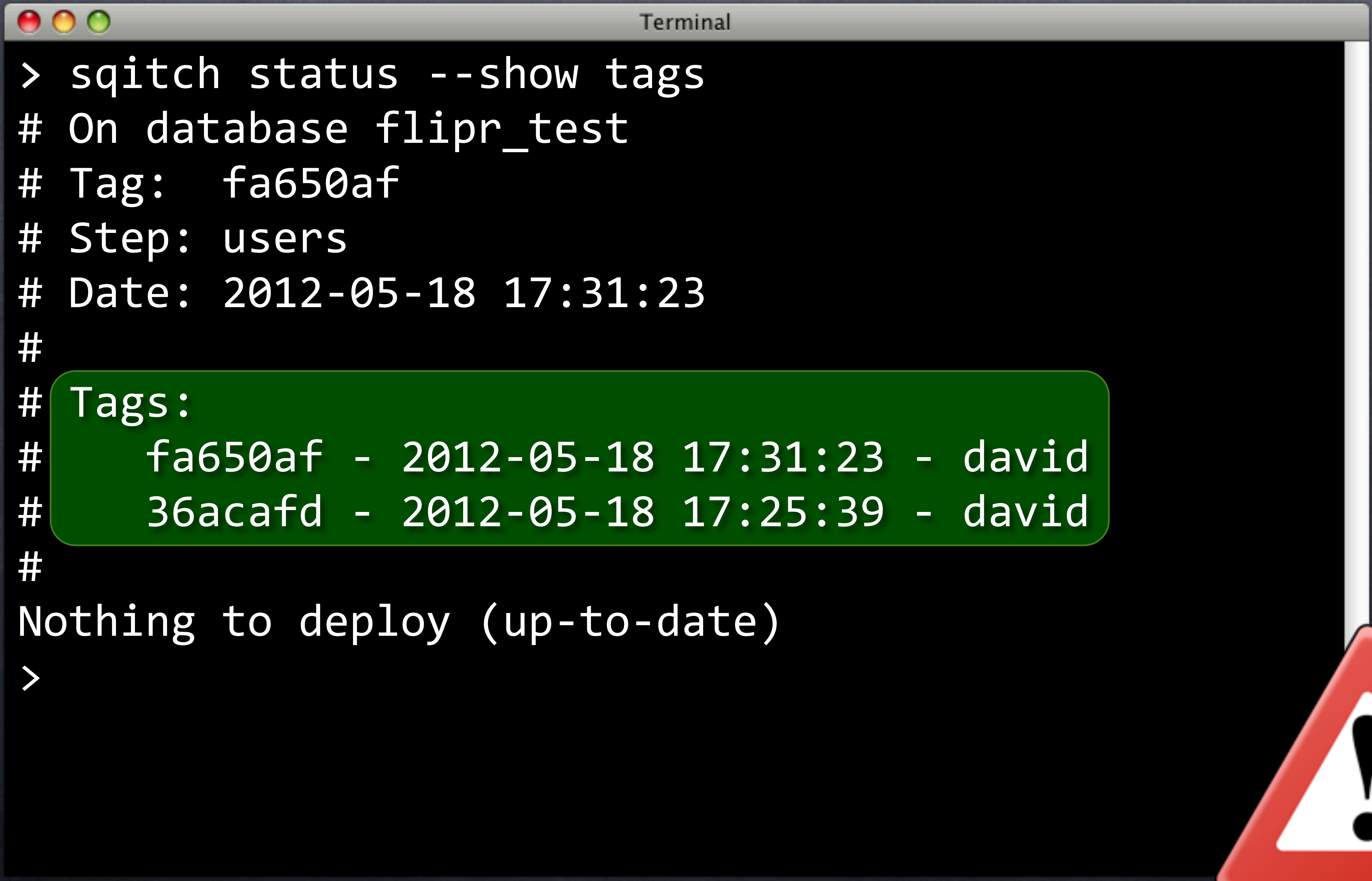
```
> sqitch status --show tags
# On database flipr_test
# Tag:  fa650af
# Step: users
# Date: 2012-05-18 17:31:23
#
# Tags:
#    fa650af - 2012-05-18 17:31:23 - david
#    36acafd - 2012-05-18 17:25:39 - david
#
Nothing to deploy (up-to-date)
>
```

Up to Date



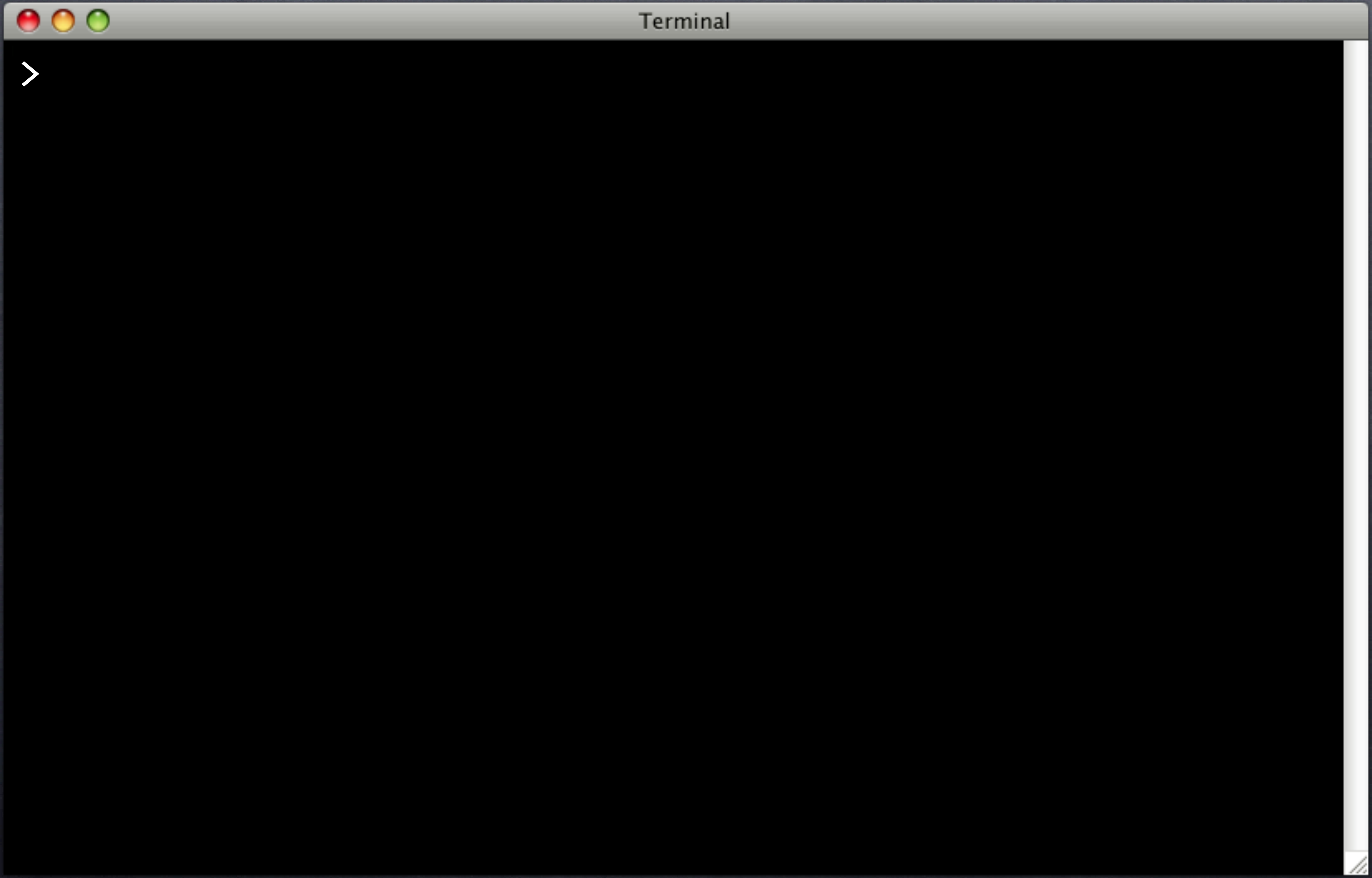
```
> sqitch status --show tags
# On database flipr_test
# Tag:  fa650af
# Step: users
# Date: 2012-05-18 17:31:23
#
# Tags:
#    fa650af - 2012-05-18 17:31:23 - david
#    36acafd - 2012-05-18 17:25:39 - david
#
Nothing to deploy (up-to-date)
>
```

Up to Date



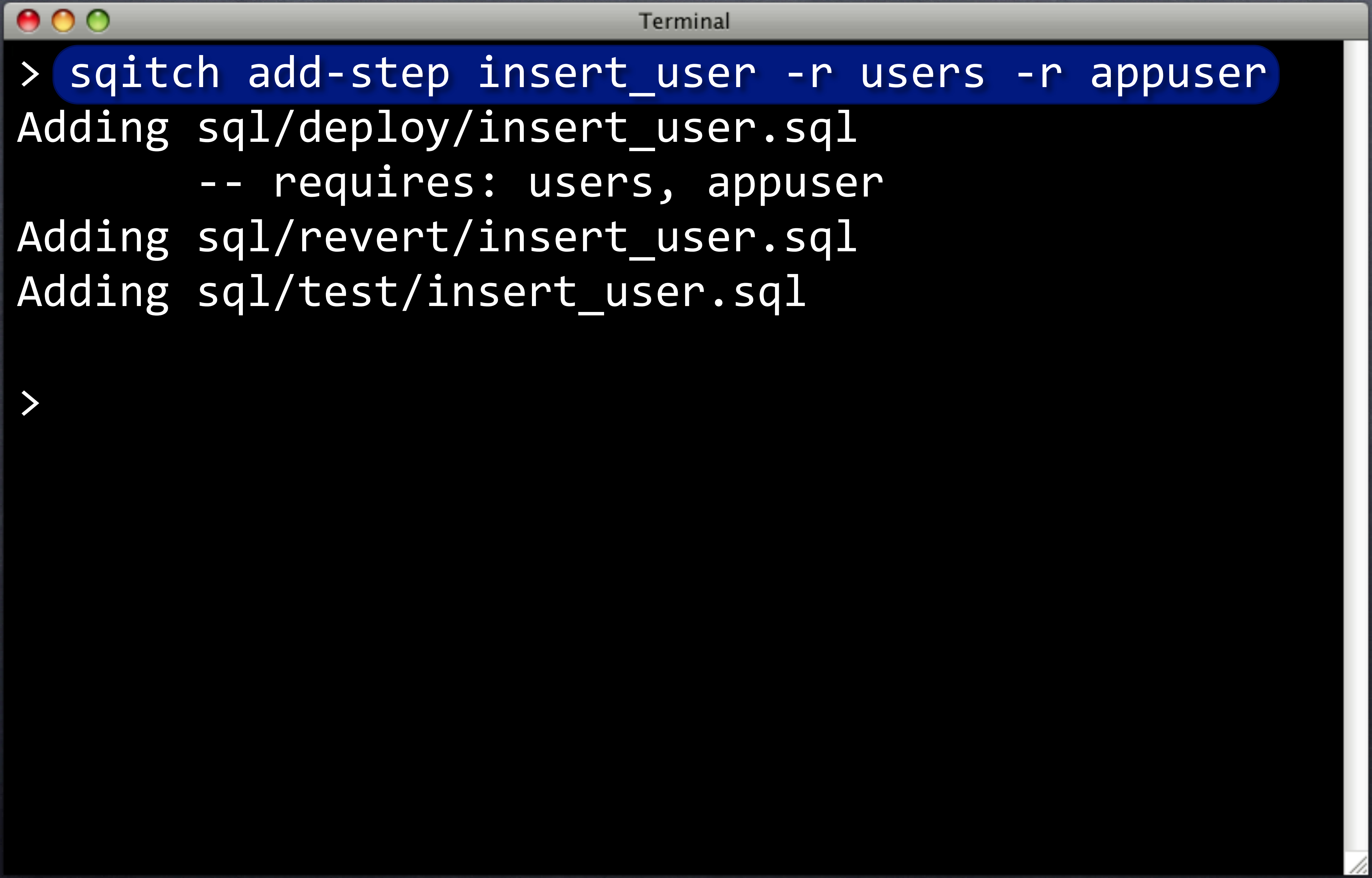
```
> sqitch status --show tags
# On database flipr_test
# Tag:  fa650af
# Step: users
# Date: 2012-05-18 17:31:23
#
# Tags:
#    fa650af - 2012-05-18 17:31:23 - david
#    36acafd - 2012-05-18 17:25:39 - david
#
Nothing to deploy (up-to-date)
>
```

A Twofer



```
>
```

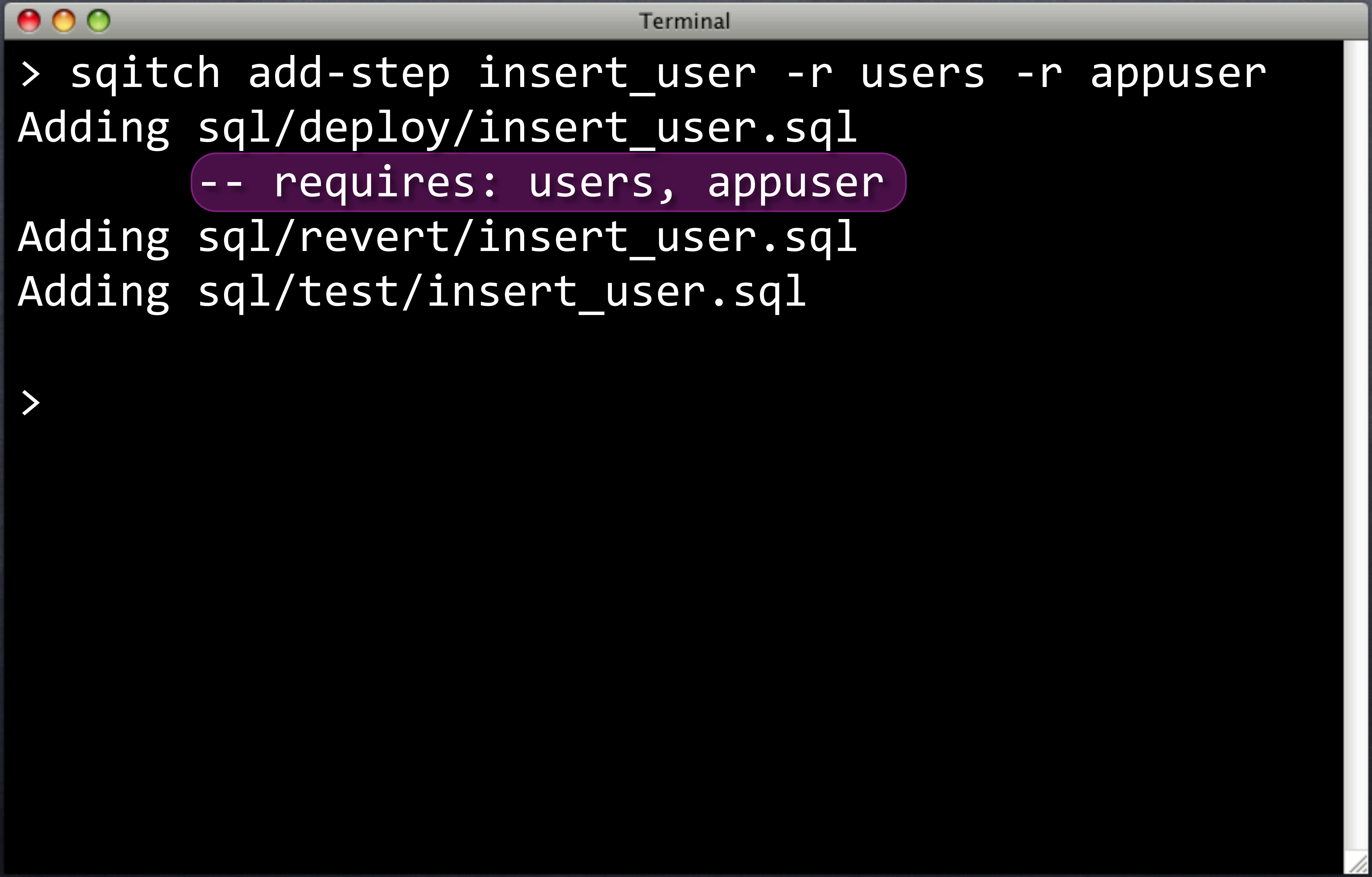
A Twofer



```
> sqitch add-step insert_user -r users -r appuser
Adding sql/deploy/insert_user.sql
       -- requires: users, appuser
Adding sql/revert/insert_user.sql
Adding sql/test/insert_user.sql


>
```

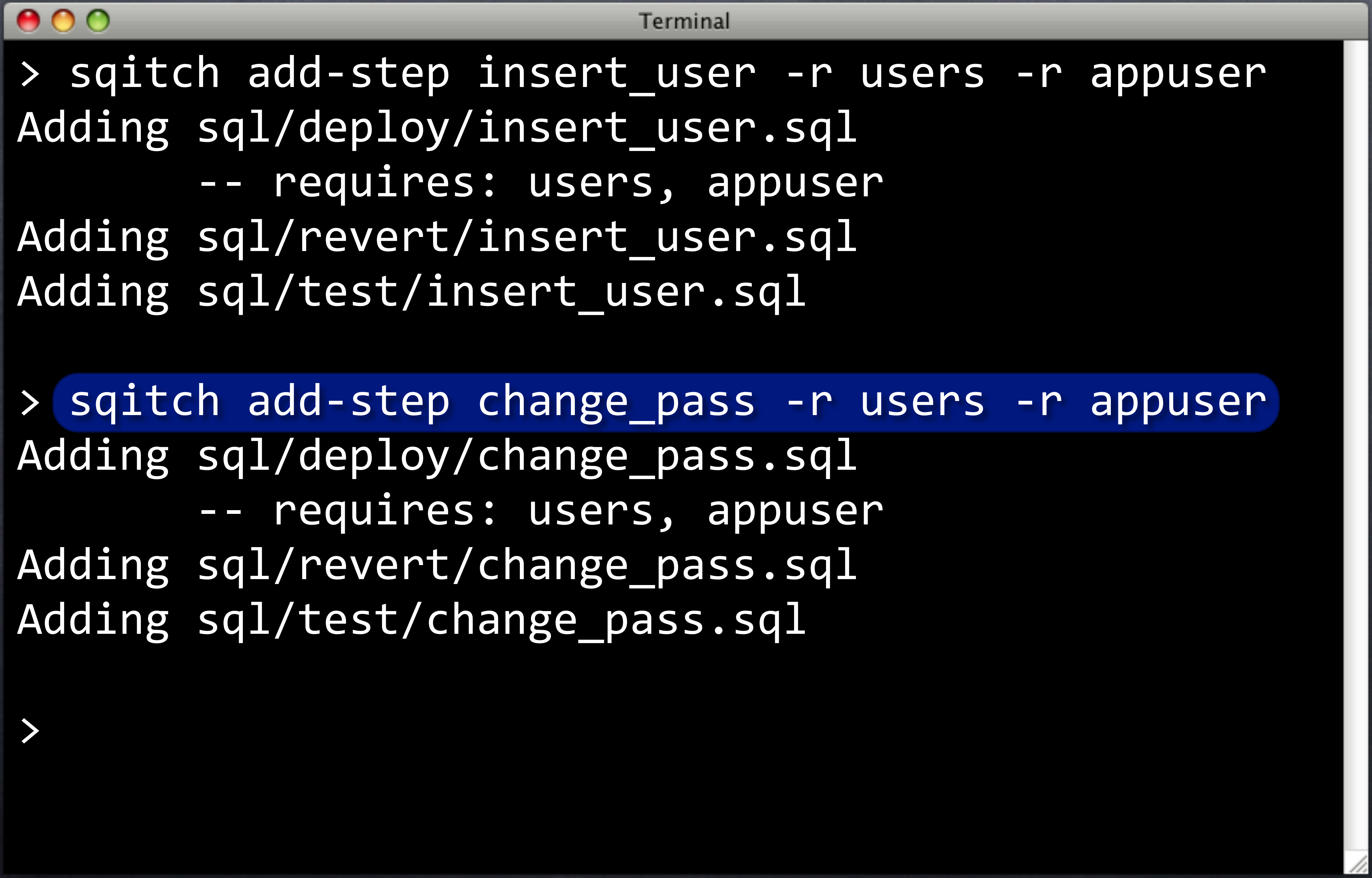
A Twofer



```
> sqitch add-step insert_user -r users -r appuser
Adding sql/deploy/insert_user.sql
       -- requires: users, appuser
Adding sql/revert/insert_user.sql
Adding sql/test/insert_user.sql


>
```

A Twofer

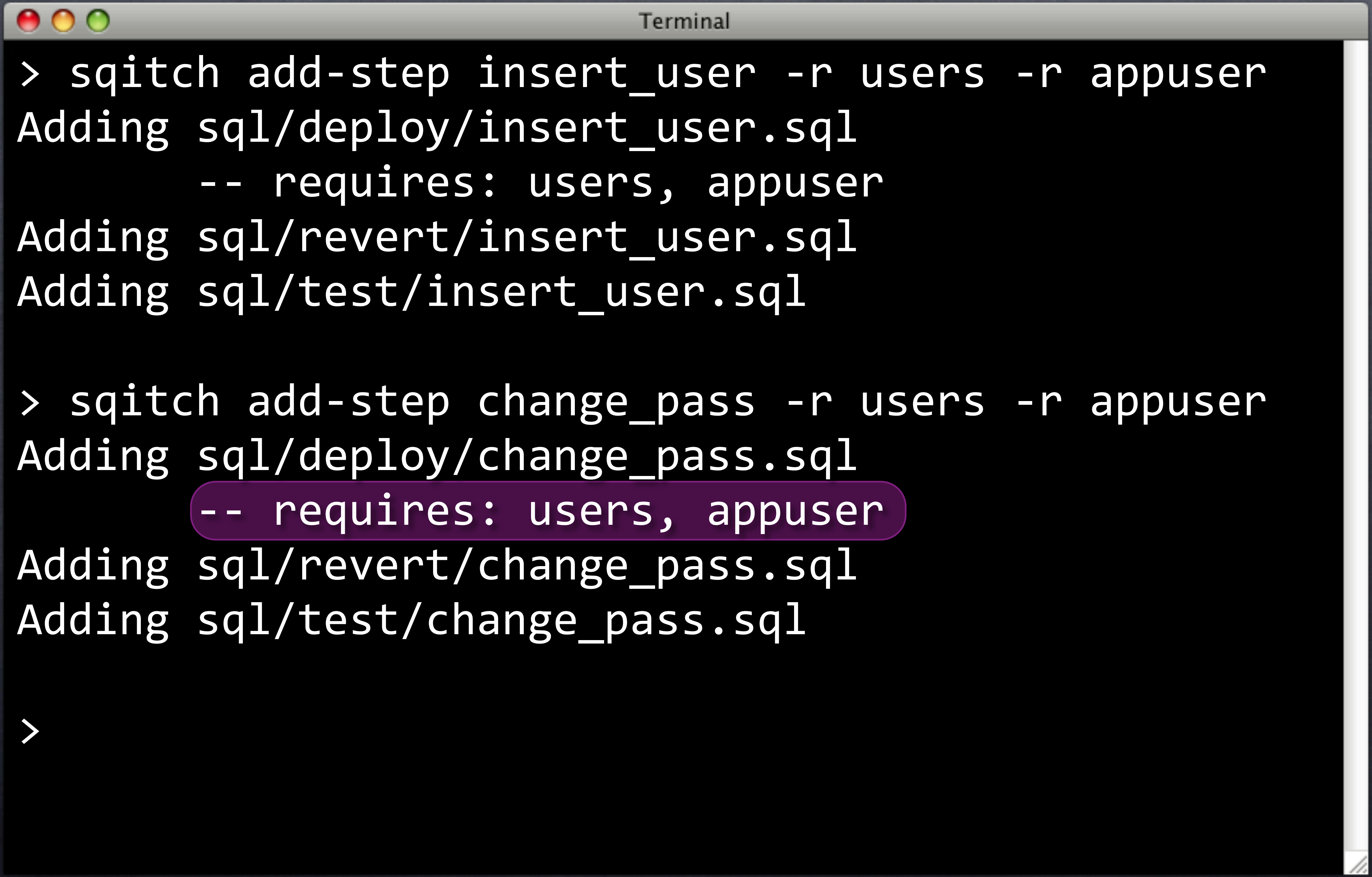


```
> sqitch add-step insert_user -r users -r appuser
Adding sql/deploy/insert_user.sql
       -- requires: users, appuser
Adding sql/revert/insert_user.sql
Adding sql/test/insert_user.sql

> sqitch add-step change_pass -r users -r appuser
Adding sql/deploy/change_pass.sql
       -- requires: users, appuser
Adding sql/revert/change_pass.sql
Adding sql/test/change_pass.sql


>
```

A Twofer

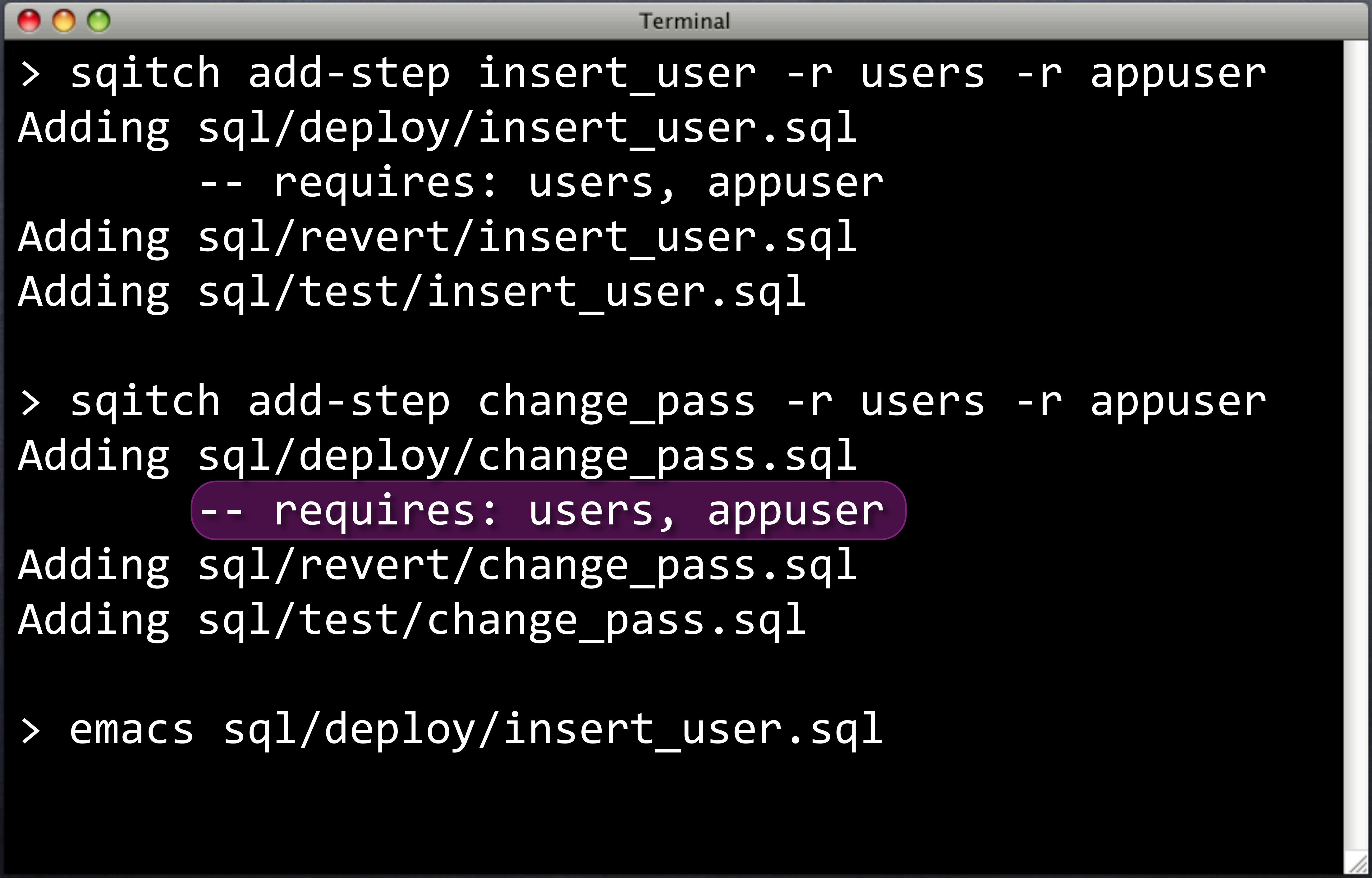


```
> sqitch add-step insert_user -r users -r appuser
Adding sql/deploy/insert_user.sql
       -- requires: users, appuser
Adding sql/revert/insert_user.sql
Adding sql/test/insert_user.sql

> sqitch add-step change_pass -r users -r appuser
Adding sql/deploy/change_pass.sql
       -- requires: users, appuser
Adding sql/revert/change_pass.sql
Adding sql/test/change_pass.sql


>
```

A Twofer

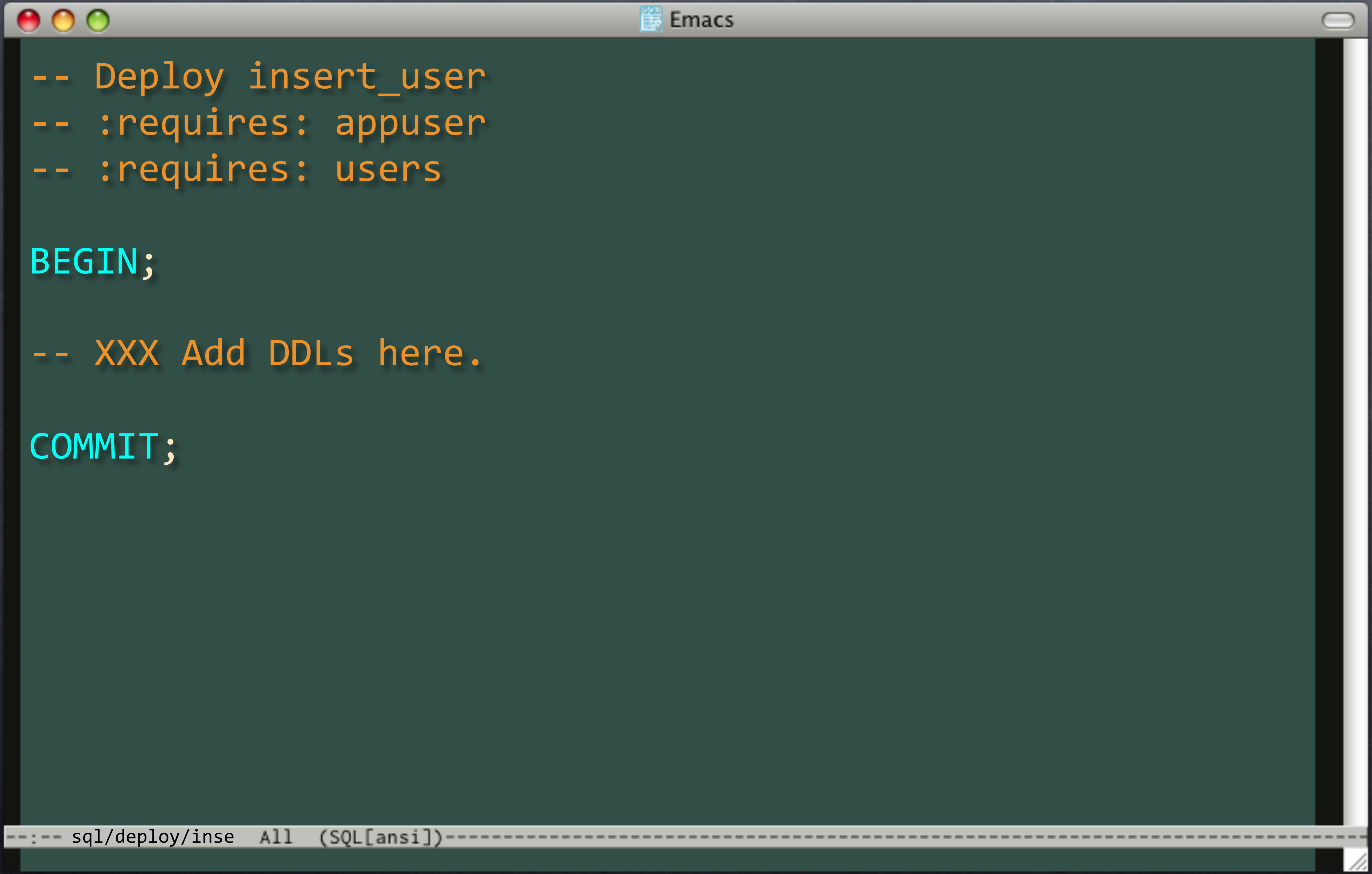


```
> sqitch add-step insert_user -r users -r appuser
Adding sql/deploy/insert_user.sql
       -- requires: users, appuser
Adding sql/revert/insert_user.sql
Adding sql/test/insert_user.sql

> sqitch add-step change_pass -r users -r appuser
Adding sql/deploy/change_pass.sql
       -- requires: users, appuser
Adding sql/revert/change_pass.sql
Adding sql/test/change_pass.sql

> emacs sql/deploy/insert_user.sql
```

sql/deploy/insert_user.sql



```
-- Deploy insert_user
-- :requires: appuser
-- :requires: users

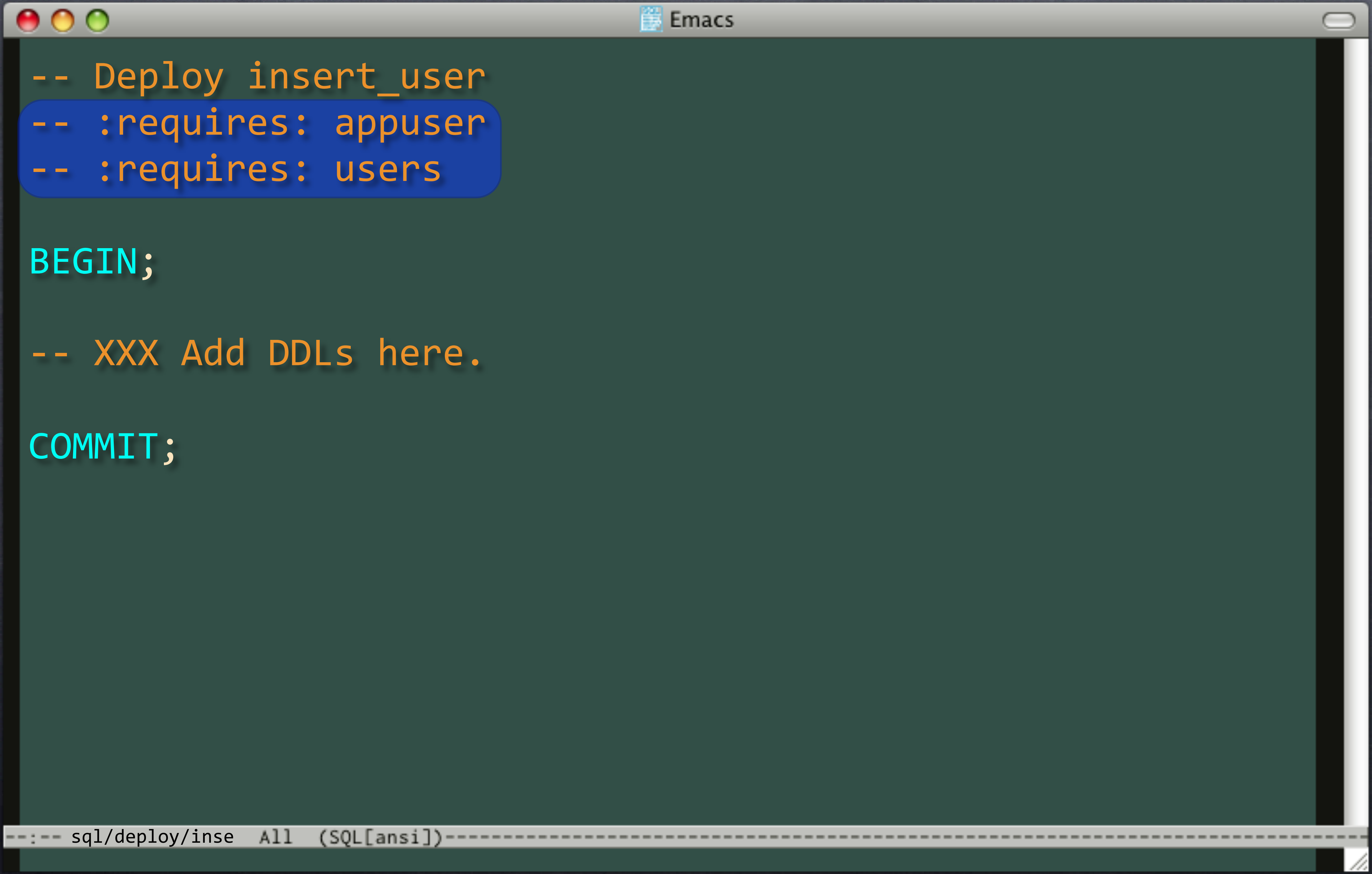
BEGIN;

-- XXX Add DDLs here.

COMMIT;
```

```
--:-- sql/deploy/inse   All   (SQL[ansi])-----------------------------------------------------------------
```

sql/deploy/insert_user.sql



```
-- Deploy insert_user
-- :requires: appuser
-- :requires: users

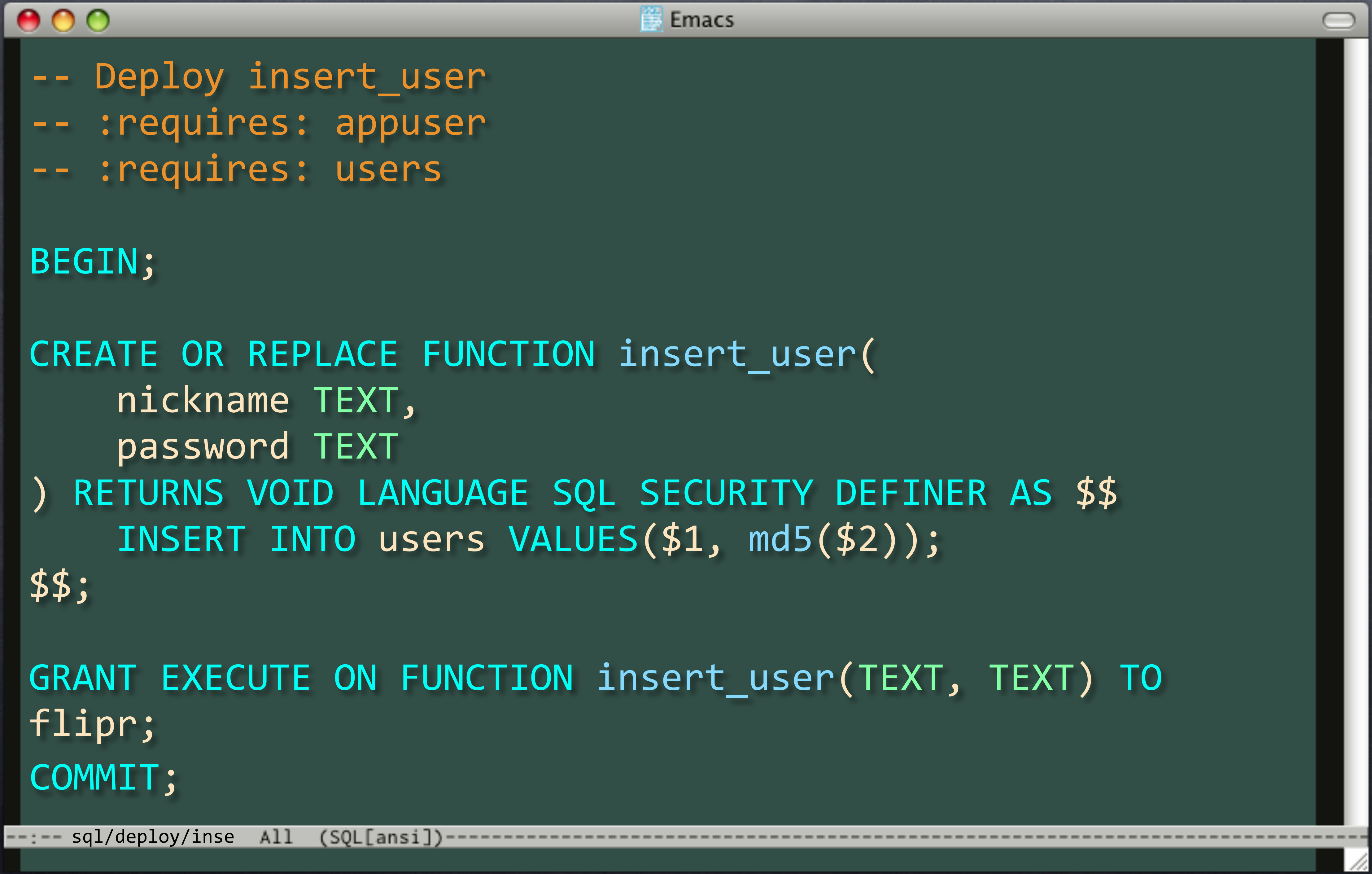
BEGIN;

-- XXX Add DDLs here.

COMMIT;
```

```
--:-- sql/deploy/inse   All   (SQL[ansi])----------------------------------------
```

sql/deploy/insert_user.sql



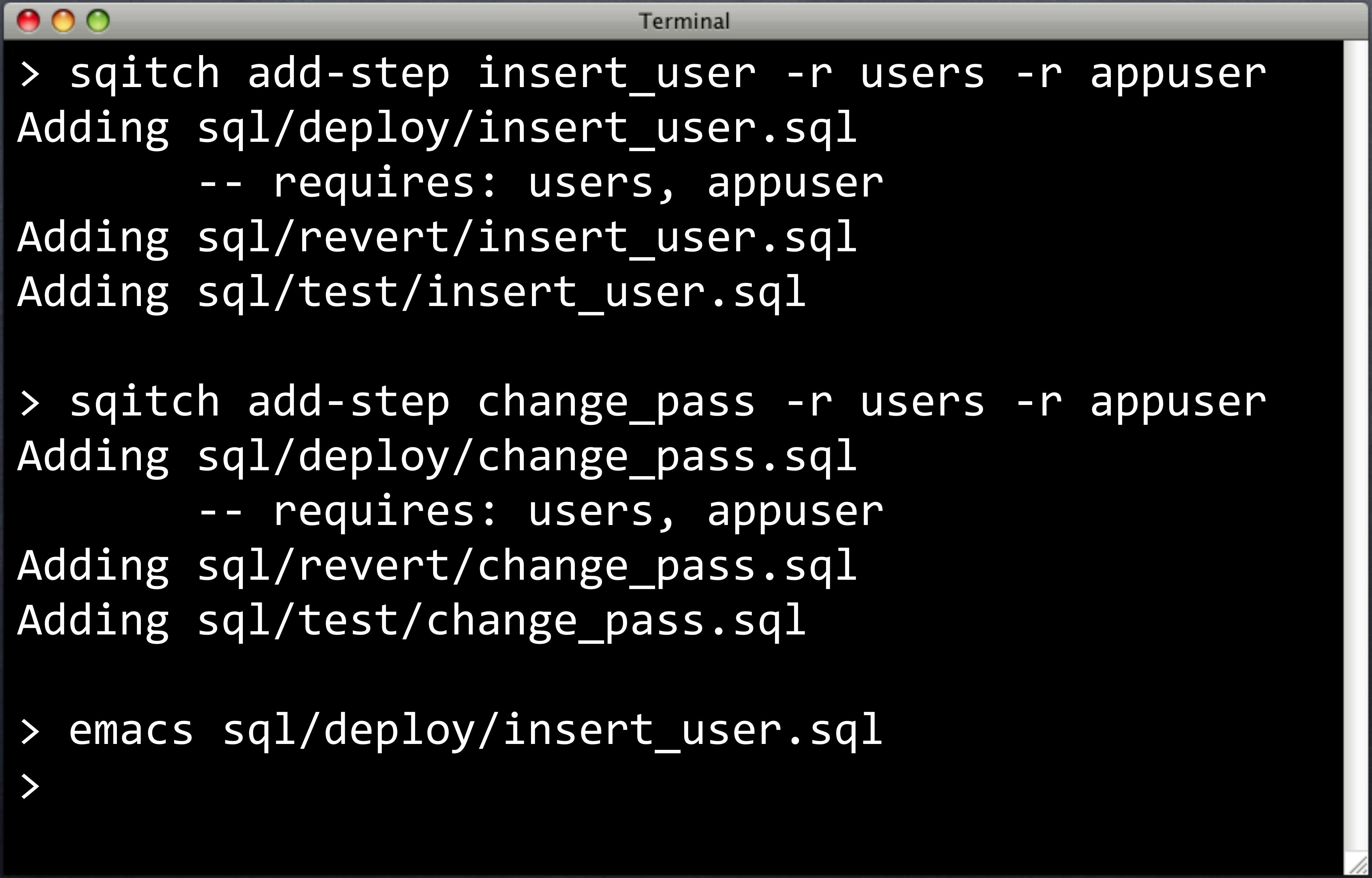
```
-- Deploy insert_user
-- :requires: appuser
-- :requires: users

BEGIN;

CREATE OR REPLACE FUNCTION insert_user(
    nickname TEXT,
    password TEXT
) RETURNS VOID LANGUAGE SQL SECURITY DEFINER AS $$
    INSERT INTO users VALUES($1, md5($2));
$$;

GRANT EXECUTE ON FUNCTION insert_user(TEXT, TEXT) TO
flipr;
COMMIT;
```

A Twofer

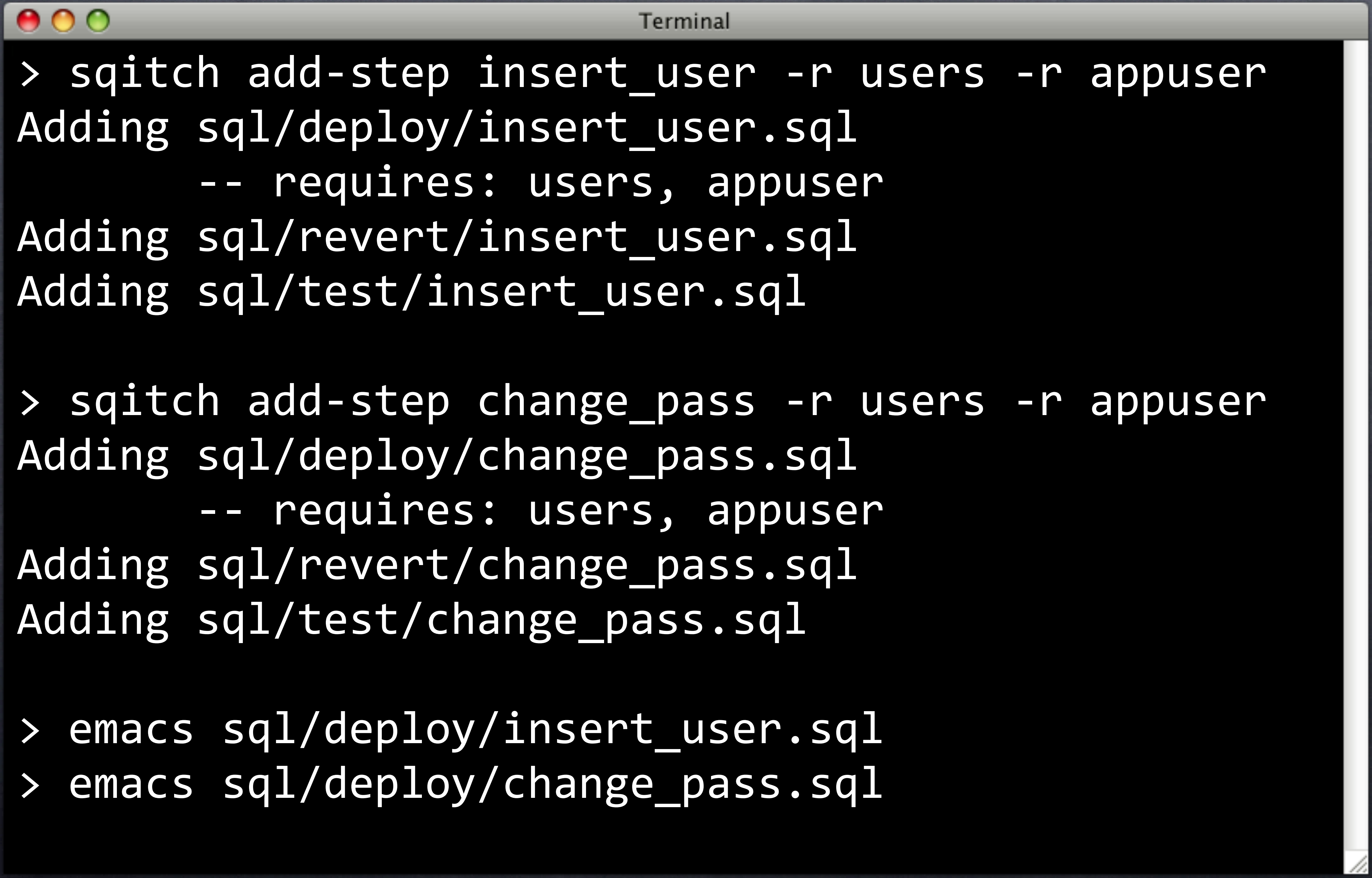


```
> sqitch add-step insert_user -r users -r appuser
Adding sql/deploy/insert_user.sql
       -- requires: users, appuser
Adding sql/revert/insert_user.sql
Adding sql/test/insert_user.sql

> sqitch add-step change_pass -r users -r appuser
Adding sql/deploy/change_pass.sql
       -- requires: users, appuser
Adding sql/revert/change_pass.sql
Adding sql/test/change_pass.sql

> emacs sql/deploy/insert_user.sql
>
```

A Twofer

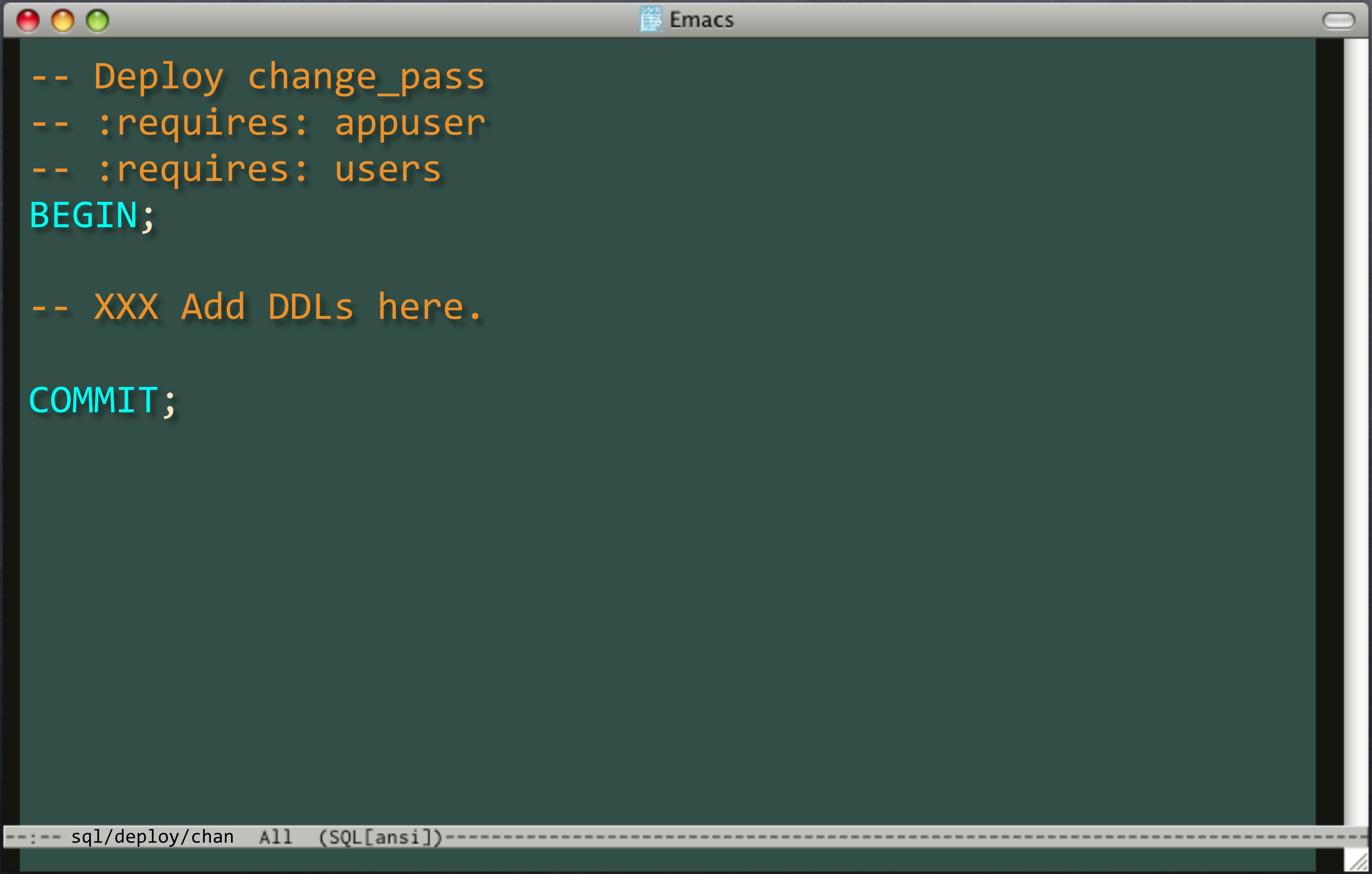


```
> sqitch add-step insert_user -r users -r appuser
Adding sql/deploy/insert_user.sql
       -- requires: users, appuser
Adding sql/revert/insert_user.sql
Adding sql/test/insert_user.sql

> sqitch add-step change_pass -r users -r appuser
Adding sql/deploy/change_pass.sql
       -- requires: users, appuser
Adding sql/revert/change_pass.sql
Adding sql/test/change_pass.sql

> emacs sql/deploy/insert_user.sql
> emacs sql/deploy/change_pass.sql
```

sql/deploy/change_pass.sql



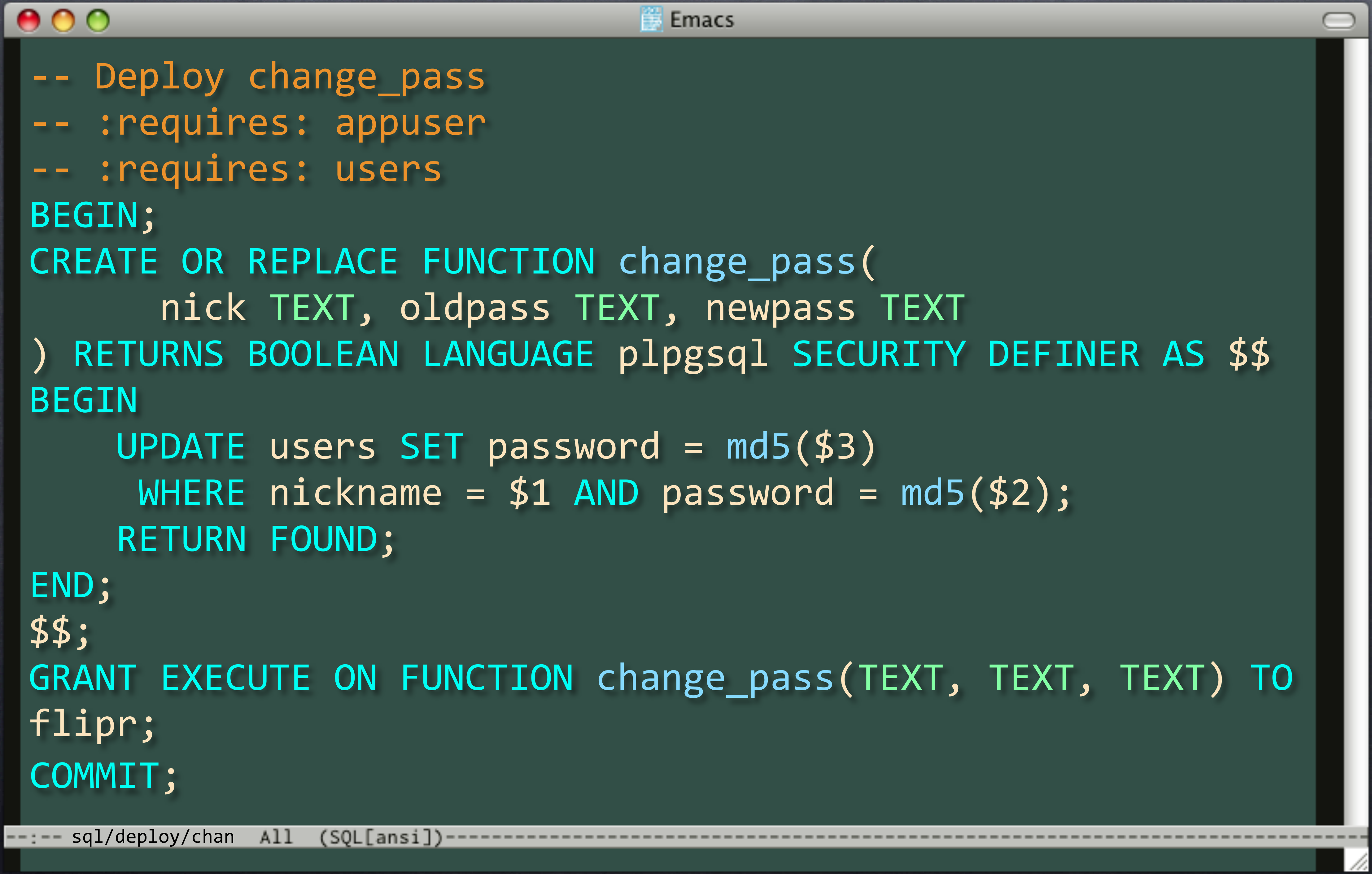
```
-- Deploy change_pass
-- :requires: appuser
-- :requires: users
BEGIN;

-- XXX Add DDLs here.

COMMIT;
```

```
--:-- sql/deploy/chan   All   (SQL[ansi])-----------------------------------------------
```

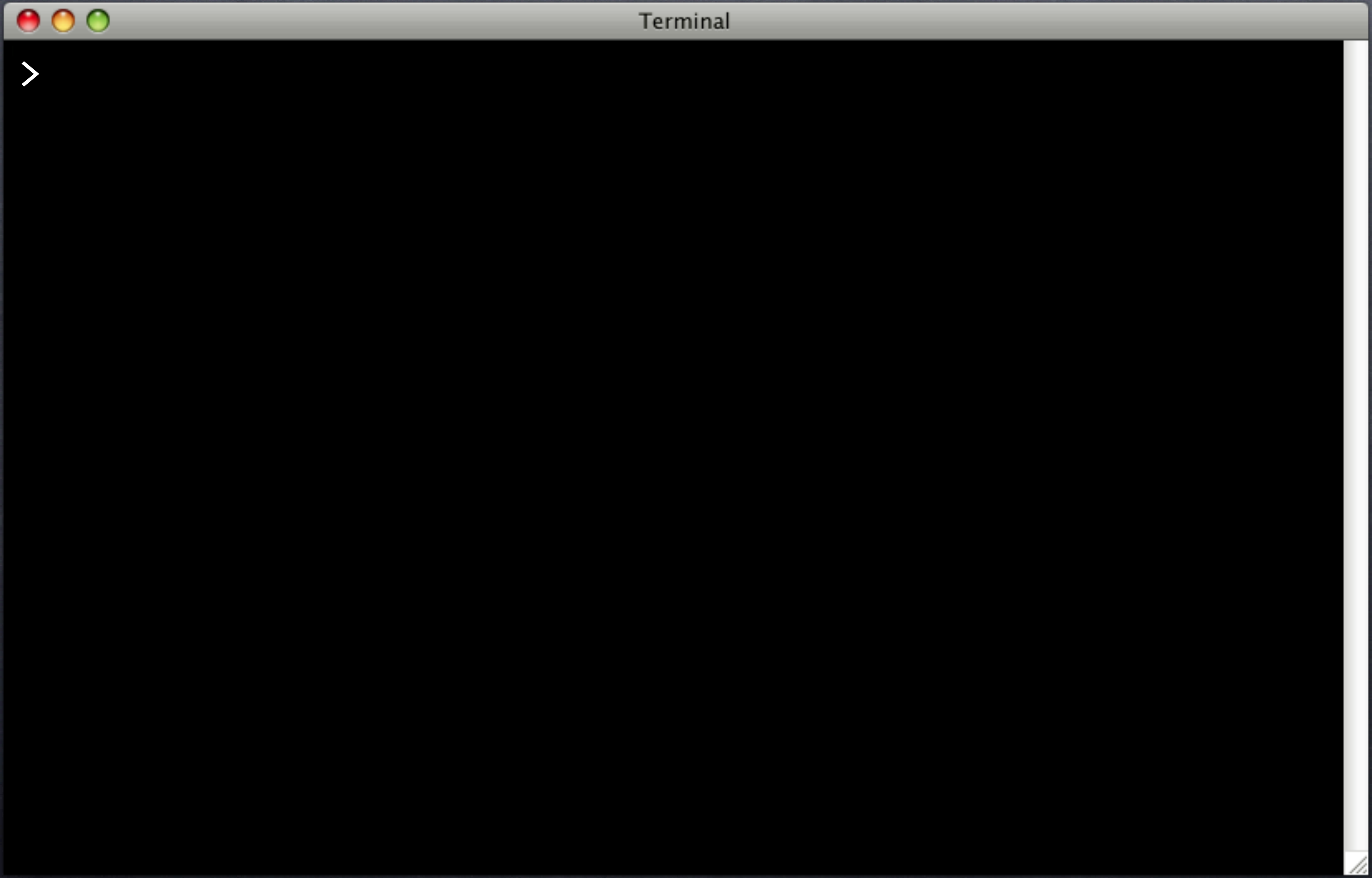
sql/deploy/change_pass.sql



```
-- Deploy change_pass
-- :requires: appuser
-- :requires: users
BEGIN;
CREATE OR REPLACE FUNCTION change_pass(
      nick TEXT, oldpass TEXT, newpass TEXT
) RETURNS BOOLEAN LANGUAGE plpgsql SECURITY DEFINER AS $$
BEGIN
    UPDATE users SET password = md5($3)
     WHERE nickname = $1 AND password = md5($2);
    RETURN FOUND;
END;
$$;
GRANT EXECUTE ON FUNCTION change_pass(TEXT, TEXT, TEXT) TO
flipr;
COMMIT;
```

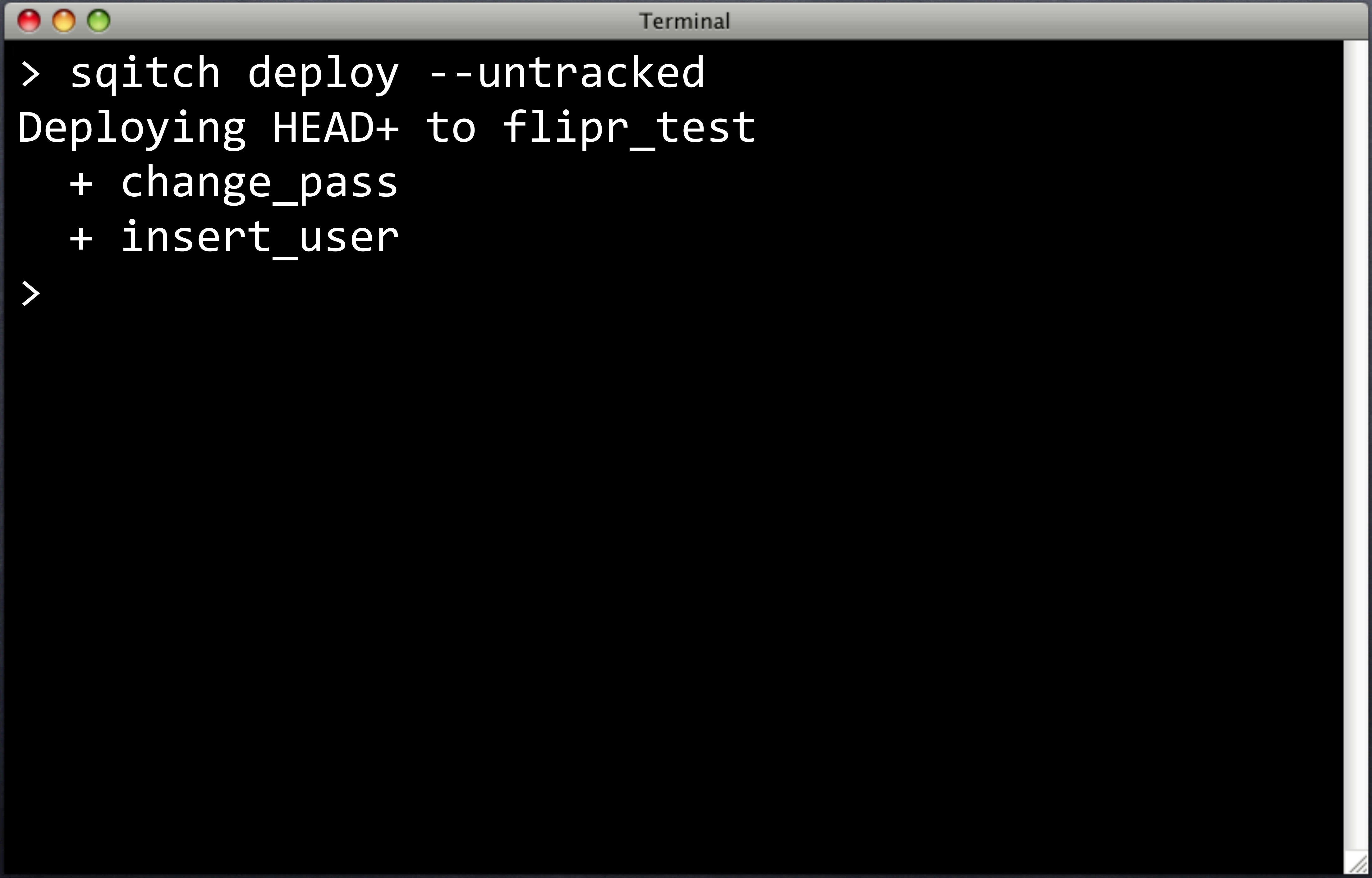
```
--:-- sql/deploy/chan   All   (SQL[ansi])----------------------------------------------------
```

Deploy Functions



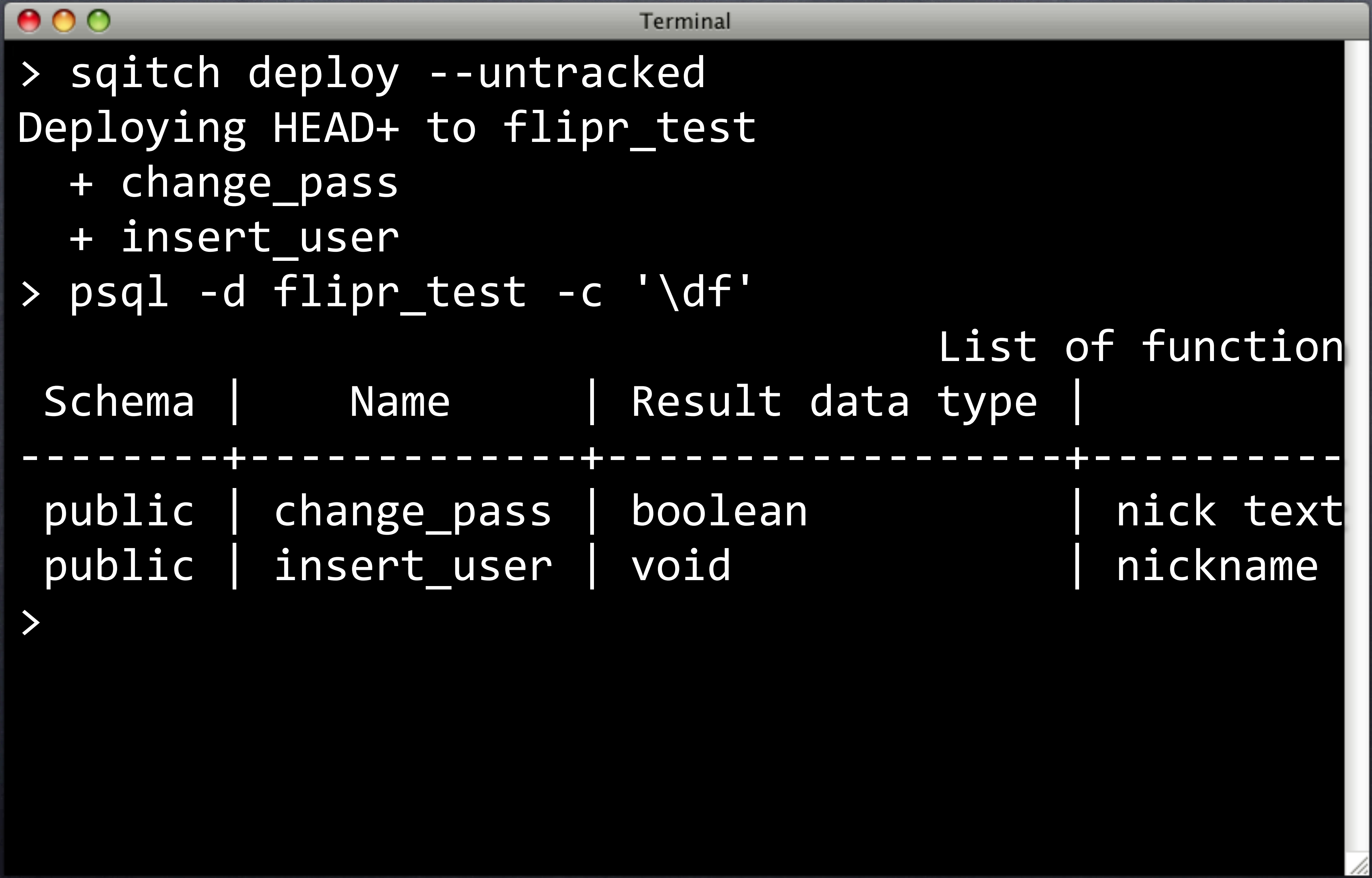
```
>
```

Deploy Functions



```
> sqitch deploy --untracked
Deploying HEAD+ to flipr_test
  + change_pass
  + insert_user
>
```

Deploy Functions



```
> sqitch deploy --untracked
Deploying HEAD+ to flipr_test
  + change_pass
  + insert_user
> psql -d flipr_test -c '\df'
                                    List of function
 Schema |    Name     | Result data type |
--------+-------------+------------------+----------
 public | change_pass | boolean          | nick text
 public | insert_user | void             | nickname
>
```

Commit It

Commit It

- sqitch revert --to HEAD

Commit It

- sqitch revert --to HEAD
- git add && git commit

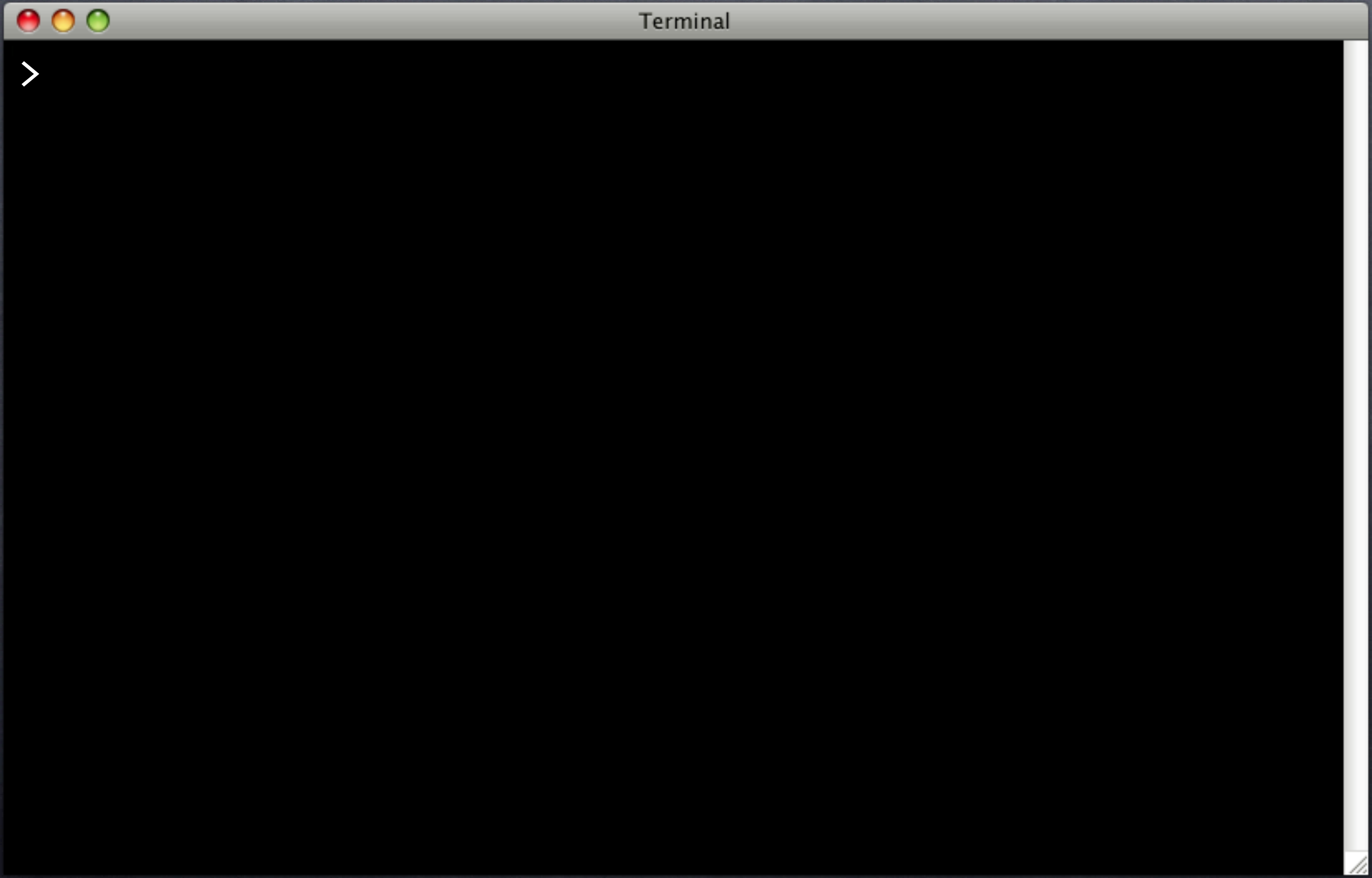
Commit It

- sqitch revert --to HEAD
- git add && git commit
- sqitch deploy

Commit It

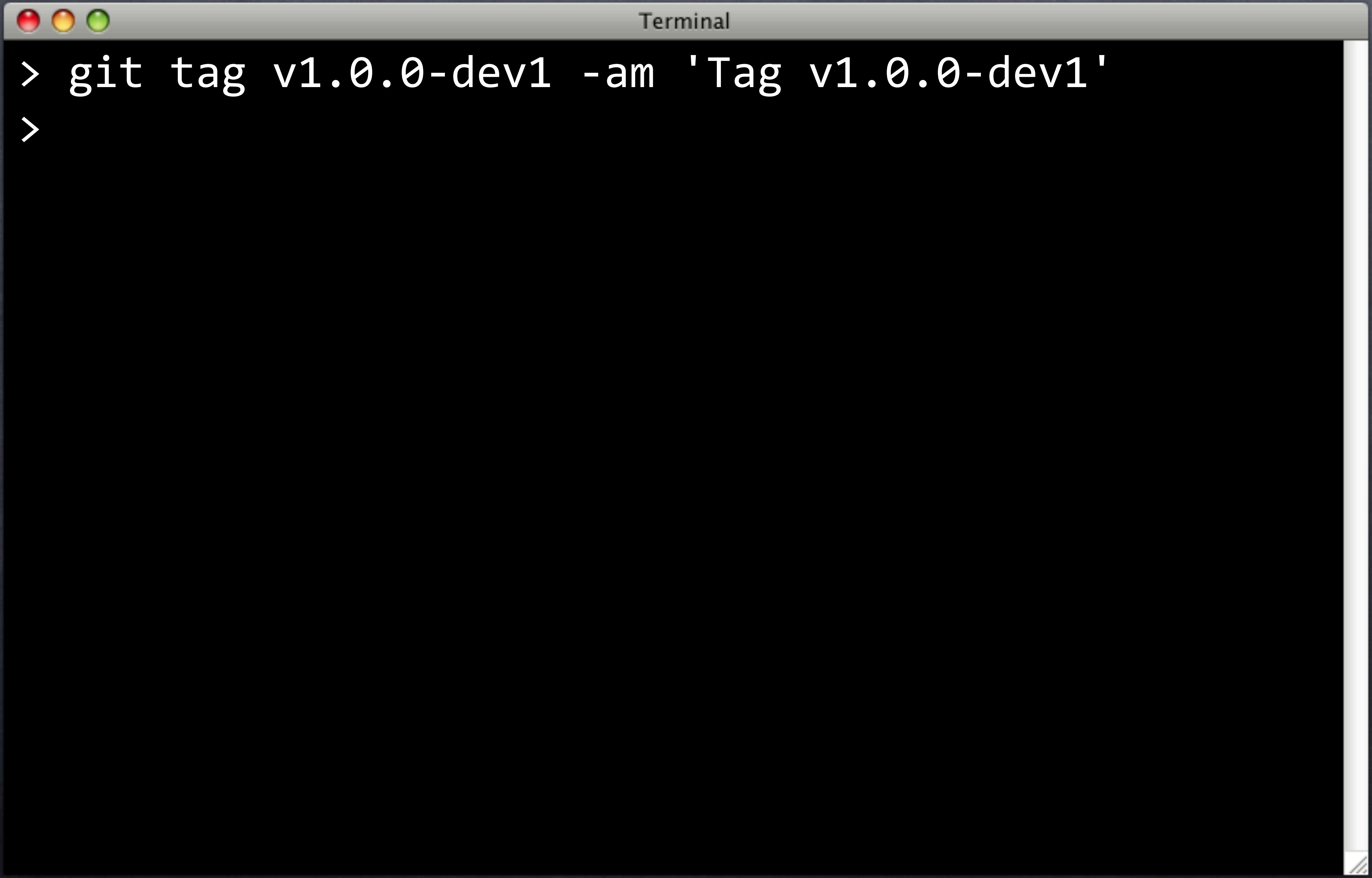
- sqitch revert --to HEAD
- git add && git commit
- sqitch deploy
- And now…

Stage It



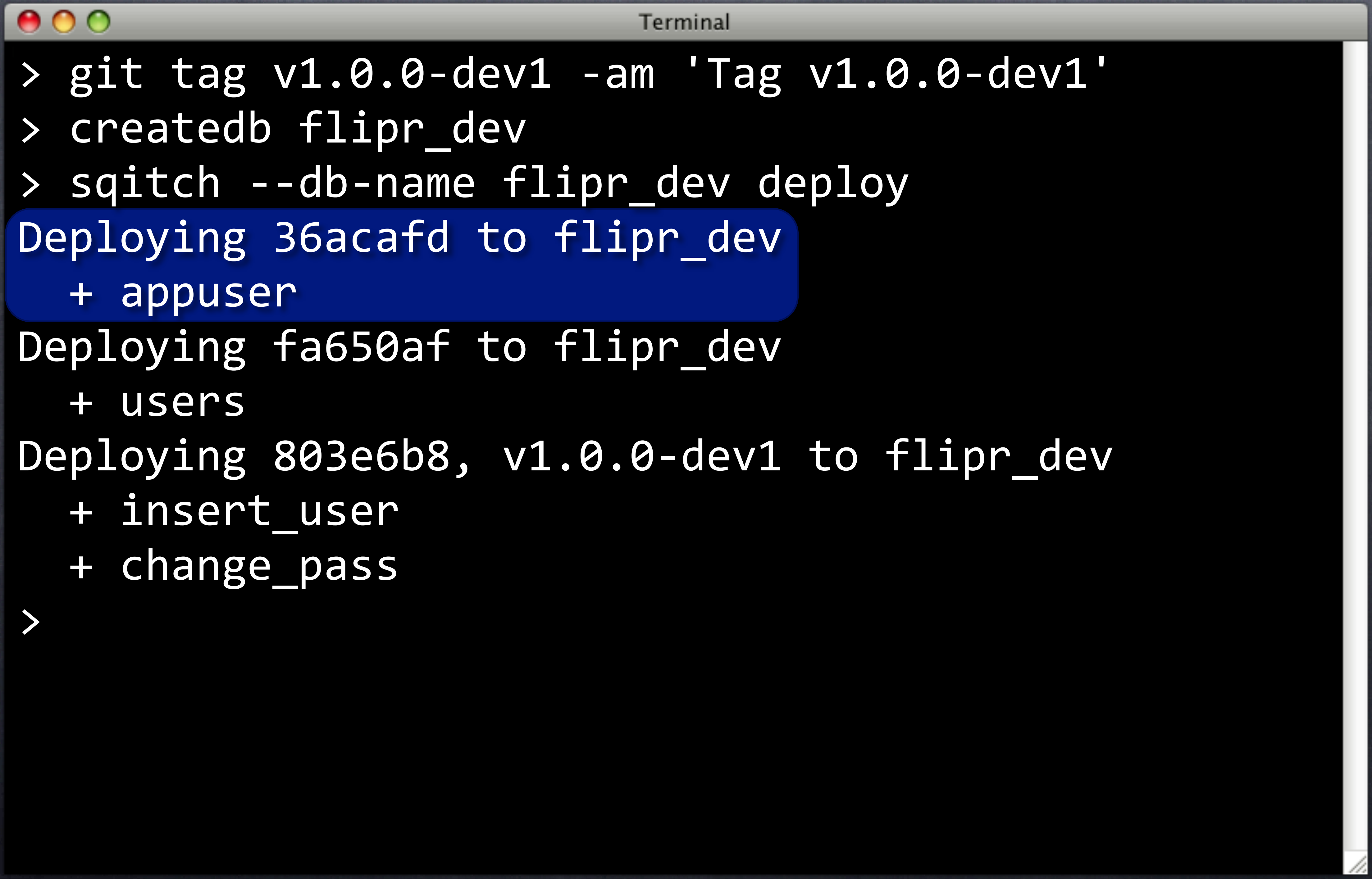
```
>
```

Stage It



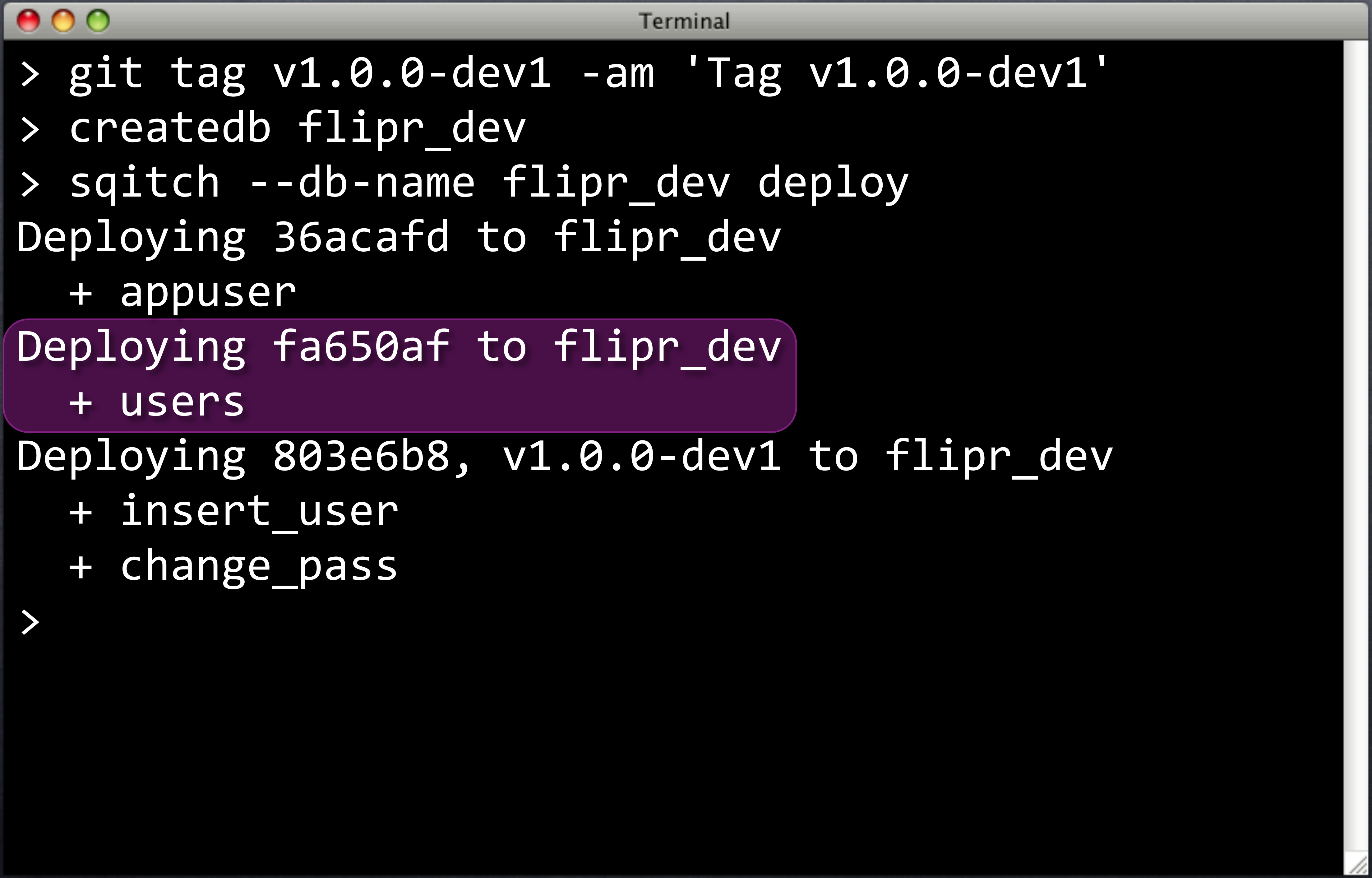
```
> git tag v1.0.0-dev1 -am 'Tag v1.0.0-dev1'
>
```

Stage It



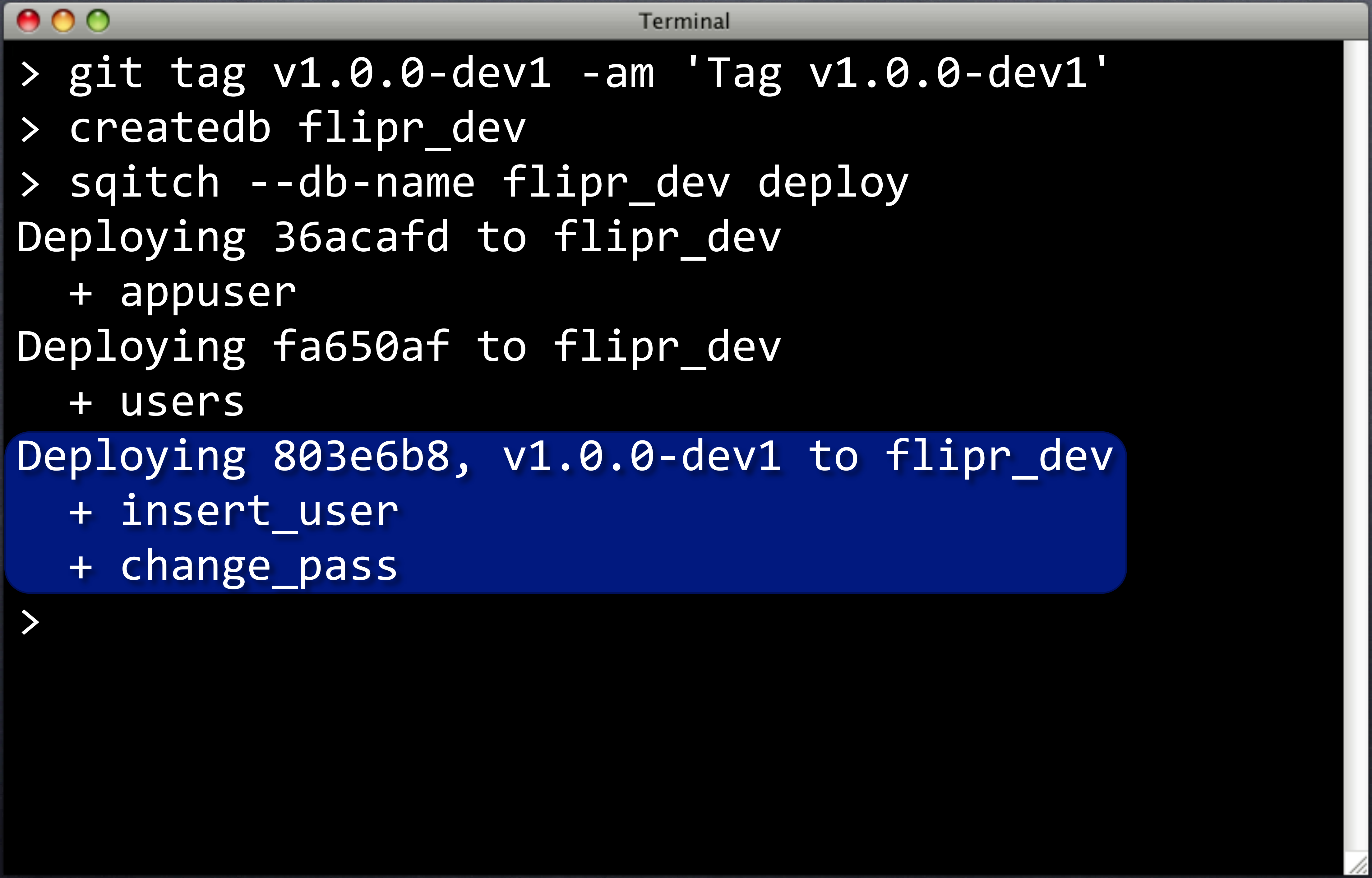
```
> git tag v1.0.0-dev1 -am 'Tag v1.0.0-dev1'
> createdb flipr_dev
> sqitch --db-name flipr_dev deploy
Deploying 36acafd to flipr_dev
  + appuser
Deploying fa650af to flipr_dev
  + users
Deploying 803e6b8, v1.0.0-dev1 to flipr_dev
  + insert_user
  + change_pass
>
```

Stage It



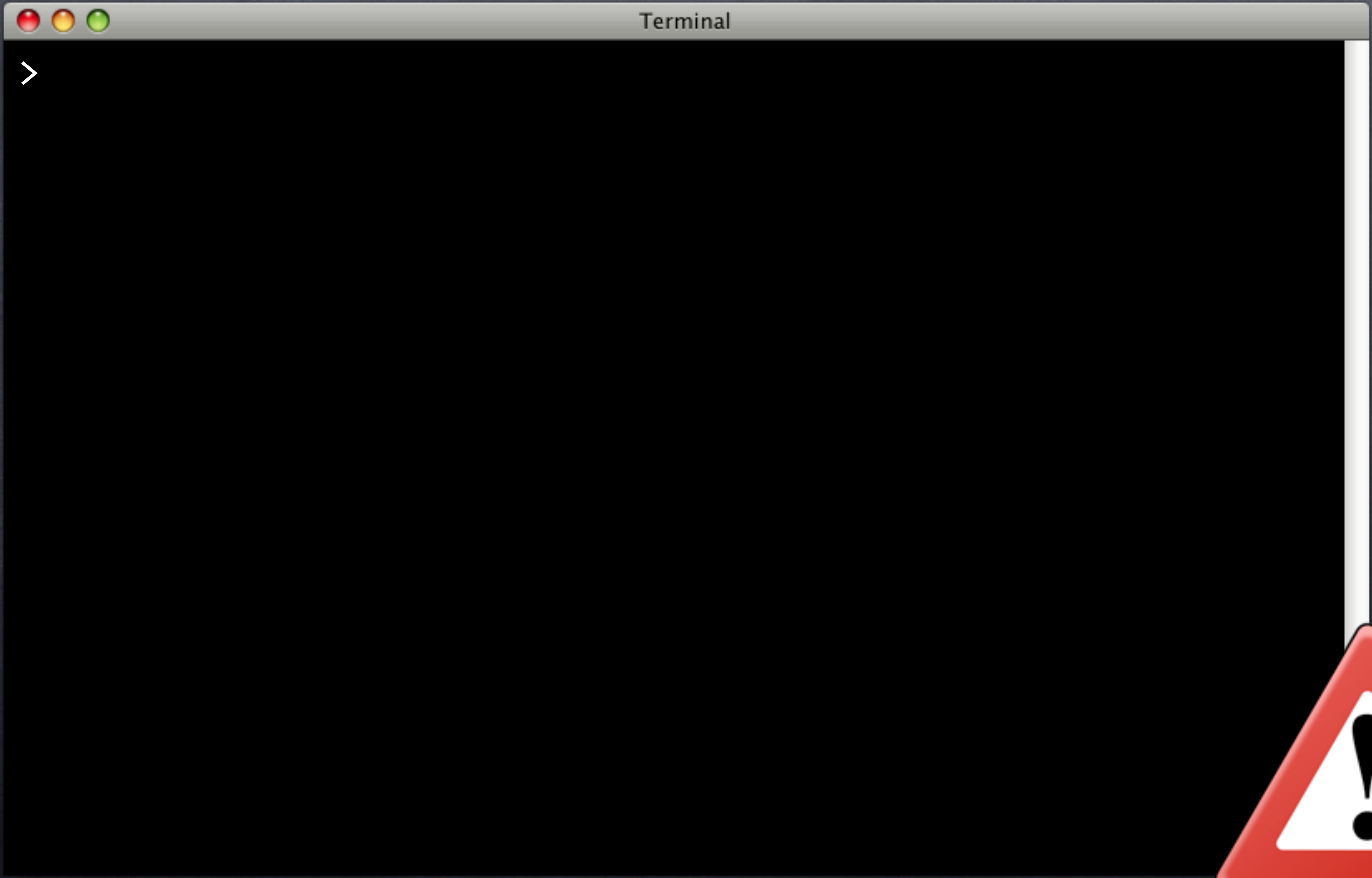
```
> git tag v1.0.0-dev1 -am 'Tag v1.0.0-dev1'
> createdb flipr_dev
> sqitch --db-name flipr_dev deploy
Deploying 36acafd to flipr_dev
  + appuser
Deploying fa650af to flipr_dev
  + users
Deploying 803e6b8, v1.0.0-dev1 to flipr_dev
  + insert_user
  + change_pass
>
```

Stage It



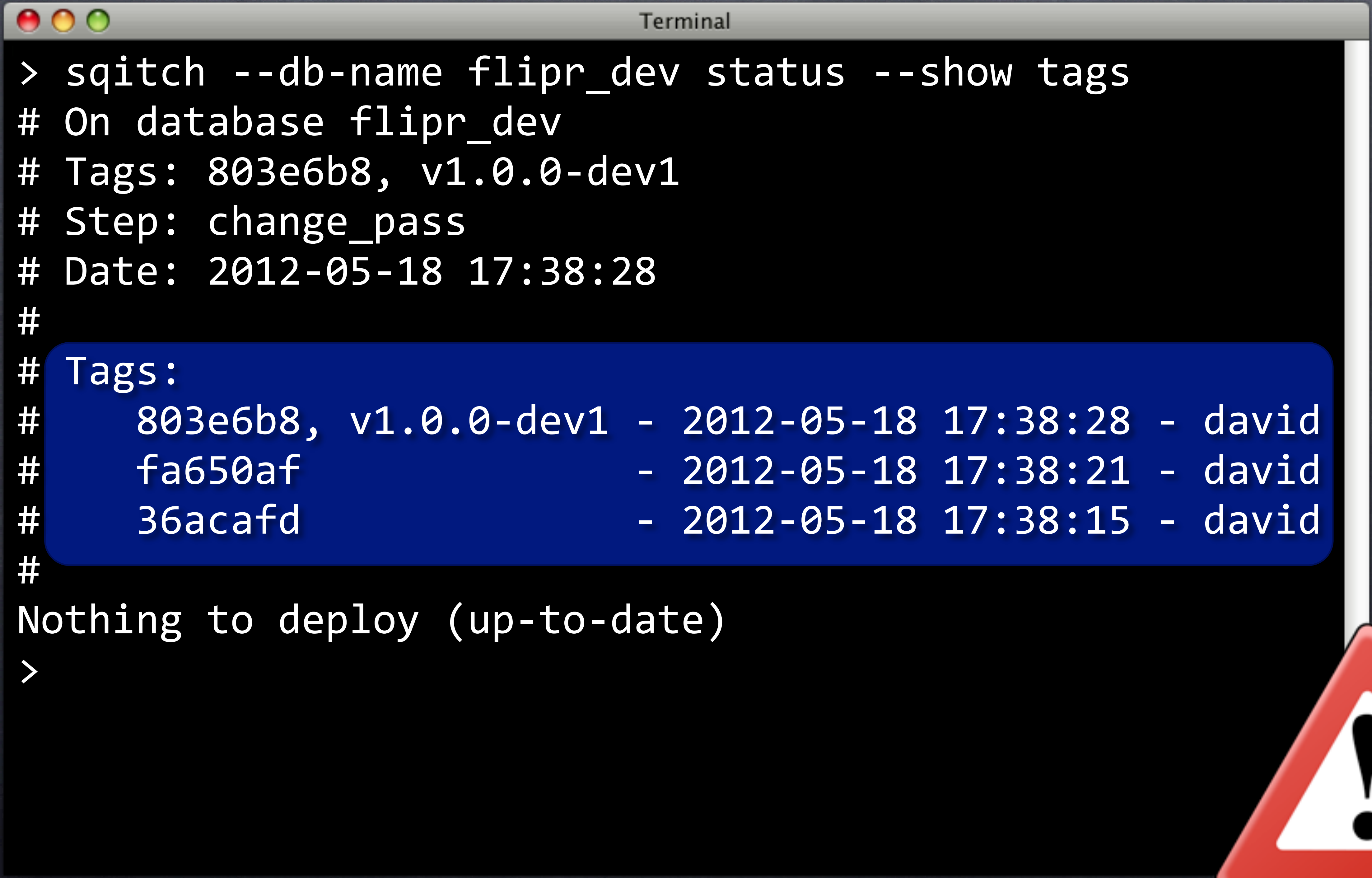
```
> git tag v1.0.0-dev1 -am 'Tag v1.0.0-dev1'
> createdb flipr_dev
> sqitch --db-name flipr_dev deploy
Deploying 36acafd to flipr_dev
  + appuser
Deploying fa650af to flipr_dev
  + users
Deploying 803e6b8, v1.0.0-dev1 to flipr_dev
  + insert_user
  + change_pass
>
```

Stage Status?



```
>
```

Stage Status?



```
> sqitch --db-name flipr_dev status --show tags
# On database flipr_dev
# Tags: 803e6b8, v1.0.0-dev1
# Step: change_pass
# Date: 2012-05-18 17:38:28
#
# Tags:
#    803e6b8, v1.0.0-dev1 - 2012-05-18 17:38:28 - david
#    fa650af              - 2012-05-18 17:38:21 - david
#    36acafd              - 2012-05-18 17:38:15 - david
#
Nothing to deploy (up-to-date)
>
```

Distribution Bundling

Distribution Bundling

- Bundle plan + scripts for deployment

Distribution Bundling

- Bundle plan + scripts for deployment
- Plan generated from VCS history

Distribution Bundling

- Bundle plan + scripts for deployment
- Plan generated from VCS history
- Package up as

Distribution Bundling

- Bundle plan + scripts for deployment
- Plan generated from VCS history
- Package up as
  - RPM

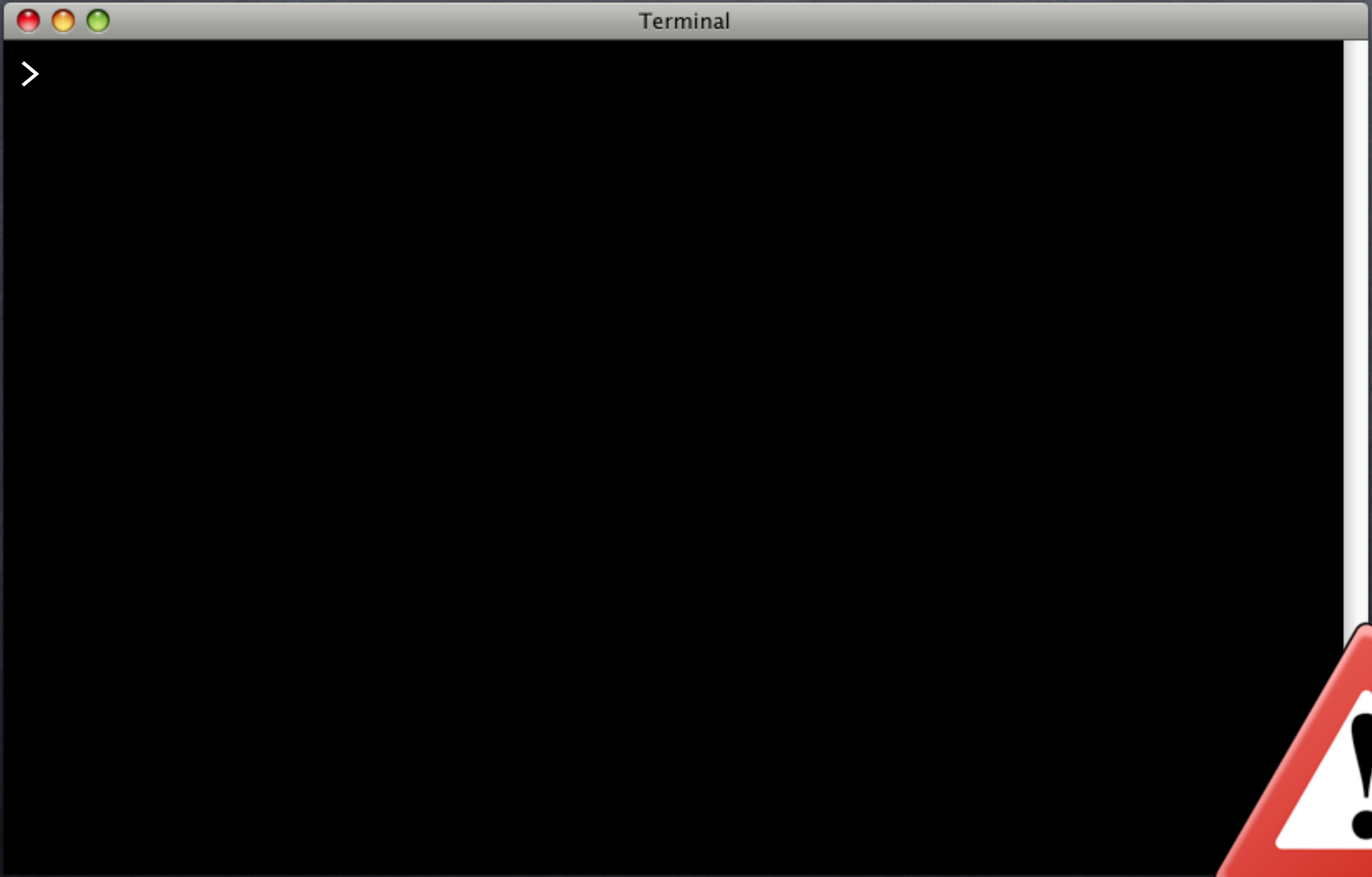
Distribution Bundling

- Bundle plan + scripts for deployment
- Plan generated from VCS history
- Package up as
  - RPM
  - Debian Package

Distribution Bundling

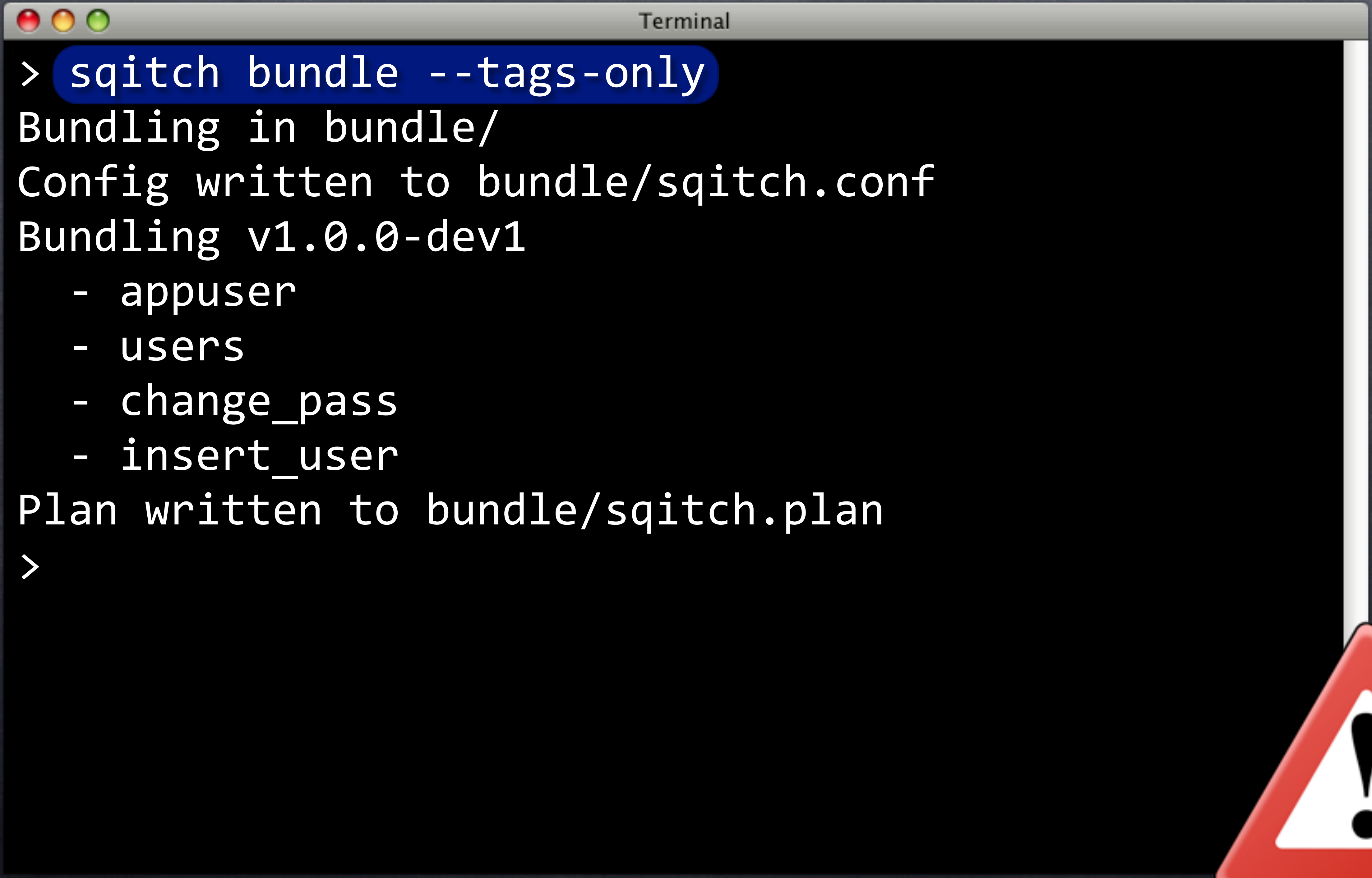
- Bundle plan + scripts for deployment
- Plan generated from VCS history
- Package up as
  - RPM
  - Debian Package
  - Gem

Ship It!



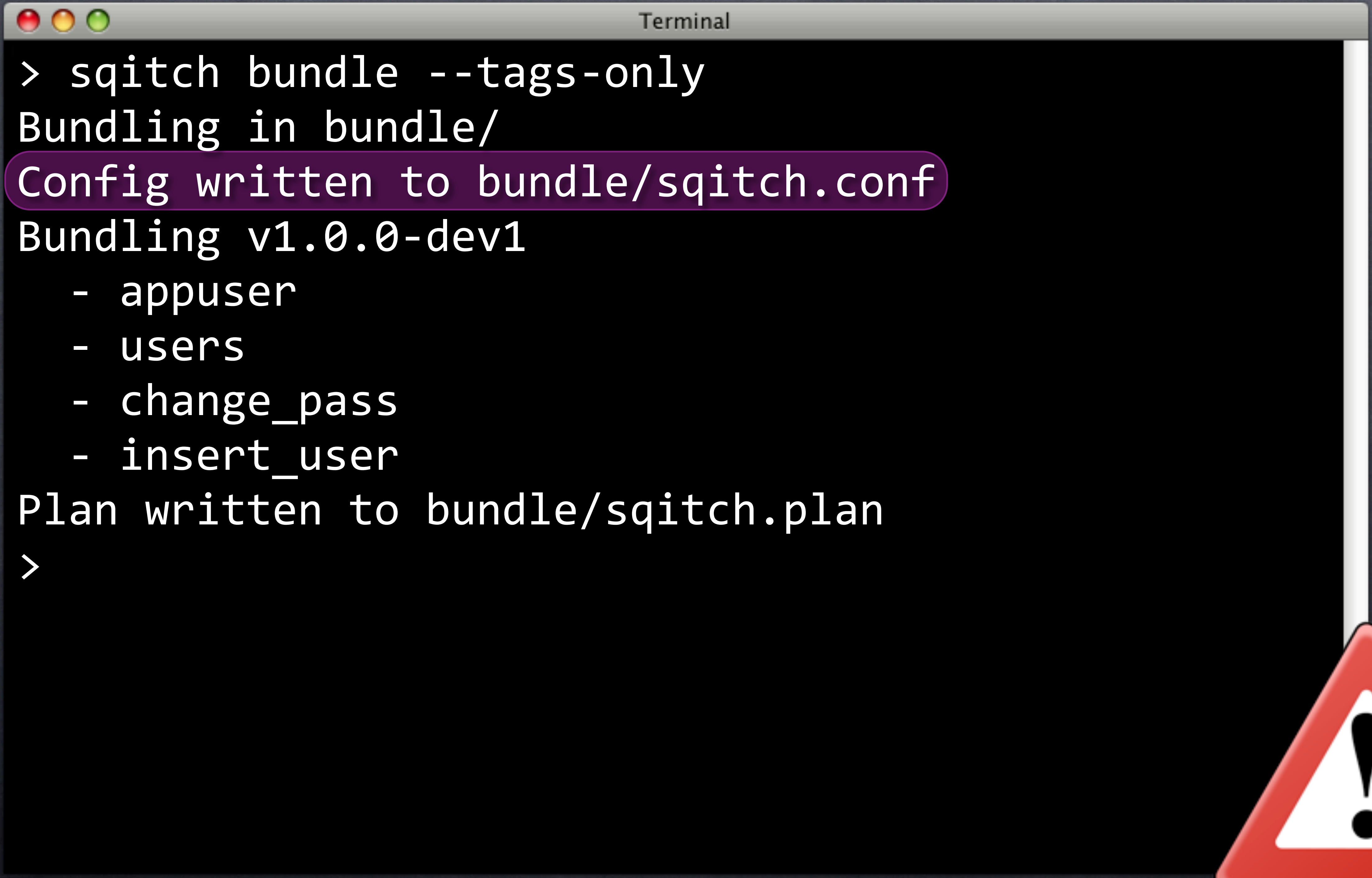
```
>
```

Ship It!



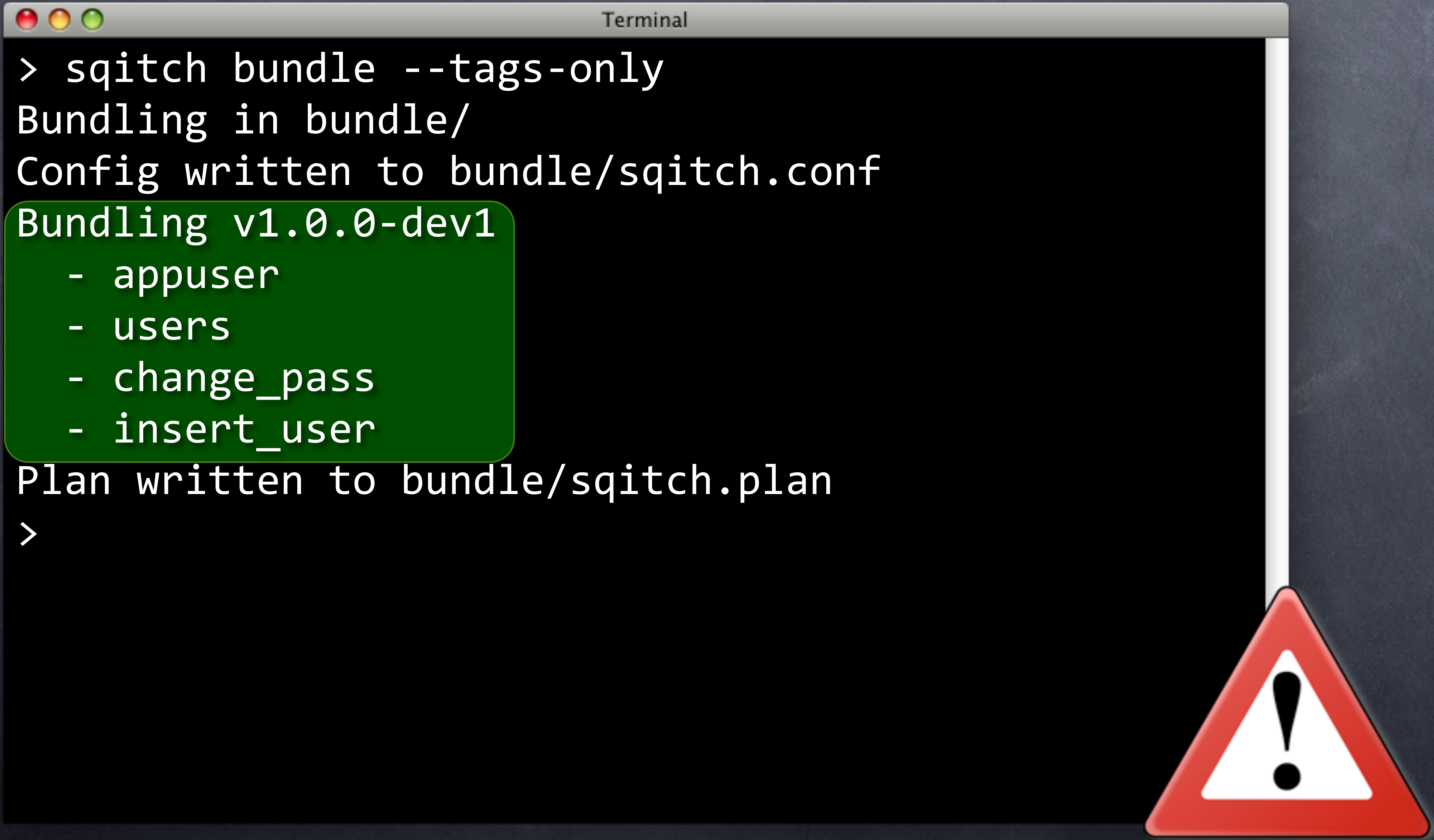
```
> sqitch bundle --tags-only
Bundling in bundle/
Config written to bundle/sqitch.conf
Bundling v1.0.0-dev1
  - appuser
  - users
  - change_pass
  - insert_user
Plan written to bundle/sqitch.plan
>
```

Ship It!



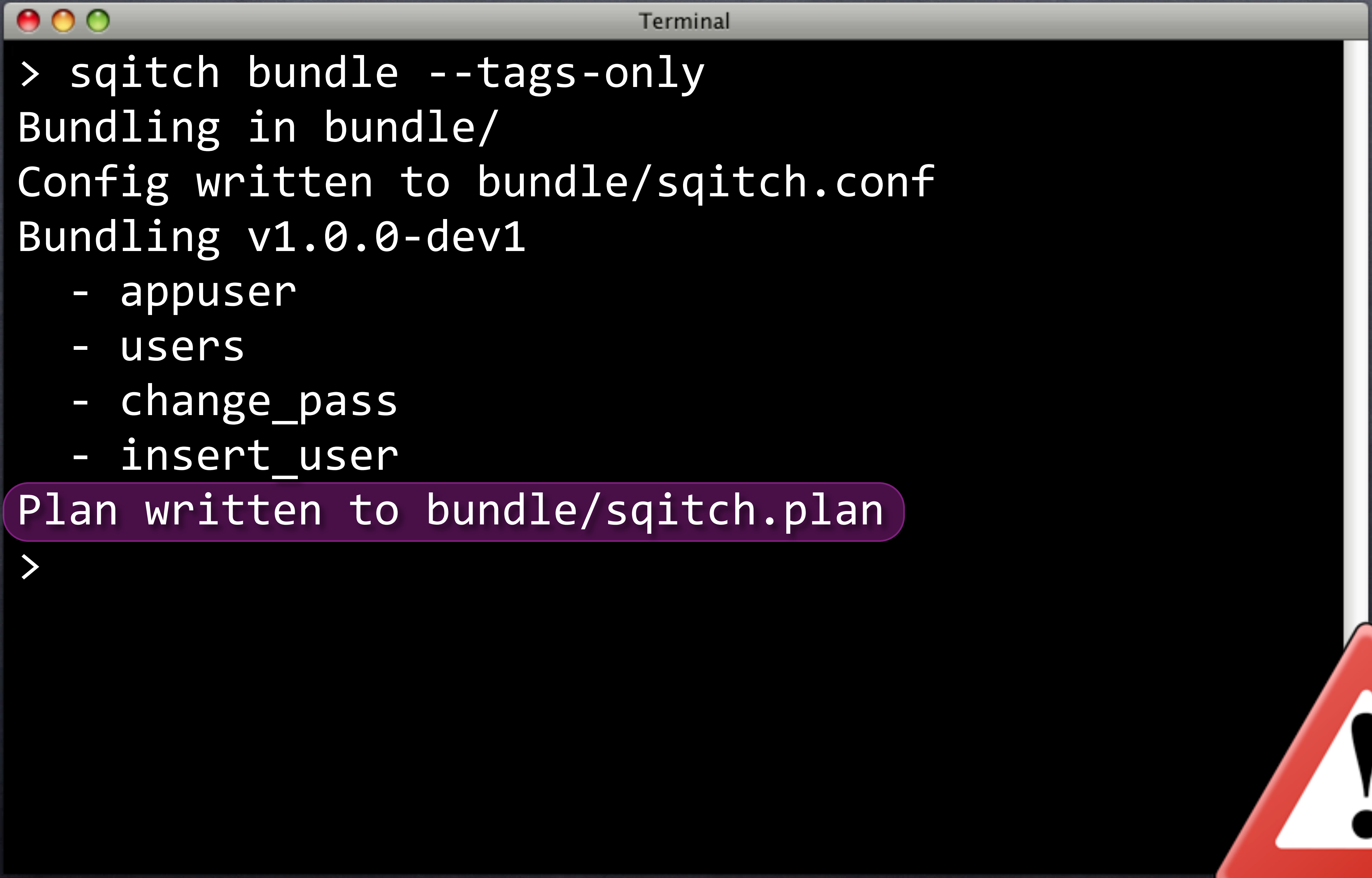
```
> sqitch bundle --tags-only
Bundling in bundle/
Config written to bundle/sqitch.conf
Bundling v1.0.0-dev1
  - appuser
  - users
  - change_pass
  - insert_user
Plan written to bundle/sqitch.plan
>
```

Ship It!



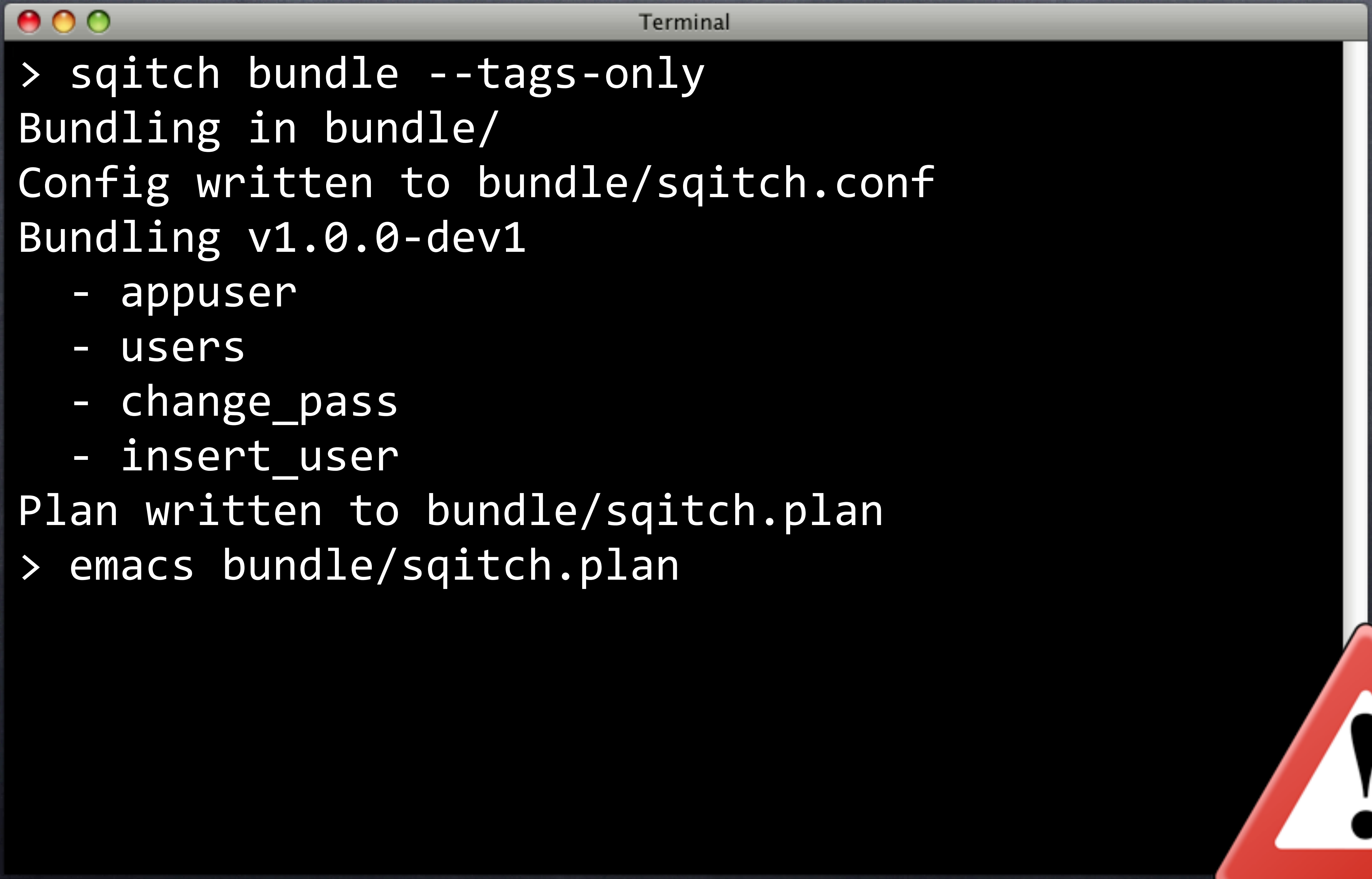
```
> sqitch bundle --tags-only
Bundling in bundle/
Config written to bundle/sqitch.conf
Bundling v1.0.0-dev1
  - appuser
  - users
  - change_pass
  - insert_user
Plan written to bundle/sqitch.plan
>
```

Ship It!



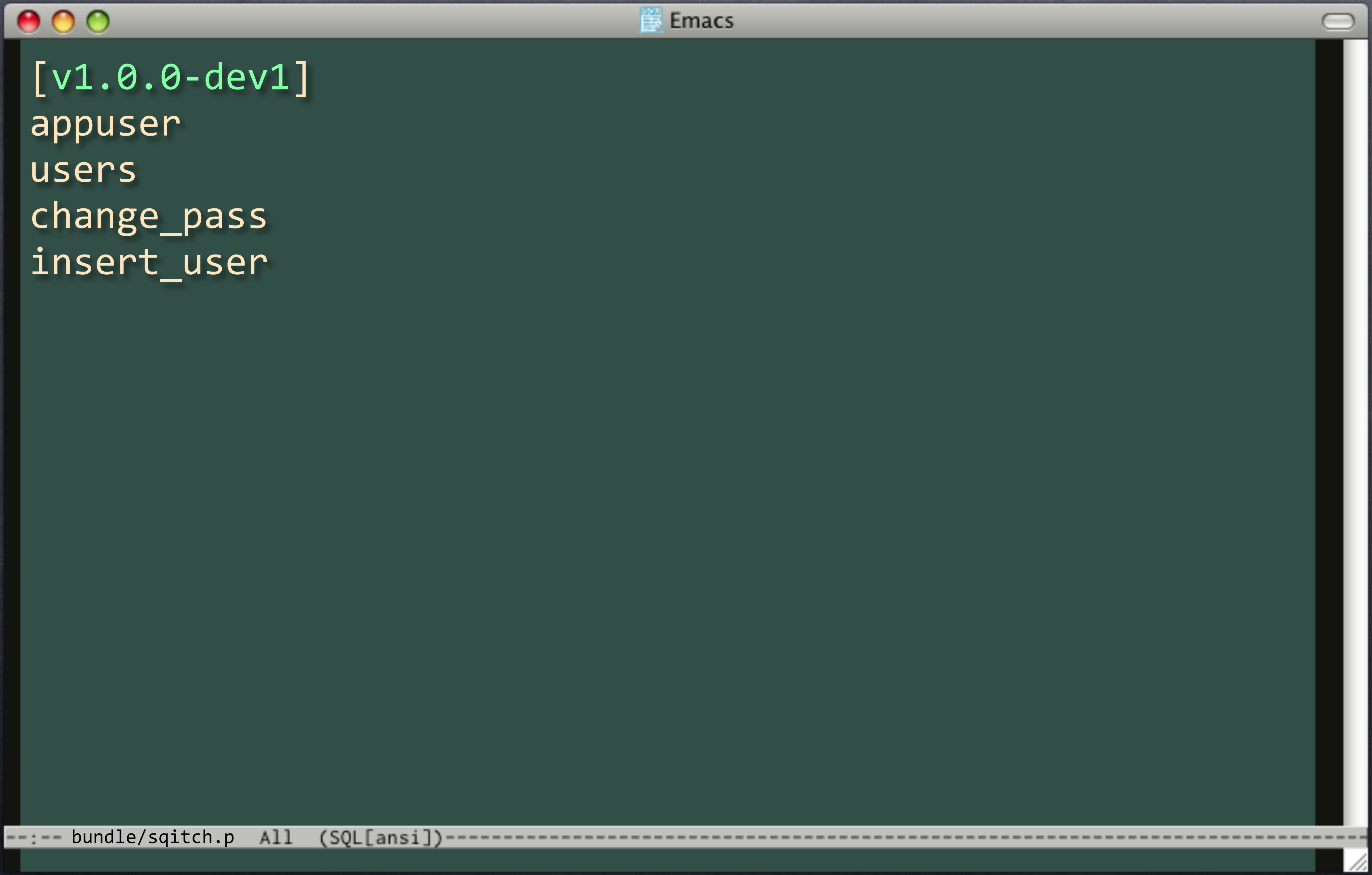
```
> sqitch bundle --tags-only
Bundling in bundle/
Config written to bundle/sqitch.conf
Bundling v1.0.0-dev1
  - appuser
  - users
  - change_pass
  - insert_user
Plan written to bundle/sqitch.plan
>
```

Ship It!



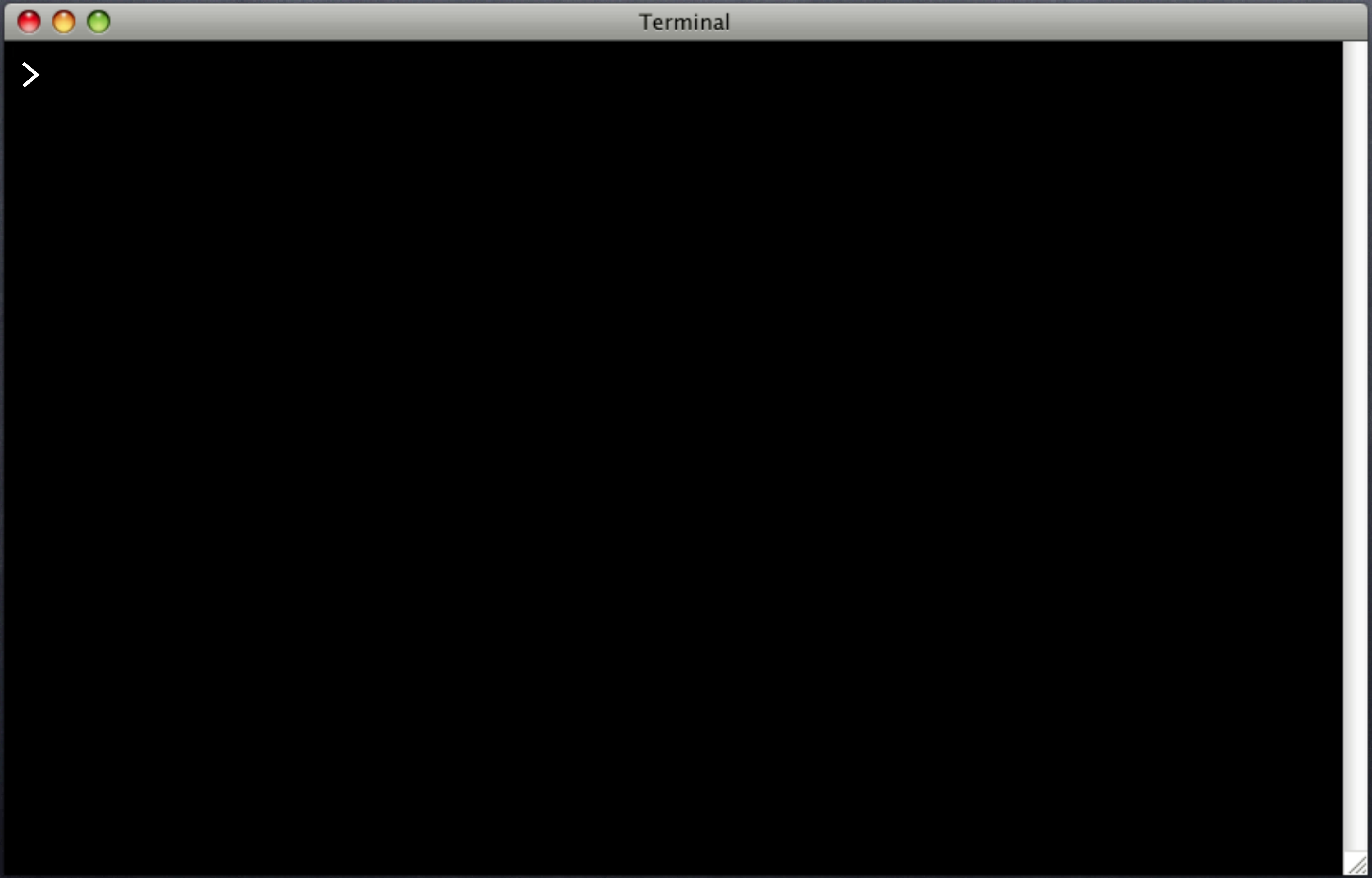
```
> sqitch bundle --tags-only
Bundling in bundle/
Config written to bundle/sqitch.conf
Bundling v1.0.0-dev1
  - appuser
  - users
  - change_pass
  - insert_user
Plan written to bundle/sqitch.plan
> emacs bundle/sqitch.plan
```

The Plan, Man



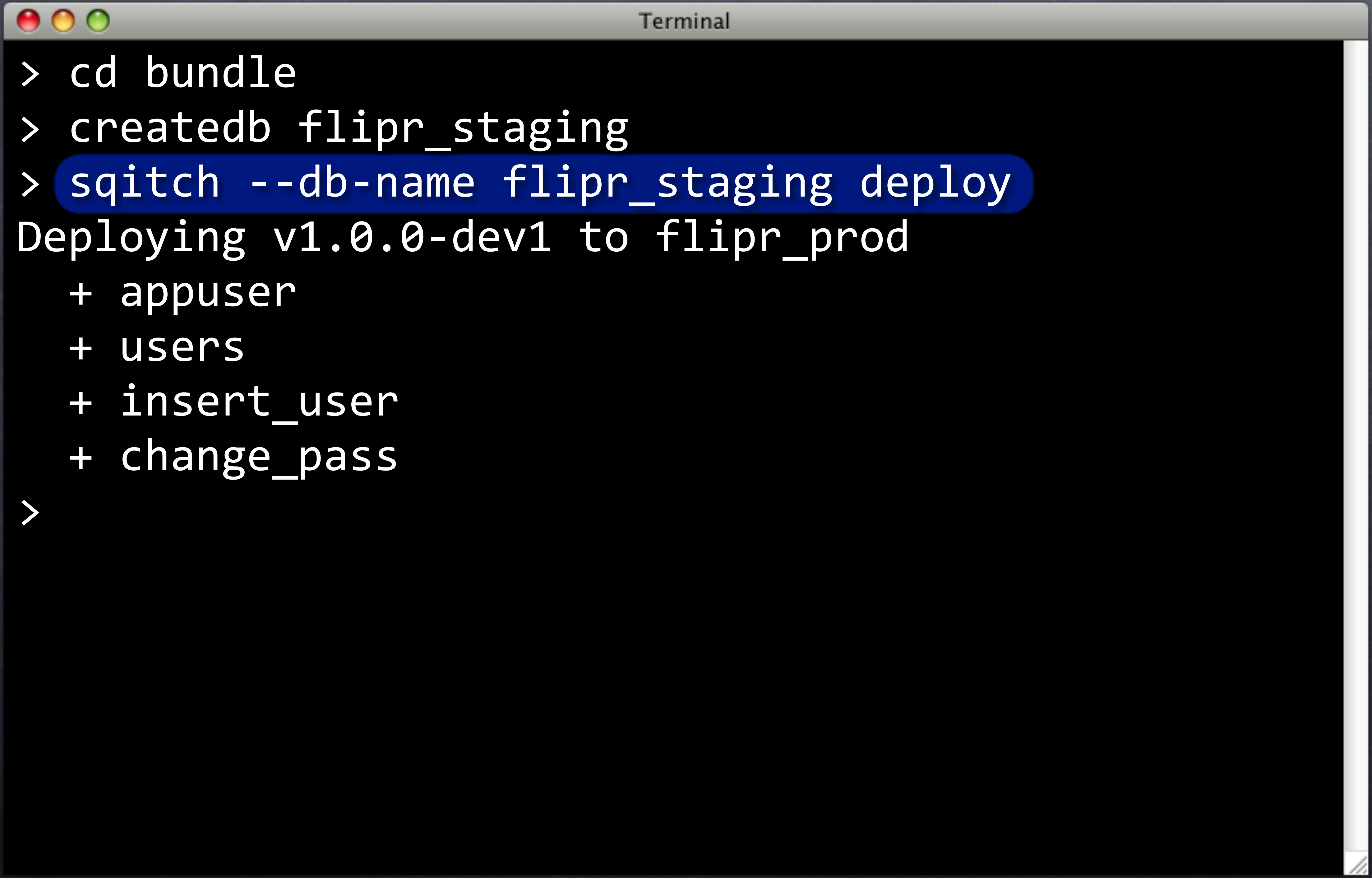
```
[v1.0.0-dev1]
appuser
users
change_pass
insert_user
```

Kick the Tires



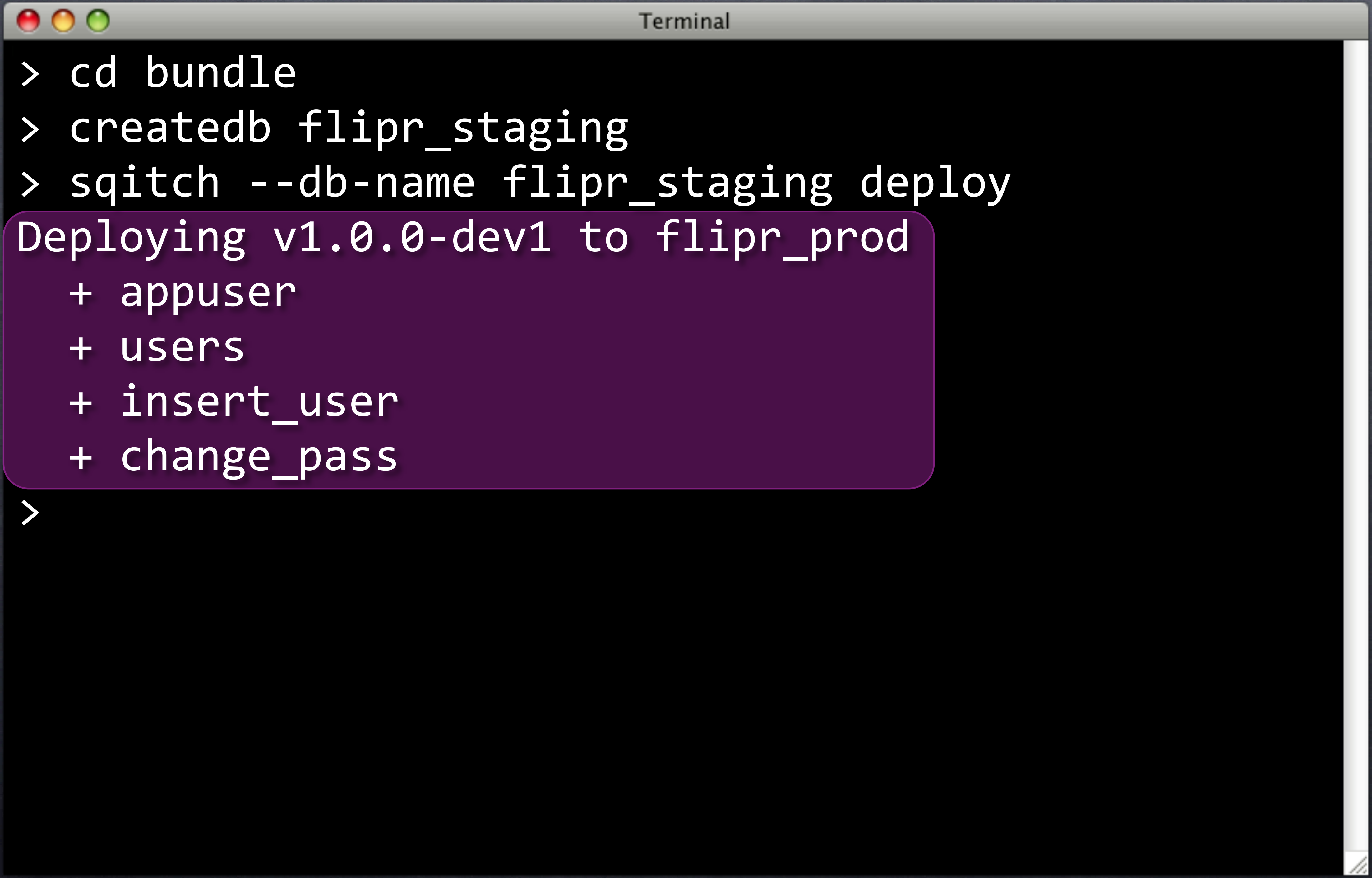
```
>
```

Kick the Tires



```
> cd bundle
> createdb flipr_staging
> sqitch --db-name flipr_staging deploy
Deploying v1.0.0-dev1 to flipr_prod
  + appuser
  + users
  + insert_user
  + change_pass
>
```

Kick the Tires



```
> cd bundle
> createdb flipr_staging
> sqitch --db-name flipr_staging deploy
Deploying v1.0.0-dev1 to flipr_prod
  + appuser
  + users
  + insert_user
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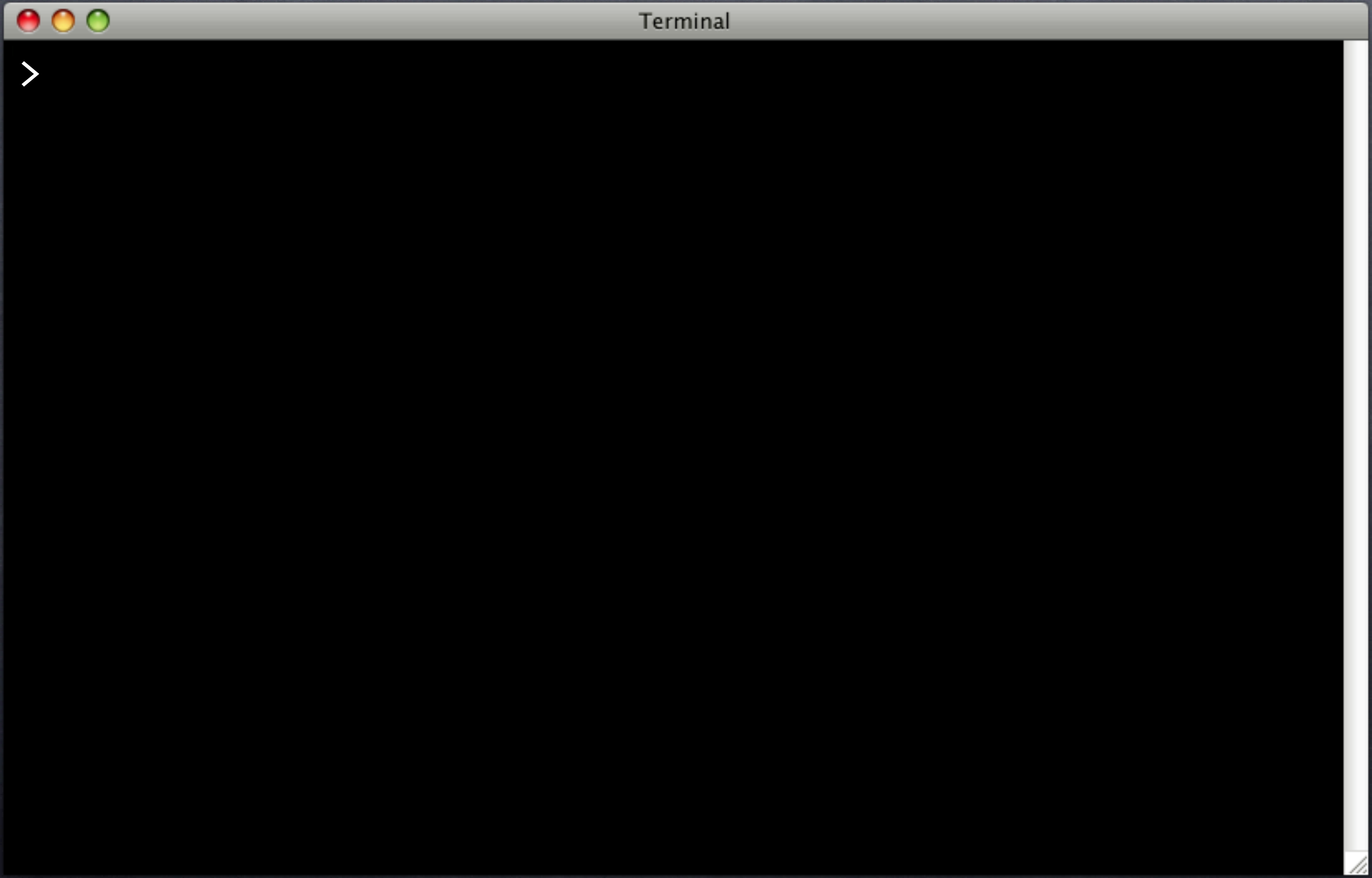
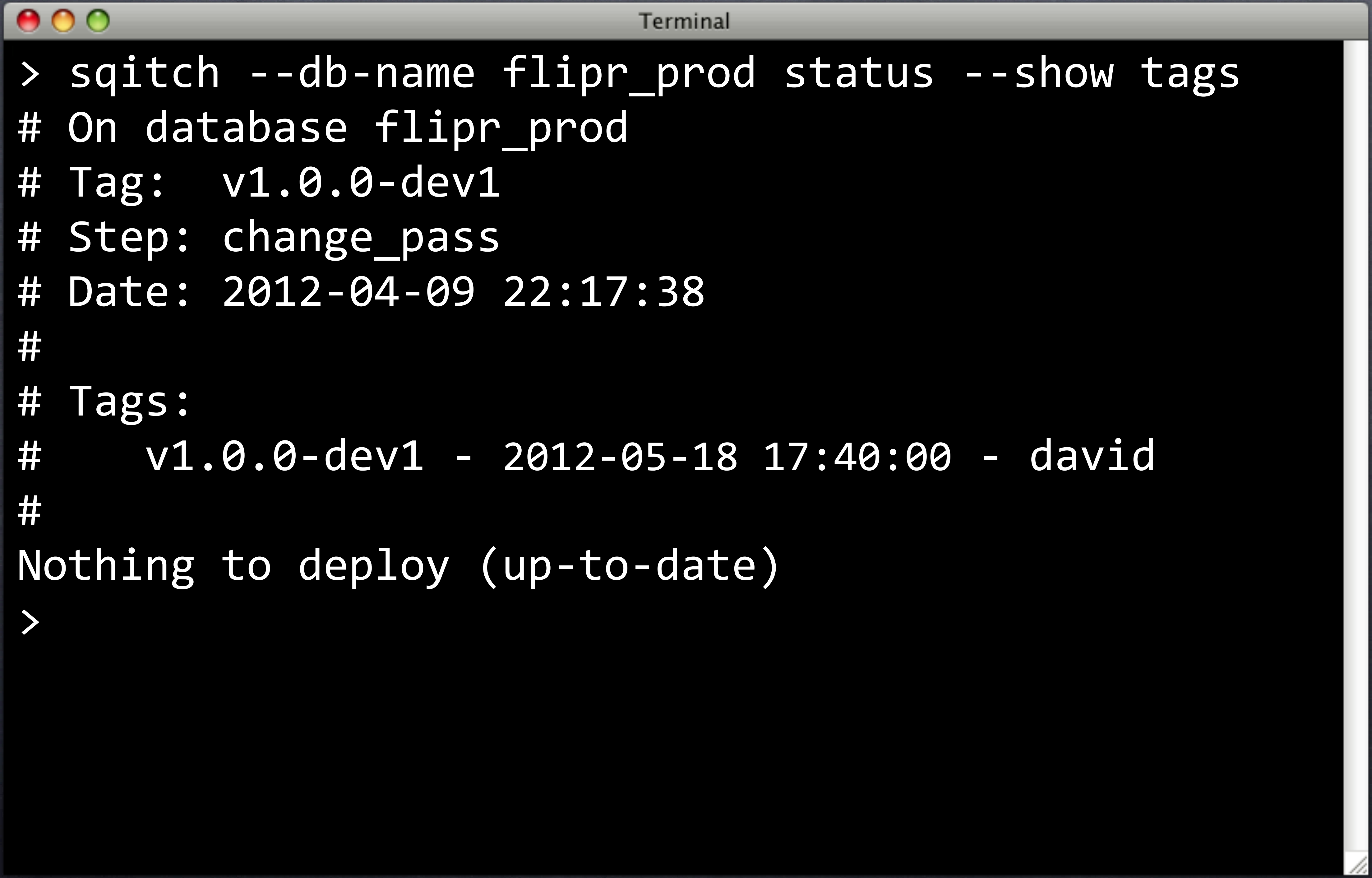
>
```

Ch-Check it Out



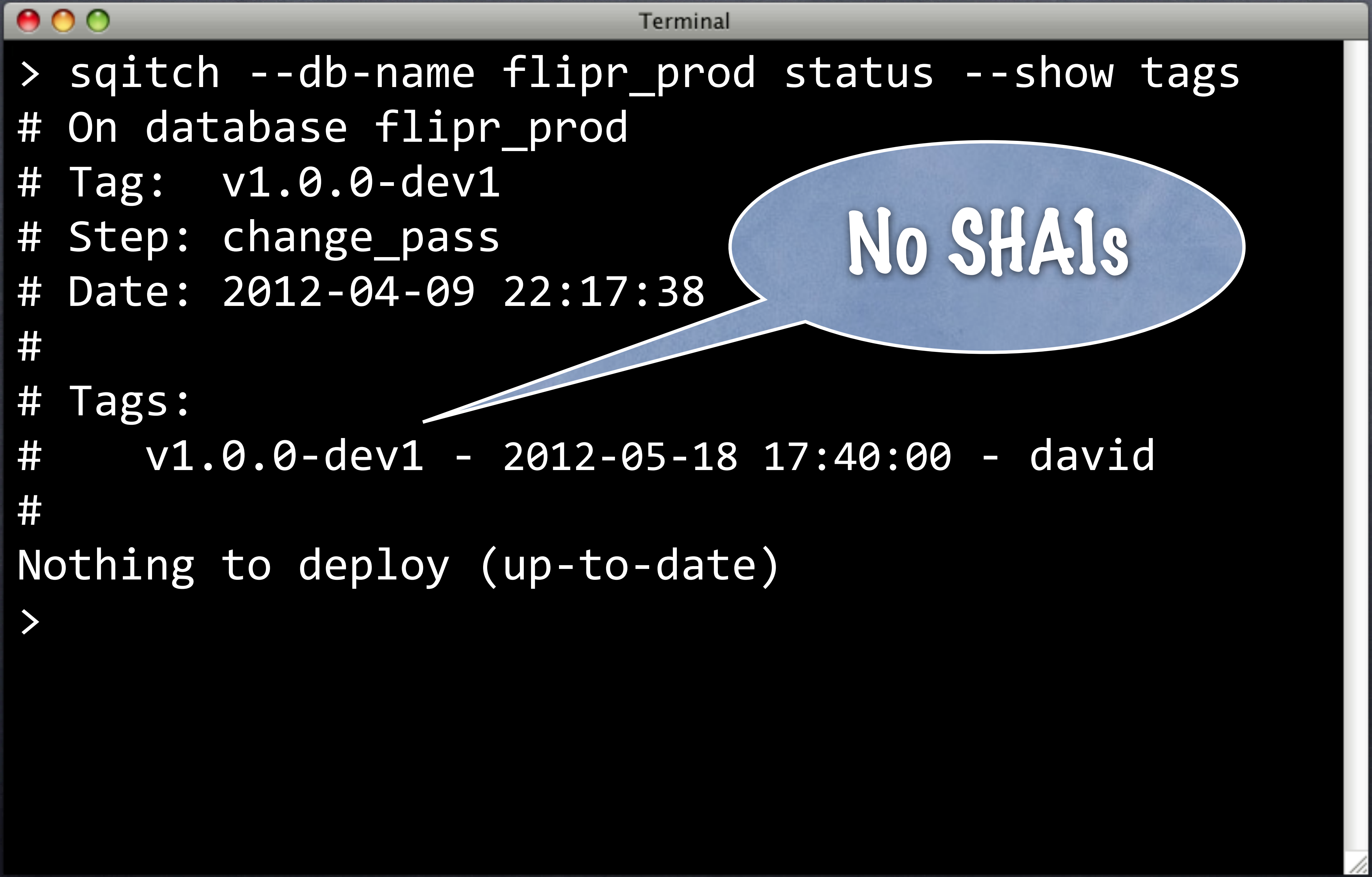
```
>
```

Ch-Check it Out



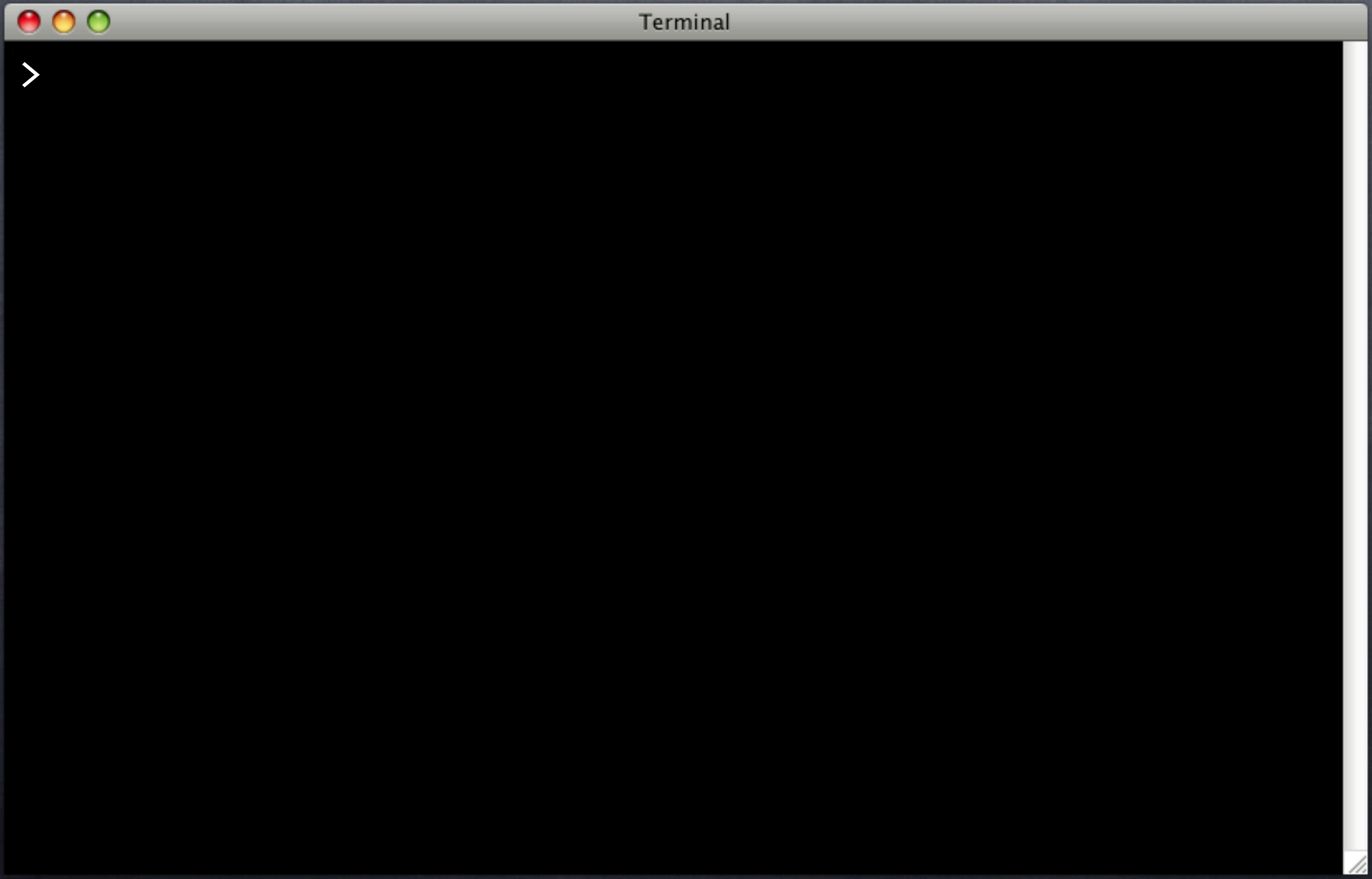
```
> sqitch --db-name flipr_prod status --show tags
# On database flipr_prod
# Tag:  v1.0.0-dev1
# Step: change_pass
# Date: 2012-04-09 22:17:38
#
# Tags:
#    v1.0.0-dev1 - 2012-05-18 17:40:00 - david
#
Nothing to deploy (up-to-date)
>
```

Ch-Check it Out



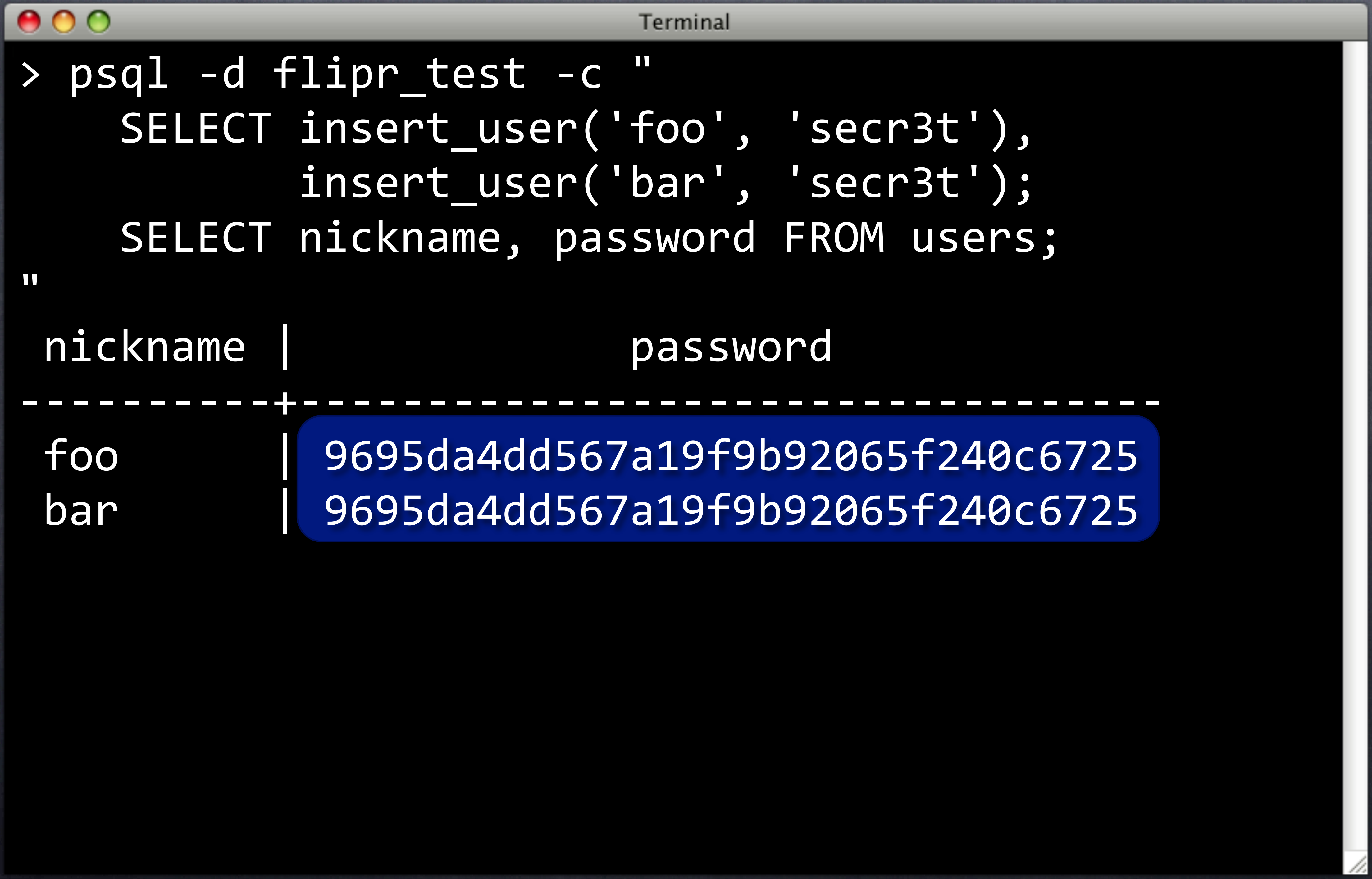
```
> sqitch --db-name flipr_prod status --show tags
# On database flipr_prod
# Tag:  v1.0.0-dev1
# Step: change_pass
# Date: 2012-04-09 22:17:38
#
# Tags:
#    v1.0.0-dev1 - 2012-05-18 17:40:00 - david
#
Nothing to deploy (up-to-date)
>
```

Ruh-Roh



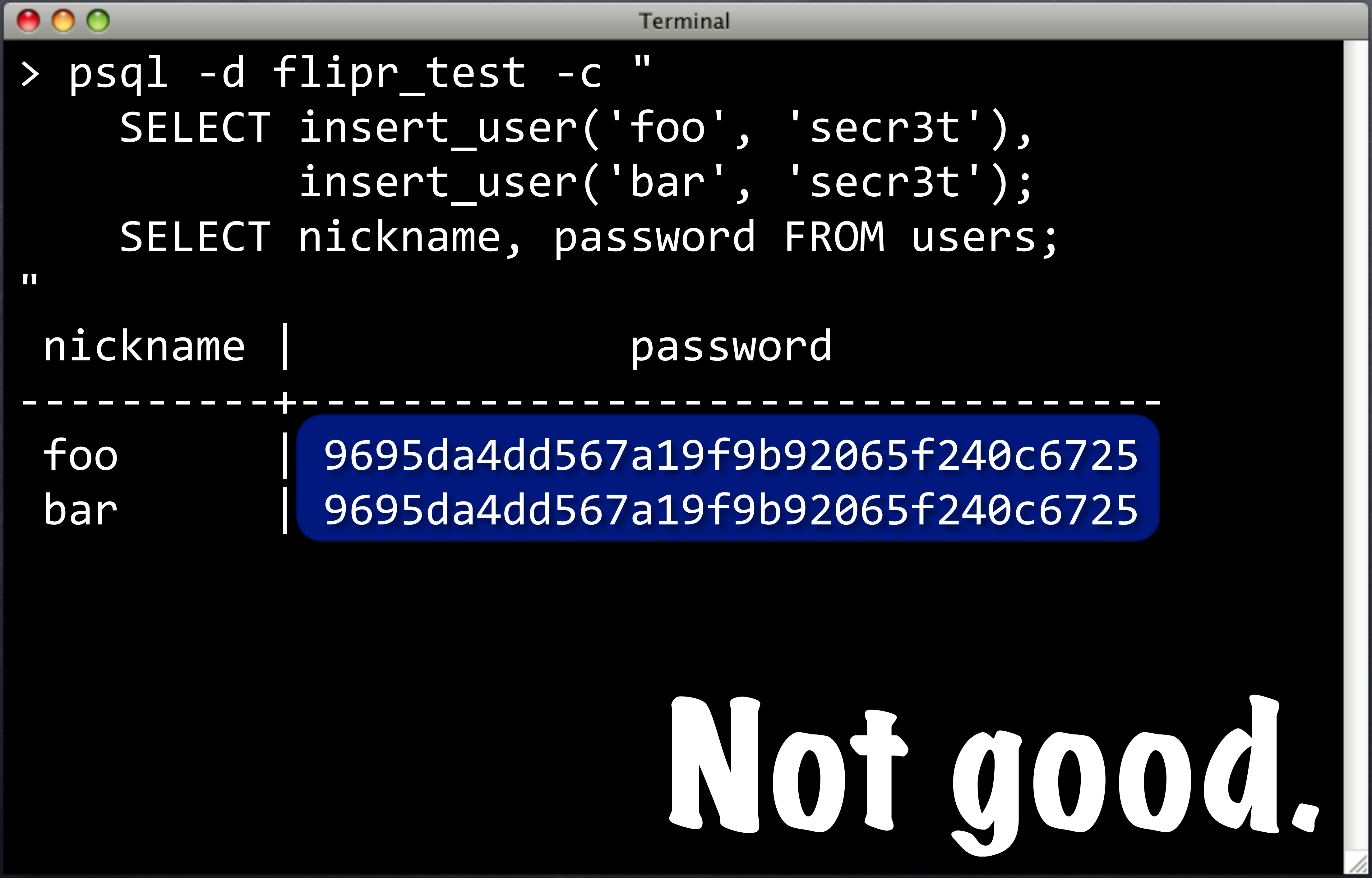
```
>
```

Ruh-Roh



```
> psql -d flipr_test -c "
    SELECT insert_user('foo', 'secr3t'),
           insert_user('bar', 'secr3t');
    SELECT nickname, password FROM users;
"
 nickname |             password
----------+----------------------------------
 foo      | 9695da4dd567a19f9b92065f240c6725
 bar      | 9695da4dd567a19f9b92065f240c6725
```

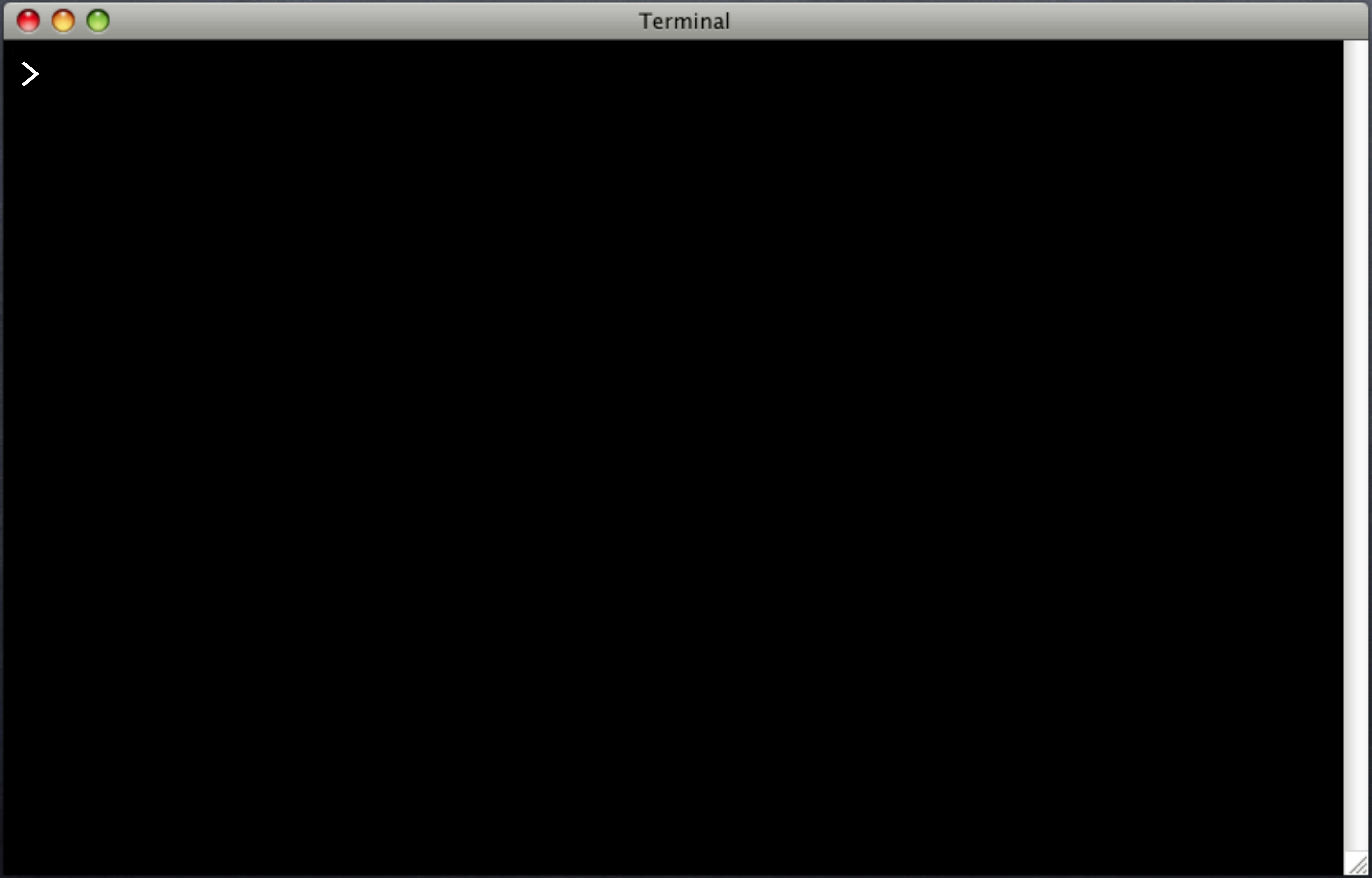
Ruh-Roh



```
> psql -d flipr_test -c "
    SELECT insert_user('foo', 'secr3t'),
           insert_user('bar', 'secr3t');
    SELECT nickname, password FROM users;
"
 nickname |             password
----------+----------------------------------
 foo      | 9695da4dd567a19f9b92065f240c6725
 bar      | 9695da4dd567a19f9b92065f240c6725
```

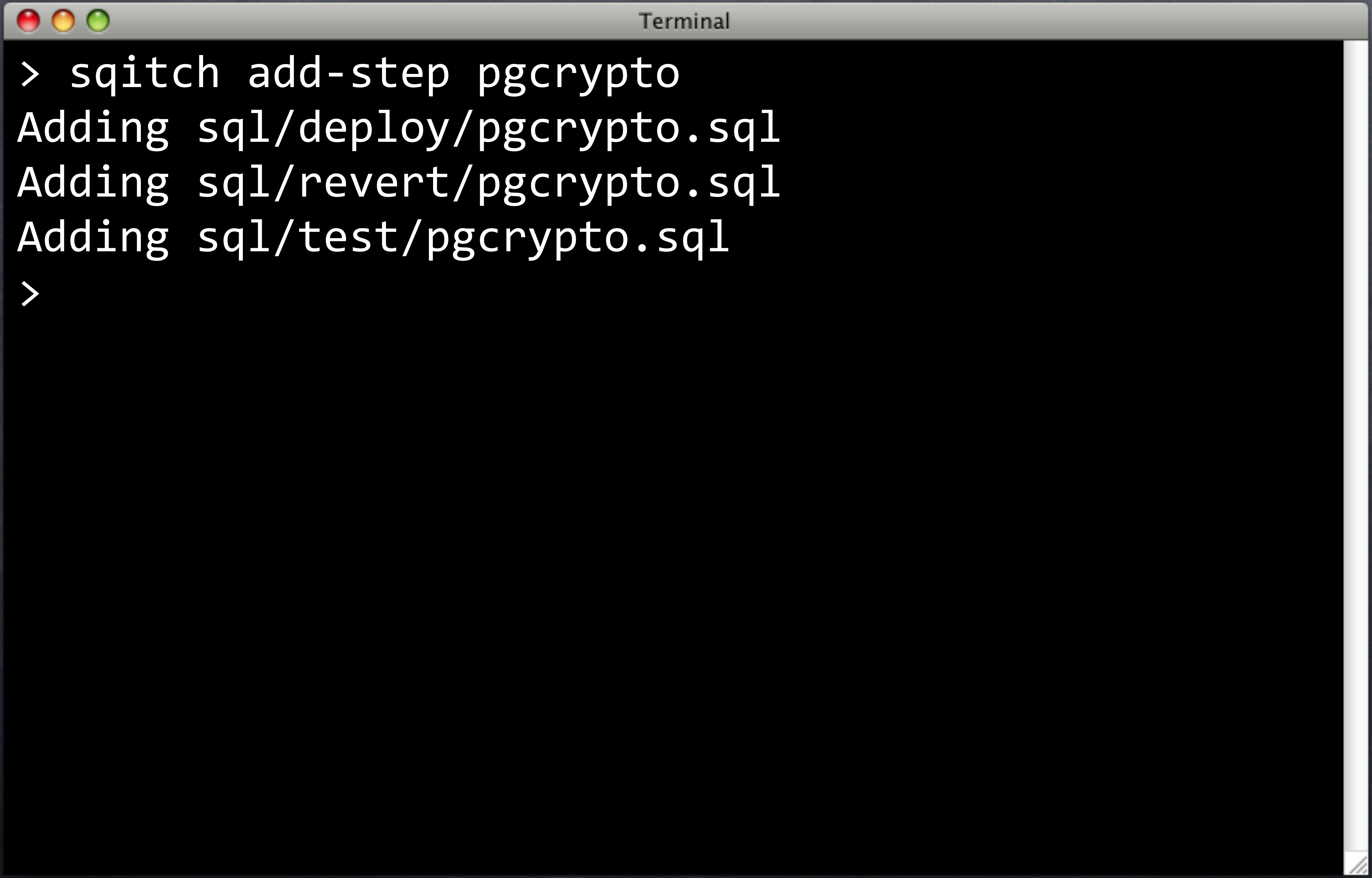
Not good.

Add pgcrypto



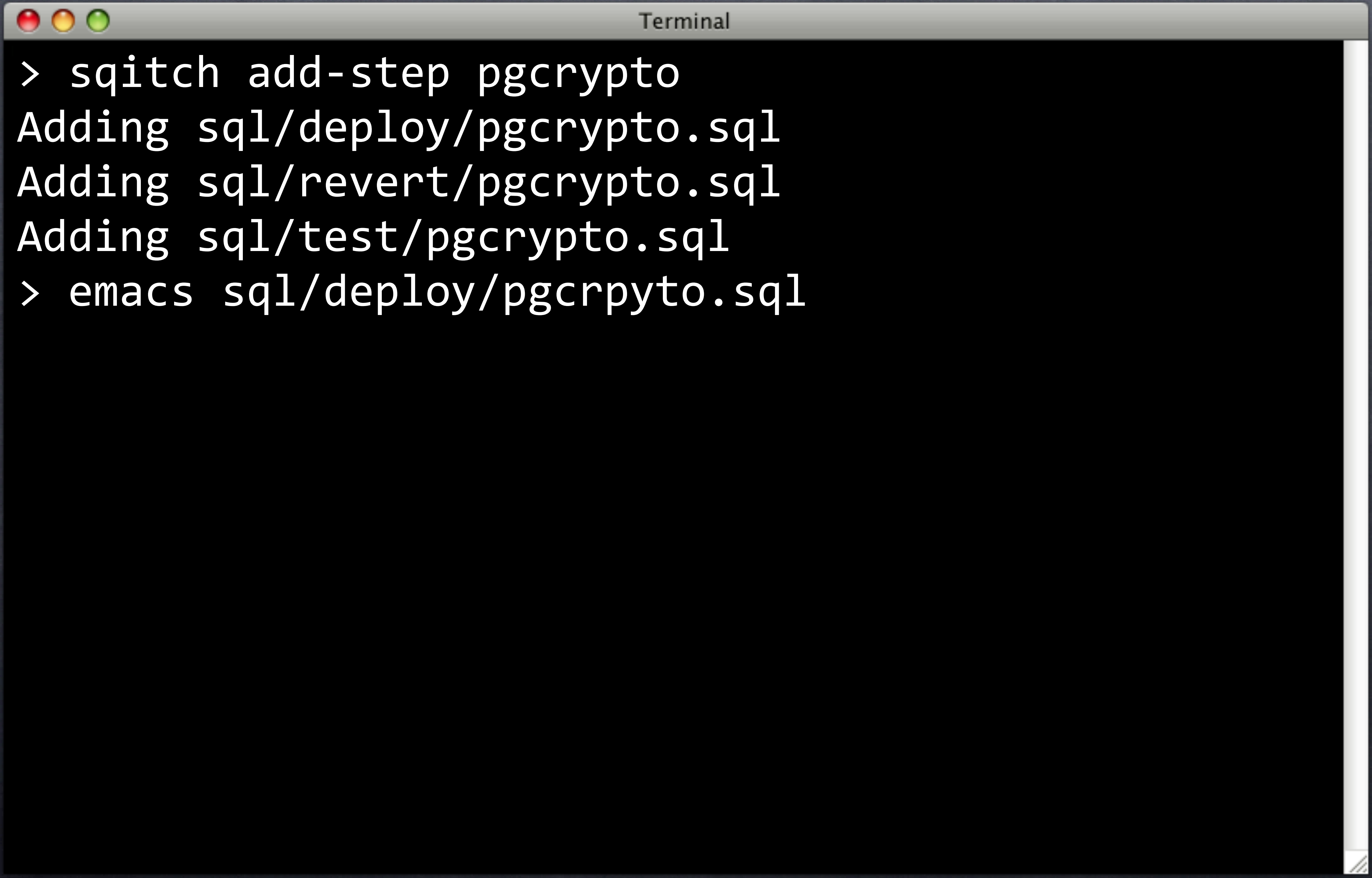
```
>
```

Add pgcrypto



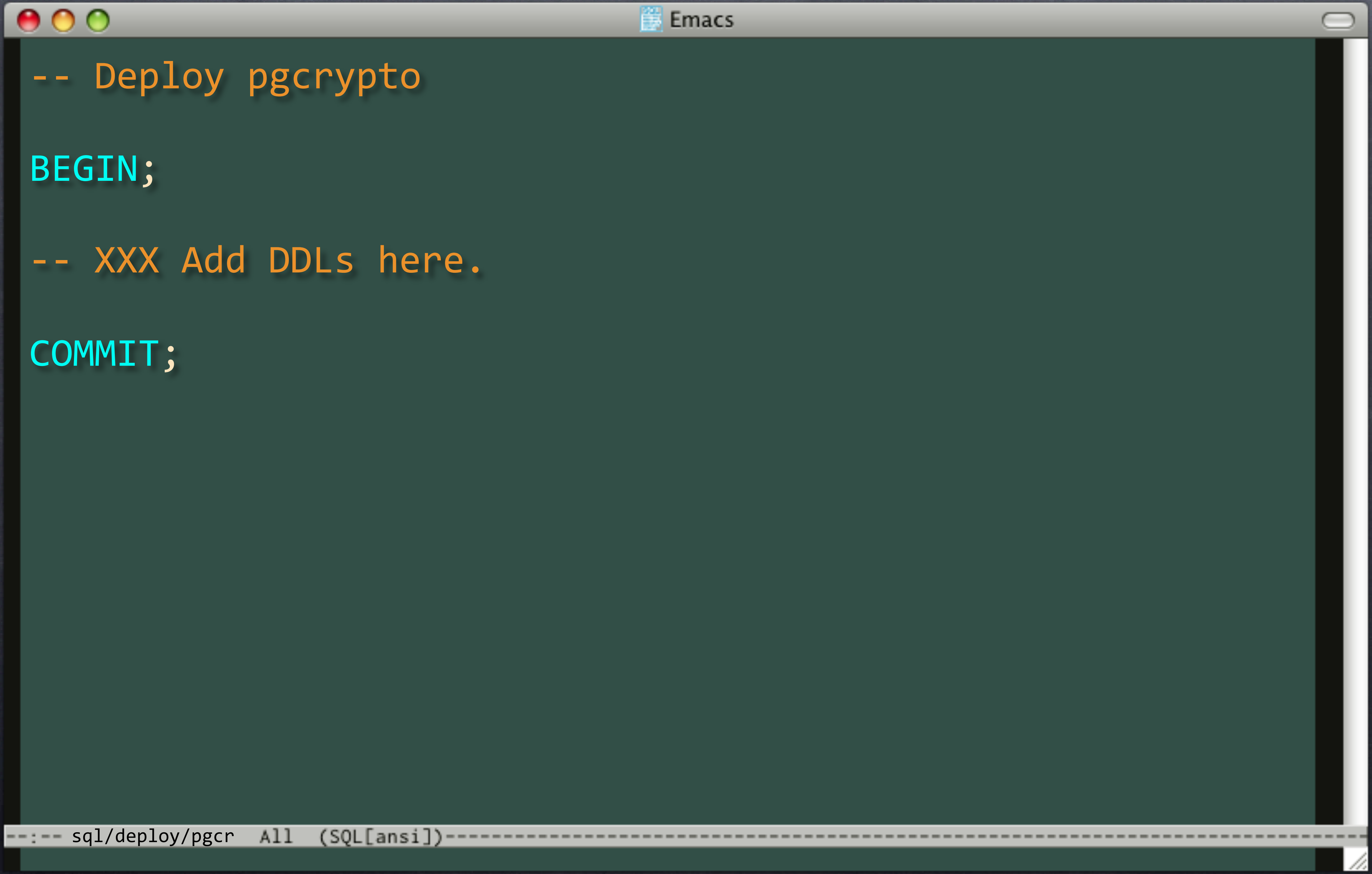
```
> sqitch add-step pgcrypto
Adding sql/deploy/pgcrypto.sql
Adding sql/revert/pgcrypto.sql
Adding sql/test/pgcrypto.sql
>
```

Add pgcrypto



```
> sqitch add-step pgcrypto
Adding sql/deploy/pgcrypto.sql
Adding sql/revert/pgcrypto.sql
Adding sql/test/pgcrypto.sql
> emacs sql/deploy/pgcrpyto.sql
```

ssql/deploy/pgcrypto.sql



```
-- Deploy pgcrypto

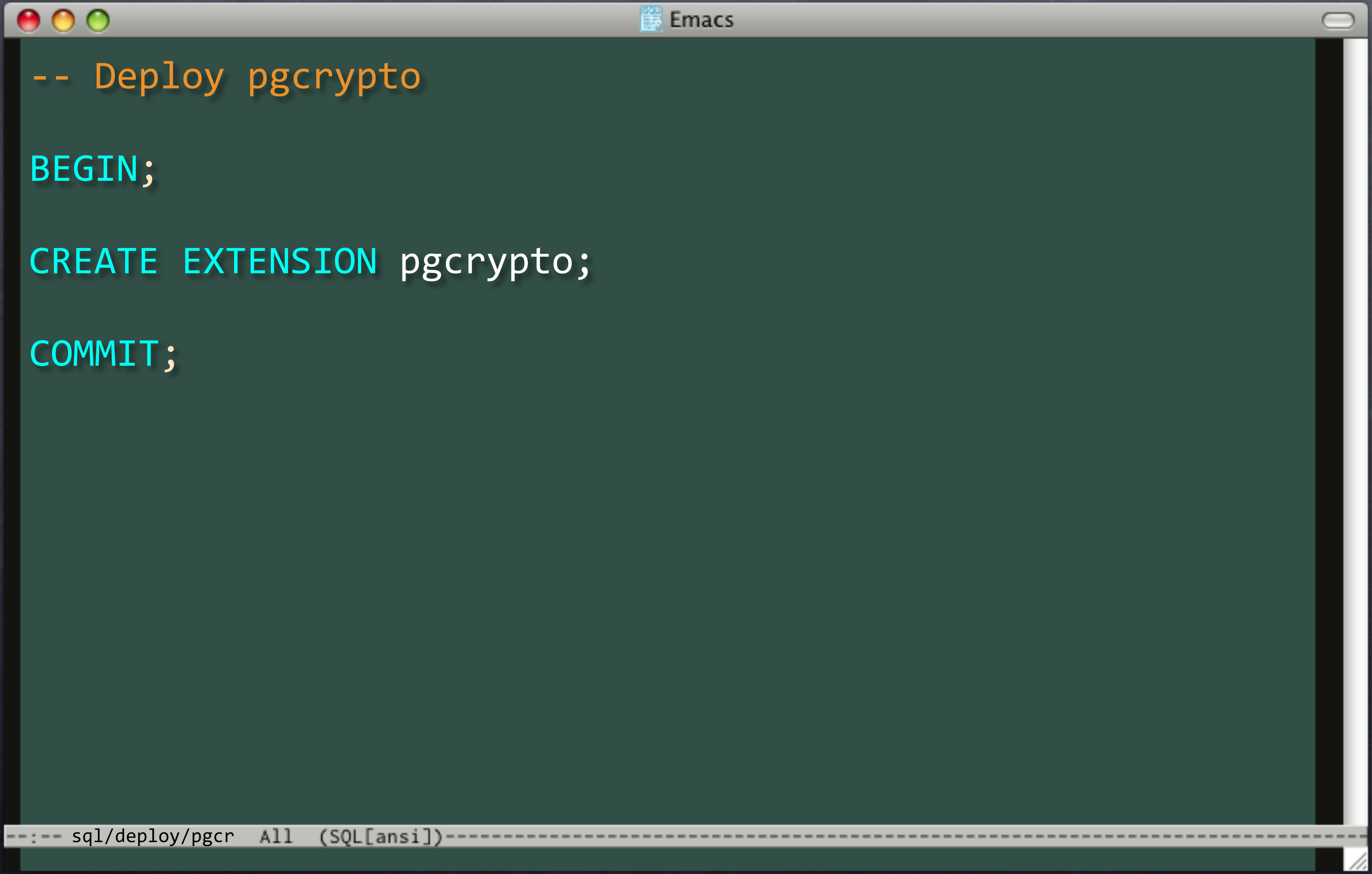
BEGIN;

-- XXX Add DDLs here.

COMMIT;
```

```
--:-- sql/deploy/pgcr   All   (SQL[ansi])-----------------------------------------------------------------
```

ssql/deploy/pgcrypto.sql



```
-- Deploy pgcrypto

BEGIN;

CREATE EXTENSION pgcrypto;

COMMIT;
```

```
--:-- sql/deploy/pgcr   All   (SQL[ansi])--------------------------------------------------------------------------------
```

How to Modify?

How to Modify?

- Copy insert_user.sql to new deploy file

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- Copy insert_user.sql to new deploy file
- Change that new file

How to Modify?

- Copy insert_user.sql to new deploy file
- Change that new file
- Copy insert_user.sql to new revert file

How to Modify?

- Copy insert_user.sql to new deploy file
- Change that new file
- Copy insert_user.sql to new revert file
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- Copy insert_user.sql to new deploy file
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- Copy insert_user.sql to new revert file
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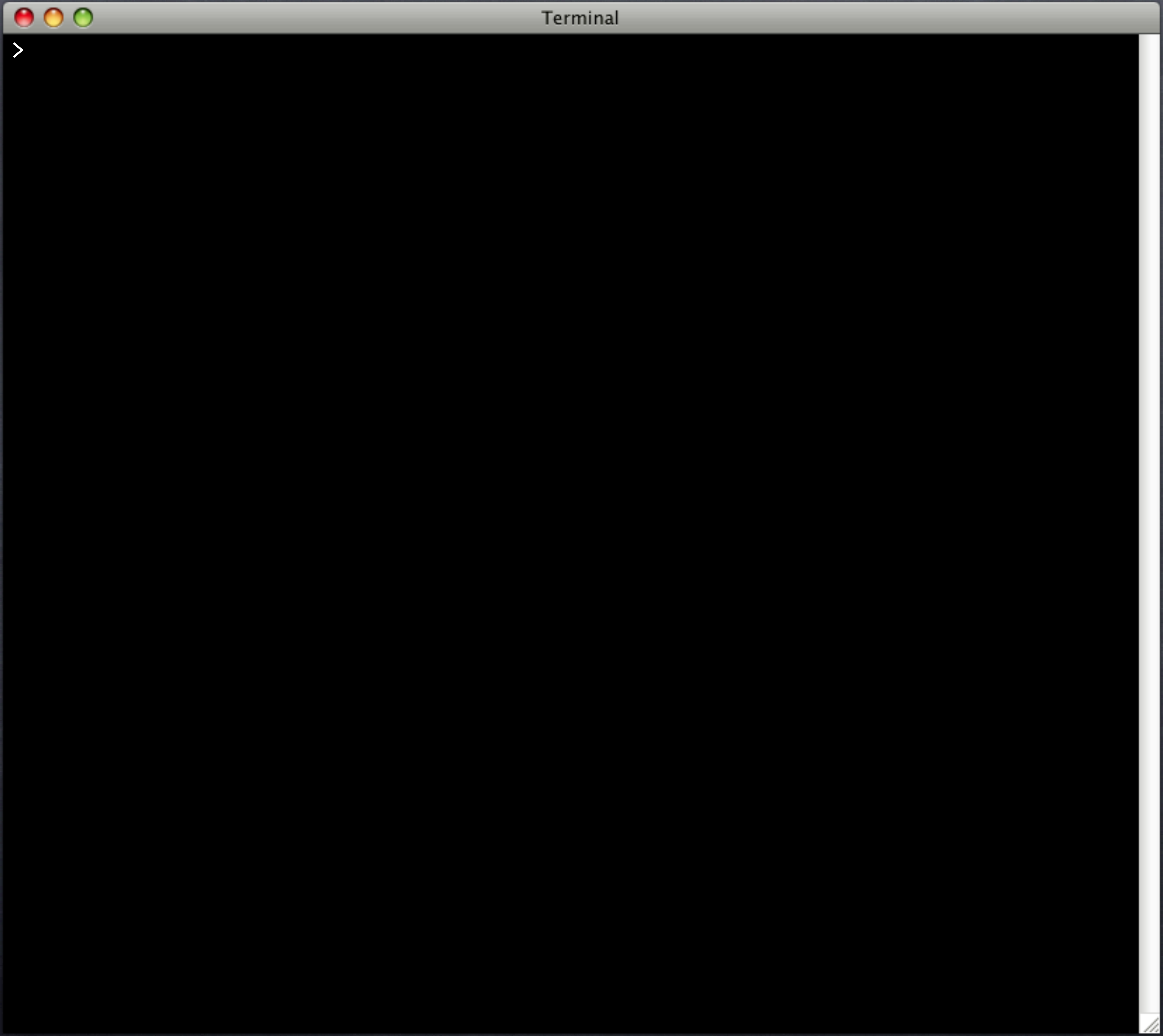
- Do the same for change_pass.sql

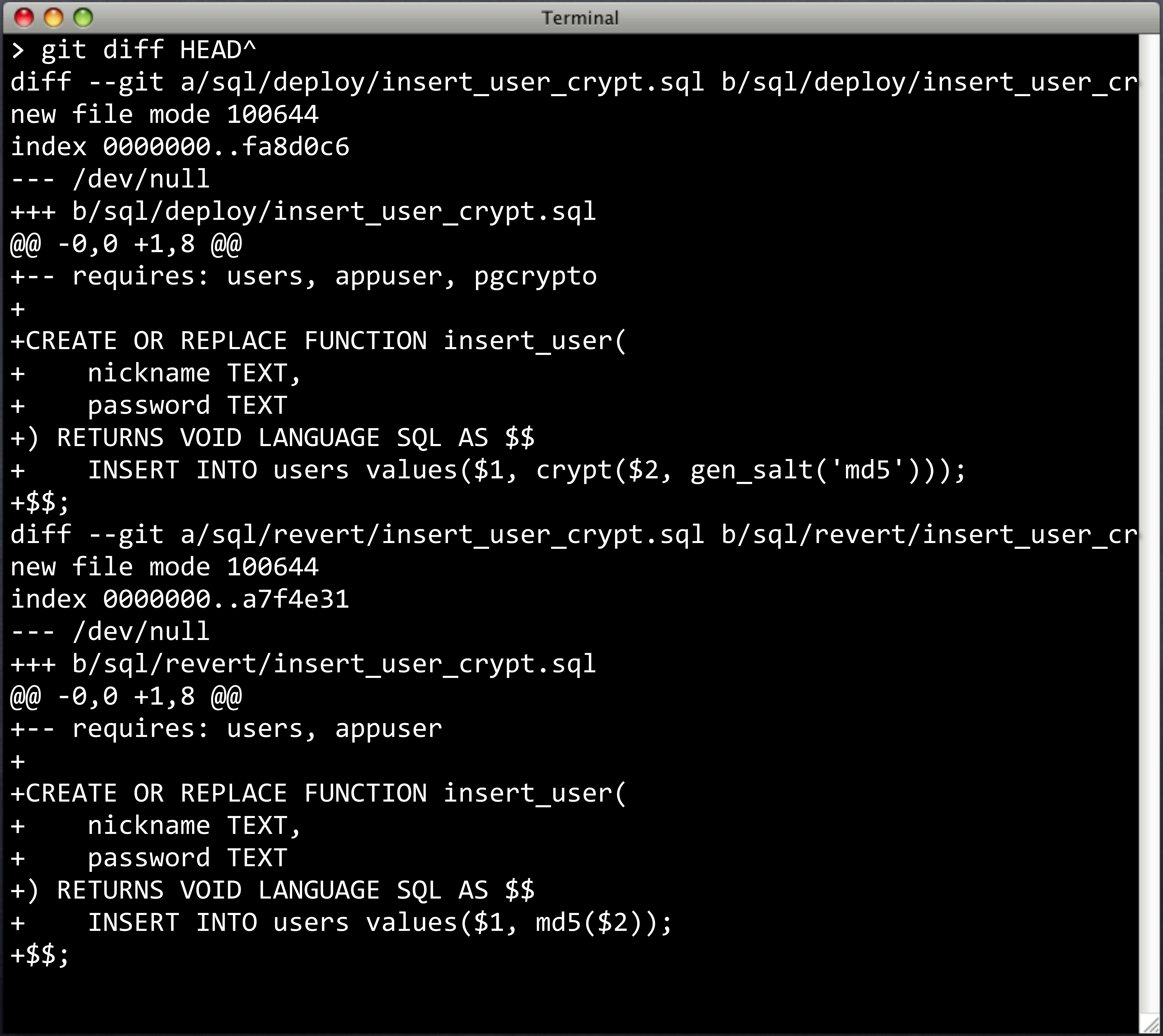
How to Modify?

- Copy insert_user.sql to new deploy file
- Change that new file
- Copy insert_user.sql to new revert file
- Test it
- Do the same for change_pass.sql
- The problem with that…

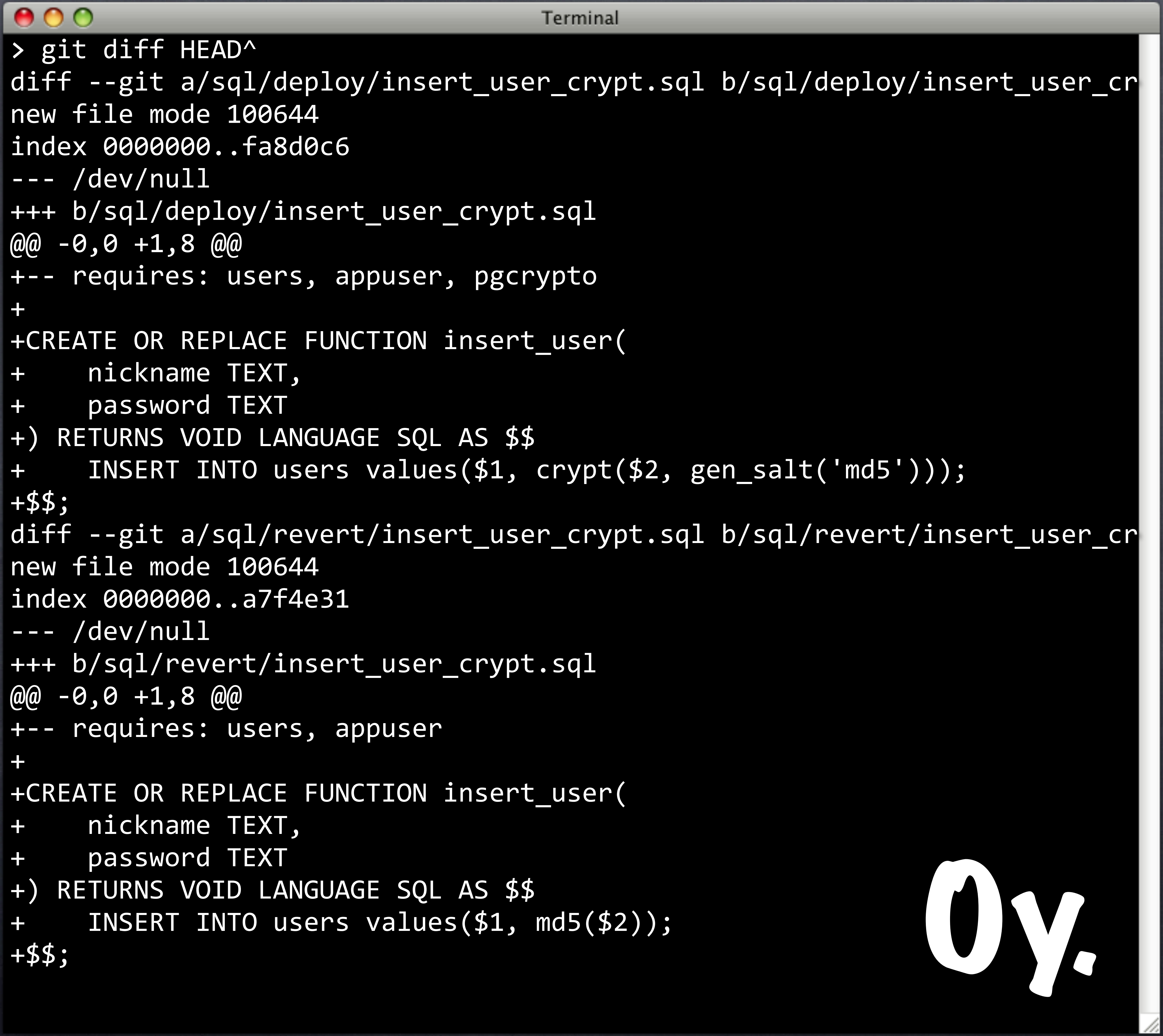


Terminal

```
>
```



```
> git diff HEAD^
diff --git a/sql/deploy/insert_user_crypt.sql b/sql/deploy/insert_user_cr
new file mode 100644
index 0000000..fa8d0c6
--- /dev/null
+++ b/sql/deploy/insert_user_crypt.sql
@@ -0,0 +1,8 @@
+-- requires: users, appuser, pgcrypto
+
+CREATE OR REPLACE FUNCTION insert_user(
+    nickname TEXT,
+    password TEXT
+) RETURNS VOID LANGUAGE SQL AS $$
+    INSERT INTO users values($1, crypt($2, gen_salt('md5')));
+$$;
diff --git a/sql/revert/insert_user_crypt.sql b/sql/revert/insert_user_cr
new file mode 100644
index 0000000..a7f4e31
--- /dev/null
+++ b/sql/revert/insert_user_crypt.sql
@@ -0,0 +1,8 @@
+-- requires: users, appuser
+
+CREATE OR REPLACE FUNCTION insert_user(
+    nickname TEXT,
+    password TEXT
+) RETURNS VOID LANGUAGE SQL AS $$
+    INSERT INTO users values($1, md5($2));
+$$;
```



```
> git diff HEAD^
diff --git a/sql/deploy/insert_user_crypt.sql b/sql/deploy/insert_user_cr
new file mode 100644
index 0000000..fa8d0c6
--- /dev/null
+++ b/sql/deploy/insert_user_crypt.sql
@@ -0,0 +1,8 @@
+-- requires: users, appuser, pgcrypto
+
+CREATE OR REPLACE FUNCTION insert_user(
+    nickname TEXT,
+    password TEXT
+) RETURNS VOID LANGUAGE SQL AS $$
+    INSERT INTO users values($1, crypt($2, gen_salt('md5')));
+$$;
diff --git a/sql/revert/insert_user_crypt.sql b/sql/revert/insert_user_cr
new file mode 100644
index 0000000..a7f4e31
--- /dev/null
+++ b/sql/revert/insert_user_crypt.sql
@@ -0,0 +1,8 @@
+-- requires: users, appuser
+
+CREATE OR REPLACE FUNCTION insert_user(
+    nickname TEXT,
+    password TEXT
+) RETURNS VOID LANGUAGE SQL AS $$
+    INSERT INTO users values($1, md5($2));
+$$;
```

Oy.

Use the VCS, Luke

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- Just modify deploy scripts directly

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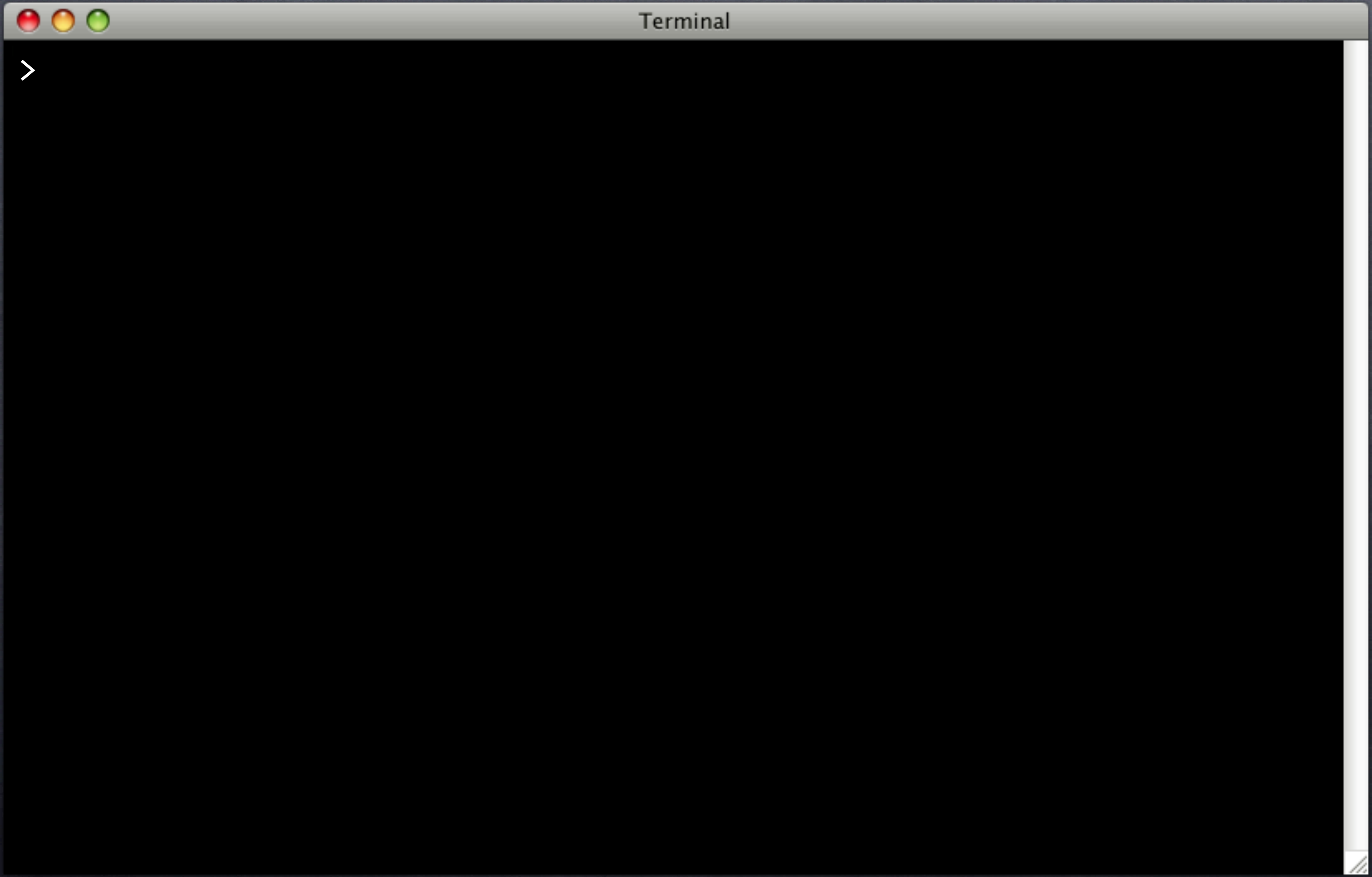
Use the VCS, Luke

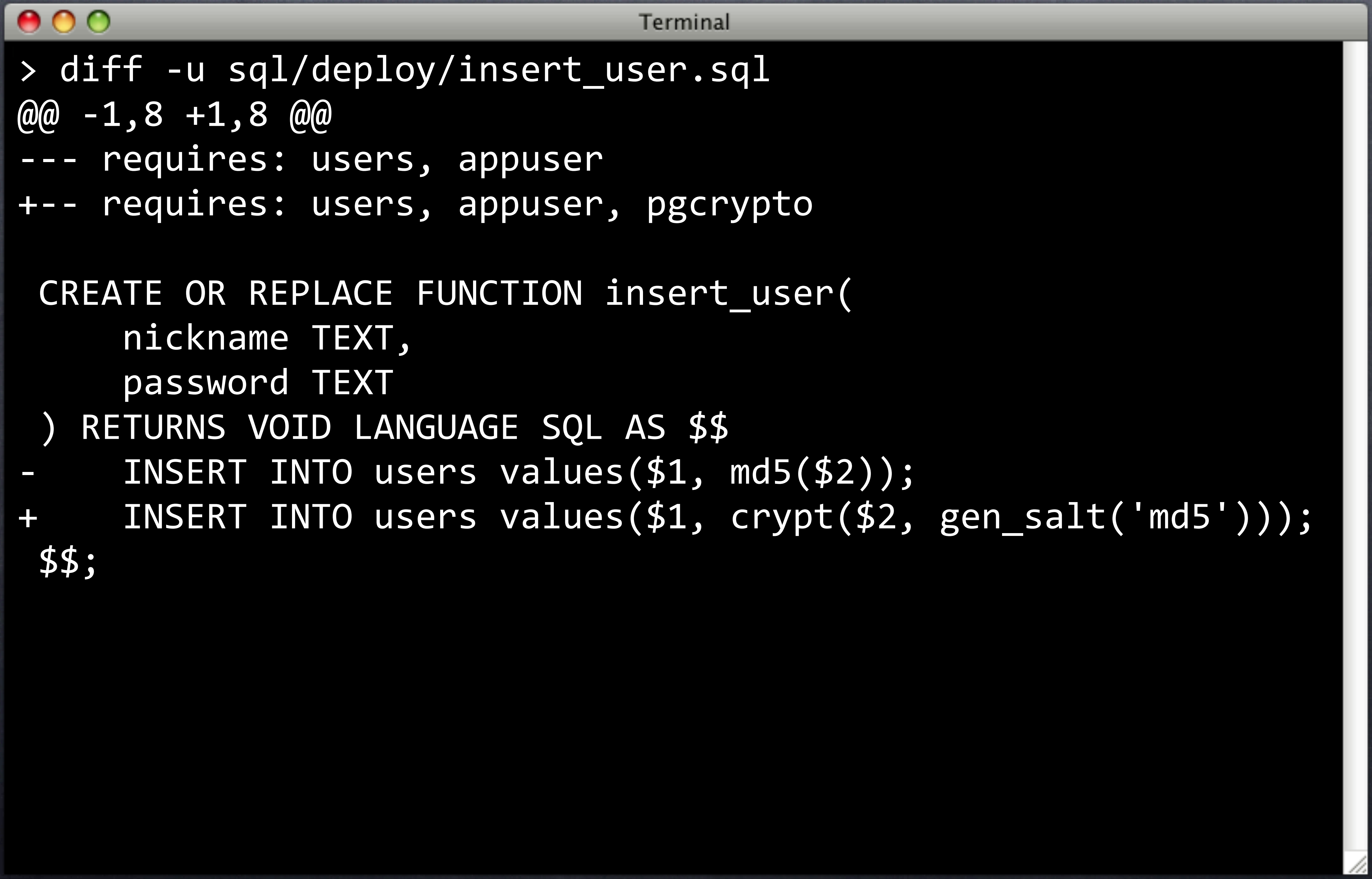
- Just modify deploy scripts directly
- Requirement:
  - Change must be idempotent
  - Same result no matter how often applied
- CREATE OR REPLACE FUNCTION is idempotent
- So change procedures in place!

What's the Diff?



```
>
```

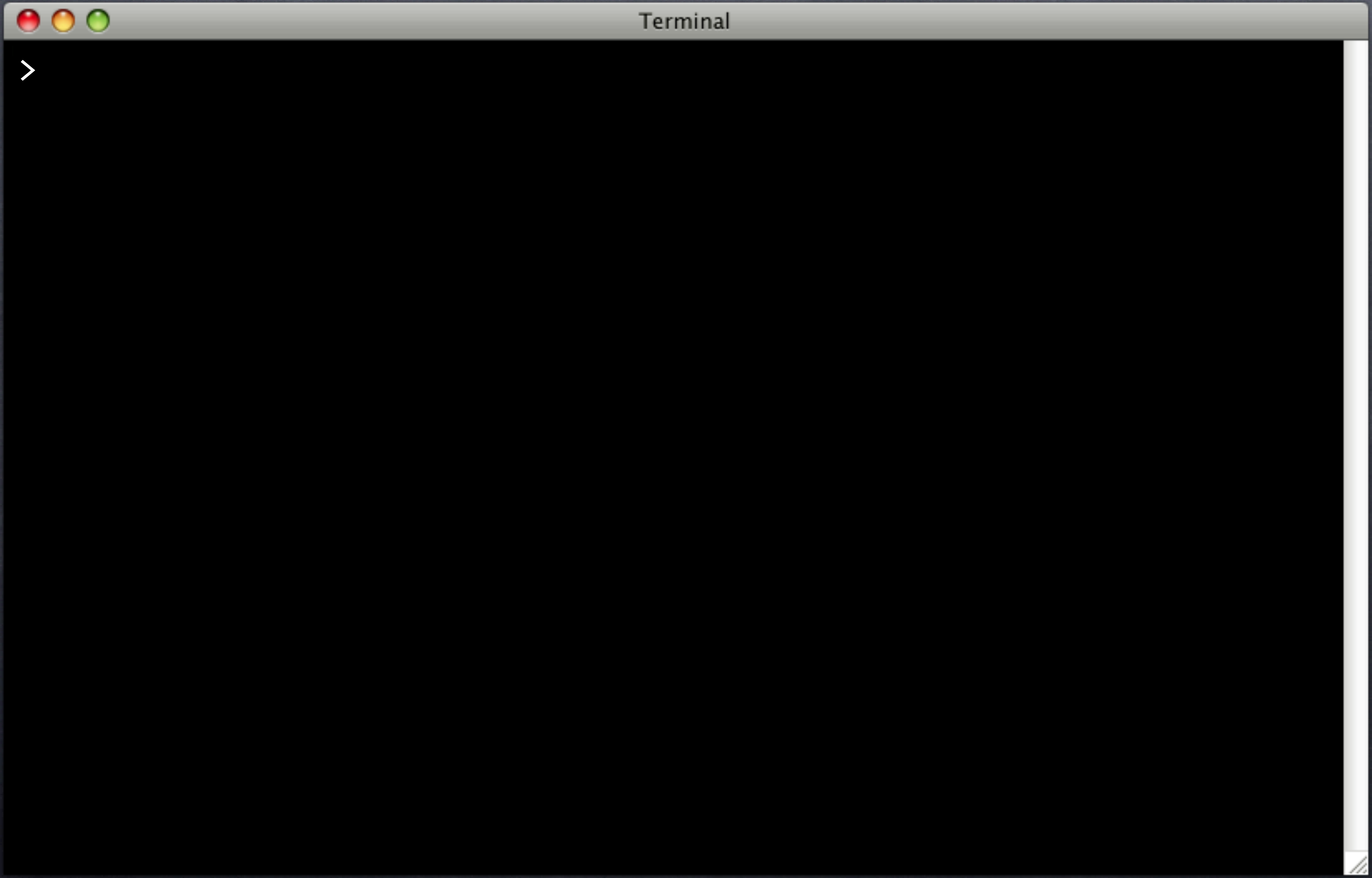
What’s the Diff?



```
> diff -u sql/deploy/insert_user.sql
@@ -1,8 +1,8 @@
--- requires: users, appuser
+-- requires: users, appuser, pgcrypto

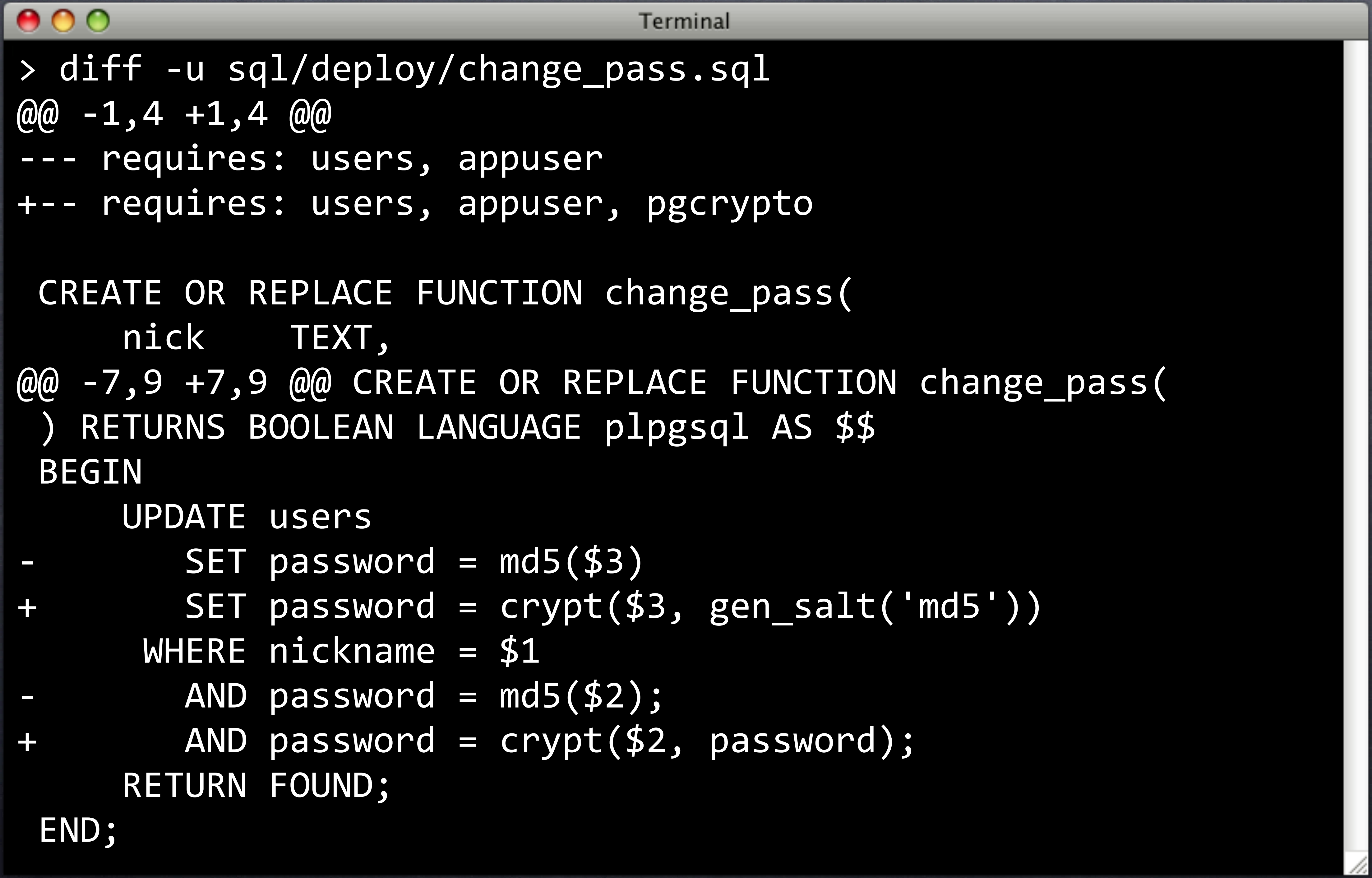
 CREATE OR REPLACE FUNCTION insert_user(
     nickname TEXT,
     password TEXT
 ) RETURNS VOID LANGUAGE SQL AS $$
-    INSERT INTO users values($1, md5($2));
+    INSERT INTO users values($1, crypt($2, gen_salt('md5')));
 $$;
```

What's the Diff?



```
>
```

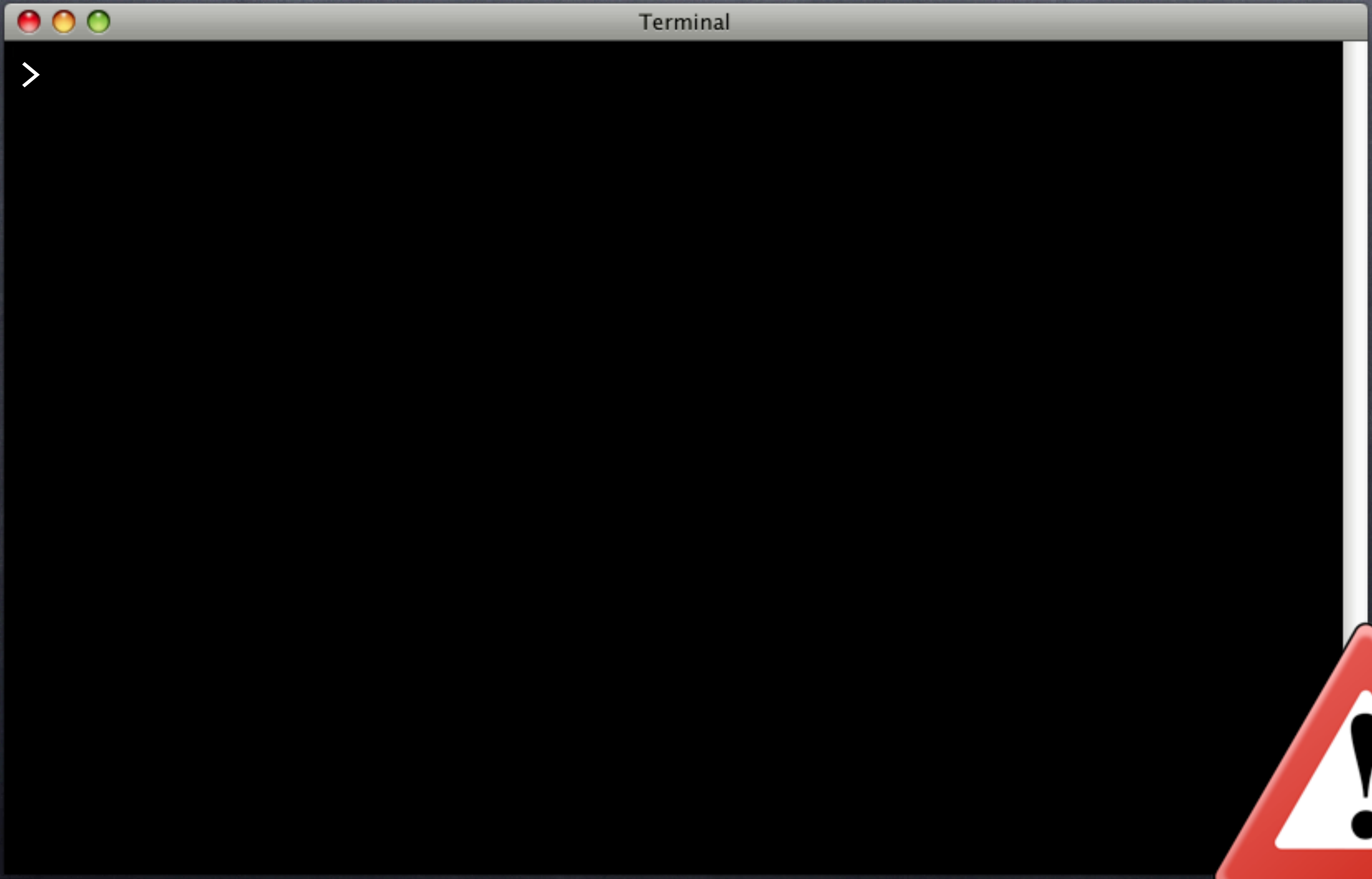
What's the Diff?



```
> diff -u sql/deploy/change_pass.sql
@@ -1,4 +1,4 @@
--- requires: users, appuser
+-- requires: users, appuser, pgcrypto

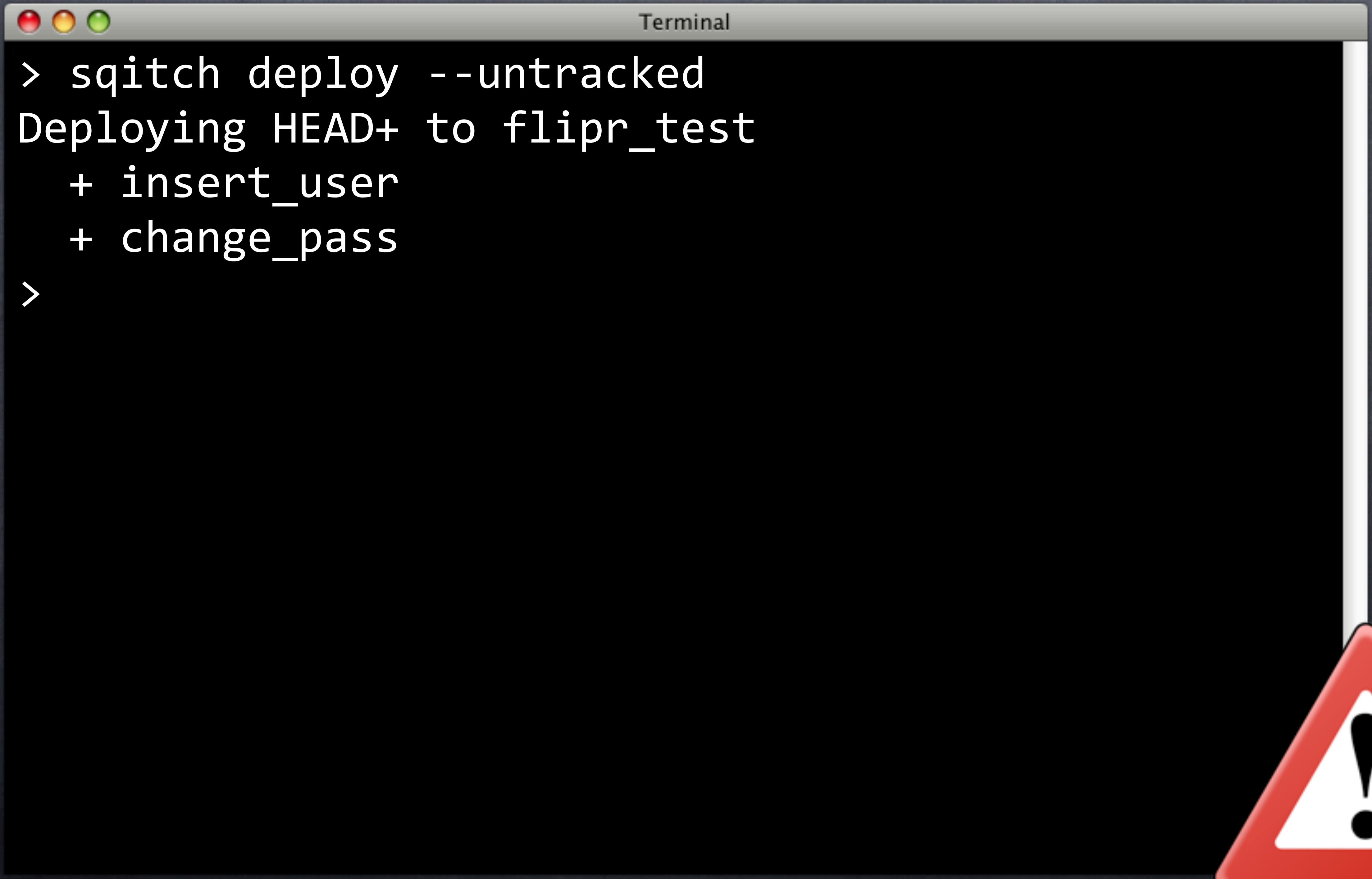
 CREATE OR REPLACE FUNCTION change_pass(
     nick    TEXT,
@@ -7,9 +7,9 @@ CREATE OR REPLACE FUNCTION change_pass(
 ) RETURNS BOOLEAN LANGUAGE plpgsql AS $$
 BEGIN
     UPDATE users
-       SET password = md5($3)
+       SET password = crypt($3, gen_salt('md5'))
      WHERE nickname = $1
-       AND password = md5($2);
+       AND password = crypt($2, password);
     RETURN FOUND;
 END;
```

Send it Up!



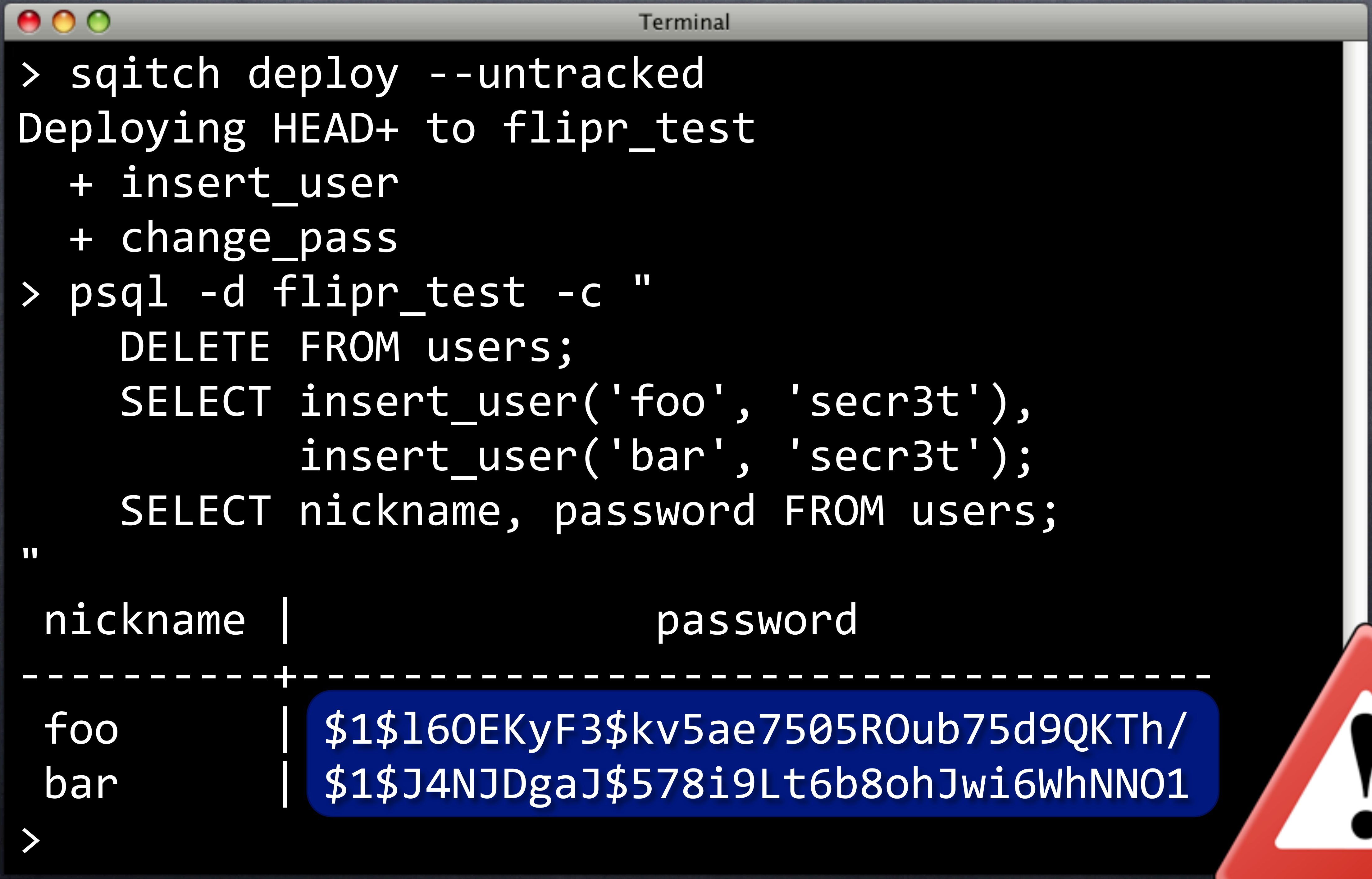
```
>
```

Send it Up!



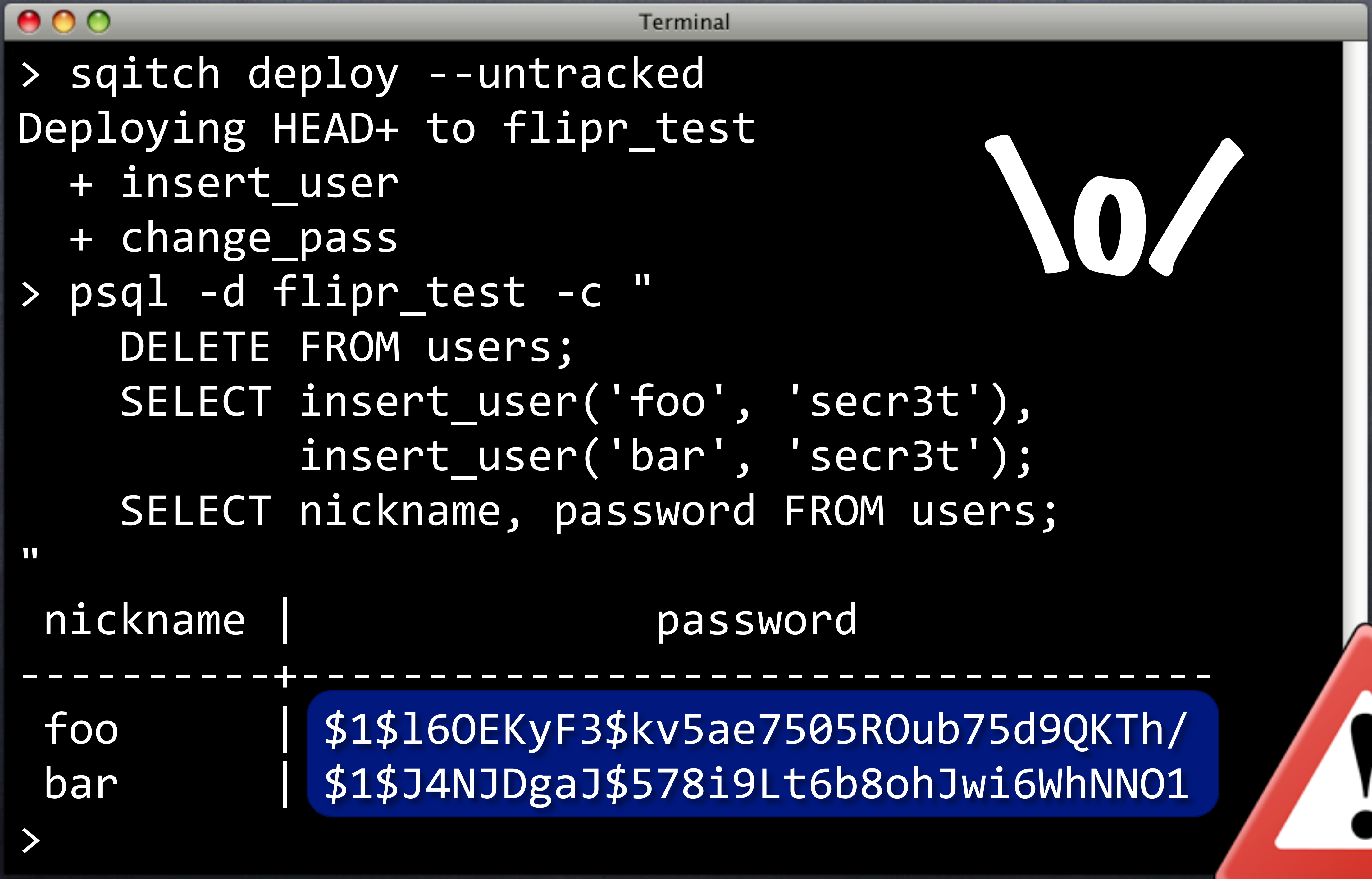
```
> sqitch deploy --untracked
Deploying HEAD+ to flipr_test
  + insert_user
  + change_pass
>
```

Send it Up!



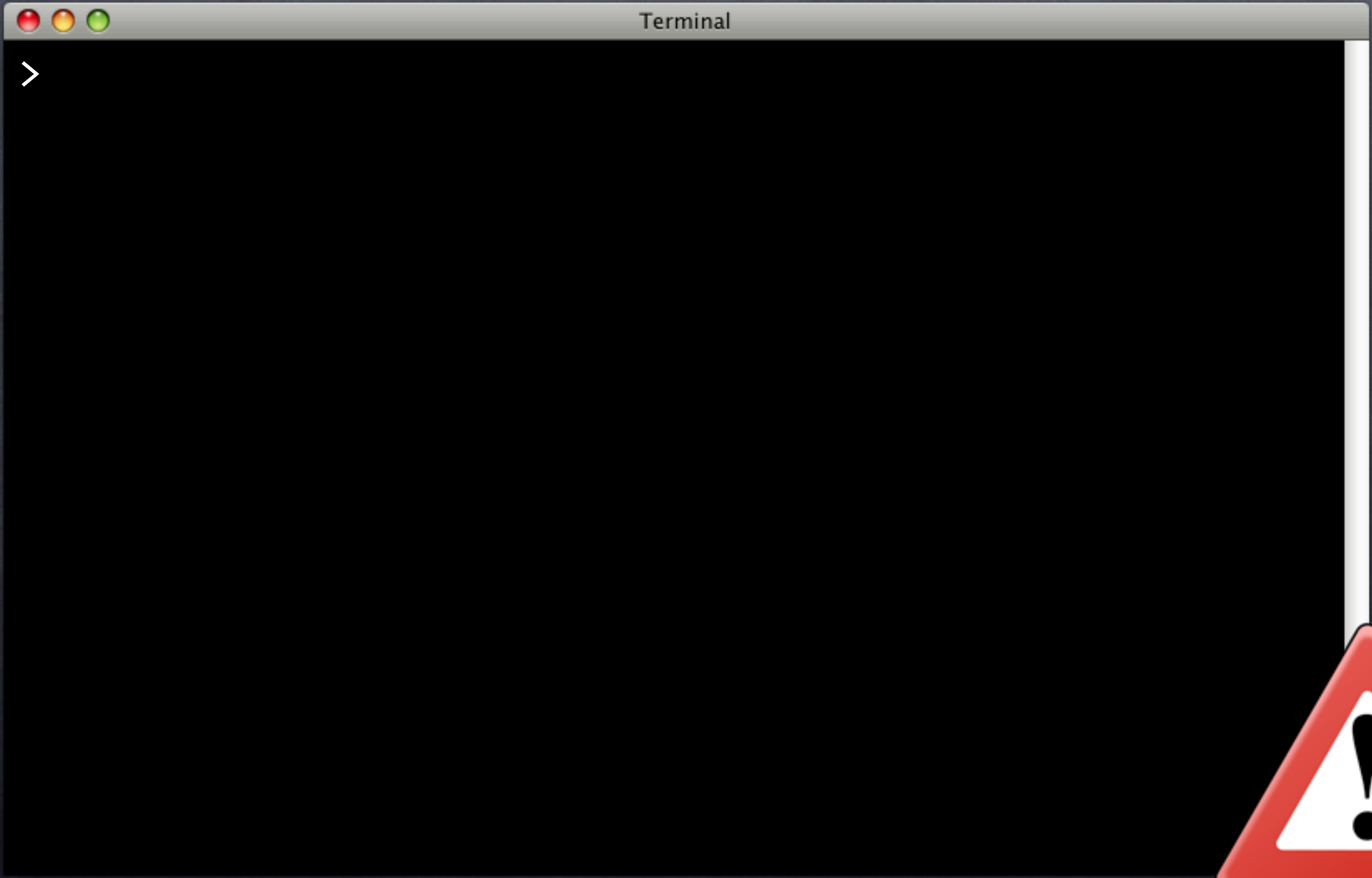
```
> sqitch deploy --untracked
Deploying HEAD+ to flipr_test
  + insert_user
  + change_pass
> psql -d flipr_test -c "
    DELETE FROM users;
    SELECT insert_user('foo', 'secr3t'),
           insert_user('bar', 'secr3t');
    SELECT nickname, password FROM users;
"
 nickname |               password
----------+-----------------------------------
 foo      | $1$l6OEKyF3$kv5ae7505ROub75d9QKTh/
 bar      | $1$J4NJDgaJ$578i9Lt6b8ohJwi6WhNNO1
>
```

Send it Up!



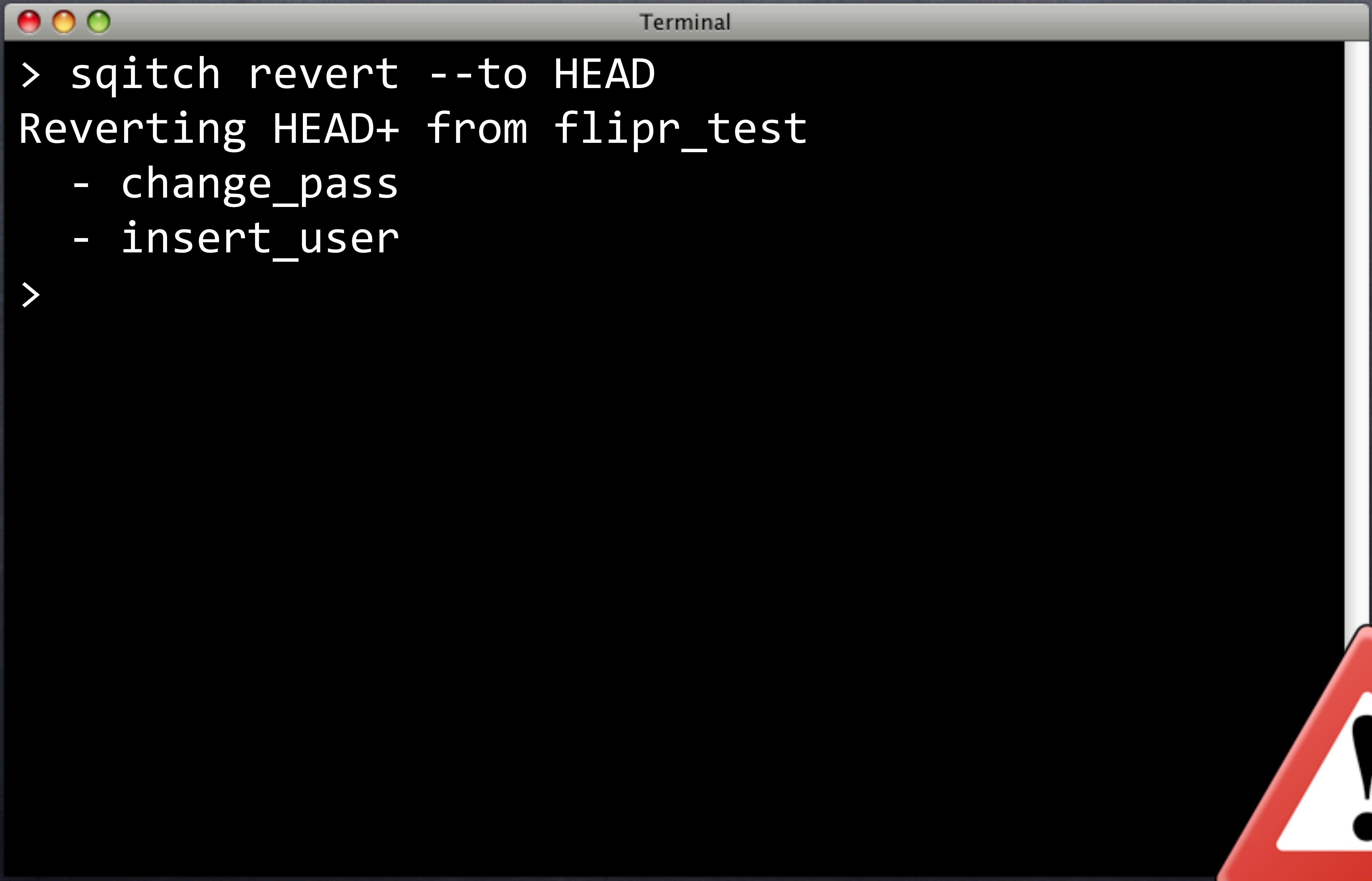
```
> sqitch deploy --untracked
Deploying HEAD+ to flipr_test
  + insert_user
  + change_pass
> psql -d flipr_test -c "
    DELETE FROM users;
    SELECT insert_user('foo', 'secr3t'),
           insert_user('bar', 'secr3t');
    SELECT nickname, password FROM users;
"
 nickname |              password
----------+------------------------------------
 foo      | $1$l6OEKyF3$kv5ae7505ROub75d9QKTh/
 bar      | $1$J4NJDgaJ$578i9Lt6b8ohJwi6WhNNO1
>
```

Can We Go Back?



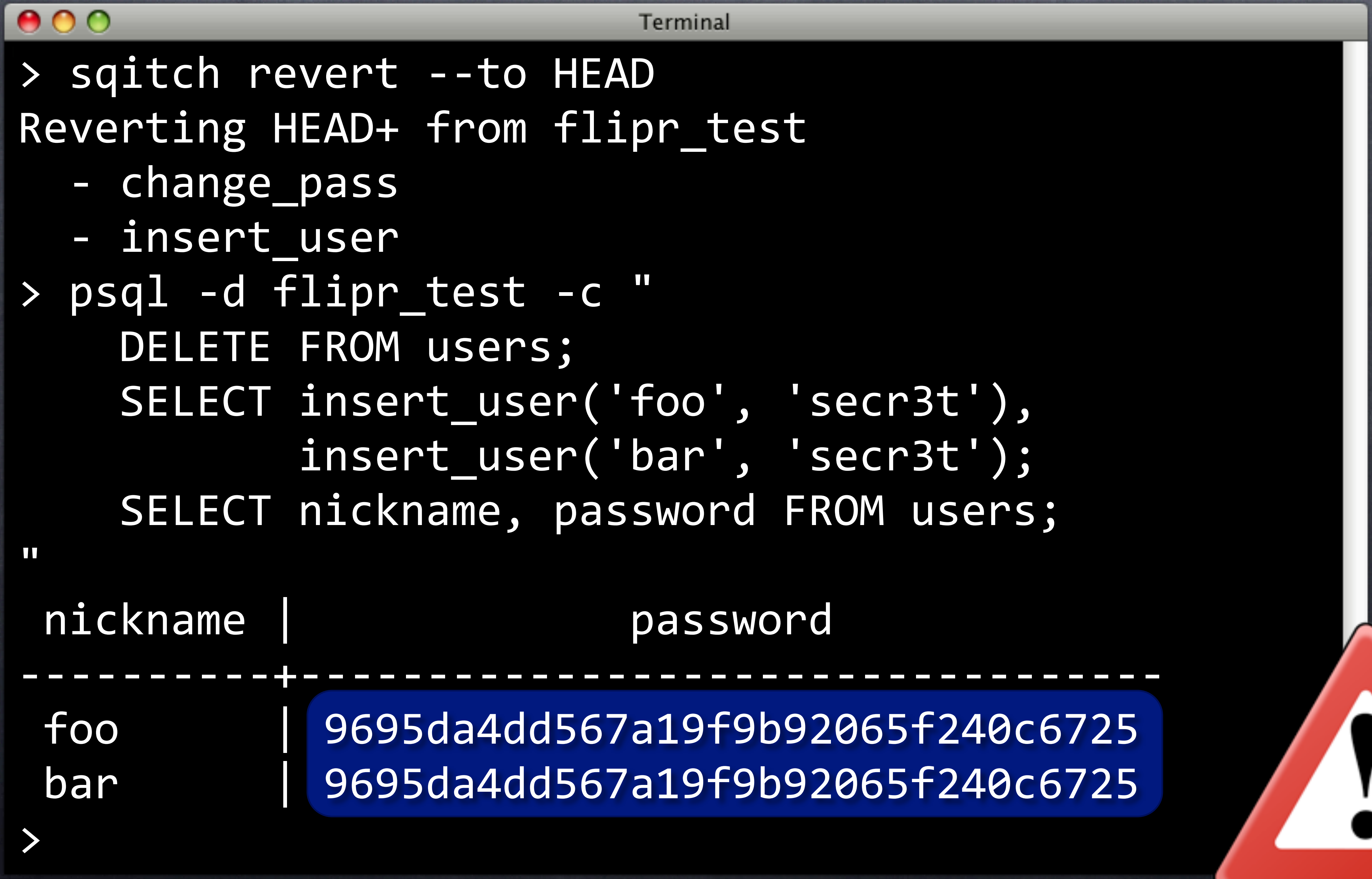
```
>
```

Can We Go Back?



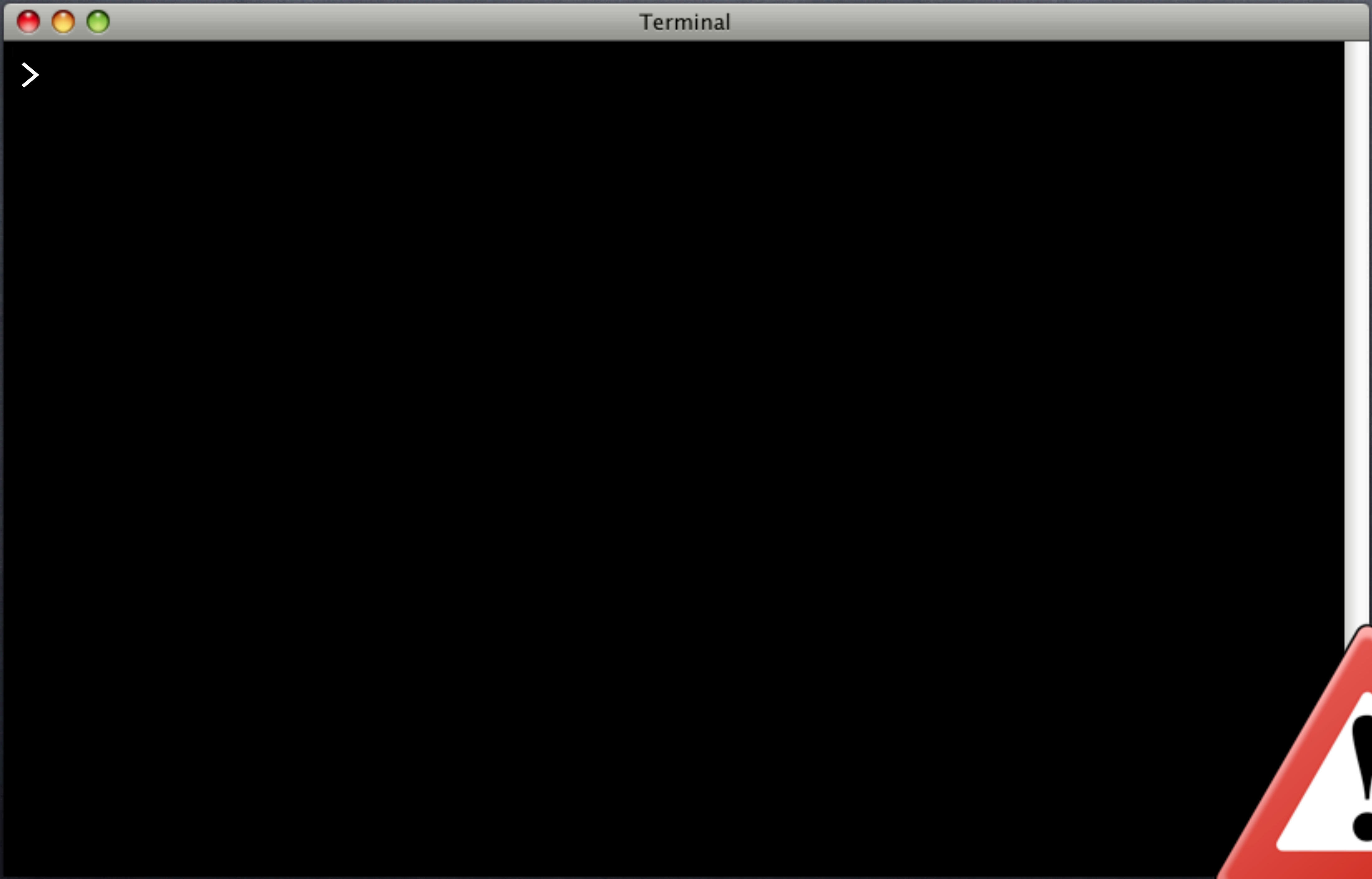
```
> sqitch revert --to HEAD
Reverting HEAD+ from flipr_test
  - change_pass
  - insert_user
>
```

Can We Go Back?



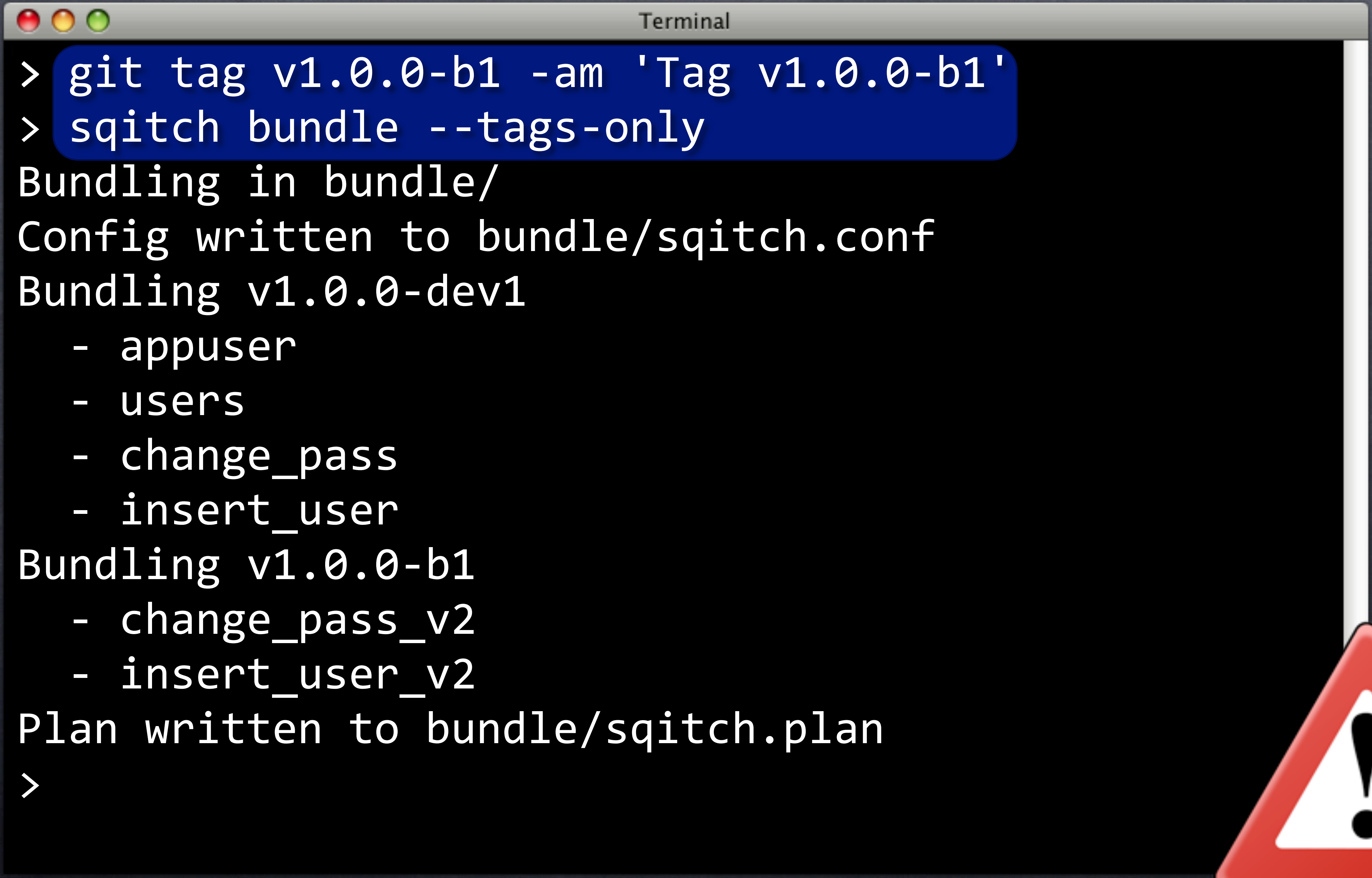
```
> sqitch revert --to HEAD
Reverting HEAD+ from flipr_test
  - change_pass
  - insert_user
> psql -d flipr_test -c "
    DELETE FROM users;
    SELECT insert_user('foo', 'secr3t'),
           insert_user('bar', 'secr3t');
    SELECT nickname, password FROM users;
"
 nickname |             password
----------+----------------------------------
 foo      | 9695da4dd567a19f9b92065f240c6725
 bar      | 9695da4dd567a19f9b92065f240c6725
>
```

What About Bundling?



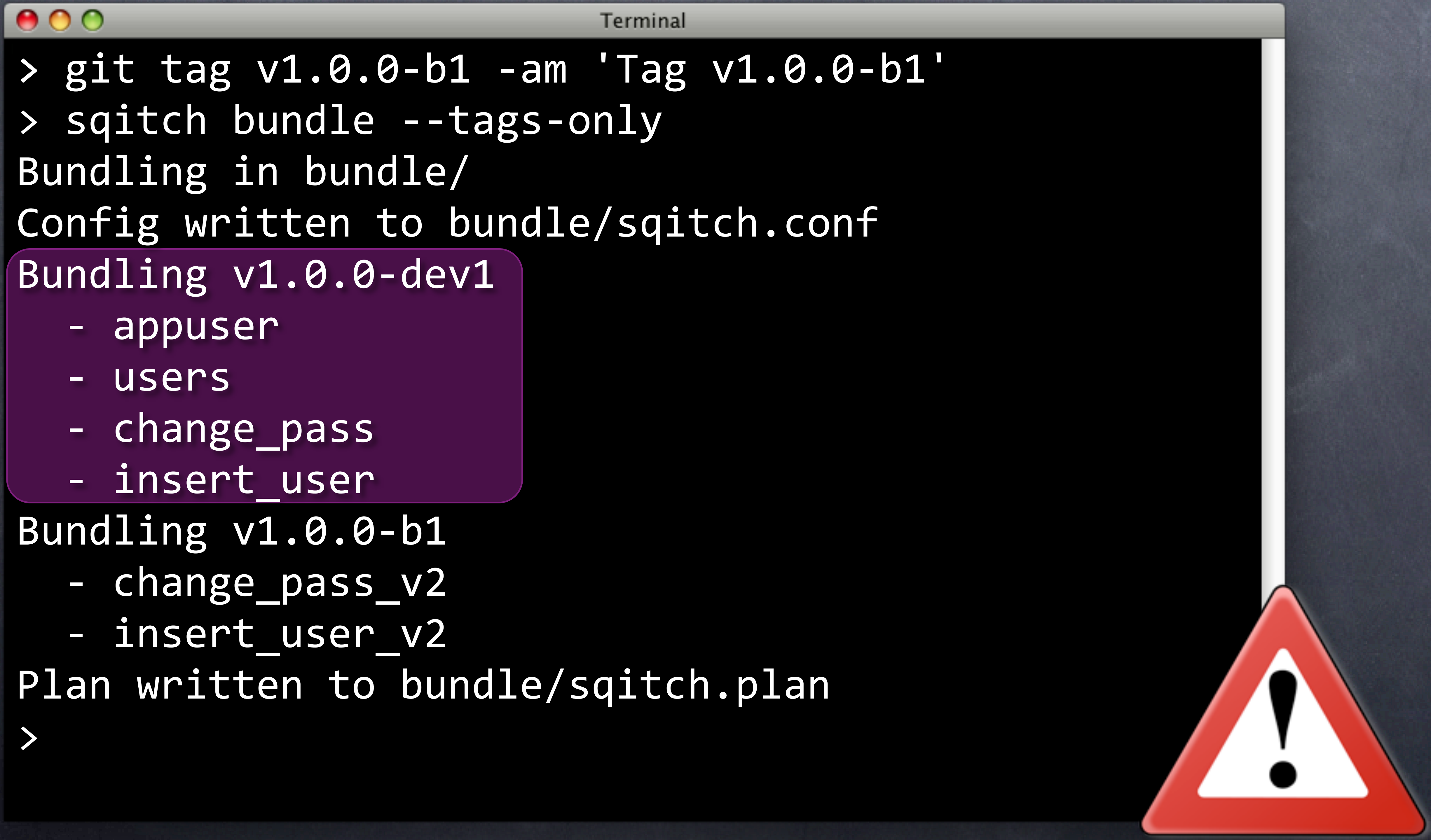
```
>
```

What About Bundling?



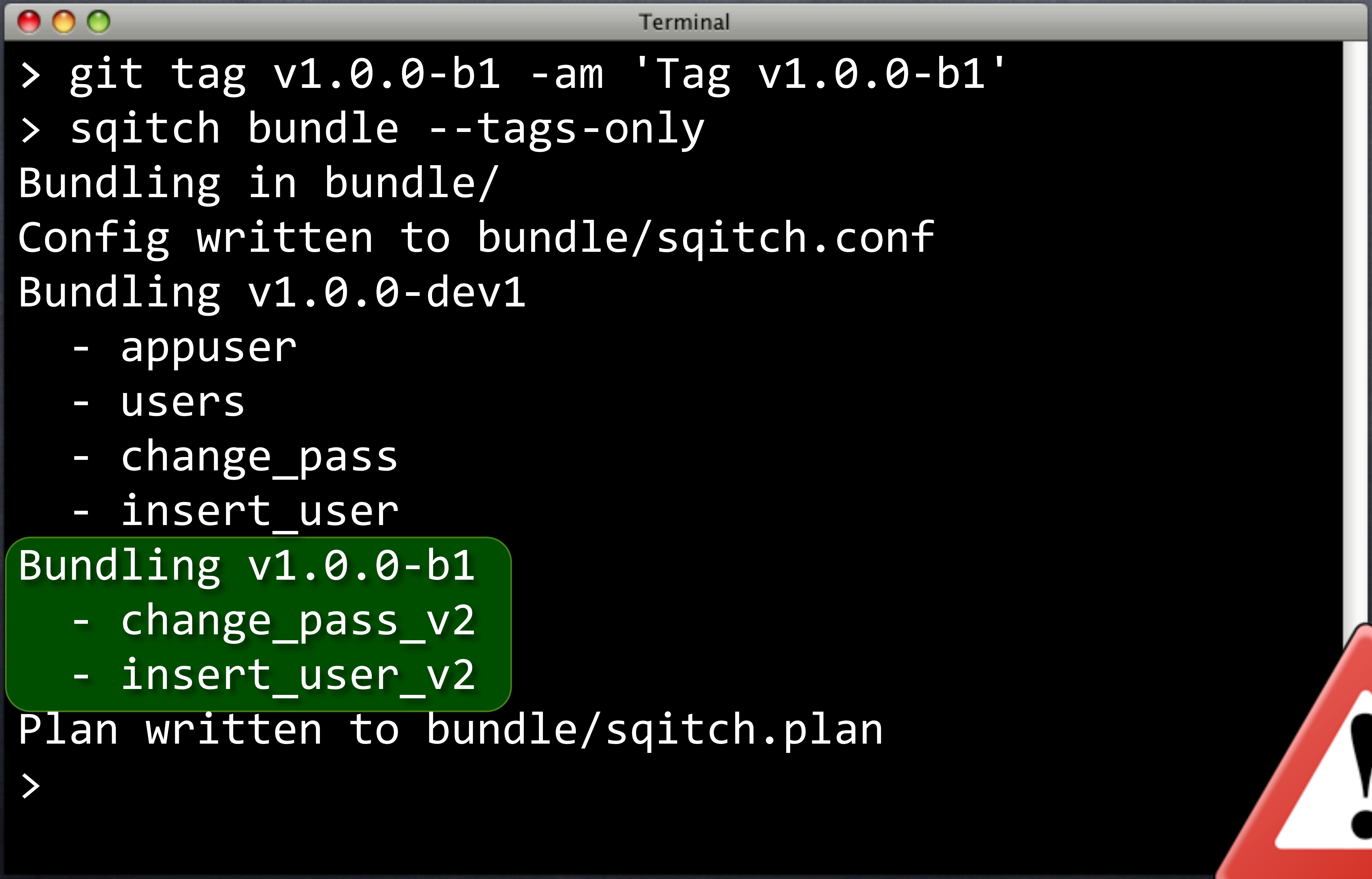
```
> git tag v1.0.0-b1 -am 'Tag v1.0.0-b1'
> sqitch bundle --tags-only
Bundling in bundle/
Config written to bundle/sqitch.conf
Bundling v1.0.0-dev1
  - appuser
  - users
  - change_pass
  - insert_user
Bundling v1.0.0-b1
  - change_pass_v2
  - insert_user_v2
Plan written to bundle/sqitch.plan
>
```

What About Bundling?



```
> git tag v1.0.0-b1 -am 'Tag v1.0.0-b1'
> sqitch bundle --tags-only
Bundling in bundle/
Config written to bundle/sqitch.conf
Bundling v1.0.0-dev1
  - appuser
  - users
  - change_pass
  - insert_user
Bundling v1.0.0-b1
  - change_pass_v2
  - insert_user_v2
Plan written to bundle/sqitch.plan
>
```

What About Bundling?



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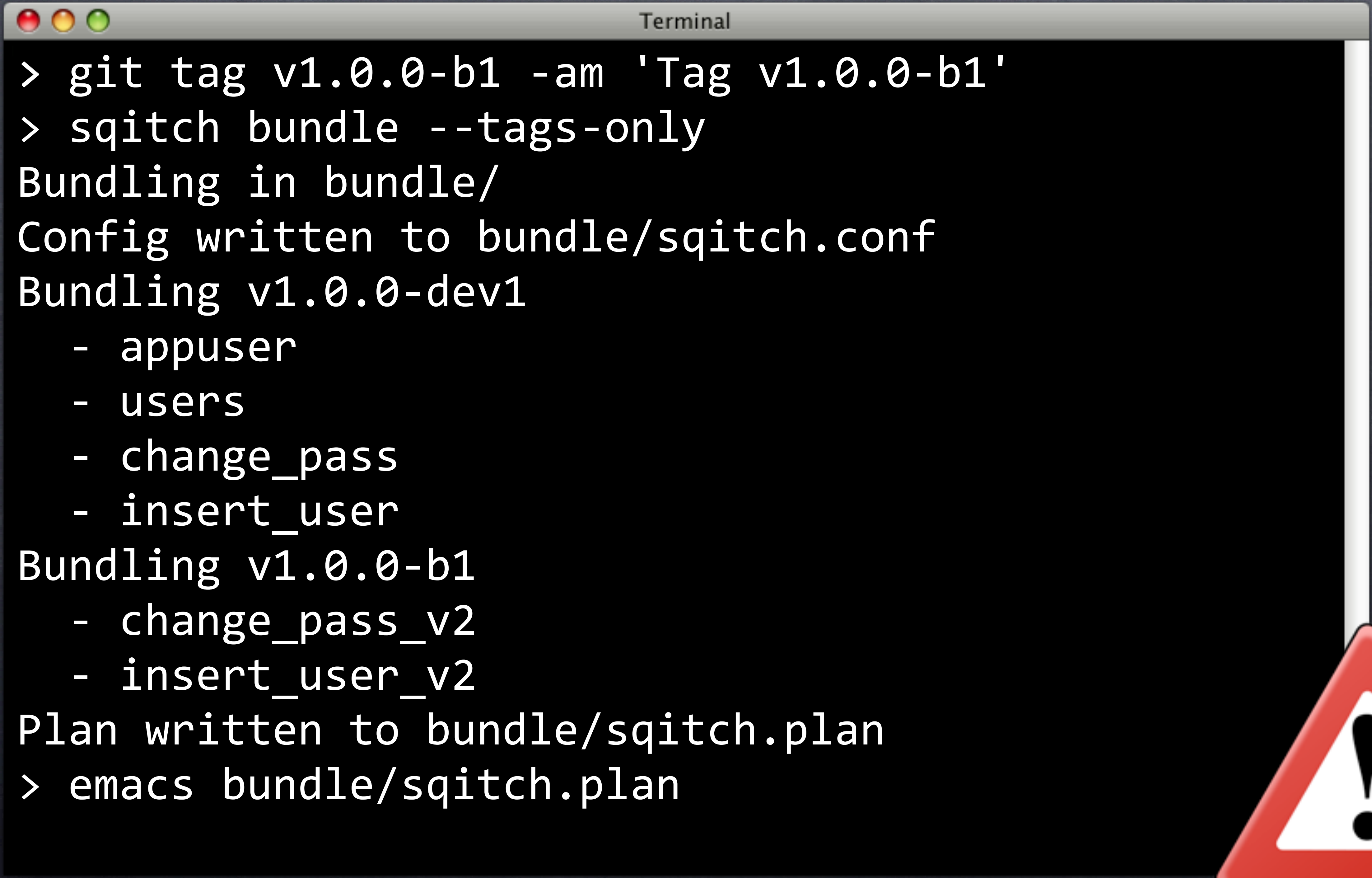
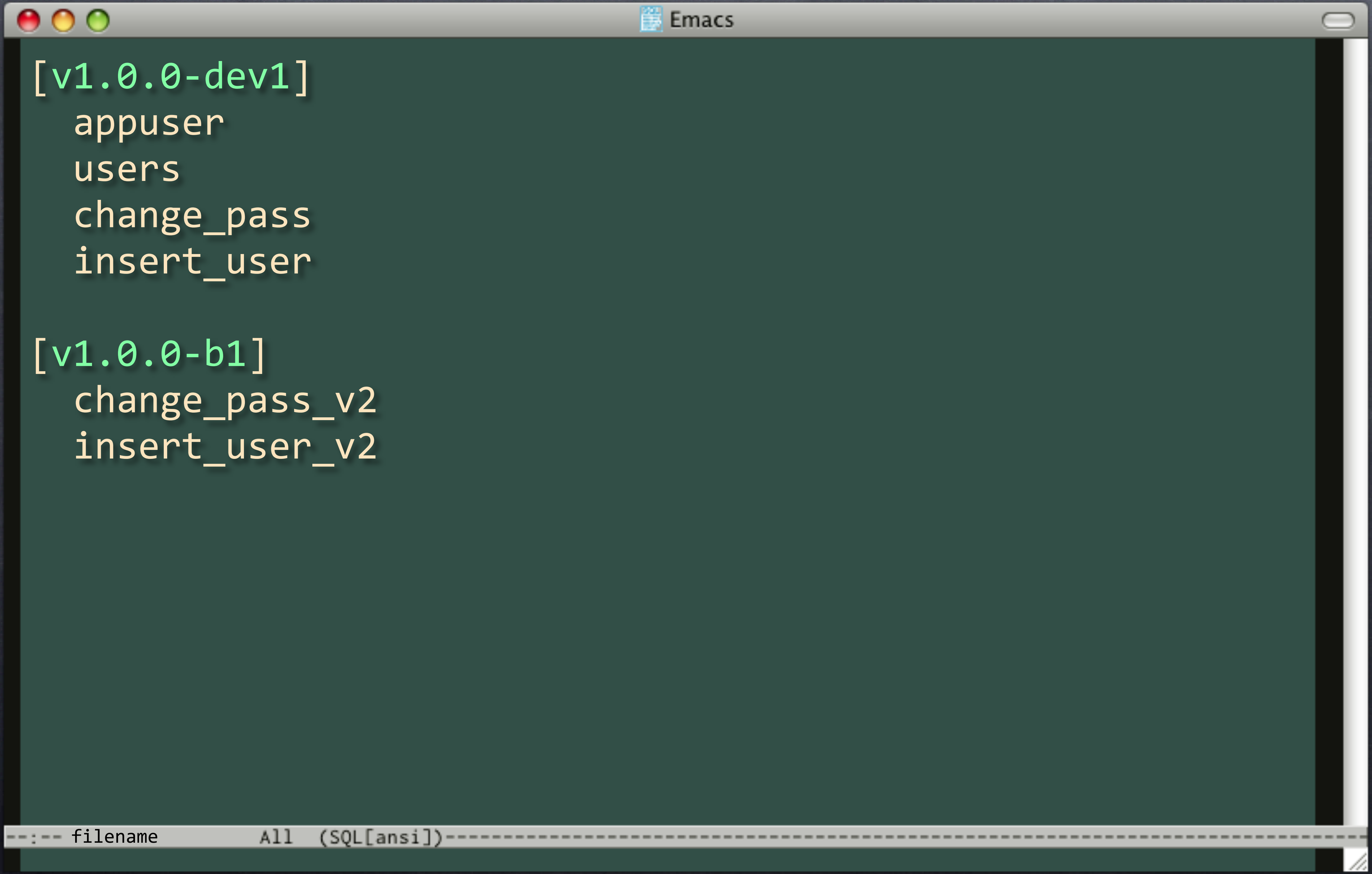
> git tag v1.0.0-b1 -am 'Tag v1.0.0-b1'
> sqitch bundle --tags-only
Bundling in bundle/
Config written to bundle/sqitch.conf
Bundling v1.0.0-dev1
  - appuser
  - users
  - change_pass
  - insert_user
Bundling v1.0.0-b1
  - change_pass_v2
  - insert_user_v2
Plan written to bundle/sqitch.plan
>
```

What About Bundling?



```
> git tag v1.0.0-b1 -am 'Tag v1.0.0-b1'
> sqitch bundle --tags-only
Bundling in bundle/
Config written to bundle/sqitch.conf
Bundling v1.0.0-dev1
  - appuser
  - users
  - change_pass
  - insert_user
Bundling v1.0.0-b1
  - change_pass_v2
  - insert_user_v2
Plan written to bundle/sqitch.plan
> emacs bundle/sqitch.plan
```

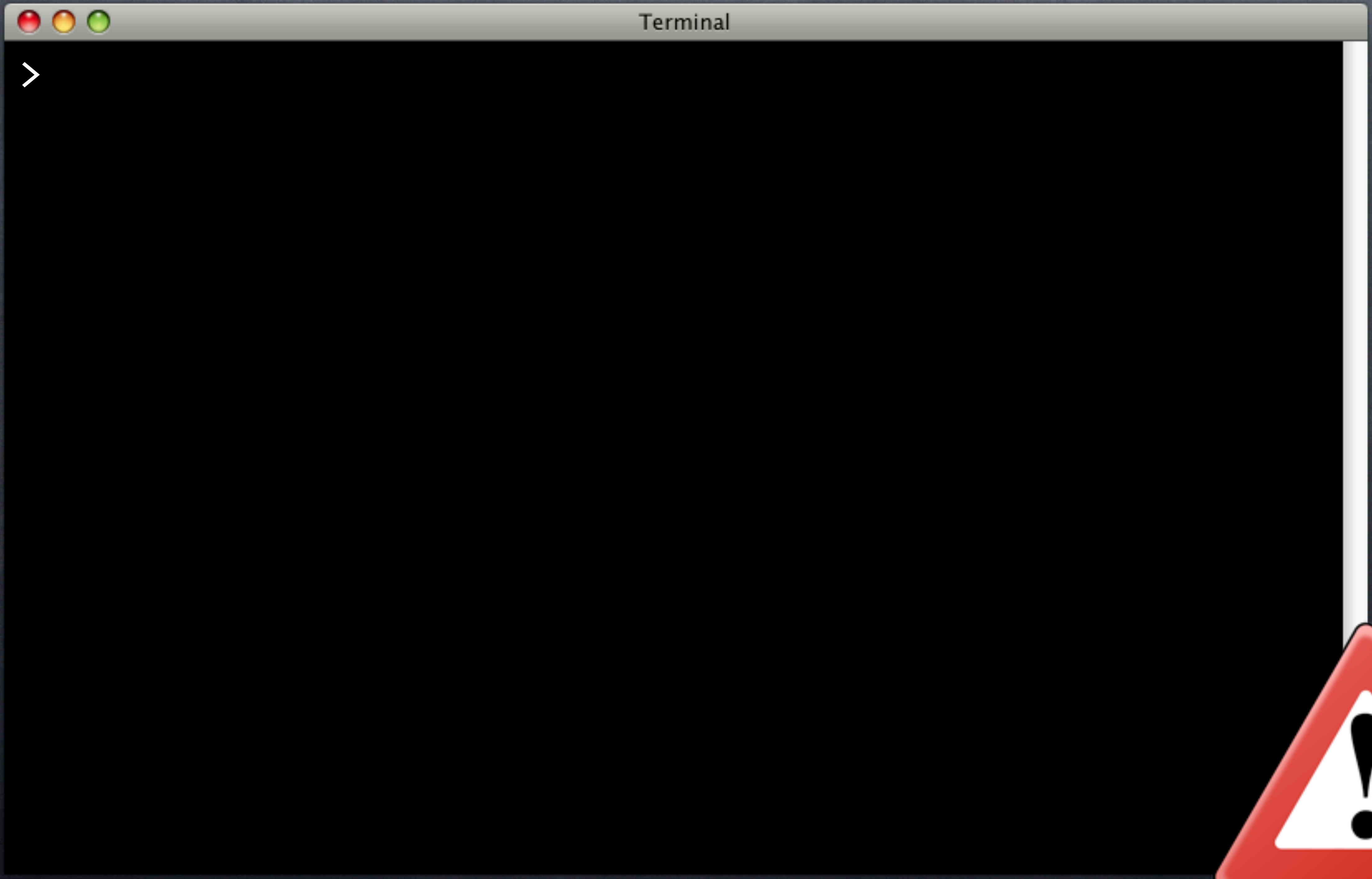
What's the Plan?



```
[v1.0.0-dev1]
  appuser
  users
  change_pass
  insert_user

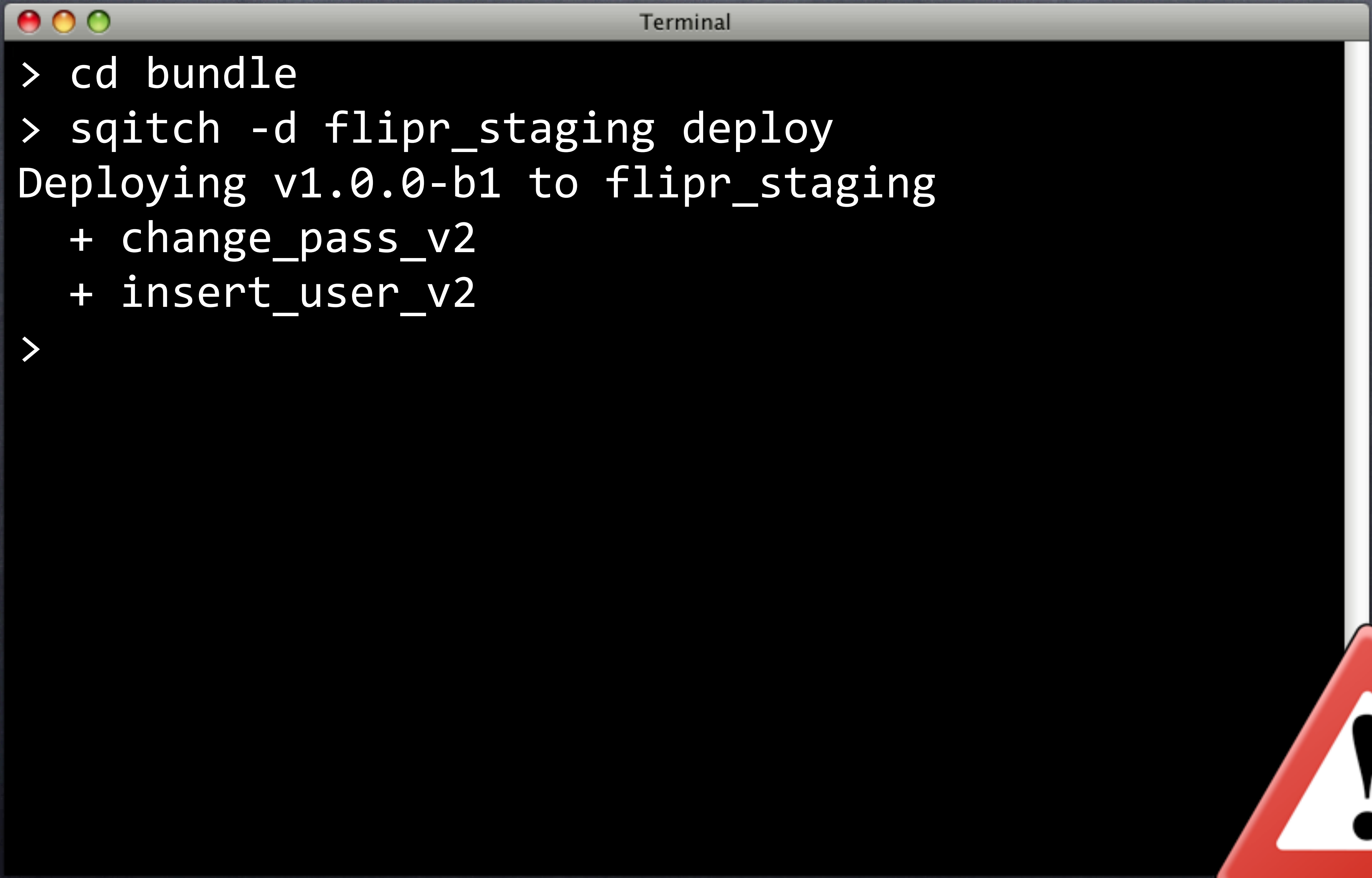
[v1.0.0-b1]
  change_pass_v2
  insert_user_v2
```

Make it So



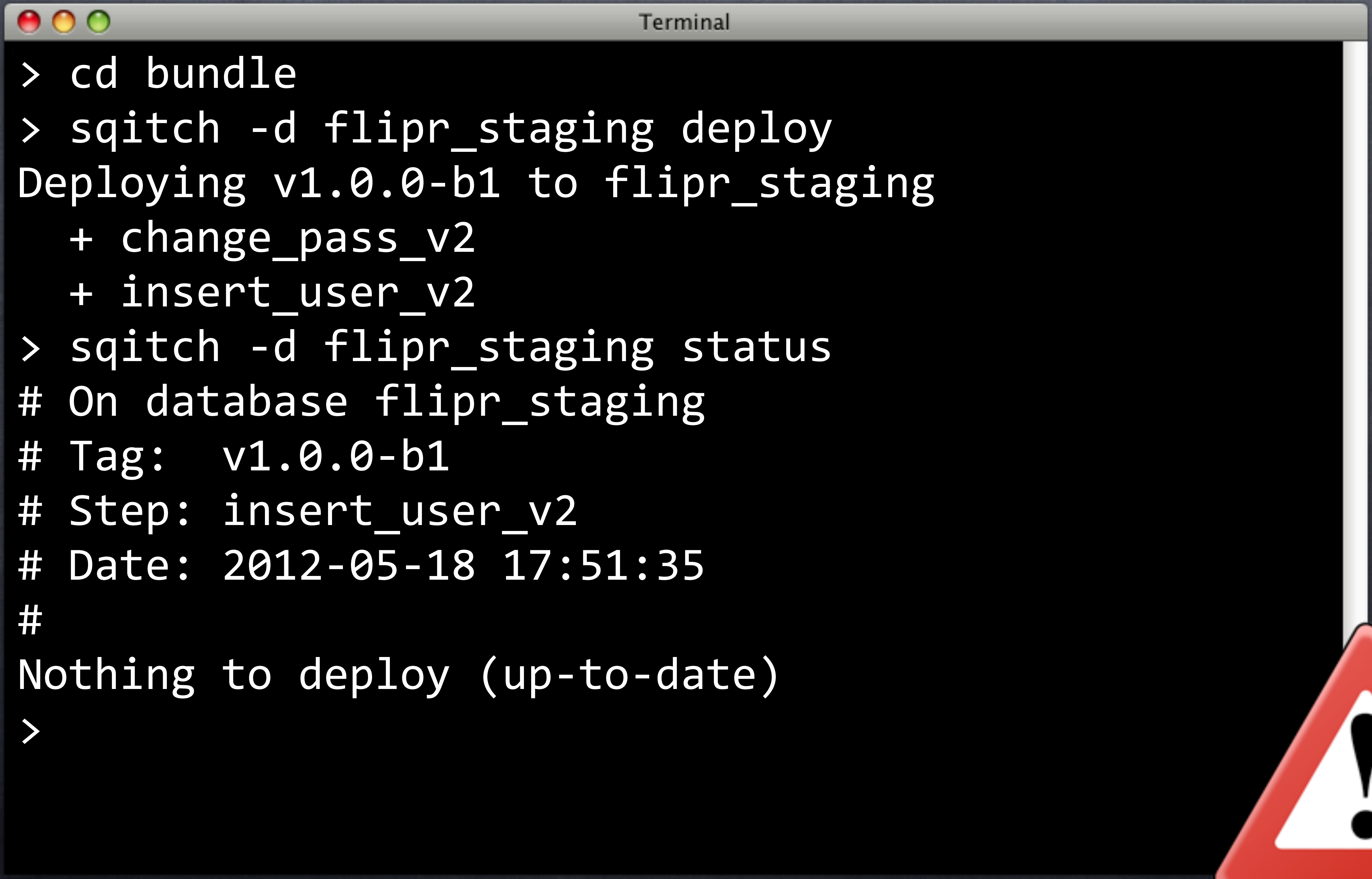
```
>
```

Make it So



```
> cd bundle
> sqitch -d flipr_staging deploy
Deploying v1.0.0-b1 to flipr_staging
  + change_pass_v2
  + insert_user_v2
>
```

Make it So



```
> cd bundle
> sqitch -d flipr_staging deploy
Deploying v1.0.0-b1 to flipr_staging
  + change_pass_v2
  + insert_user_v2
> sqitch -d flipr_staging status
# On database flipr_staging
# Tag:  v1.0.0-b1
# Step: insert_user_v2
# Date: 2012-05-18 17:51:35
#
Nothing to deploy (up-to-date)
>
```

Ship It!

Other Commands

Other Commands

- log - Like git log

Other Commands

- log - Like git log
- check - Validate plan & database

Other Commands

- log - Like git log
- check - Validate plan & database
- test - Test deployment success

Other Commands

- log - Like git log
- check - Validate plan & database
- test - Test deployment success
- help - Get it

Current Status

Current Status

- Working on it full time

Current Status

- Working on it full time
- Rethinking VCS integration

Current Status

- Working on it full time
- Rethinking VCS integration
  - Rely more on plan file

Current Status

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- Make it great!

Thank you.

Simple SQL Change Management with Sqitch

David E. Wheeler
http://sqitch.org/

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