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Using PostgreSQL with .NET

Or How to fall in love with the database again.

Agenda

- I'm not going to cover "installing" Postgres, it's easy for windows at least, and not a huge challenge for most linux'es
- I'm not going to cover setting up Entity Framework, because it's exactly the same as any other tutorial, but you use the EF NpgSQL NuGet instead of SQL Server

- **Code will be at:**
  - **https://github.com/shawty/haintonpostgres**

Agenda

- A few Tips first
- Authentication
- NpgSQL – The .NET Database Driver
- Standard Data Types
- Advanced Data Types
- Pub/Sub Messaging

- **Once these slides are finished, everything will be live code/sql etc.**

Who am I?

- I don't think I need to say too much, most folks in the .NET scene, esp in the northeast UK know who I am by now ☺
- I've been doing all manner of I.T related stuff now for about 40 years, my contact details are at the beginning of the video, I'll put them back up at the end.
- My real name is "Peter Shaw", most know me as "Shawty" and I'm fairly well known for helping to run the Linked .NET users group (Lidnug.Org)

Who am I?

- I'm deaf, I know this even is not in person where this is a more important thing, but as a result I don't have headphones or anything on, so I CANNOT hear feedback from skype or any desktop alerts.
- If you have questions for me, leave them until the end and I'll get one of the Hainton guys to relay them to me somehow.

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A few tips

The Elephant will help you, as long as you help it.

A few Tips

- Always use the Table and Column attributes for EF when designing your models.
- If your using a very recent version of Postgres, use the “identity” type for your primary keys, NOT serial.
- If you have to use “serial” or are on an older PG build, make sure you set the compatibility mode.

A few Tips

- If you have to use “serial” or are on an older PG build, make sure you set the compatibility mode.

```
protected override void OnConfiguring(DbContextOptionsBuilder optionsBuilder)
    => optionsBuilder.UseNpgsql("...", o => o.SetPostgresVersion(9, 6));
```

- The best source of info on this topic is in the official docs:
- **https://www.npgsql.org/efcore/modeling/generated-properties**

Authentication

Don’t upset the Elephant!

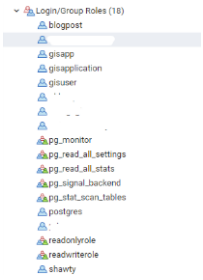
Authentication

- STAGE 1
- HBA (Host Based Access)

```
#
# Database administrative login by Unix domain socket
local   all             postgres                                peer

# TYPE  DATABASE        USER            ADDRESS                 METHOD
host    all             all             192.168.17.100/32       md5
#host    gisapp          postgres        192.168.17.30/32        md5
host    all             all  127.0.0.1/32                       md5
host    gisapp          gisapplication  192.168.17.30/32        md5

# "local" is for Unix domain socket connections only
local   all             all                                     peer

# IPv4 local connections:
host    all             all             127.0.0.1/32            md5

# IPv6 local connections:
host    all             all             ::1/128                 md5

# Allow replication connections from localhost, by a user with the
# replication privilege.
local   replication     all                                     peer
host    replication     all             127.0.0.1/32            md5
host    replication     all             ::1/128                 md5
```

Authentication

- STAGE 2
- Server User Authentication



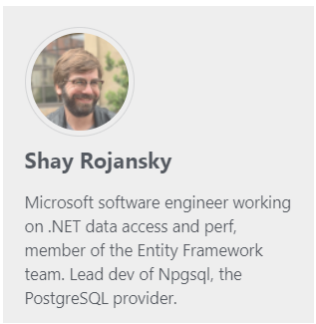
NpgSQL

The .NET way to make the Elephant love you.

NpgSQL

- If your using Entity Framework or ADO (Or anything that uses either of them) your going to need NpgSQL.
- There are other drivers, from 3rd party vendors but NpgSQL is tested, battle hardened and supported by the data services team at Microsoft in the form of …..

NpgSQL



https://www.npgsql.org/index.html

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Standard Data Types

Int's, Strings and Booleans… there all the same

Standard Data Types

- Exactly as you might expect, int, varchar, nvarchar, float, decimal even money – are all available.
- Postgres however has better types of it's own, and those types frequently perform better than the more compatible types, which are largely available just to adhere to the Ansi SQL 97/99 standards.

Standard Data Types

- USE TEXT – Not var char, char or any of those types.
- USE TIMESTAMPTZ – Not timestamp and definitely not datetime, time or date.
- If you have to use serial for primary keys, use BIGSERIAL or UUID, bigserial and serial both use the same amount of storage space in the DB, if your using a modern PG version use “identity”
- Be careful of BOOL & BIT

Standard Data Types

- If possible always use numeric for number types, even integers, the performance is better.
- DO NOT use “money” or “float” these types are now very old, and very flakey, often causing rounding errors and other hard to spot problems.
- Numeric(10,0) is equivalent to int

Standard Data Types

- https://wiki.postgresql.org/wiki/Don%27t_Do_This
  - The big list of don't do this topics is always interesting AND funny to read.

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Advanced Data Types

Let's see what the Elephant has in it's bag of tricks.

Advanced Data Types

- Array
- Hstore
- Json/Jsonb
- Box
- Line
- Point
- Inet/Cidr
- Range
- Macaddr
- Polygon
- Geography
- Spatial
  - WGS84
  - GeoPoint
  - GeoLine
  - GeoPoly

Advanced Data Types

- I can't possibly demo all the types and their potential uses, so my code sample only shows the following
- Arrays
- Json(b)
- DateRange
- Inet
- GeoPoint

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Pub/Sub messaging

Keep the elephant informed, and it
Will keep your app informed.

Pub/Sub Messaging

```
var conn = new NpgsqlConnection(ConnectionString);
conn.Open();
conn.Notification += (o, e) => Console.WriteLine("Received notification");

using (var cmd = new NpgsqlCommand("LISTEN channel_name", conn)) {
  cmd.ExecuteNonQuery();
}

while (true) {
  conn.Wait();   // Thread will block here
}
```

- **https://www.npgsql.org/doc/wait.html**
- **https://www.codeguru.com/columns/dotnet/postgres-tricks-in-.net.html**

Summary

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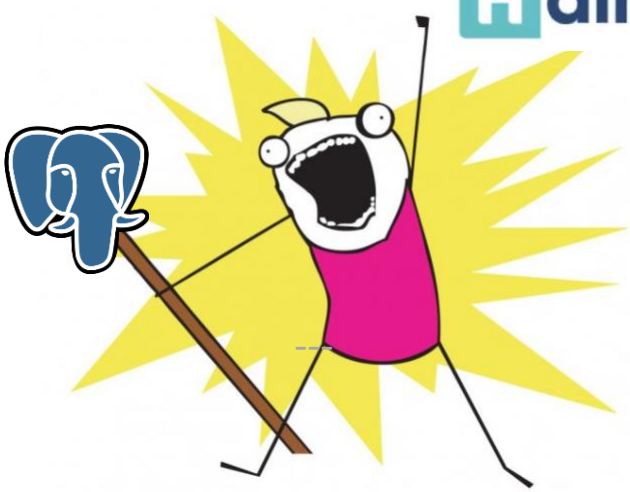
https://shawtyds.wordpress.com/2019/10/27/rediscovering-postgres-and-ef-core/



Postgres All The Things!

Links

- https://www.codeguru.com/columns/dotnet/postgres-tricks-in-.net.html
- https://shawtyds.wordpress.com/2015/04/08/postgres-never-ceases-to-amaze-me/
- https://shawtyds.wordpress.com/2019/10/27/rediscovering-postgres-and-ef-core/
- https://www.syncfusion.com/succinctly-free-ebooks/postgres?utm_medium=AuthorBadge