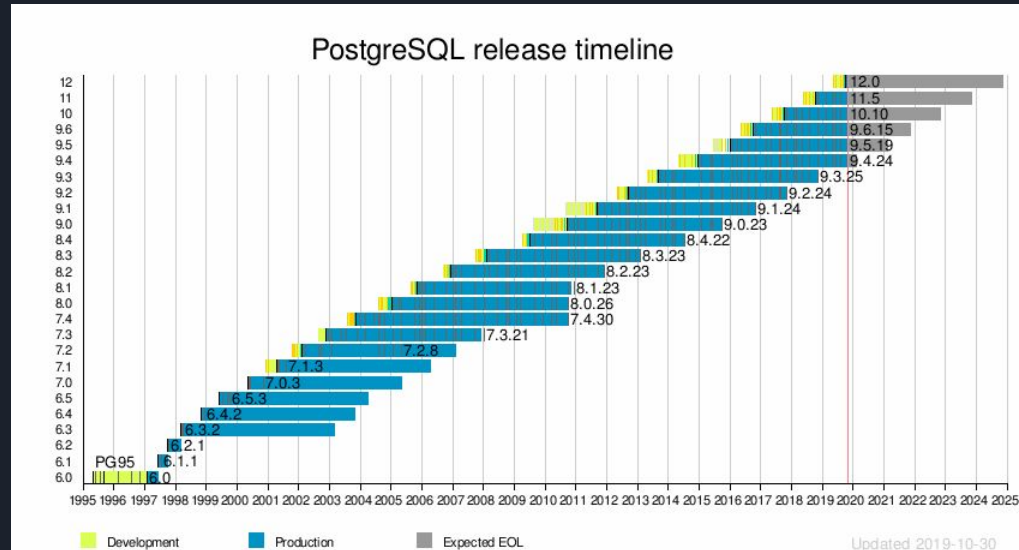


A decorative graphic on the left side of the slide. It consists of a blue parallelogram and a light green parallelogram, both tilted at an angle. The blue shape is in the foreground, and the green shape is partially behind it. They are set against a dark blue background with faint, lighter blue diagonal stripes.

# PostgreSQL

# About PostgreSQL

- Free open source object-relational database system
- Evolved from ingres project at UC Berkeley





# Features

- User defined types
- Table inheritance
- Sophisticated locking mechanism
- Foreign key constraints
- Views, rules, subquery
- Multi-version concurrency control
- Asynchronous replication



# PostgreSQL Setup

- Follow instructions and download from <http://www.postgresqltutorial.com/install-postgresql/>
- Connect to PostgreSQL database either through interactive terminal program psql or pgAdmin application (requires download) <http://www.postgresqltutorial.com/connect-to-postgresql-database/>



# PostGIS

- PostGIS extends PostgreSQL into a spatial database
- Supports three features: spatial types, indexes, and functions
- Spatial data types refer to shapes such as point, line, polygon, etc.
- Multi-dimensional spatial indexing is used for efficient processing of spatial operations
- Spatial functions are for querying of spatial properties and relationships



# PostgreSQL Roles Management

- PostgreSQL uses roles concept to manage database access permissions.
- It is easier to manage roles as a group so that you can grant or revoke privileges from a group as a whole.
- In PostgreSQL, you create a role that represents a group, and then grant membership in the group role to individual user roles.



# PostgreSQL Queries


- `SELECT column_1 FROM table_name WHERE condition;`
- `INSERT INTO table_name (column_1, column_2) VALUES (value_1, value_2);`
- `UPDATE table_name SET column_1 = value_1, column_2 = value_2 WHERE condition;`
- `DELETE FROM table_name WHERE condition;`



# PostgreSQL supported languages

- SQL
- C
- pgSQL
- Python
- Perl
- Tcl





# PostgreSQL Database Instances with Amazon RDS

- Enter the RDS Console
- Create a PostgreSQL DB Instance
- Download a SQL Client
- Connect to the PostgreSQL Database
- Delete the DB Instance

Amazon RDS makes it easy to set up, operate, and scale a relational database in the cloud.



# Operating systems for PostgreSQL

- It is the default database for macOS Servers
- Linux
- FreeBSD
- OpenBSD
- Windows



# PostgreSQL Design

- It is designed to handle a range of workloads
- From single machines to data warehouses
- Web services with many concurrent users



# Storage and replication

There are a few ways to handle storage and replication

- PostgreSQL has built-in binary replication
- Indexing for b-tree and hash table indexes and index access methods
- Schemas
- Data types
- User-defined objects
- Inheritance