

Introduction to PostgreSQL data types

CREATING POSTGRES SQL DATABASES



Darryl Reeves

Industry Assistant Professor, New York
University

Data categories in PostgreSQL

- Text
- Numeric
- Temporal
- Boolean
- Others: Geometric, Binary, Monetary

Example 1: representing birthdays

- Cathy: May 3rd, 2006
- Possible representations
 - "May 3, 2006" (text)
 - "5/3/2006" (text)
 - 2006-05-03 (date)

Example 2: tracking payment status

- Did attending member pay?
- Possible representations:
 - "Yes"/"No" (text)
 - "Y"/"N" (text)
 - 'true'/'false' (boolean)
- Specific types provide restriction on values

Example 3: trip distances

- Mark flew 326 miles for client meeting
- Possible representations:
 - "326 miles" (text)
 - "326" (text)
 - 326 (numeric)

Let's practice!

CREATING POSTGRESQL DATABASES

Defining text columns

CREATING POSTGRESQL DATABASES

SQL

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Using text in PostgreSQL

```
CREATE TABLE book (  
    isbn CHAR(13) NOT NULL,  
    author_first_name VARCHAR(50) NOT NULL,  
    author_last_name VARCHAR(50) NOT NULL,  
    content TEXT NOT NULL  
);
```

Text data types: `TEXT` , `VARCHAR(N)` , `CHAR(N)`

The TEXT data type

- Strings of variable length
- Strings of unlimited length
- Good for text-based values of unknown length

The VARCHAR data type

- Strings of variable length
- Strings of unlimited length
- Restriction can be imposed on column values
 - `VARCHAR(N)`
 - *N* - maximum number of characters stored
 - Column can store strings with less than *N* characters
 - Inserting string longer than *N* is error
- `VARCHAR` without *N* specified equivalent to `TEXT`

```
first_name VARCHAR(50) NOT NULL;
```

The CHAR data type

- `CHAR(N)` values consist of exactly *N* characters
- Strings are right-padded with spaces
- `CHAR` equivalent to `CHAR(1)`

```
isbn CHAR(13) NOT NULL;
```

Let's practice!

CREATING POSTGRESQL DATABASES

Defining numeric data columns

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Numeric data with discrete values

```
CREATE TABLE people.employee {  
  id SERIAL PRIMARY KEY,  
  first_name VARCHAR(10) NOT NULL,  
  last_name VARCHAR(10) NOT NULL  
}
```

Numeric data with discrete values

```
CREATE TABLE people.employee {  
  id SERIAL PRIMARY KEY,  
  first_name VARCHAR(10) NOT NULL,  
  last_name VARCHAR(10) NOT NULL,  
  num_sales INTEGER  
}
```

Integer types

Type	Description	Range
<code>SMALLINT</code>	small-range integer	-32768 to +32767

¹ <https://www.postgresql.org/docs/9.1/datatype-numeric.html>

Integer types

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<code>SMALLINT</code>	small-range integer	-32768 to +32767
<code>INTEGER</code>	typical choice for integer	-2147483648 to +2147483647

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Integer types

Type	Description	Range
<code>SMALLINT</code>	small-range integer	-32768 to +32767
<code>INTEGER</code>	typical choice for integer	-2147483648 to +2147483647
<code>BIGINT</code>	large-range integer	-9223372036854775808 to 9223372036854775807

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Integer types

Type	Description	Range
SMALLINT	small-range integer	-32768 to +32767
INTEGER	typical choice for integer	-2147483648 to +2147483647
BIGINT	large-range integer	-9223372036854775808 to 9223372036854775807
SERIAL	autoincrementing integer	1 to 2147483647

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Integer types

Type	Description	Range
SERIAL	autoincrementing integer	1 to 2147483647
BIGSERIAL	large autoincrementing integer	1 to 9223372036854775807

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Numeric data with continuous values

```
CREATE TABLE people.employee {  
  id SERIAL PRIMARY KEY,  
  first_name VARCHAR(10) NOT NULL,  
  last_name VARCHAR(10) NOT NULL,  
  num_sales INTEGER  
}
```

Numeric data with continuous values

```
CREATE TABLE people.employee {  
  id SERIAL PRIMARY KEY,  
  first_name VARCHAR(10) NOT NULL,  
  last_name VARCHAR(10) NOT NULL,  
  num_sales INTEGER,  
  salary DECIMAL(8,2) NOT NULL  
}
```

DECIMAL (precision, scale)

Floating-point types

Type	Description	Range
DECIMAL or NUMERIC	user-specified precision	131072 digits before the decimal point;16383 digits after the decimal point

¹ <https://www.postgresql.org/docs/9.1/datatype-numeric.html>

Floating-point types

Type	Description	Range
<code>DECIMAL</code> (<code>NUMERIC</code>)	user-specified precision	up to 131072 digits before the decimal point; up to 16383 digits after the decimal point
<code>REAL</code>	variable-precision	6 decimal digits precision

¹ <https://www.postgresql.org/docs/9.1/datatype-numeric.html>

Floating-point types

Type	Description	Range
DECIMAL (NUMERIC)	user-specified precision	up to 131072 digits before the decimal point; up to 16383 digits after the decimal point
REAL	variable-precision	6 decimal digits precision
DOUBLE PRECISION	variable precision	15 decimal digits precision

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Let's practice!

CREATING POSTGRESQL DATABASES

Defining boolean and temporal data columns

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Boolean and temporal data

```
CREATE TABLE book (  
    isbn CHAR(13) NOT NULL,  
    author_first_name VARCHAR(50) NOT NULL,  
    author_last_name VARCHAR(50) NOT NULL,  
    content TEXT NOT NULL  
);
```

Boolean and temporal data

```
CREATE TABLE book (  
    isbn CHAR(13) NOT NULL,  
    author_first_name VARCHAR(50) NOT NULL,  
    author_last_name VARCHAR(50) NOT NULL,  
    content TEXT NOT NULL,  
    originally_published DATE NOT NULL,  
    out_of_print BOOLEAN DEFAULT FALSE  
);
```

The BOOLEAN data type

- Three possible values
 - `true` state
 - `false` state
 - `NULL` (unknown state)
- Common for representing yes-or-no scenarios
- Can be defined with keyword `BOOL` or `BOOLEAN`

```
in_stock BOOL DEFAULT TRUE;
```

Temporal data types

Type	Descriptions	Format
<code>TIMESTAMP</code>	represents a date and time	2010-09-21 15:47:16
<code>DATE</code>	represents a date	1972-07-08
<code>TIME</code>	represents a time	05:30:00

Let's practice!

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