What's in the database?

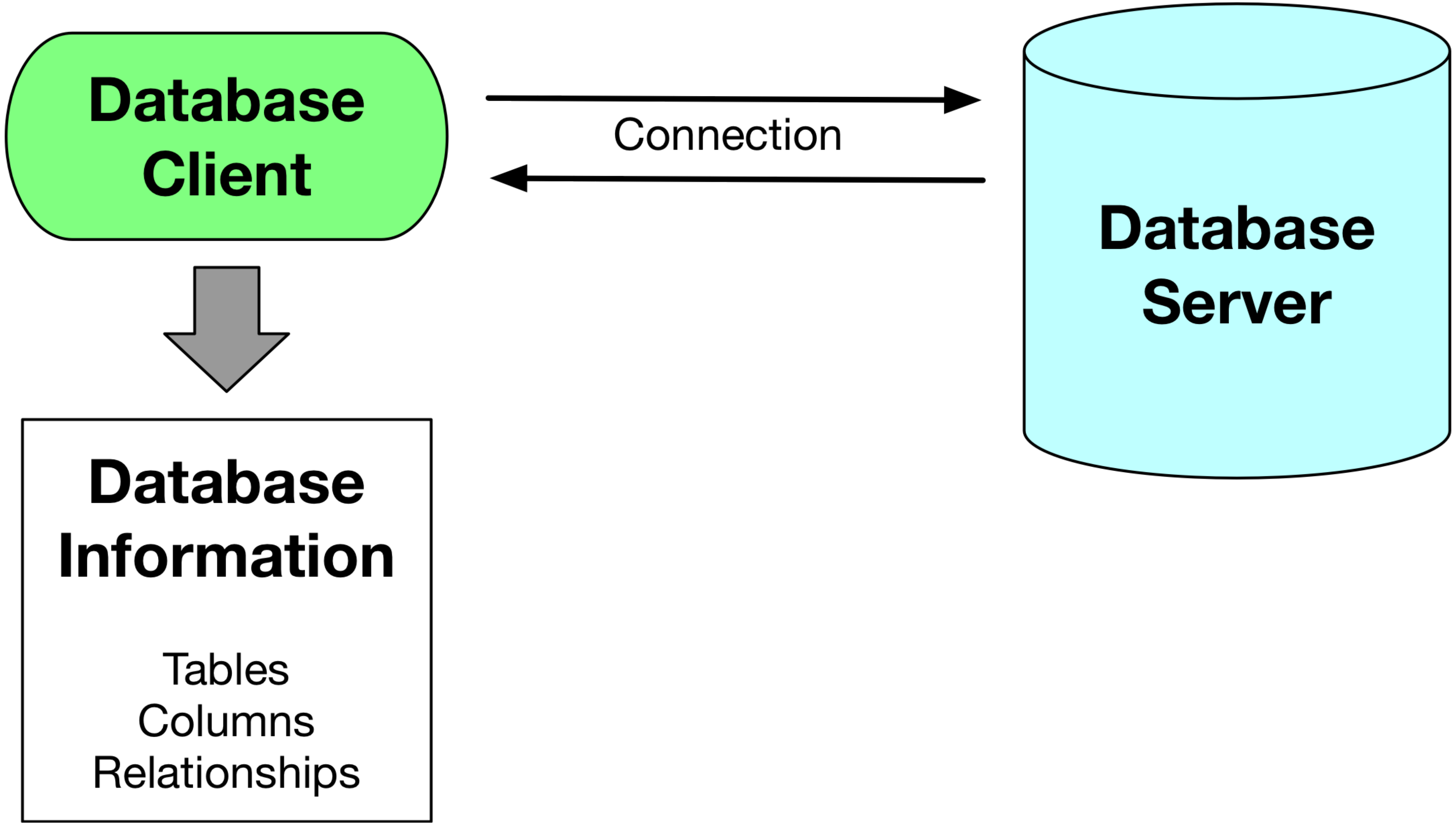
EXPLORATORY DATA ANALYSIS IN SQL

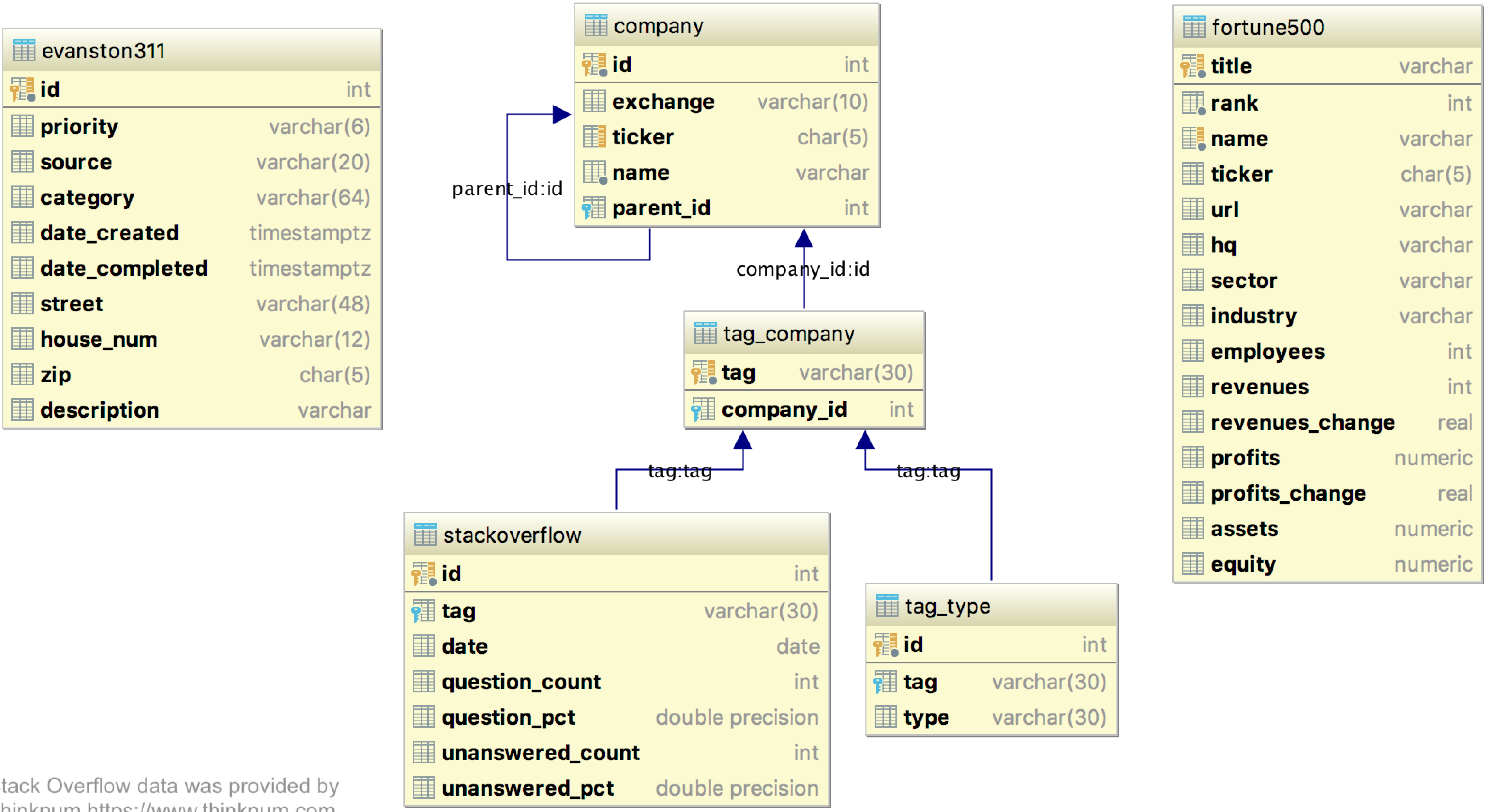
SQL

Christina Maimone
Data Scientist

PostgreSQL

Database client





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priority	varchar(6)
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description	varchar

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stackoverflow	
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date	date
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fortune500	
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rank	int
name	varchar
ticker	char(5)
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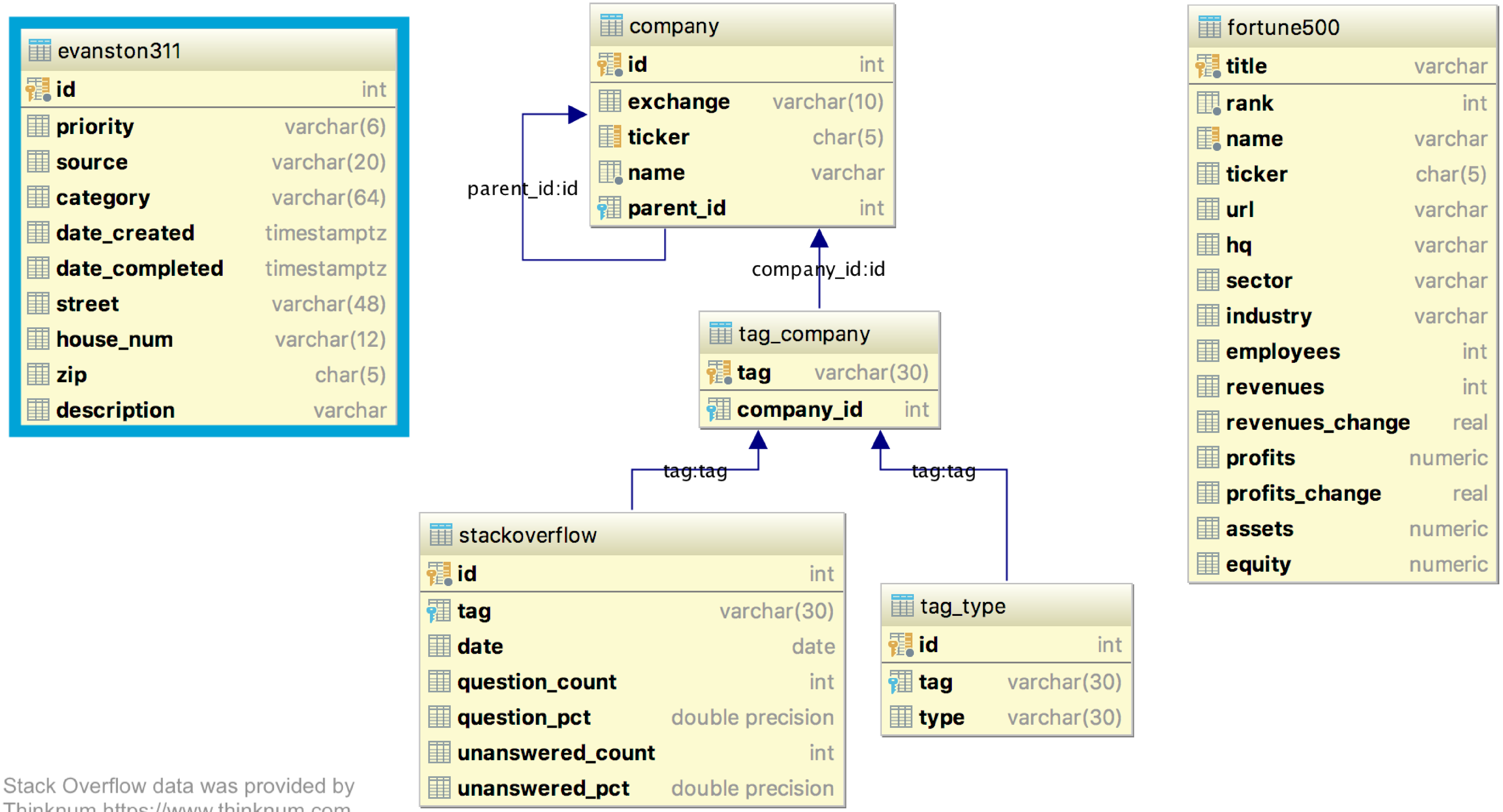
hq	varchar
sector	varchar
industry	varchar
employees	int
revenues	int
revenues_change	real
profits	numeric
profits_change	real
assets	numeric
equity	numeric

Stack Overflow data was provided by
Thinknum https://www.thinknum.com



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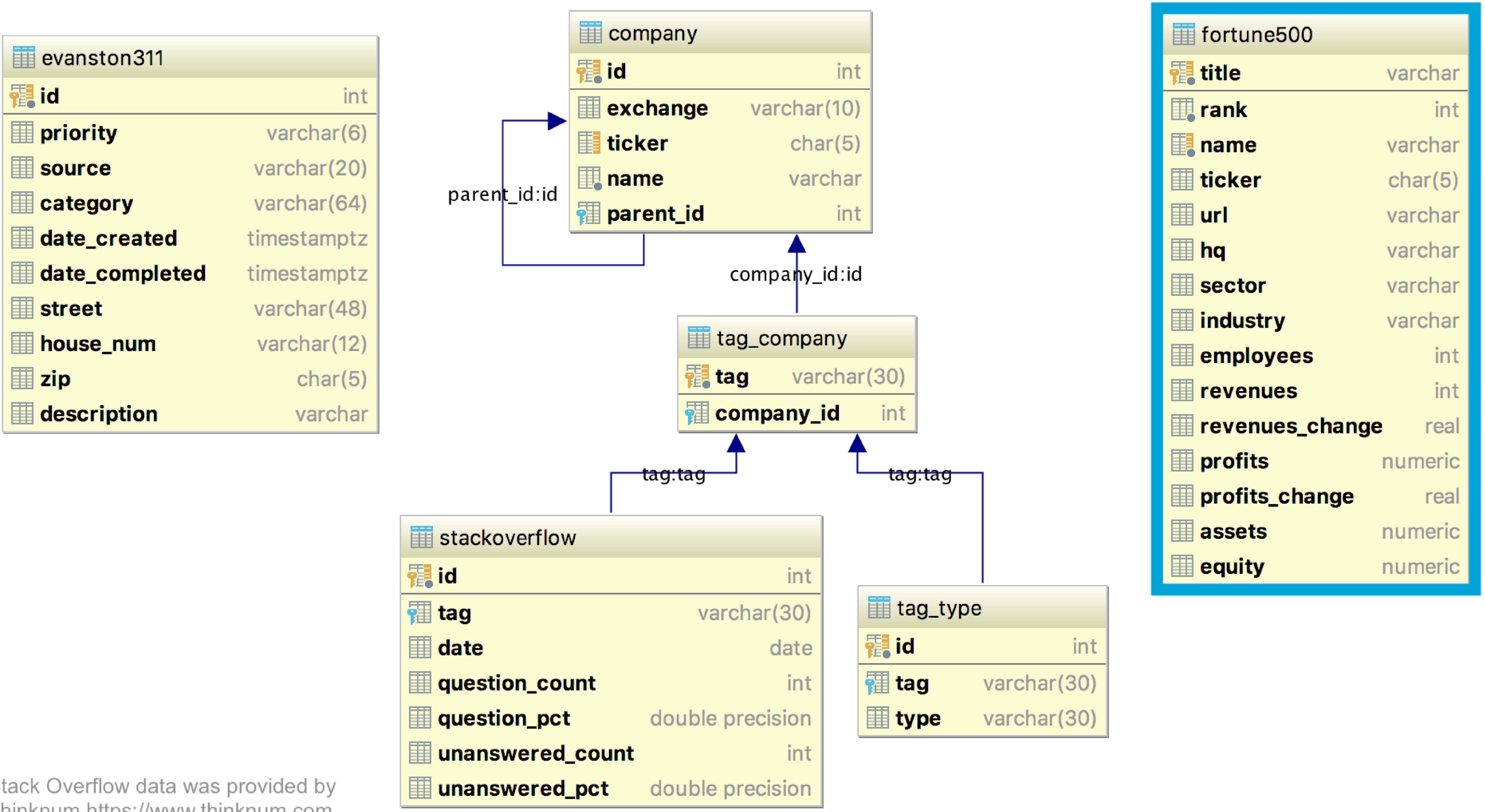

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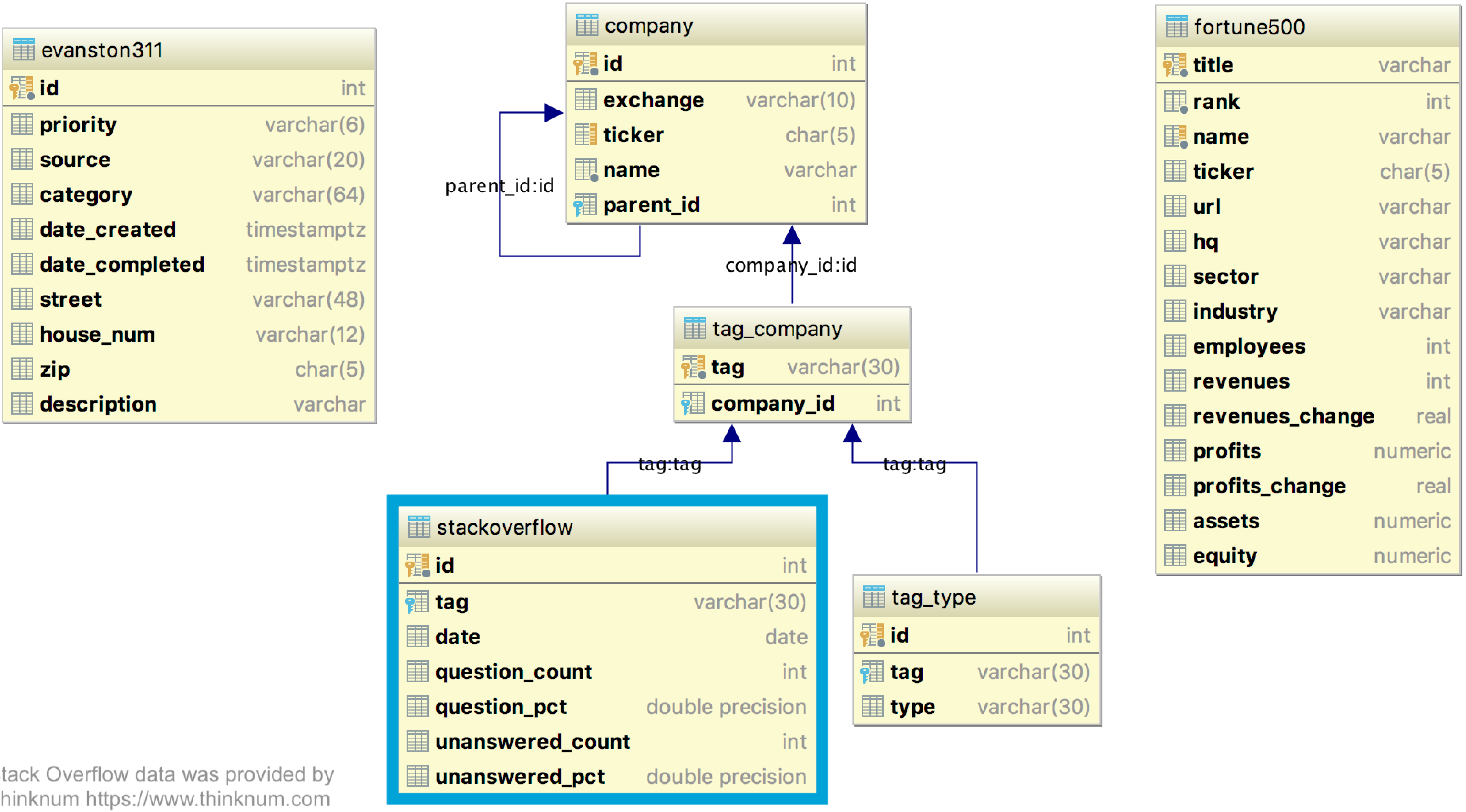

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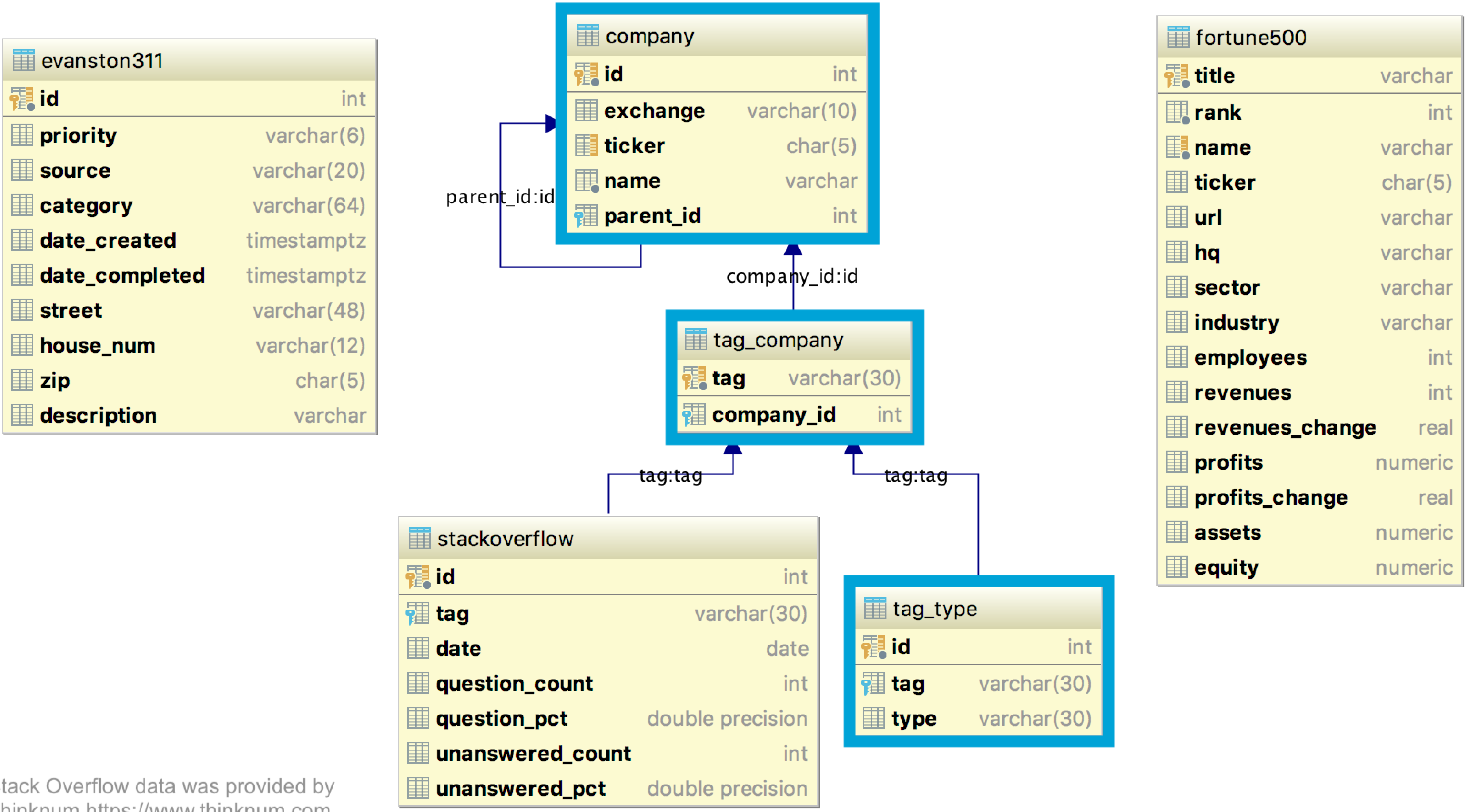

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Select a few rows

```
SELECT *
  FROM company
 LIMIT 5;
```

```
 id | exchange | ticker |         name          | parent_id
----+----------+--------+-----------------------+-----------
  1 | nasdaq   | PYPL   | PayPal Holdings, Inc. |
  2 | nasdaq   | AMZN   | Amazon.com, Inc.      |
  3 | nasdaq   | MSFT   | Microsoft Corporation |
  4 | nasdaq   | MDB    | MongoDB Inc.          |
  5 | nasdaq   | DBX    | Dropbox, Inc.         |
(5 rows)
```

A few reminders

Code	Note
`NULL`	missing

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`IS NULL` , `IS NOT NULL`	don't use `= NULL`

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`count(*)`	number of rows
`count(column_name)`	number of non- `NULL` values

A few reminders

Code	Note
`NULL`	missing
`IS NULL` , `IS NOT NULL`	don't use `= NULL`
`count(*)`	number of rows
`count(column_name)`	number of non- `NULL` values
`count(DISTINCT column_name)`	number of different non- `NULL` values

A few reminders

Code	Note
`NULL`	missing
`IS NULL` , `IS NOT NULL`	don't use `= NULL`
`count(*)`	number of rows
`count(column_name)`	number of non- `NULL` values
`count(DISTINCT column_name)`	number of different non- `NULL` values
`SELECT DISTINCT column_name ...`	distinct values, including `NULL`

Let's start exploring

EXPLORATORY DATA ANALYSIS IN SQL

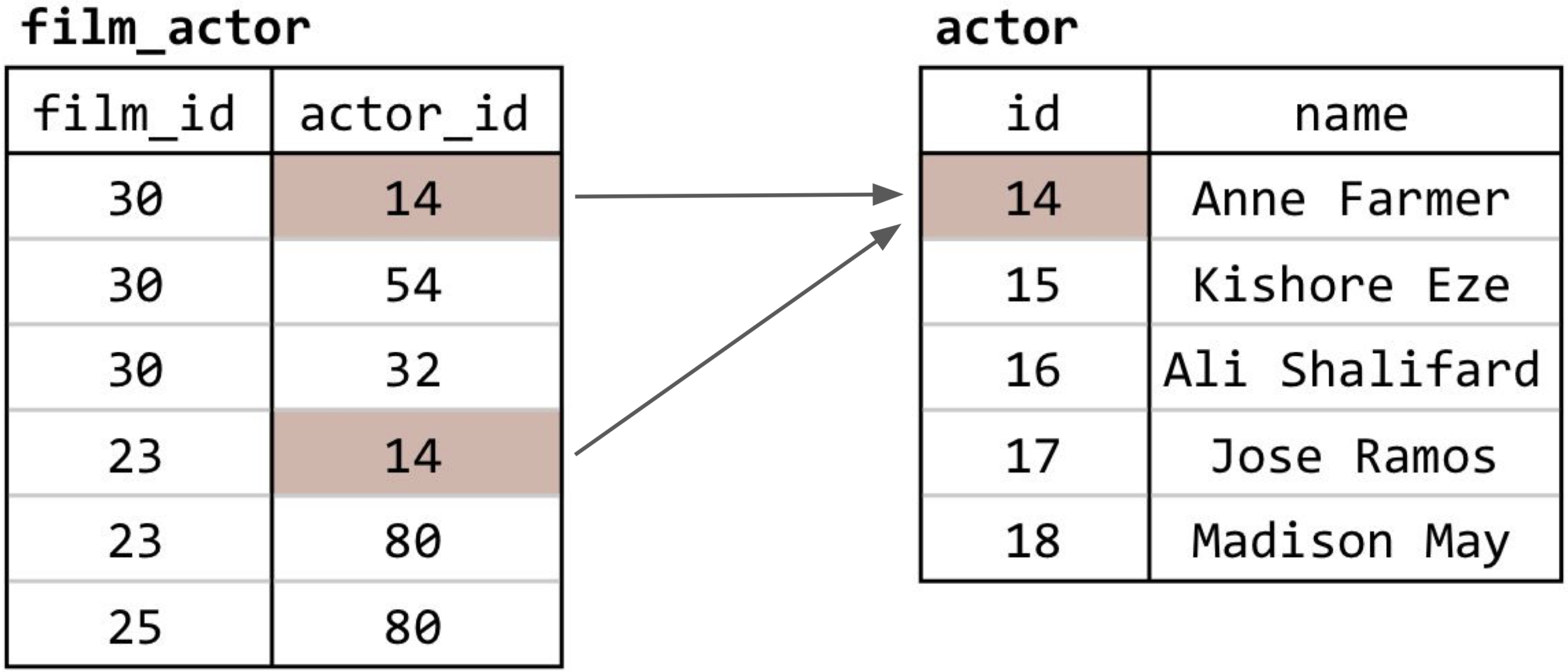
The keys to the database

EXPLORATORY DATA ANALYSIS IN SQL

SQL

Christina Maimone
Data Scientist

Foreign keys



film_actor

film_id	actor_id
30	14
30	54
30	32
23	14
23	80
25	80

actor

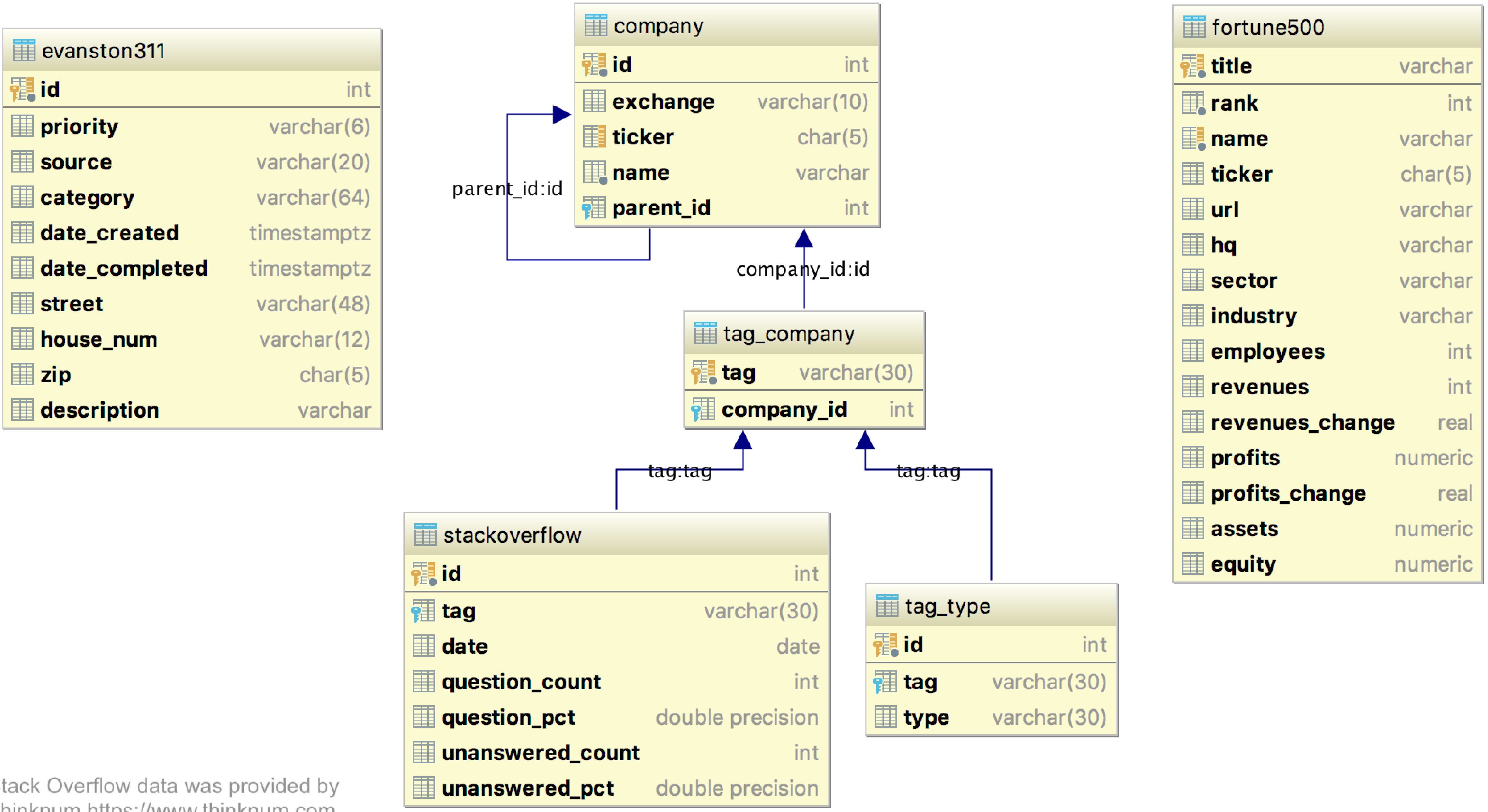
id	name
14	Anne Farmer
15	Kishore Eze
16	Ali Shalifard
17	Jose Ramos
18	Madison May

Foreign keys

- Reference another row
    - In a different table or the same table
    - Via a unique ID

        >> Primary key column containing unique, non-NULL values

- Values restricted to values in referenced column OR `NULL`



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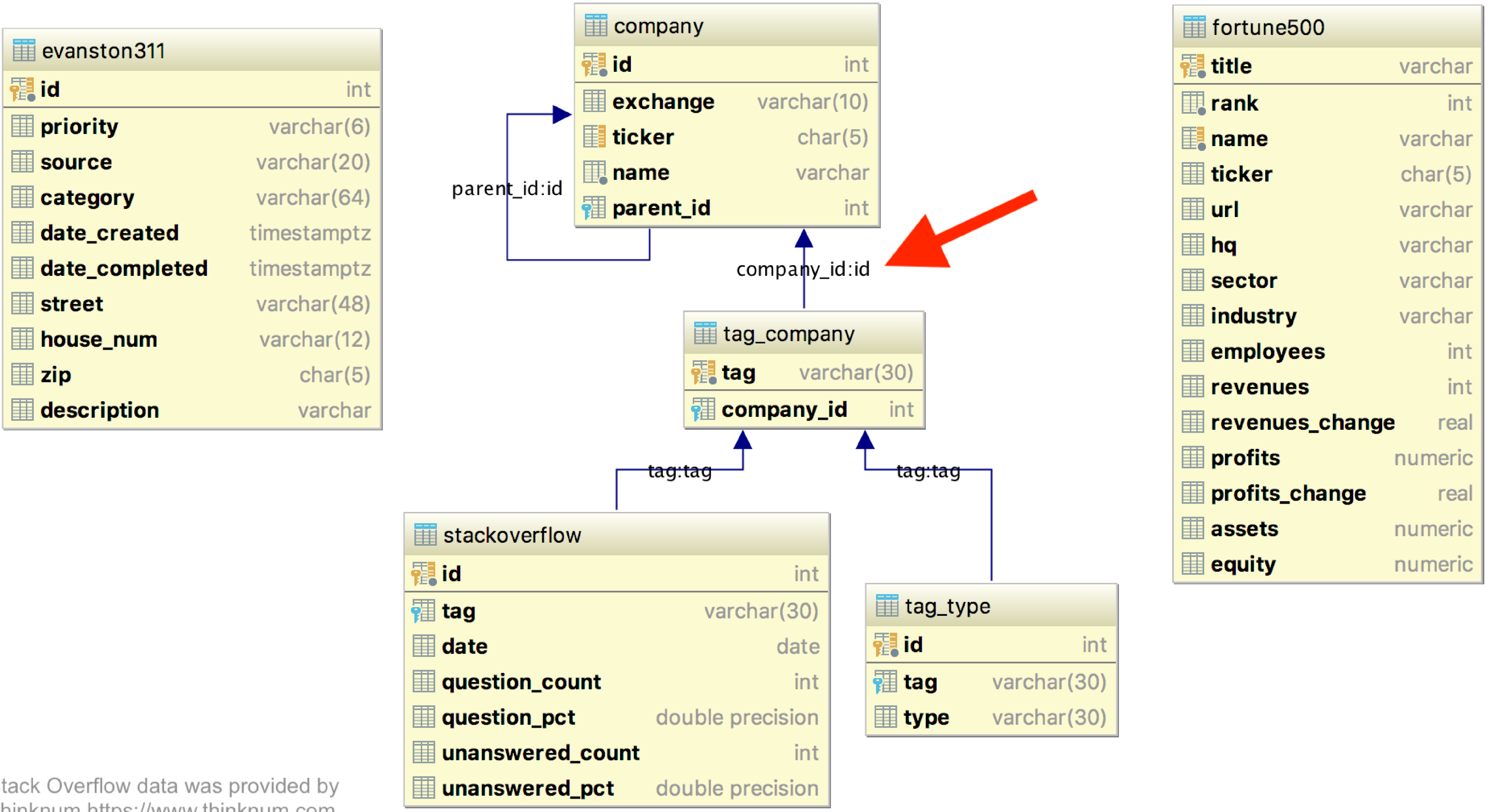

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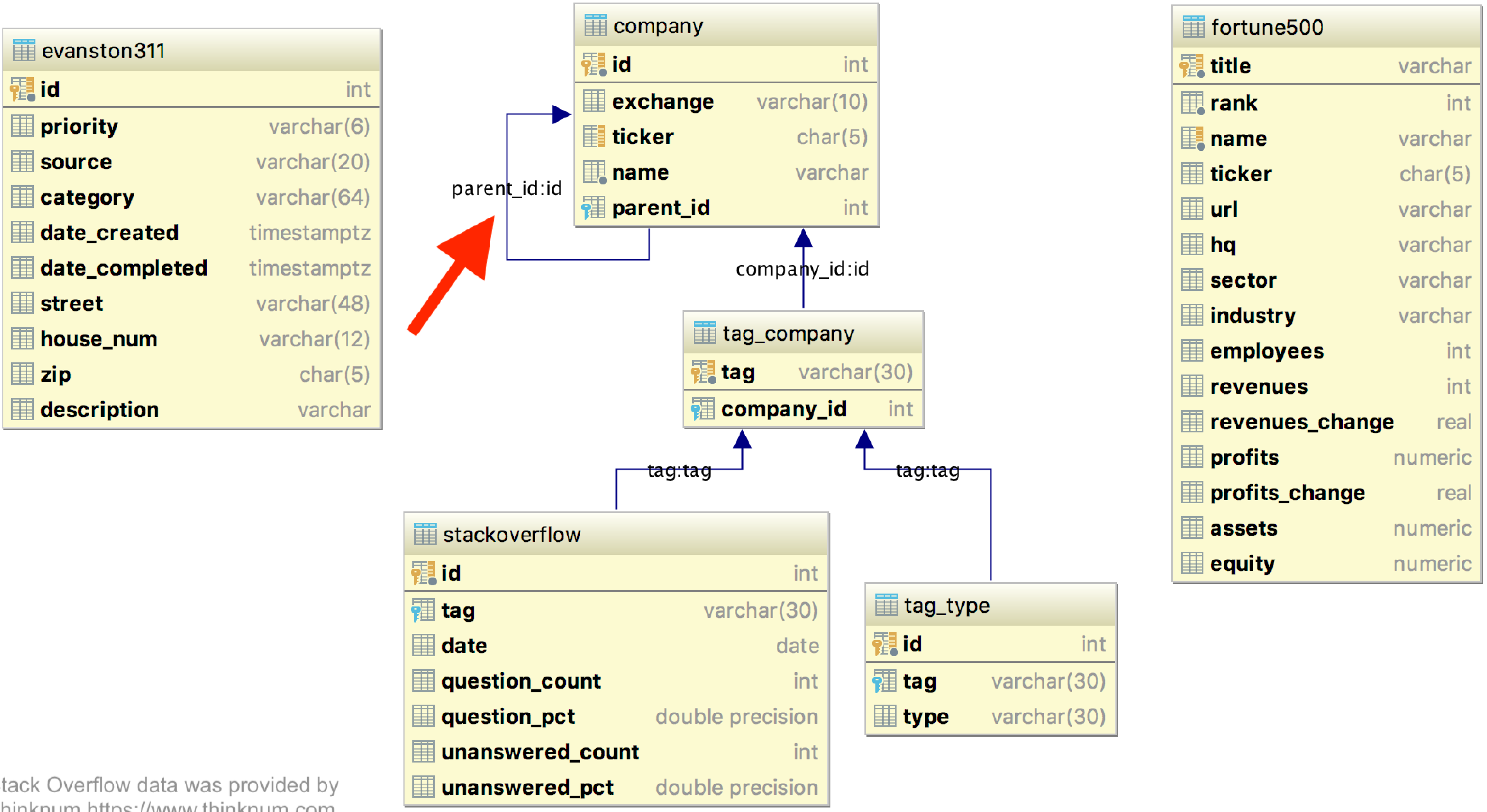

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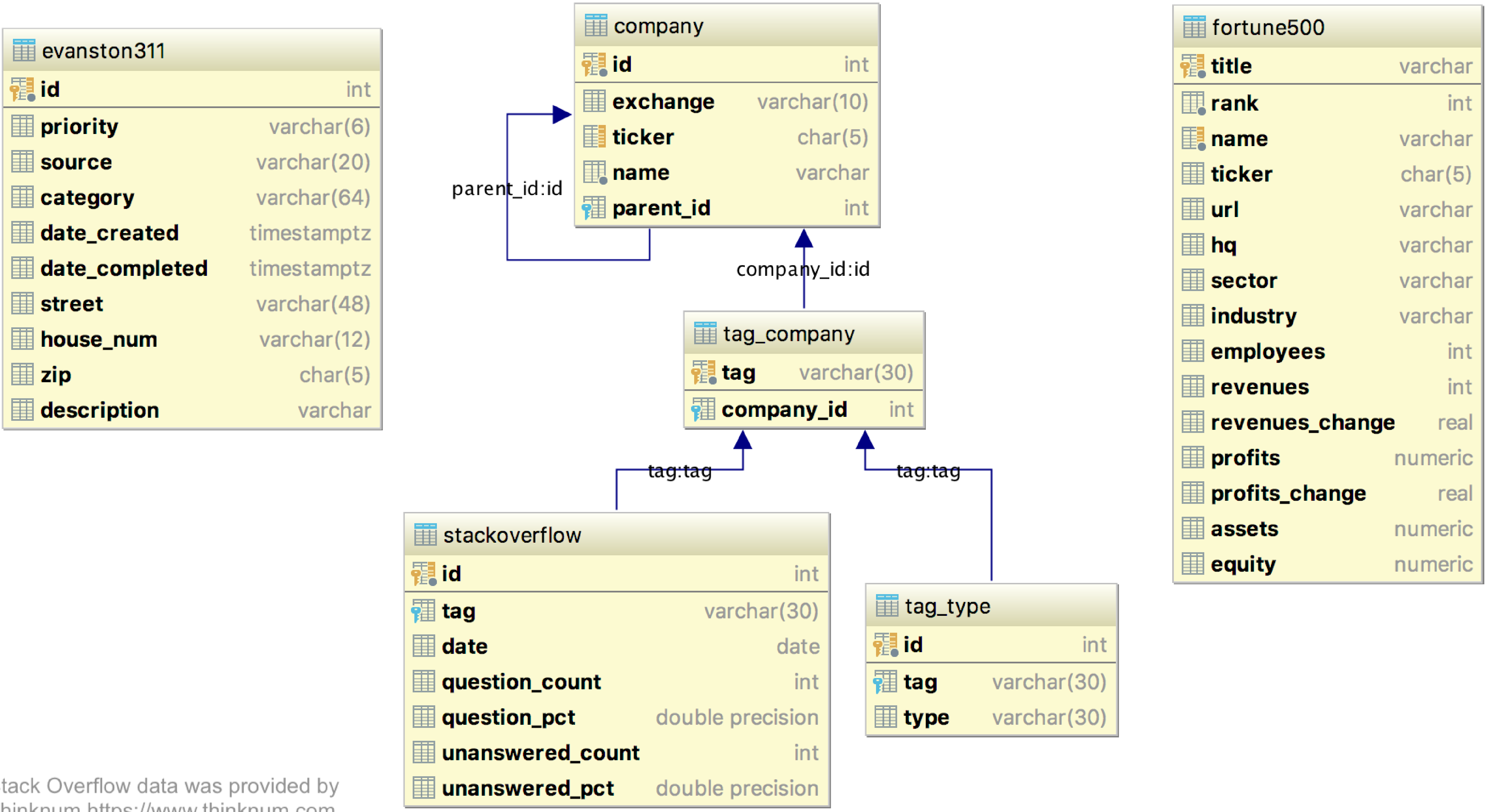

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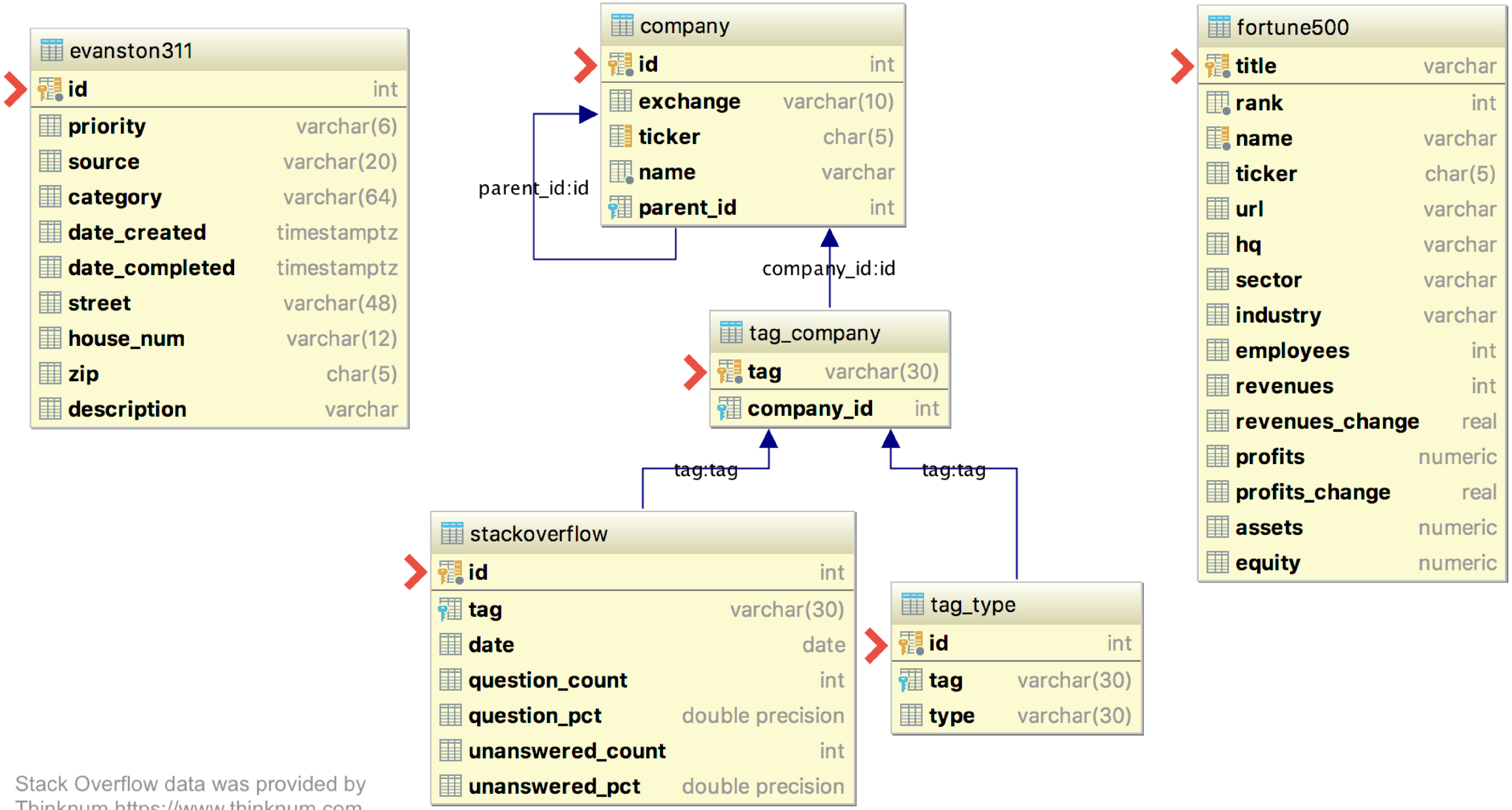

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Coalesce function

```
coalesce(value_1, value_2 [, ...])
```

- Operates row by row
- Returns first non-`NULL` value

Coalesce function

```sql
SELECT *
  FROM prices;
```

```
 column_1 | column_2
----------+----------
          |       10
          |
       22 |
        3 |        4
```

```sql
SELECT coalesce(column_1, column_2)
  FROM prices;
```

```
 coalesce
----------
       10

       22
        3
```

Time to keep exploring!

EXPLORATORY DATA ANALYSIS IN SQL

Column Types and Constraints

EXPLORATORY DATA ANALYSIS IN SQL

SQL

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Data Scientist

Column constraints

- **Foreign key:** value that exists in the referenced column, or NULL
- **Primary key:** unique, not `NULL`
- **Unique:** values must all be different except for `NULL`
- **Not null:** `NULL` not allowed: must have a value
- **Check constraints:** conditions on the values
  - `column1 > 0`
  - `columnA > columnB`

Data types

Common

- Numeric
- Character
- Date/Time
- Boolean

Special

- Arrays
- Monetary
- Binary
- Geometric
- Network Address
- XML
- JSON
- and more!

Numeric types: PostgreSQL documentation

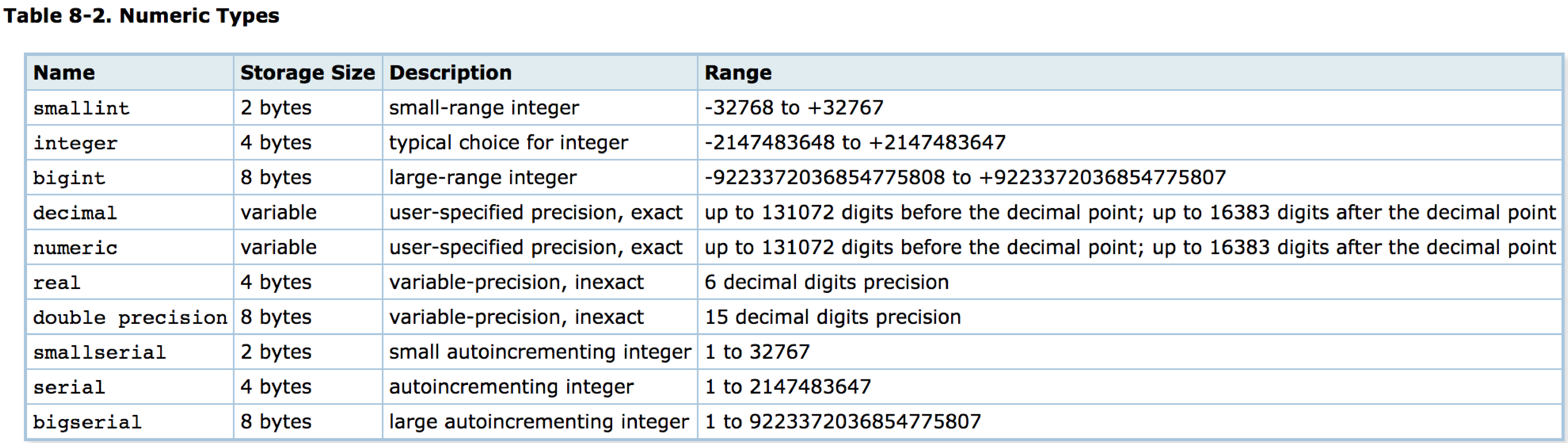
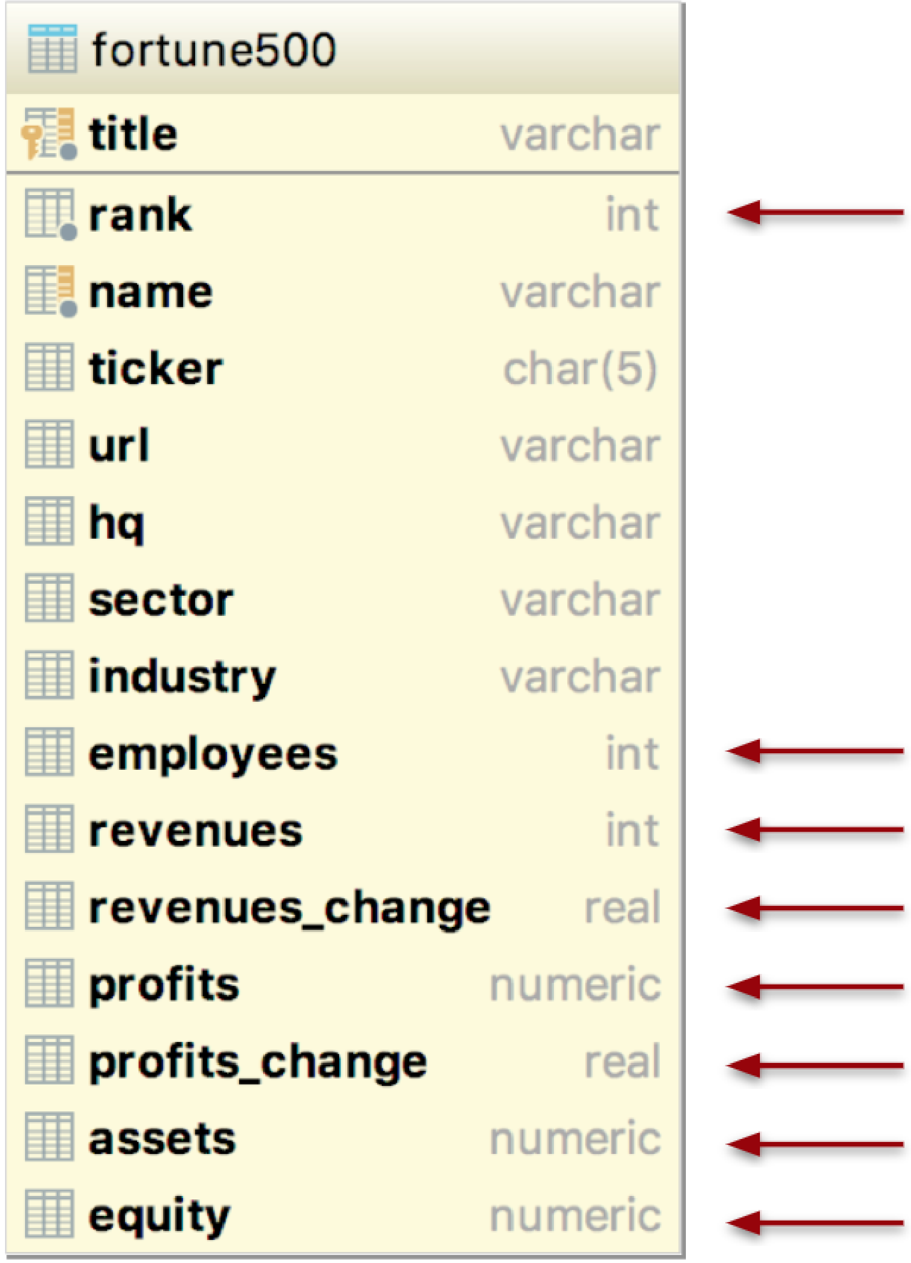


Table 8-2. Numeric Types

Name	Storage Size	Description	Range
`smallint`	2 bytes	small-range integer	-32768 to +32767
`integer`	4 bytes	typical choice for integer	-2147483648 to +2147483647
`bigint`	8 bytes	large-range integer	-9223372036854775808 to +9223372036854775807
`decimal`	variable	user-specified precision, exact	up to 131072 digits before the decimal point; up to 16383 digits after the decimal point
`numeric`	variable	user-specified precision, exact	up to 131072 digits before the decimal point; up to 16383 digits after the decimal point
`real`	4 bytes	variable-precision, inexact	6 decimal digits precision
`double precision`	8 bytes	variable-precision, inexact	15 decimal digits precision
`smallserial`	2 bytes	small autoincrementing integer	1 to 32767
`serial`	4 bytes	autoincrementing integer	1 to 2147483647
`bigserial`	8 bytes	large autoincrementing integer	1 to 9223372036854775807

Types in entity relationship diagrams



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Casting with CAST()

Format

```
-- With the CAST function
SELECT CAST (value AS new_type);
```

Examples

```
-- Cast 3.7 as an integer
SELECT CAST (3.7 AS integer);
```

```
4
```

```
-- Cast a column called total as an integer
SELECT CAST (total AS integer)
  FROM prices;
```

Casting with ::

Format

```sql
-- With :: notation
SELECT value::new_type;
```

Examples

```sql
-- Cast 3.7 as an integer
SELECT 3.7::integer;
```

```sql
-- Cast a column called total as an integer
SELECT total::integer
  FROM prices;
```

Time to practice!

EXPLORATORY DATA ANALYSIS IN SQL