

CUSTOM AGGREGATES

In PostgreSQL

A presentation by Georgios



WHO AM I

Georgios



Stockholm PostgreSQL

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CUSTOM AGGREGATES

WHY SHOULD I SEAT THROUGH THIS PRESENTATION?

- PostgreSQL is easily extendible. Creating custom types, functions, operators etc provide the user with considerable flexibility in order to solve her problems.
- Aggregates are very useful and most of the non default ones are provided by extensions: PL/R being an excellent example
- Writing a custom aggregate, can actually solve real world problems but it can also provide a window or entry point to understanding the extension mechanism of PostgreSQL

CUSTOM AGGREGATES

WHAT SHOULD I EXPECT TO GET OUT OF IT?

- An understanding of how to create a custom aggregate
- What transition states are and how they are used
- Moving windows functions
- If there is time doing it in C and creating an extension
- Some fun with queries

CUSTOM AGGREGATES

OUR SETTING ([POSTGRESQL], [13DEVEL])

```
-- create a table with some data
CREATE TABLE aggregate_test (
    id SERIAL PRIMARY KEY,
    value double precision DEFAULT NULL
);
```

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OUR SETTING ([POSTGRESQL], [13DEVEL])

```
-- insert some reproducible random-ish values
SELECT setseed(.123);
```

```
INSERT INTO aggregate_test (value)
SELECT
  CASE WHEN
    floor(random() * 10 + 1)::integer % 3 = 0
  THEN
    NULL
  ELSE
    (random() * 200) - 100
  END
FROM
  generate_series(0, 199);
```

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OUR SETTING ([POSTGRESQL], [13DEVEL])

-- vacuum the table

-- Is it needed?

-- What you think?

VACUUM (

 FULL,

 ANALYZE,

 VERBOSE

)

aggregate_test;

-- inspect the table

TABLE aggregate_test;

id	value
1	
2	-95.3091452171904
3	12.056912275934906
4	-76.61960380988972
5	61.12054683373458
<snip>	
197	34.27958598556131
198	
199	-59.02172978998621
200	24.800265582720016

(200 rows)

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LET US TRY TO PERFORM A CUMMULATIVE SUM

SELECT

 id,

 value,

 sum(value) OVER (ORDER BY id ASC) AS “Cummulative Sum”

FROM

 aggregate_test

ORDER BY

 id

 ASC;

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LET US TRY TO PERFORM A CUMMULATIVE SUM

id	value	Cummulative Sum
1		
2	-95.3091452171904	-95.3091452171904
3	12.056912275934906	-83.2522329412555
4	-76.61960380988972	-159.87183675114522
5	61.12054683373458	-98.75128991741065
<snip>		
197	34.27958598556131	423.9526809782127
198		423.9526809782127
199	-59.02172978998621	364.93095118822646
200	24.800265582720016	389.7312167709465
(200 rows)		

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LET US TRY TO PERFORM A CUMMULATIVE SUM AND STEP!!!

```
-- great, and the step?  
WITH cte AS (SELECT  
    id,  
    value,  
    sum(value) OVER (ORDER BY id ASC) AS "Cummulative Sum",  
    LAG(value, 1) OVER (ORDER BY id ASC) AS lag  
FROM  
    aggregate_test  
ORDER BY  
    id  
    ASC)  
SELECT id, value, "Cummulative Sum", value - lag AS step FROM cte;
```