Ausgewählte Systeme Postgres

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Agenda

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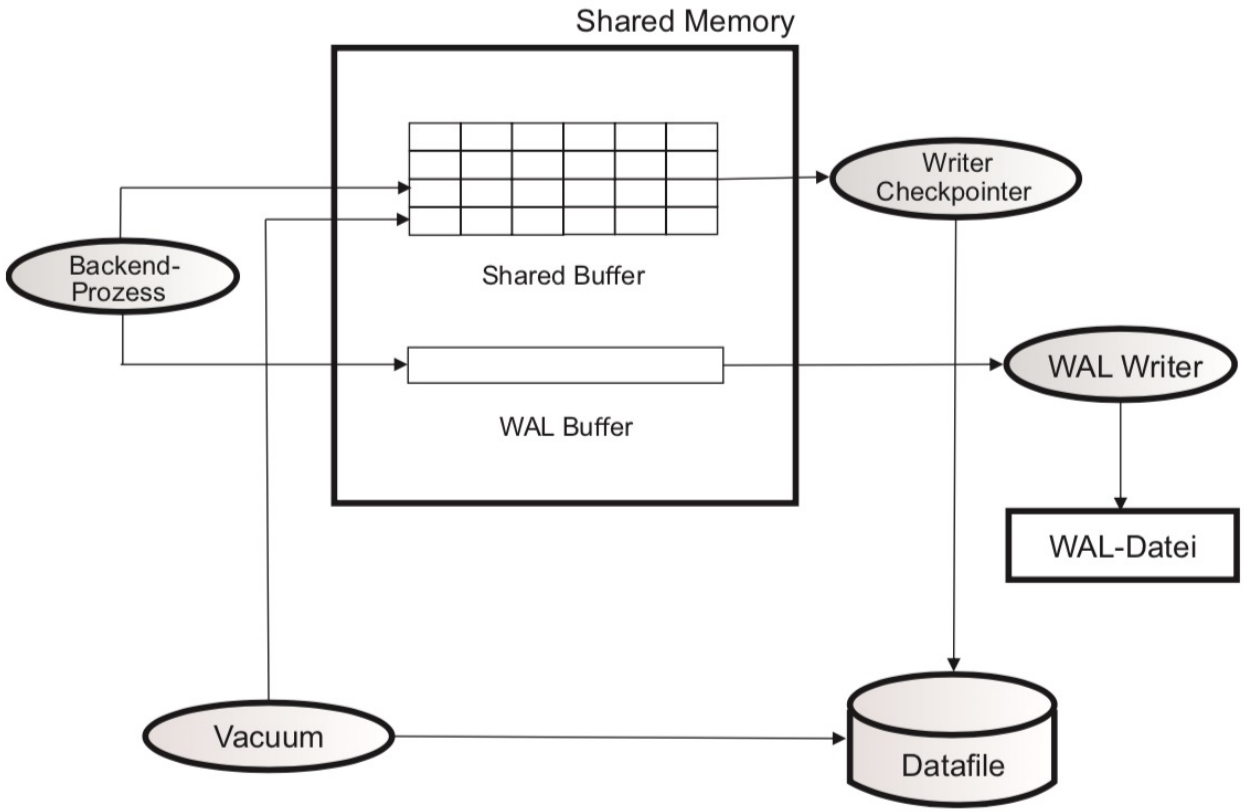
PostgreSQL Überblick

Postgres ist ein Datenbankmanagementsystem mit folgenden Eigenschaften :

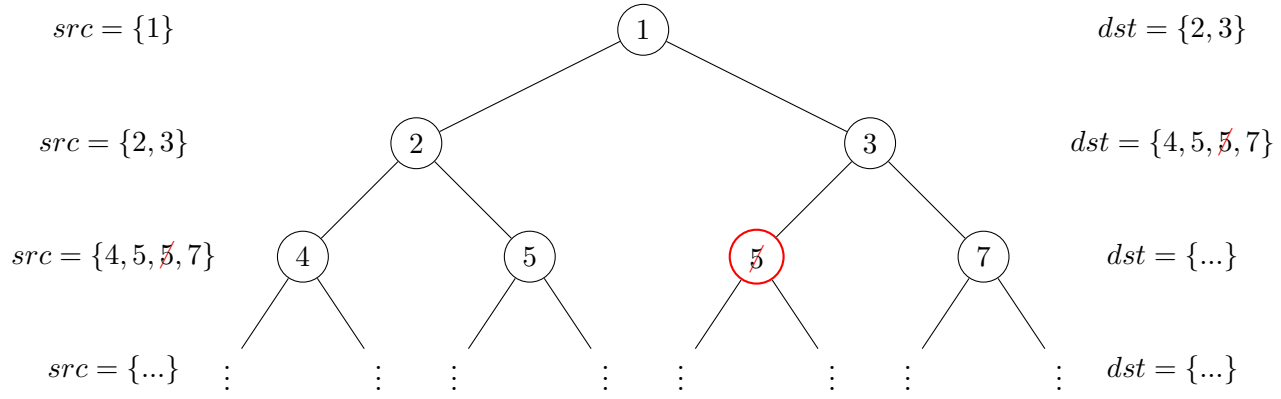
- Objektrelational
- ACID konform
- CRUD konform
- Hersteller: PostgreSQL Global Development Group, ursprünglich University of California
- Zielgruppe: Telekommunikationsunternehmen für Ordermanagement System.

Postgres Architektur



Konzepte für rekursive Anfragen

Nächste Seite



Listing 1: selectRecursive

```
SELECT DISTINCT(dst) FROM team22.relation_facebook WHERE src IN(
    SELECT DISTINCT(dst) FROM team22.relation_facebook WHERE src IN(
        SELECT DISTINCT(dst) FROM team22.relation_facebook WHERE src IN(1)
    )
)
```

Listing 2: selectWithJoin

```
SELECT DISTINCT(rf3.dst)
    FROM public.relation_facebook rf1,
        public.relation_facebook rf2,
        public.relation_facebook rf3
    WHERE rf2.src = rf1.dst
        AND rf3.src = rf2.dst
        AND rf1.src = 765;
```

Listing 3: StoredProcedure

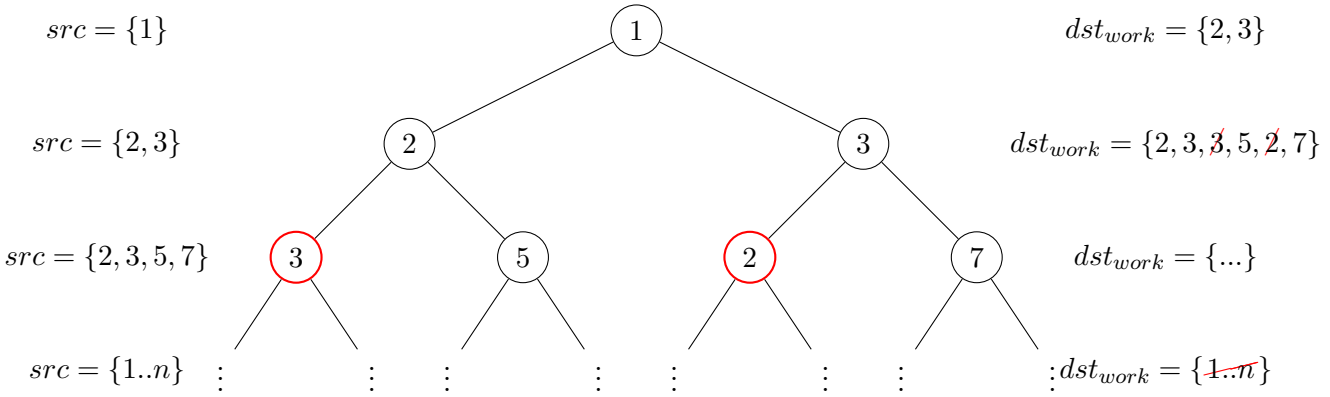
```
CREATE OR REPLACE FUNCTION recursivesearch(tInput integer[], iRecursionDepth integer, sTable text) RETURNS SETOF
    integer AS $$
    Declare
    intermDst_ integer[];
    iCount integer;
    BEGIN
    CREATE TABLE intermDst AS SELECT * FROM unnest(tInput);
    EXECUTE 'CREATE TABLE intermDst1 AS SELECT DISTINCT(dst) FROM ' || sTable || ' WHERE src IN (SELECT * FROM
        intermDst)';
    -- Does not return from function!
    return query SELECT * FROM intermDst1;
    -- Does not return from function!
    intermDst_ := ARRAY(SELECT * FROM intermDst1);
    raise notice 'timestamp: %', clock_timestamp();
    SELECT count(*) INTO iCount FROM intermDst;
    raise notice 'Count Table: %', iCount;
    DROP TABLE intermDst;
    DROP TABLE intermDst1;
    if iRecursionDepth > 1 THEN
    return query SELECT * FROM recursivesearch(intermDst_, iRecursionDepth - 1, sTable);
    ELSE
    RETURN;
    END IF;
    END;
$$ LANGUAGE plpgsql;
```

Listing 4: innerJoinSourceCodeGenerator

```
CREATE OR REPLACE FUNCTION innerJoinSourceCodeGenerator(iRecursionDepth integer, sTable text) RETURNS SETOF integer
     AS $$
Declare
intermDst_ integer[];
iCount integer;
tStatement text;
tSelectStatement text;
tConcatenateStatement text;
tAlternativeStatement text;
tWhereStatement text;
tFinalStatement text;
BEGIN
iCount = 0;
tSelectStatement = '';
tWhereStatement = '';
tConcatenateStatement := 'SELECT DISTINCT(dst) FROM ' || sTable || ' WHERE src IN(';
tStatement := sTable || ' rf';
tAlternativeStatement = sTable || ' rf';
--    iCount = 0;
if iRecursionDepth = 0 THEN
raise notice 'Rekursivtiefe von 0 nicht m glich';
RETURN ;
end if;
if iRecursionDepth = 1 THEN
tConcatenateStatement = tConcatenateStatement || '765' || ')';
return query EXECUTE tConcatenateStatement;
RETURN;
end if;
WHILE iCount < iRecursionDepth LOOP
if iCount = iRecursionDepth - 1 then
tSelectStatement := tSelectStatement || tStatement  || iCount || ' ';
else
tSelectStatement := tSelectStatement || tStatement  || iCount || ', ';
end if;
if iCount != 0 then
if iCount = iRecursionDepth - 1 then
tWhereStatement := tWhereStatement || 'rf' || iCount || '.src = rf' || iCount - 1 || '.dst ';
else
tWhereStatement := tWhereStatement || 'rf' || iCount || '.src = rf' || iCount - 1 || '.dst AND ';
end if;
else
tWhereStatement := 'rf' || iCount || '.src = 765 AND ' ;
end if;
iCount = iCount + 1;
end loop;
tWhereStatement := 'WHERE ' || tWhereStatement;
tSelectStatement := 'FROM ' || tSelectStatement;
tFinalStatement = 'SELECT DISTINCT(rf'||iRecursionDepth - 1 || '.dst) ' || tSelectStatement || tWhereStatement;
raise notice 'FROM Statement: %', tSelectStatement;
raise notice 'Where Statement: %', tWhereStatement;
raise notice 'Finale Statement: %', tFinalStatement;
return query EXECUTE tFinalStatement;
END;
$$ LANGUAGE plpgsql;
```

Listing 5: selectSourceCodeGenerator

```
CREATE OR REPLACE FUNCTION selectSourceCodeGenerator(iRecursionDepth integer, sTable text) RETURNS SETOF integer AS
    $$
Declare
intermDst_ integer[];
iCount integer;
tStatement text;
tConcatenateStatement text;
BEGIN
tConcatenateStatement := 'SELECT DISTINCT(dst) FROM ' || sTable || ' WHERE src IN(';
tStatement := 'SELECT DISTINCT(dst) FROM ' || sTable || ' WHERE src IN(765)';
--   iCount = 0;
if iRecursionDepth = 0 THEN
return query EXECUTE tStatement;
RETURN;
end if;
WHILE iRecursionDepth > 0 LOOP
tStatement := tConcatenateStatement || tStatement ||')';
iRecursionDepth = iRecursionDepth - 1;
end loop;
raise notice 'Execute String %', tStatement;
return query EXECUTE tStatement;
END;
$$ LANGUAGE plpgsql;
```



Listing 6: selectWithUnion

```
WITH RECURSIVE graphtraverse AS(
    SELECT DISTINCT(dst)
        FROM
            public.relation_facebook
        WHERE
            src =765
    UNION
    SELECT p.dst
        FROM
            relation_facebook p
        WHERE
            src IN ( p.src )
    )
SELECT * FROM graphtraverse
```

pgBench

- Tool zur Durchführung von Benchmark-Tests
- Bei einem Benchmark-Test wird eine Menge von SQL-Statements beliebig oft wiederholt.
- pgBench berechnet die Anzahl der Transaktionen pro Sekunde

Messergebnisse pgBench