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Using Match with Multiple Clauses Causes Odd Results

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I am writing a Cypher query in Neo4j 2.0.4 that attempts to get the total number of inbound and outbound relationships for a selected node. I can do this easily when I only use this query one-node-at-a-time, like so:



2

MATCH (g1:someIndex{name:"name1"})
MATCH g1-[r1]-()
RETURN count(r1);
//Returns 305

MATCH (g2:someIndex{name:"name2"})
MATCH g2-[r2]-()
RETURN count(r2);
//Returns 2334

But when I try to run the query with 2 nodes together (i.e. get the total number of relationships for both g1 and g2), I seem to get a *bizarre* result.

MATCH (g1:someIndex{name:"name1"}), (g2:someIndex{name:"name2"})
MATCH g1-[r1]-(), g2-[r2]-()
RETURN count(r1)+count(r2);
//Returns 1423740

For some reason, the number is much much greater than the total of 305+2334.

It seems like other Neo4j users have run into strange issues when using multiple MATCH clauses, so I read through Michael Hunger's explanation at

https://groups.google.com/d/msg/neo4j/7ePLU8y93h8/8jpuopsFEFsJ, which advised Neo4j users to pipe the results of one match using WITH to avoid "identifier uniqueness". However, when I run the following query, it simply times out:

```
MATCH (g1:gene{name:"SV422_HUMAN"}),(g2:gene{name:"BRCA1_HUMAN"})
MATCH g1-[r1]-()
WITH r1
MATCH g2-[r2]-()
RETURN count(r1)+count(r2);
```

I suspect this query doesn't return because there's a lot of records returned by r1. In this case, how would I operate my "get-number-of-relationships" query on 2 nodes? Am I just using some incorrect syntax, or is there some fundamental issue with the logic of my "2 node at a time" query?

neo4j cypher

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asked Apr 3 at 15:59

Shrey Gupta

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2 Answers



MATCH (g1:someIndex{name:"name1"}), (g2:someIndex{name:"name2"})

Your first problem is that you are returning a Cartesian product when you do this:

MATCH (g1:someIndex{name:"name1"}), (g2:someIndex{name:
MATCH g1-[r1]-(), g2-[r2]-()
RETURN count(r1)+count(r2);

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If there are 305 instances of r1 and 2334 instances of r2 , you're returning (305 * 2334) == 711870 rows, and because you are summing this (count(r1)+count(r2)) you're getting a total of 711870 + 711870 == 1423740.

Your second problem is that you are not carrying over g2 in the WITH clause of this query:

```
MATCH (g1:gene{name:"SV422_HUMAN"}),(g2:gene{name:"BRCA1_HUMAN"})
MATCH g1-[r1]-()
WITH r1
MATCH g2-[r2]-()
RETURN count(r1)+count(r2);
```

You match on g2 in the first MATCH clause, but then you leave it behind when you only carry over r1 in the WITH clause at line 3. Then, in line 4, when you match on g2-[r2]-() you are matching literally everything in your graph, because g2 has been unbound.

Let me walk through a solution with the movie dataset that ships with the Neo4j browser, as you have not provided sample data. Let's say I want to get the total count of relationships attached to Tom Hanks and Hugo Weaving.

As separate queries:

.........,,

```
MATCH (:Person {name:'Tom Hanks'})-[r]-()
RETURN COUNT(r)
```

=> 13

```
MATCH (:Person {name:'Hugo Weaving'})-[r]-()
RETURN COUNT(r)
=> 5
```

If I try to do it your way, I'll get (13 * 5) * 2 == 90, which is incorrect:

=> 90

Again, this is because I've matched on all combinations of r1 and r2, of which there are 65 (13 * 5 == 65) and then summed this to arrive at a total of 90 (65 + 65 == 90).

The solution is to use DISTINCT:

=> 18

Clearly, the DISTINCT modifier only counts the distinct instances of each entity.

You can also accomplish this with WITH if you wanted:

```
MATCH (:Person {name:'Tom Hanks'})-[r]-()
WITH COUNT(r) AS r1
MATCH (:Person {name:'Hugo Weaving'})-[r]-()
RETURN r1 + COUNT(r)
```

=> 18

TL;DR - Beware of Cartesian products. DISTINCT is your friend:

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```
answered Apr 3 at 16:40

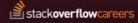
Nicole White

3,059 • 4 • 15
```

Thank you Nicole! I had no clue that my current query was using a cross product; that makes a lot more sense now. – Shrey Gupta Apr 3 at 16:42

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The explosion of results you're seeing can be easily explained:



```
MATCH (g1:someIndex{name:"name1"}), (g2:someIndex{name:"name2"})
MATCH g1-[r1]-(), g2-[r2]-()
RETURN count(r1)+count(r2);
//Returns 1423740
```

In the 2nd line every combination of any relationship from g1 is combined with any relationship of g2 , this explains the number since 1423740 = 305 * 2334 * 2. So you're evaluating basically a cross product here.

The right way to calculate the sum of all relationships for name1 and name2 is:

```
MATCH (g:someIndex)-[r]-()
WHERE g.name in ["name1", "name2"]
RETURN count(r)
```

share improve this answer



Thank you Stefan! This makes sense now. +1 - Shrey Gupta Apr 3 at 20:45

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