Cypher query tuning : How to avoid lot of locking

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Locking on relationship updates

Prior to 4.3, neo4j obtained a lock on nodes when

- Creating a relationship
- Deleting a relationship
- Merging a relationship

Neo4j 4.3 and later, neo4j obtained a lock on nodes when

- Merging a relationship
- Fine grained relationship chain locking on create or delete

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Merge relationship acquires an exclusive lock on nodes

Cypher - Neoj 4.4

```
MATCH (person:Person {id : 1})
MATCH (prod:Product {id :1})
MERGE (person)-[r:BOUGHT]->(prod)
WITH * call apoc.util.sleep(200000)
RETURN person, r, prod
```

List of locks acquired

```
neo4j$ CALL dbms.listActiveLocks("query-23284")
```

	mode	resourceType	resourceId
1	"EXCLUSIVE"	"NODE"	2
2	"EXCLUSIVE"	"NODE"	10000001
3	"SHARED"	"INDEX_ENTRY"	1856812472073455400
4	"SHARED"	"INDEX_ENTRY"	2485248069970693063
5	"SHARED"	"LABEL"	2
6	"SHARED"	"LABEL"	3
7	"SHARED"	"RELATIONSHIP_TYPE"	9223372036854775807
8	"SHARED"	"RELATIONSHIP_TYPE"	9
9	"EXCLUSIVE"	"NODE_RELATIONSHIP_GROUP_DELETE"	2
10	"EXCLUSIVE"	"NODE_RELATIONSHIP_GROUP_DELETE"	10000001
11	"SHARED"	"DEGREES"	2
12	"SHARED"	"DEGREES"	10000001

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CREATE relationship doesn’t lock on nodes

Cypher - Neoj 4.4

```
MATCH (person:Person {id : 1})
MATCH (prod:Product {id :1})
OPTIONAL MATCH (person)-[r:BOUGHT]->(prod)
WITH *, CASE WHEN r IS NULL THEN [1] ELSE [] END as relCol
FOREACH (x IN relCol |
CREATE (person)-[:BOUGHT]->(prod)
)
WITH * call apoc.util.sleep(200000)
RETURN person, r, prod
```

List of locks acquired

```
4j$ CALL dbms.listActiveLocks("query-23296")
```

	mode	resourceType	resourceId
1	"SHARED"	"INDEX_ENTRY"	1856812472073455400
2	"SHARED"	"INDEX_ENTRY"	2485248069970693063
3	"SHARED"	"LABEL"	2
4	"SHARED"	"LABEL"	3
5	"SHARED"	"RELATIONSHIP_TYPE"	9223372036854775807
6	"SHARED"	"RELATIONSHIP_TYPE"	9
7	"SHARED"	"NODE_RELATIONSHIP_GROUP_DELETE"	2
8	"SHARED"	"NODE_RELATIONSHIP_GROUP_DELETE"	10000001
9	"SHARED"	"DEGREES"	2
10	"SHARED"	"DEGREES"	10000001

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Same output different versions

MERGE Relationship

```
MATCH (person:Person {id : 1})
MATCH (prod:Product {id :1})
MERGE (person)-[r:BOUGHT]->(prod)
WITH * call apoc.util.sleep(200000)
RETURN person, r, prod
```

CREATE Relationship

```
MATCH (person:Person {id : 1})
MATCH (prod:Product {id :1})
OPTIONAL MATCH (person)-[r:BOUGHT]->(prod)
WITH *, CASE WHEN r IS NULL THEN [1] ELSE [] END
as relCol
FOREACH (x IN relCol |
CREATE (person)-[:BOUGHT]->(prod)
)
WITH * call apoc.util.sleep(200000)
RETURN person, r, prod
```

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Live Demo

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