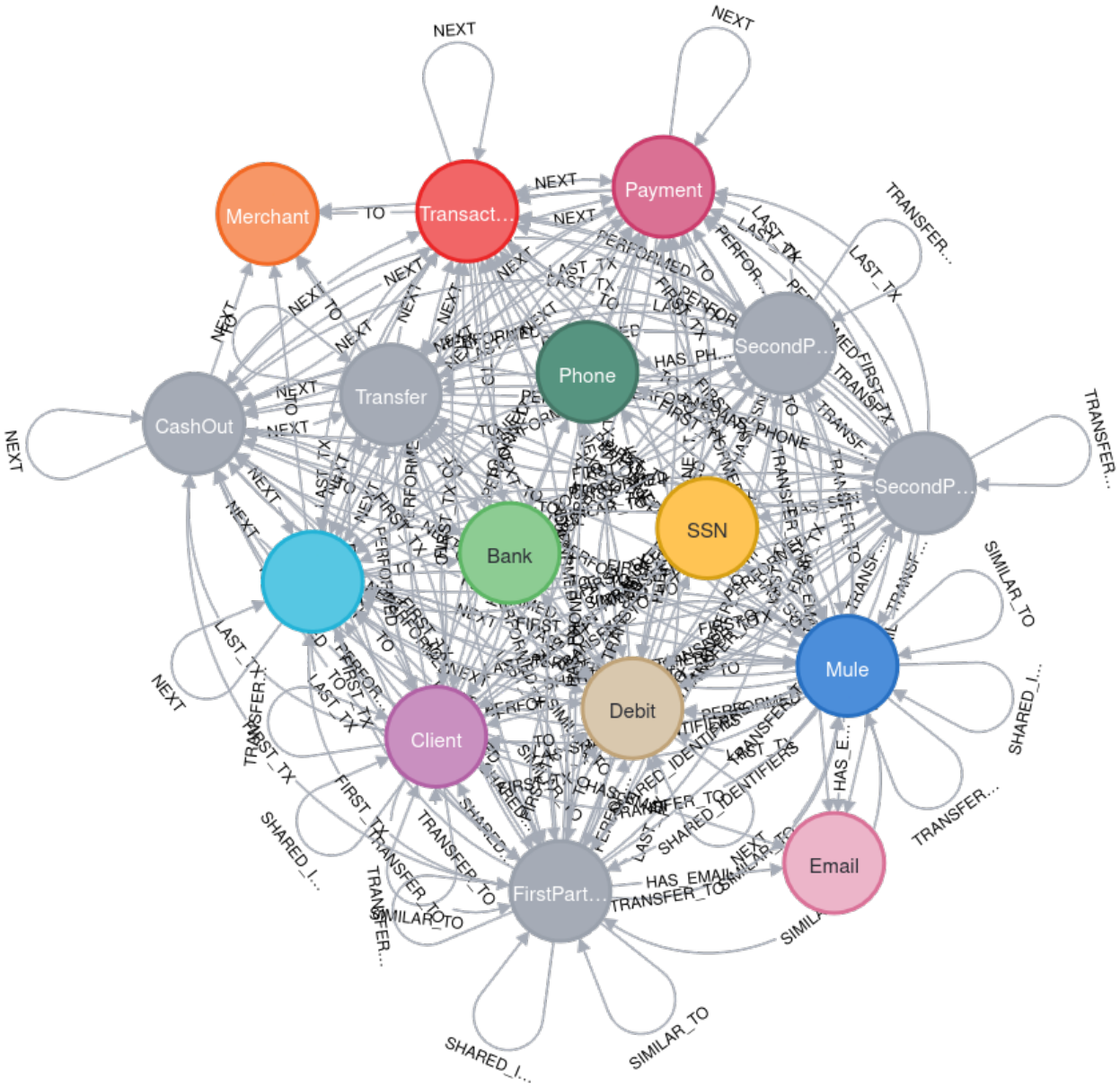
Analyse the Fraud Detection dataset including

1. Schema visualization

Command:

```
CALL db.schema.visualization()
```



Output:

2. Node count

Command:

```
MATCH (n)
RETURN count(n)
```

Output:

count(n)
332973

3. Relationship count

Command:

```
MATCH ()-[r]→()
RETURN count(r)
```

Output:

count(r)
980098

4. Node labels and their count

Command:

```
CALL db.labels() YIELD label
CALL apoc.cypher.run('MATCH (:`'+label+'`) RETURN count(*) as count', {})
YIELD value
RETURN label as Label, value.count AS Count
```

Output:

Label	Count
"Client"	2433
"Bank"	3
"Merchant"	347
"Mule"	433
"CashIn"	149037
"CashOut"	76023
"Debit"	4392

"Payment"	74577
"Transfer"	19460
"Transaction"	323489
"Email"	2229
"SSN"	2238
"Phone"	2234

5. Relationship types and their count

Command:

```
MATCH ()-[r]→()
RETURN TYPE(r) AS type, COUNT(relationship) AS count
ORDER BY count DESC;
```

Output:

type	value.count
"PERFORMED"	323489
"TO"	323489
"HAS_SSN"	2433
"HAS_EMAIL"	2433
"HAS_PHONE"	2433
"FIRST_TX"	2332
"LAST_TX"	2332
"NEXT"	321157

5: Find out what types of transactions do these Clients perform with first party fraudsters?

Command:

```
MATCH (:Client:FirstPartyFraudster)-[]-(txn:Transaction)-[]-(c:Client)
WHERE NOT c:FirstPartyFraudster
UNWIND labels(txn) AS transactionType
RETURN transactionType, count(*) AS freq
```

Spark log:

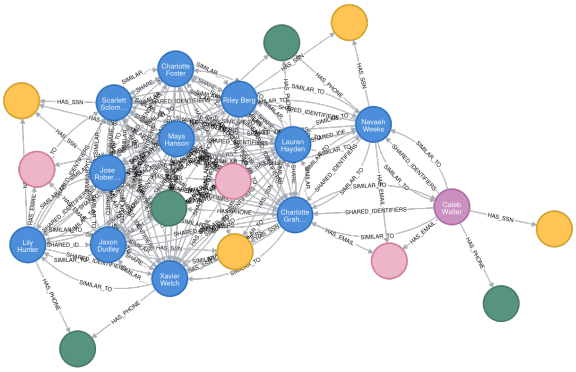
```
+---------------+----+
|transactionType|freq|
+---------------+----+
|       Transfer|  89|
|    Transaction|  89|
+---------------+----+
```

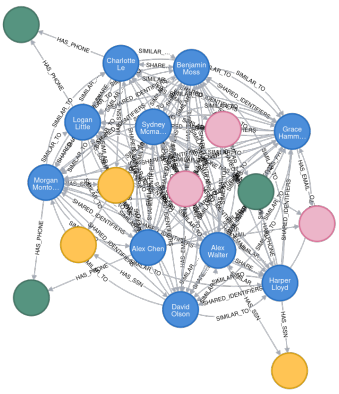
See code at spark/src/main/scala/Neo4jToSpark.scala.

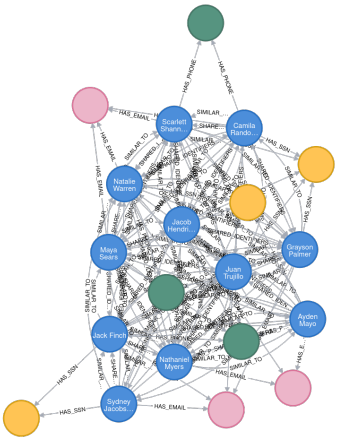
6: How many clusters of FraudRings with greater than 9 client nodes?

Command:

```
MATCH (c:Client)
WITH c.firstPartyFraudGroup AS fpGroupID, collect(c.id) AS fGroup
WITH *, size(fGroup) AS groupSize WHERE groupSize > 9
WITH collect(fpGroupID) AS fraudRings
MATCH p=(c:Client)-[:HAS_SSN|HAS_EMAIL|HAS_PHONE]→()
WHERE c.firstPartyFraudGroup IN fraudRings
RETURN p
```







Graph:

Command for number of groups:

```
MATCH (c:Client)
WITH c.firstPartyFraudGroup AS fpGroupID, collect(c.id) AS fGroup
WITH *, size(fGroup) AS groupSize WHERE groupSize > 9
WITH collect(fpGroupID) AS fraudRings
MATCH p=(c:Client)-[:HAS_SSN|HAS_EMAIL|HAS_PHONE]→()
WHERE c.firstPartyFraudGroup IN fraudRings
RETURN count(DISTINCT c.firstPartyFraudGroup) as groupCount
```

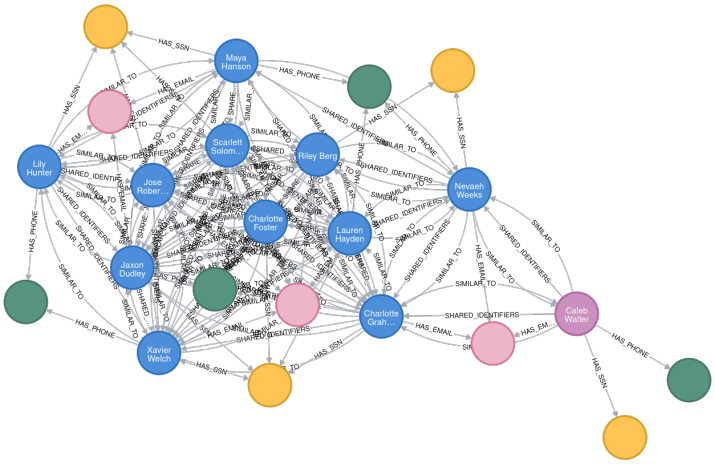
Output:

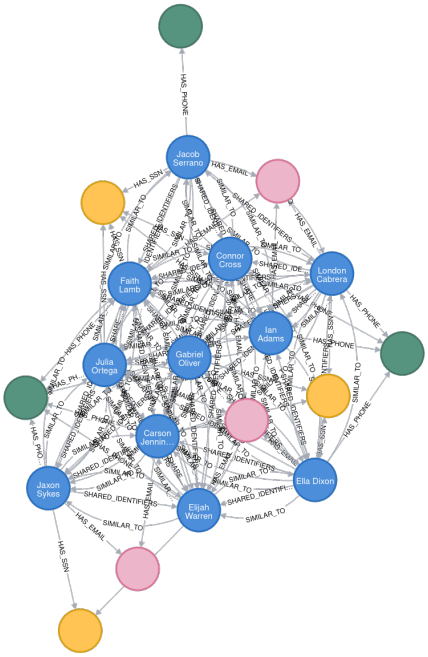
groupCount
5

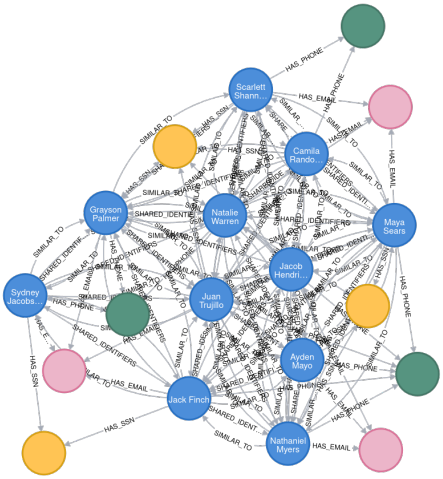
7: How many clusters of FraudRings with greater than 10 client nodes?

Command:

```
MATCH (c:Client)
WITH c.firstPartyFraudGroup AS fpGroupID, collect(c.id) AS fGroup
WITH *, size(fGroup) AS groupSize WHERE groupSize > 10
WITH collect(fpGroupID) AS fraudRings
MATCH p=(c:Client)-[:HAS_SSN|HAS_EMAIL|HAS_PHONE]→()
WHERE c.firstPartyFraudGroup IN fraudRings
RETURN p
```







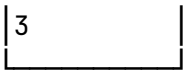
Graph:

Command for number of groups:

```
MATCH (c:Client)
WITH c.firstPartyFraudGroup AS fpGroupID, collect(c.id) AS fGroup
WITH *, size(fGroup) AS groupSize WHERE groupSize > 10
WITH collect(fpGroupID) AS fraudRings
MATCH p=(c:Client)-[:HAS_SSN|HAS_EMAIL|HAS_PHONE]→()
WHERE c.firstPartyFraudGroup IN fraudRings
RETURN count(DISTINCT c.firstPartyFraudGroup) as groupCount
```

Output:

```
╒═══════════╕
│groupCount│
╞═══════════╡
```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