

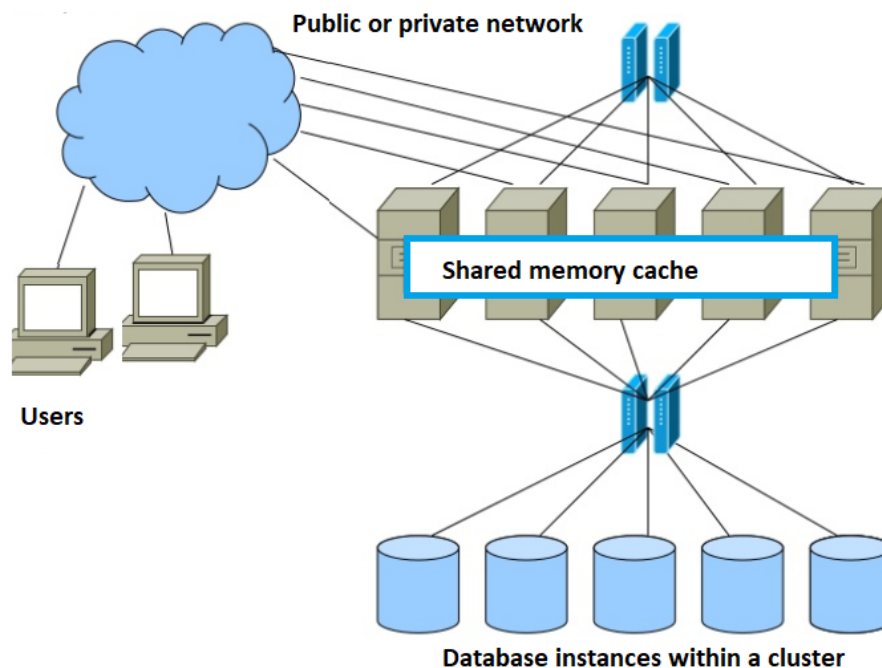


Exercise: Use Case 3

An example of a proposed solution

1. Typical architecture according to the type of information system

Propose a Typical architecture of a distributed parallel cluster environment



2. Kind of database to implement and its design

Propose a NoSQL graph database that supports ACID transactions

Characteristics of the graph data model:

Graph databases can help find credit card thieves faster.

By representing transactions as a graph, we can look for the common denominator in the fraud cases and find the point of origin of the scam.

A series of credit card transactions can be represented as a graph.

Each transaction involves two nodes: a Customer and a Bookshop.

The nodes are linked by the transaction itself.

A transaction has a date and a status.

Legitimate transactions have the status "UnComplained".

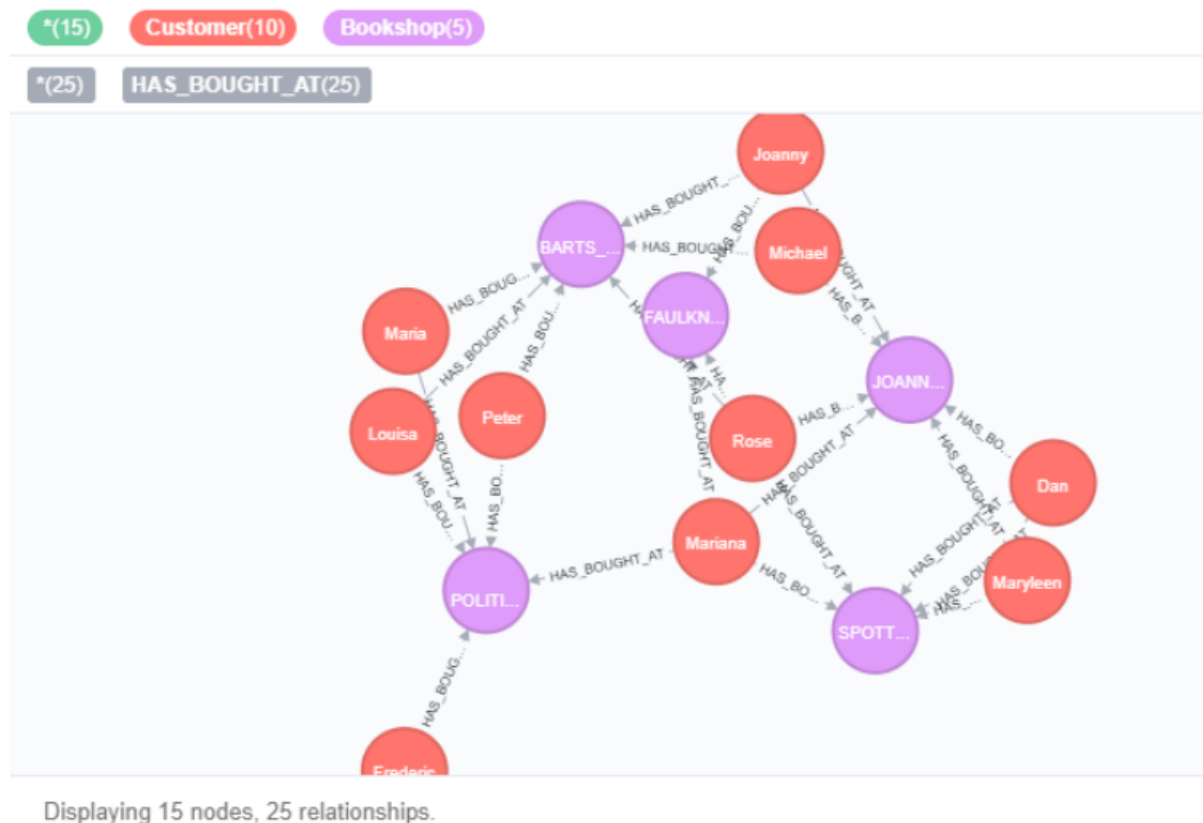
Fraudulent transactions are "Complained".



3. Answers to the queries required
The queries are shown below
4. How does it support scalability
Scalability can be achieved by increasing a new node to the cluster
5. How does it support maintainability
As it is a graph, it is flexible to changes
6. How does it support security and reliability
The proposal supports ACID properties and authentication

Design of the graph database

The graph data model below represents how the data looks as a graph.





Populating the database

// Create customers

```
CREATE (Peter:Customer {id:'1', name:'Peter', gender:'man', age:'50'})
CREATE (Joanny:Customer {id:'2', name:'Joanny', gender:'man', age:'48'})
CREATE (Dan:Customer {id:'3', name:'Dan', gender:'man', age:'23'})
CREATE (Michael:Customer {id:'4', name:'Michael', gender:'man', age:'30'})
CREATE (Frederic:Customer {id:'5', name:'Frederic', gender:'man', age:'31'})
CREATE (Mariana:Customer {id:'6', name:'Mariana', gender:'woman', age:'52'})
CREATE (Louisa:Customer {id:'7', name:'Louisa', gender:'woman', age:'23'})
CREATE (Maria:Customer {id:'8', name:'Maria', gender:'woman', age:'58'})
CREATE (Maryleen:Customer {id:'9', name:'Maryleen', gender:'woman', age:'51'})
CREATE (Rose:Customer {id:'10', name:'Rose', gender:'woman', age:'37'})
```

// Create Bookshops

```
CREATE (JOANNE_HENDRICKS_COOKBOOKS:Bookshop {id:'11',
name:'JOANNE_HENDRICKS_COOKBOOKS', street:'2626 Wilkinson Court',
address:'Saint Paul, CA 92410'})
CREATE (FAULKNERHOUSE:Bookshop {id:'12', name:'FAULKNERHOUSE',
street:'4355 Walnut Street', age:'Saint Paul, CA 92410'})
CREATE (BARTS_BOOKS:Bookshop {id:'13', name:'BARTS_BOOKS',
street:'2092 Larry Street', age:'Saint Paul, CA 92410'})
CREATE (SPOTTY_DOG_BOOKS_AND_ALE:Bookshop {id:'14',
name:'SPOTTY_DOG_BOOKS_AND_ALE', street:'1870 Caynor Circle', age:'Saint
Paul, CA 92410'})
CREATE (POLITICS_AND_PROSE:Bookshop {id:'15', name:'
POLITICS_AND_PROSE', street:'1381 Spruce Drive', age:'Saint Paul, CA 92410'})
CREATE (POLITICS_BOOKS:Bookshop {id:'16', name:'POLITICS_BOOKS',
street:'826 Anmoore Road', age:'Saint Paul, CA 92410'})
CREATE (THE_LAST_BOOKSTORE:Bookshop {id:'17',
name:'THE_LAST_BOOKSTORE', street:'1925 Spring Street', age:'Saint Paul, CA
92410'})
CREATE (BRATTLE_BOOK_SHOP:Bookshop {id:'18',
name:'BRATTLE_BOOK_SHOP', street:'4209 Elsie Drive', age:'Saint Paul, CA
92410'})
CREATE (BOOKS_FOR_THE_CITY:Bookshop {id:'19', name:'
BOOKS_FOR_THE_CITY ', street:'86 D Street', age:'Saint Paul, CA 92410'})
CREATE (JOHN_K_KING_USED_AND_RARE:Bookshop {id:'20',
name:'JOHN_K_KING_USED_AND_RARE', street:'945 Kinney Street', age:'Saint
Paul, CA 92410'})
CREATE (BEST_BOOKS_FOREVER:Bookshop {id:'21',
name:'BEST_BOOKS_FOREVER', street:'3810 River Lane', age:'Saint Paul, CA
92410'})
CREATE (OREALLY:Bookshop {id:'22', name:'OREALLY', street:'3778 Tenmile
Road', age:'Saint Paul, CA 92410'})
```



```
CREATE (WATERSTONES:Bookshop {id:'23', name:' WATERSTONES ',
street:'349 Bel Meadow Drive', age:'K Rivers, MO 64105'})
CREATE (MY_BEST_BOOKS:Bookshop {id:'24', name:' MY_BEST_BOOKS',
street:'99 Strother Street', age:'K Rivers, MO 64105'})
CREATE (OLDIES_BUT_GOODIES:Bookshop {id:'25',
name:'OLDIES_BUT_GOODIES', street:'3306 Douglas Dairy Road', age:'K Rivers,
MO 64105'})
CREATE (RARE_BOOKS:Bookshop {id:'26', name:'RARE_BOOKS', street:'2912
Nutter Street', age:'K Rivers, MO 64105'})
```

// Create transaction history

```
CREATE (Peter)-[:HAS_BOUGHT_AT {salessalesamount:'986.50',
time:'4/17/2018', status:'UnComplained'}}->(POLITICS_AND_PROSE)
CREATE (Peter)-[:HAS_BOUGHT_AT {salessalesamount:'239.99',
time:'5/15/2018', status:'UnComplained'}}->(BEST_BOOKS_FOREVER)
CREATE (Peter)-[:HAS_BOUGHT_AT {salessalesamount:'475.55',
time:'3/28/2018', status:'UnComplained'}}->(BRATTLE_BOOK_SHOP)
CREATE (Peter)-[:HAS_BOUGHT_AT {salessalesamount:'654.00',
time:'3/20/2018', status:'UnComplained'}}->(BARTS_BOOKS)
CREATE (Joanny)-[:HAS_BOUGHT_AT {salessalesamount:'196.75',
time:'7/24/2018', status:'UnComplained'}}->(BOOKS_FOR_THE_CITY)
CREATE (Joanny)-[:HAS_BOUGHT_AT {salessalesamount:'502.50',
time:'4/9/2018', status:'UnComplained'}}->(FAULKNERHOUSE)
CREATE (Joanny)-[:HAS_BOUGHT_AT {salessalesamount:'848.00',
time:'5/29/2018', status:'UnComplained'}}->(BARTS_BOOKS)
CREATE (Joanny)-[:HAS_BOUGHT_AT {salessalesamount:'802.30',
time:'3/11/2018', status:'UnComplained'}}-
>(JOANNE_HENDRICKS_COOKBOOKS)
CREATE (Joanny)-[:HAS_BOUGHT_AT {salessalesamount:'203.34',
time:'3/27/2018', status:'UnComplained'}}->(OREALLY)
CREATE (Dan)-[:HAS_BOUGHT_AT {salessalesamount:'35.20', time:'1/23/2018',
status:'UnComplained'}}->(SPOTTY_DOG_BOOKS_AND_ALE)
CREATE (Dan)-[:HAS_BOUGHT_AT {salessalesamount:'605', time:'1/27/2018',
status:'UnComplained'}}->(SPOTTY_DOG_BOOKS_AND_ALE)
CREATE (Dan)-[:HAS_BOUGHT_AT {salesamount:'62.60', time:'9/17/2018',
status:'UnComplained'}}->(BOOKS_FOR_THE_CITY)
CREATE (Dan)-[:HAS_BOUGHT_AT {salesamount:'141.45', time:'11/14/2018',
status:'UnComplained'}}->(JOANNE_HENDRICKS_COOKBOOKS)
CREATE (Michael)-[:HAS_BOUGHT_AT {salesamount:'134.00', time:'4/14/2018',
status:'UnComplained'}}->(JOANNE_HENDRICKS_COOKBOOKS)
CREATE (Michael)-[:HAS_BOUGHT_AT {salesamount:'336.45', time:'4/3/2018',
status:'UnComplained'}}->(MYOPIC_BOOKS)
CREATE (Michael)-[:HAS_BOUGHT_AT {salesamount:'964.50', time:'3/22/2018',
status:'UnComplained'}}->(BARTS_BOOKS)
CREATE (Michael)-[:HAS_BOUGHT_AT {salesamount:'430.00', time:'8/10/2018',
status:'UnComplained'}}->(BRATTLE_BOOK_SHOP)
```



```
CREATE (Michael)-[:HAS_BOUGHT_AT {salesamount:'11.00', time:'9/4/2018',
status:'UnComplained'}}->(BOOKS_FOR_THE_CITY)
CREATE (Frederic)-[:HAS_BOUGHT_AT {salesamount:'545.00', time:'10/6/2018',
status:'UnComplained'}}->(BOOKS_FOR_THE_CITY)
CREATE (Frederic)-[:HAS_BOUGHT_AT {salesamount:'457.50', time:'10/15/2018',
status:'UnComplained'}}->(JOHN_K_KING_USED_AND_RARE)
CREATE (Frederic)-[:HAS_BOUGHT_AT {salesamount:'468.00', time:'7/29/2018',
status:'UnComplained'}}->(THE_LAST_BOOKSTORE)
CREATE (Frederic)-[:HAS_BOUGHT_AT {salesamount:'768.50', time:'11/28/2018',
status:'UnComplained'}}->(MYOPIC_BOOKS)
CREATE (Frederic)-[:HAS_BOUGHT_AT {salesamount:'921.00', time:'3/12/2018',
status:'UnComplained'}}->(POLITICS_AND_PROSE)
CREATE (Mariana)-[:HAS_BOUGHT_AT {salesamount:'740.50', time:'12/15/2018',
status:'UnComplained'}}->(SPOTTY_DOG_BOOKS_AND_ALE)
CREATE (Mariana)-[:HAS_BOUGHT_AT {salesamount:'510.00', time:'11/27/2018',
status:'UnComplained'}}->(FAULKNERHOUSE)
CREATE (Mariana)-[:HAS_BOUGHT_AT {salesamount:'414.50', time:'1/20/2018',
status:'UnComplained'}}->(POLITICS_AND_PROSE)
CREATE (Mariana)-[:HAS_BOUGHT_AT {salesamount:'721.50', time:'7/17/2018',
status:'UnComplained'}}->(JOANNE_HENDRICKS_COOKBOOKS)
CREATE (Mariana)-[:HAS_BOUGHT_AT {salesamount:'353.00', time:'10/25/2018',
status:'UnComplained'}}->(OREALLY)
CREATE (Louisa)-[:HAS_BOUGHT_AT {salesamount:'681.00', time:'12/28/2018',
status:'UnComplained'}}->(BRATTLE_BOOK_SHOP)
CREATE (Louisa)-[:HAS_BOUGHT_AT {salesamount:'87.50', time:'2/19/2018',
status:'UnComplained'}}->(BARTS_BOOKS)
CREATE (Louisa)-[:HAS_BOUGHT_AT {salesamount:'533.00', time:'8/6/2018',
status:'UnComplained'}}->(MYOPIC_BOOKS)
CREATE (Louisa)-[:HAS_BOUGHT_AT {salesamount:'723.00', time:'1/8/2018',
status:'UnComplained'}}->(MYOPIC_BOOKS)
CREATE (Louisa)-[:HAS_BOUGHT_AT {salesamount:'627.00', time:'5/20/2018',
status:'UnComplained'}}->(POLITICS_AND_PROSE)
CREATE (Maria)-[:HAS_BOUGHT_AT {salesamount:'74.00', time:'9/4/2018',
status:'UnComplained'}}->(BOOKS_FOR_THE_CITY)
CREATE (Maria)-[:HAS_BOUGHT_AT {salesamount:'231.00', time:'7/12/2018',
status:'UnComplained'}}->(BARTS_BOOKS)
CREATE (Maria)-[:HAS_BOUGHT_AT {salesamount:'924.00', time:'10/4/2018',
status:'UnComplained'}}->(BOOKS_FOR_THE_CITY)
CREATE (Maria)-[:HAS_BOUGHT_AT {salesamount:'742.00', time:'8/12/2018',
status:'UnComplained'}}->(POLITICS_AND_PROSE)
CREATE (Maryleen)-[:HAS_BOUGHT_AT {salesamount:'276.00',
time:'12/24/2018', status:'UnComplained'}}->(BOOKS_FOR_THE_CITY)
CREATE (Maryleen)-[:HAS_BOUGHT_AT {salesamount:'66.40', time:'4/16/2018',
status:'UnComplained'}}->(BEST_BOOKS_FOREVER)
CREATE (Maryleen)-[:HAS_BOUGHT_AT {salesamount:'467.40',
time:'12/23/2018', status:'UnComplained'}}->(SPOTTY_DOG_BOOKS_AND_ALE)
```




```
CREATE (Maryleen)-[:HAS_BOUGHT_AT {salesamount:'830.40', time:'3/13/2018',
status:'UnComplained'}]->(BRATTLE_BOOK_SHOP)
CREATE (Maryleen)-[:HAS_BOUGHT_AT {salesamount:'240.40', time:'7/9/2018',
status:'UnComplained'}]->(JOANNE_HENDRICKS_COOKBOOKS)
CREATE (Maryleen)-[:HAS_BOUGHT_AT {salesamount:'164.50',
time:'12/26/2018', status:'UnComplained'}]->(BOOKS_FOR_THE_CITY)
CREATE (Rose)-[:HAS_BOUGHT_AT {salesamount:'630.50', time:'10/6/2018',
status:'UnComplained'}]->(SPOTTY_DOG_BOOKS_AND_ALE)
CREATE (Rose)-[:HAS_BOUGHT_AT {salesamount:'19.50', time:'7/29/2018',
status:'UnComplained'}]->(FAULKNERHOUSE)
CREATE (Rose)-[:HAS_BOUGHT_AT {salesamount:'352.50', time:'12/16/2018',
status:'UnComplained'}]->(OREALLY)
CREATE (Rose)-[:HAS_BOUGHT_AT {salesamount:'147.50', time:'8/3/2018',
status:'UnComplained'}]->(JOANNE_HENDRICKS_COOKBOOKS)
CREATE (Rose)-[:HAS_BOUGHT_AT {salesamount:'91.50', time:'6/29/2018',
status:'UnComplained'}]->(BARTS_BOOKS)
CREATE (Peter)-[:HAS_BOUGHT_AT {salesamount:'1021.50', time:'7/18/2018',
status:'Complained'}]->(WATERSTONES)
CREATE (Peter)-[:HAS_BOUGHT_AT {salesamount:'1732.50', time:'5/10/2018',
status:'Complained'}]->(MY_BEST_BOOKS)
CREATE (Peter)-[:HAS_BOUGHT_AT {salesamount:'1415.50', time:'4/1/2018',
status:'Complained'}]->(OLDIES_BUT_GOODIES)
CREATE (Peter)-[:HAS_BOUGHT_AT {salesamount:'1849.50', time:'12/20/2018',
status:'Complained'}]->(RARE_BOOKS)
CREATE (Michael)-[:HAS_BOUGHT_AT {salesamount:'1914.50', time:'7/18/2018',
status:'Complained'}]->(WATERSTONES)
CREATE (Michael)-[:HAS_BOUGHT_AT {salesamount:'1424.50', time:'5/10/2018',
status:'Complained'}]->(MY_BEST_BOOKS)
CREATE (Michael)-[:HAS_BOUGHT_AT {salesamount:'1721.50', time:'4/1/2018',
status:'Complained'}]->(OLDIES_BUT_GOODIES)
CREATE (Michael)-[:HAS_BOUGHT_AT {salesamount:'1003.50',
time:'12/20/2018', status:'Complained'}]->(RARE_BOOKS)
CREATE (Maria)-[:HAS_BOUGHT_AT {salesamount:'1149.50', time:'7/18/2018',
status:'Complained'}]->(WATERSTONES)
CREATE (Maria)-[:HAS_BOUGHT_AT {salesamount:'1152.50', time:'8/10/2018',
status:'Complained'}]->(MY_BEST_BOOKS)
CREATE (Maria)-[:HAS_BOUGHT_AT {salesamount:'1884', time:'8/1/2018',
status:'Complained'}]->(OLDIES_BUT_GOODIES)
CREATE (Maria)-[:HAS_BOUGHT_AT {salesamount:'1790.00', time:'12/20/2018',
status:'Complained'}]->(RARE_BOOKS)
CREATE (Rose)-[:HAS_BOUGHT_AT {salesamount:'1925.00', time:'7/18/2018',
status:'Complained'}]->(WATERSTONES)
CREATE (Rose)-[:HAS_BOUGHT_AT {salesamount:'1374.00', time:'7/10/2018',
status:'Complained'}]->(MY_BEST_BOOKS)
CREATE (Rose)-[:HAS_BOUGHT_AT {salesamount:'1368.00', time:'7/1/2018',
status:'Complained'}]->(OLDIES_BUT_GOODIES)
```



```
CREATE (Rose)-[:HAS_BOUGHT_AT {salesamount:'1816.00', time:'12/20/2018', status:'Complained'}]->(RARE_BOOKS)
```

QUERIES:

== Obtain all customers that have complained about fraudulent transactions or books they have not actually bought

== which customers and which Bookshops are involved in our fraud case

```
MATCH (victim:Customer)-[r:HAS_BOUGHT_AT]->(Bookshop)
```

```
WHERE r.status = "Complained"
```

```
RETURN r.time AS `Date of Transaction`, Bookshop.name AS `Bookshop Name`,  
victim.name AS `Customer Name`, r.salesamount AS `Sales Amount`
```

```
ORDER BY `Date of Transaction` DESC
```

```
1 MATCH (victim:Customer)-[r:HAS_BOUGHT_AT]->(Bookshop)
2 WHERE r.status = "Complained"
3 RETURN r.time AS `Date of Transaction`, Bookshop.name AS `Bookshop Name`, victim.name AS `Customer Name`,
   r.salesamount AS `Sales Amount`
4 ORDER BY `Date of Transaction` DESC
```

```
$ MATCH (victim:Customer)-[r:HAS_BOUGHT_AT]->(Bookshop) WHERE r.status = "Complained" RETURN r.time AS `Date of Transacti...
```

Date of Transaction	Bookshop Name	Customer Name	Sales Amount
"8/10/2018"	"MY_BEST_BOOKS"	"Maria"	"1152.50"
"8/1/2018"	"OLDIES_BUT_GOODIES"	"Maria"	"1884"
"7/18/2018"	"WATERSTONES "	"Peter"	"1021.50"
"7/18/2018"	"WATERSTONES "	"Michael"	"1914.50"
"7/18/2018"	"WATERSTONES "	"Maria"	"1149.50"
"7/18/2018"	"WATERSTONES "	"Rose"	"1925.00"
"7/10/2018"	"MY_BEST_BOOKS"	"Rose"	"1374.00"
"7/1/2018"	"OLDIES_BUT_GOODIES"	"Rose"	"1368.00"
"5/10/2018"	"MY_BEST_BOOKS"	"Peter"	"1732.50"
"5/10/2018"	"MY_BEST_BOOKS"	"Michael"	"1424.50"
"4/1/2018"	"OLDIES_BUT_GOODIES"	"Peter"	"1415.50"
"4/1/2018"	"OLDIES_BUT_GOODIES"	"Michael"	"1721.50"
"12/20/2018"	"RARE_BOOKS"	"Peter"	"1849.50"
"12/20/2018"	"RARE_BOOKS"	"Michael"	"1003.50"
"12/20/2018"	"RARE_BOOKS"	"Maria"	"1790.00"
"12/20/2018"	"RARE_BOOKS"	"Rose"	"1816.00"

Started streaming 16 records after 13 ms and completed after 254 ms.

== Identify the criminal by the transaction date on each fraudulent transaction. As the criminal we are looking for is involved in a legitimate transaction during which he captures his victims credit card numbers, and after that, he can execute his illegitimate transactions.



That means that we not only want the illegitimate transactions but also the transactions happening before the theft.

```
MATCH (victim:Customer)-[r:HAS_BOUGHT_AT]->(Bookshop)
WHERE r.status = 'Complained'
MATCH (victim)-[t:HAS_BOUGHT_AT]->(otherBookshops)
WHERE t.status = 'UnComplained' AND t.time < r.time
WITH victim, otherBookshops, t ORDER BY t.time DESC
RETURN t.time AS `Date of Transaction`, otherBookshops.name AS `Book shop`,
victim.name AS `Customer Name`, t.salesamount AS `Sales Amount`, t.status,
r.status
ORDER BY `Date of Transaction` DESC
```

```
1 MATCH (victim:Customer)-[r:HAS_BOUGHT_AT]->(Bookshop)
2 WHERE r.status = 'Complained'
3 MATCH (victim)-[t:HAS_BOUGHT_AT]->(otherBookshops)
4 WHERE t.status = 'UnComplained' AND t.time < r.time
5 WITH victim, otherBookshops, t ORDER BY t.time DESC
6 RETURN t.time AS `Date of Transaction`, otherBookshops.name AS `Book shop`, victim.name AS `Customer Name`,
t.salesamount AS `Sales Amount`
```

\$ MATCH (victim:Customer)-[r:HAS_BOUGHT_AT]->(Bookshop) WHERE r.status = 'Complained' MATCH (victim)-[t:HAS_BOUGHT_AT]->(...

Date of Transaction	Book shop	Customer Name	Sales Amount
"7/12/2018"	"BARTS_BOOKS"	"Maria"	"231.00"
"7/12/2018"	"BARTS_BOOKS"	"Maria"	"231.00"
"7/12/2018"	"BARTS_BOOKS"	"Maria"	"231.00"
"6/29/2018"	"BARTS_BOOKS"	"Rose"	"91.50"
"6/29/2018"	"BARTS_BOOKS"	"Rose"	"91.50"
"6/29/2018"	"BARTS_BOOKS"	"Rose"	"91.50"
"5/15/2018"	"BEST_BOOKS_FOREVER"	"Peter"	null
"4/3/2018"	null	"Michael"	"336.45"
"4/3/2018"	null	"Michael"	"336.45"
"4/17/2018"	"POLITICS_AND_PROSE"	"Peter"	null
"4/17/2018"	"POLITICS_AND_PROSE"	"Peter"	null
"4/14/2018"	"JOANNE_HENDRICKS_COOKBOOKS"	"Michael"	"134.00"
"4/14/2018"	"JOANNE_HENDRICKS_COOKBOOKS"	"Michael"	"134.00"
"3/28/2018"	"BRATTLE_BOOK_SHOP"	"Peter"	null
"3/28/2018"	"BRATTLE_BOOK_SHOP"	"Peter"	null
"3/28/2018"	"BRATTLE_BOOK_SHOP"	"Peter"	null

Started streaming 34 records after 305 ms and completed after 305 ms

Find the common Bookshop in all of these fraudulent transactions

```
MATCH (victim:Customer)-[r:HAS_BOUGHT_AT]->(Bookshop)
WHERE r.status = "Complained"
```




```
MATCH (victim)-[t:HAS_BOUGHT_AT]->(otherBookshops)
WHERE t.status = "UnComplained" AND t.time < r.time
WITH (victim), otherBookshops, t ORDER BY t.time DESC
RETURN DISTINCT otherBookshops.name AS `Suspicious Store`,
count(DISTINCT t) AS Count, collect(DISTINCT victim.name) AS Victims
ORDER BY Count DESC
```

```
1 MATCH (victim:Customer)-[r:HAS_BOUGHT_AT]->(Bookshop)
2 WHERE r.status = "Complained"
3 MATCH (victim)-[t:HAS_BOUGHT_AT]->(otherBookshops)
4 WHERE t.status = "UnComplained" AND t.time < r.time
5 WITH (victim), otherBookshops, t ORDER BY t.time DESC
6 RETURN DISTINCT otherBookshops.name AS `Suspicious Store`, count(DISTINCT t) AS Count, collect(DISTINCT
victim name) AS Victims
```

```
$ MATCH (victim:Customer)-[r:HAS_BOUGHT_AT]->(Bookshop) WHERE r.status = "Complained" MATCH (victim)-[t:HAS_BOUGHT_AT]->(...
```

	Suspicious Store	Count	Victims
Table	"BARTS_BOOKS"	4	["Maria", "Rose", "Michael", "Peter"]
A	"OREALLY"	1	["Rose"]
Text	null	1	["Michael"]
</>	"POLITICS_AND_PROSE"	1	["Peter"]
Code	"BRATTLE_BOOK_SHOP"	1	["Peter"]
	"BOOKS_FOR_THE_CITY"	1	["Maria"]
	"JOANNE_HENDRICKS_COOKBOOKS"	1	["Michael"]
	"SPOTTY_DOG_BOOKS_AND_ALE"	1	["Rose"]
	"BEST_BOOKS_FOREVER"	1	["Peter"]

In each instance of a fraudulent transaction, the credit card holder had visited Barts Books the days just prior.

We now know the location and the date on which the customer's credit cards numbers were stolen.

With a graph visualization solution like Linkurious, we could inspect the data to confirm our intuition.

Now we can alert the authorities and the Bookshop on the situation. They should have enough information to take it from there!