Graph Based Neo4j Services for Different Sectors

Abstract- Managing large data is not the only concern but generating insight from them has become a bigger task. Analytics has become important part of the data industry. Web services connect people, products, photos, ideas, locations and more. Tools are still emerging for the optimization of this correctness. Graph database is one such tool.

Introduction-

Seth Godin said that business need to stop collecting data points and start connecting it. Connecting points means the relationships between those points. For that we need a database technology that stores the entities which define relationship. As relational database management systems are poor at handling relationships because of their table structure and make it difficult to add new kind of connections. Instead of working with table and rows if we work with nodes and edges it will present similar output as we draw on whiteboard. That is why Graph database came into picture. Graph not only store relationship between the data points but also provides flexibility when new relationships are added or new model is adapted for a new business requirement.

Graph Database

Graph databases are powerful which links billions of connected data to create new sources of value for customers [1]. It tracks connections among entities and provide links for more detailed information. Graph databases store data in a graph which can be sorted, found and retrieved using traversing algorithms. Graph data structure uses nodes to represent data which is the smallest possible graph. Connection between them is made node to node by edges. Traversal navigates a graph identifying the paths which order nodes.

Graph contains Nodes and Relationship   Query a graph with traversal.
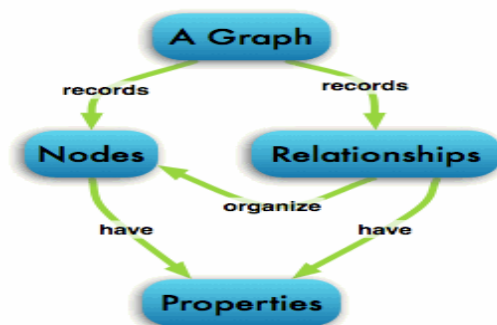

Fig1: Graph database representation where nodes organized by database relationships and have properties [2].
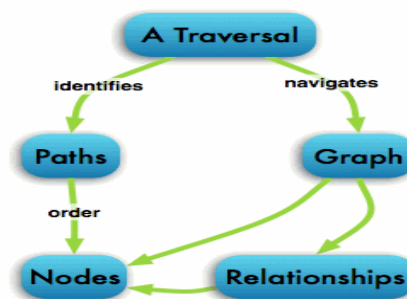

Fig2: Traversal in a graph [2].

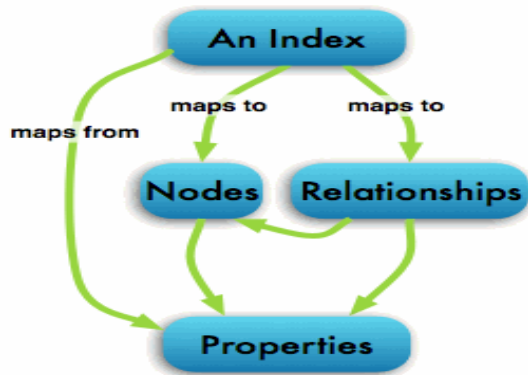An index maps from properties to either nodes or relationships.

Fig 3: Index Look-up Nodes or Relationships [2]

Due to some of its benefit it is being used by various companies.

1.It is schema less and storage efficient for semi structured information.

2.Supports ACID transaction with rollback feature.

3.Effective in mapping a graph to an Object Oriented language.

4.Queries are expressed as traversals. Hence provide fast traversals as compared to SQL.

5.Easy integration with existing programming languages.

If we talk about graph database, then we need to look into World's leading Graph Database which is Neo4j.

Neo4j

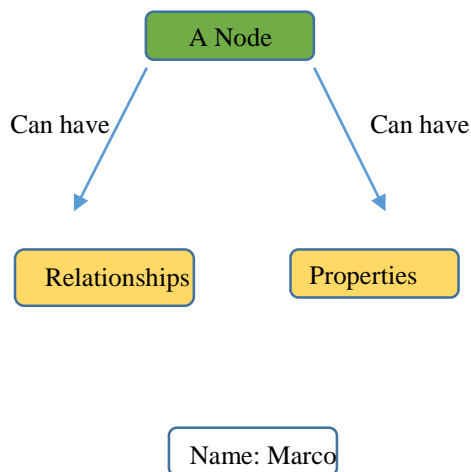In Neo4j, both nodes and relationships can contain properties.

Fig 4: Node in Neo4j

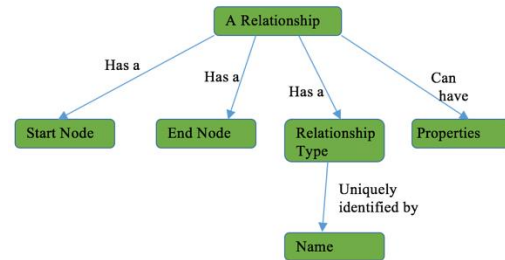Both nodes and relationship can have properties.

Fig 5: Relationship in Node4j

Properties are the key- values where key is a string. Values can either be a primitive data or an array of primitive type.
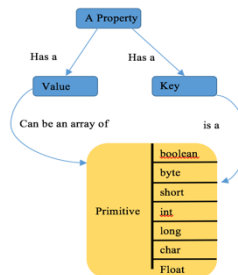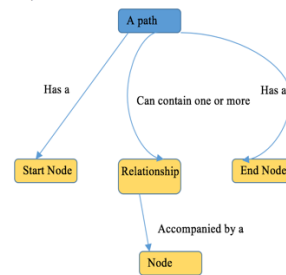

Fig6: Property in Neo4j   Fig7: Path in Neo4j

Path is one or more nodes with connecting relationships retrieved as a traversal result.

Three key advantages of graph database:

1)Performance

2)Flexibility

3)Agility

Graph database is suitable for the sectors which utilizes the relationships for further prediction and analysis like social network analysis, e-Commerce, dependence analysis and cybersecurity. In order to leverage from Graph database, we need to consider the use cases which has been opted by different sectors.

Use cases which provides competitive advantages [3]:

1)**Fraud Detection –**

Every year Bank and Insurance companies lose billions of dollars. In Graph database, it is difficult to uncover patterns. By putting checks into place and associate them with event triggers which includes event like logging in, placing an order and these schemas can be uncovered before they are able to be cause damage. As well complex graph can be flagged as a possible instance of fraud.
Example – Credit card transactions in e-Commerce industry

2)**Real time recommendation Engines**-
 It processes large amount of data and relationships offering relevant recommendations in real time as well accommodate new data and relationship continuously.
Example- Walmart and eBay (Retail Industry)
Walmart decided to use a graph database as they are serving more than 245 million customers with 11,000 stores in 27 countries and e-commerce website in 10 countries. It helped them to provide the real time recommendation to the customers using the Graph Database.

3)**Master Data Management**-
Due to usage of Graph Database, master data (consist all the information of an enterprise) became much easier to model and reduced the cost by reducing resources as we don't need to migrate all master data into a single location. Graph easily connects data between CRM systems, inventory and accounting to provide a consistent vision of whole enterprise.

4)**Network and IT Operations**-
In a IT industry the nodes are growing vastly as well the main problem of troubleshooting and data analysis is very important. Graph representation help IT managers to catalog assets, visualize deployment and identify the dependencies. It helps the managers to conduct impact analysis like which part of the network or which service is not working properly.
Ex- Large European telecom provider

5)**Identify & Access Management**-
IAM stores information about parties (business units, end-users) and resources (files, products, network devices). IAM apply the rules to provide authorization to authenticated users. Graph database access lookups over large and complex structure and

execute in milliseconds. It is basically used in content management, federated authorization services and social networking preferences.
Example- Telenor Norway (Communication sector.)
By using all the above use cases, it becomes easy for a company to utilize their own database for the prediction of future as well where maintenance is not high.

Conclusion
When we talk about Graph Database, we need to consider the world's first and best Graph Database company which has 50 plus customers from Global 2000 list. It is the only Graph Database which provides native graph storage, scalability and ACID compliant. It is easy to learn and use. Neo4j is reliable for critical production application and it is easier to load data into Neo4j.
If you consider using Graph database, it is good to prefer Neo4j.

References:

[1] http://neo4j.com/news/forrester-market-overview-graph-databases/
 [2]http://neo4j-org-dev.herokuapp.com/learn/graphdatabase
[3]http://info.neo4j.com/rs/773-GON-065/images/Neo4j_Top5_UseCases_Graph%20Databases.pdf?_ga=1.246258884.1378702965.1465968018