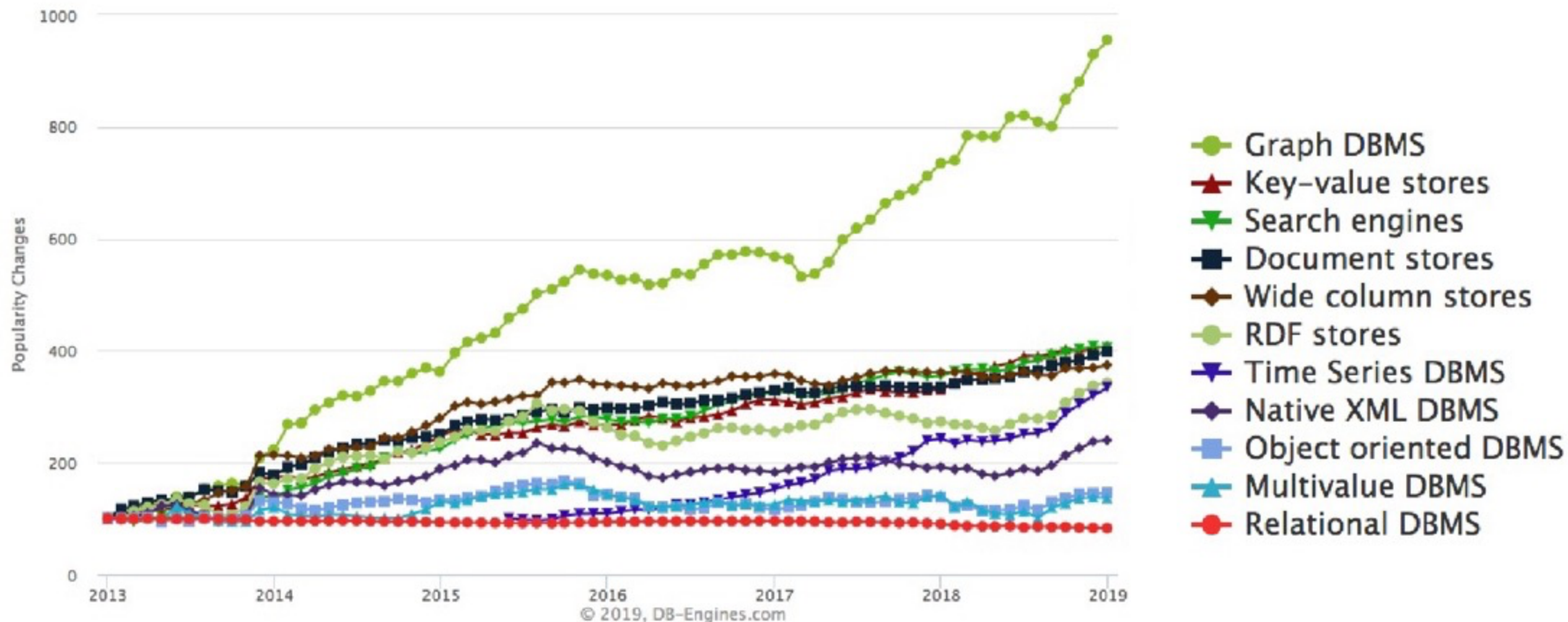




**Graph Databases**  
**Miracle Cure for Big Data**

# GRAPH DATABASE

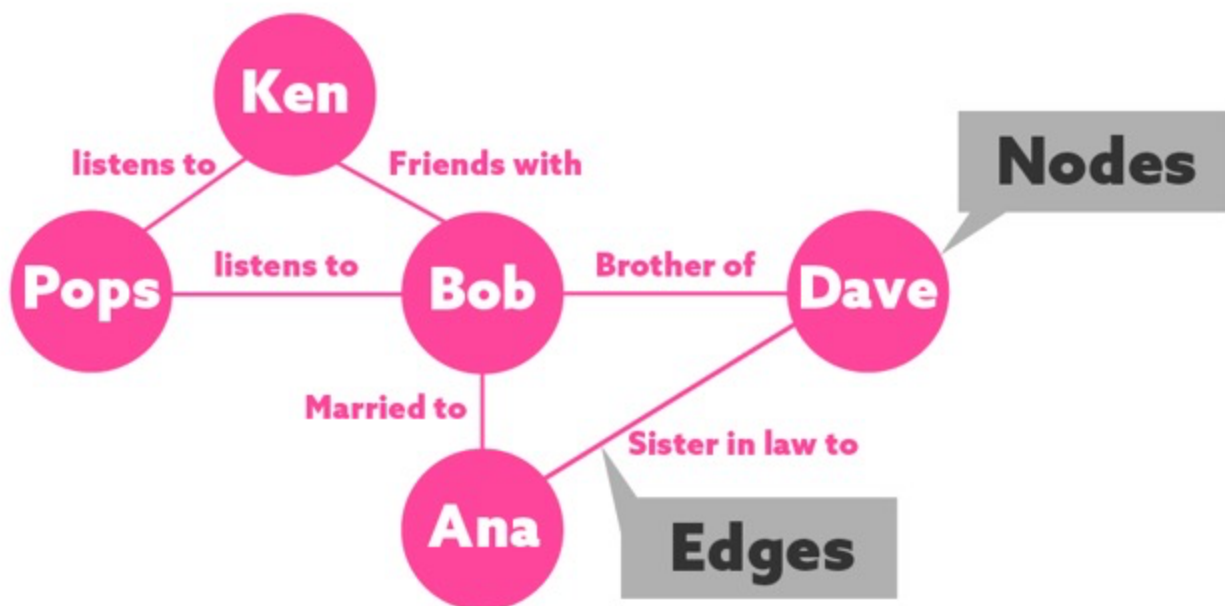
## Complete trend, starting with January 2013



Popularity change rate by category from DB-Engines † ([http://db-engines.com/en/ranking\\_categories](http://db-engines.com/en/ranking_categories))

# GRAPH DATABASE

- We can describe various **relational structures** as networks.
- These networks can be abstracted as a set of **nodes and edges = graph**.



# WHY GRAPHS

- We often use tables, which use a **“relational model”** to manage our data.
- However, some search patterns are not appropriate with this model.

Is there any relationship between Bob and Charlie?  
Any transaction?

Is there any money laundering flow, where the money goes around and back to the original owner?



## Account

Account ID	Owner ID	Creation Date
1111	200	2010-3-10
2222	100	2011-2-13
3333	400	2015-9-16
4444	300	2012-5-25
5555	100	...

## Customer

Owner ID	Name
200	Alice
100	Bob
400	Charlie
300	Dave
...	...

## Transaction

SRC	DEST	Type	Amount
1111	3333	Wire	\$20,000
5555	4444	Wire	\$30,000
4444	2222	Recurring	\$10,000
3333	5555	Wire	\$20,000
...			



# WHY GRAPHS

## ■ Represent data as **graphs**

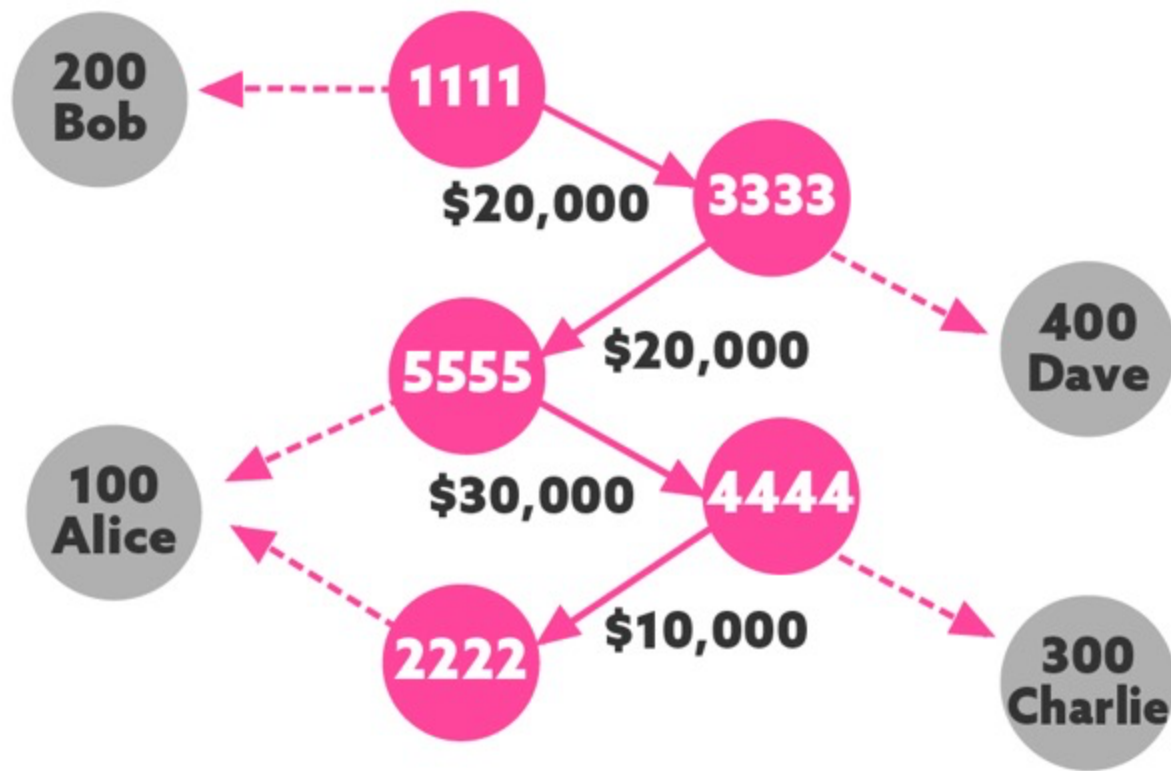
-Entity = **node**

-Relationship = **edge**

## ■ The following questions may be answered more intuitively.

Is there any relationship between Bob and Charlie?  
Any transaction?

Is there any money laundering flow, where the money goes around and back to the original owner?

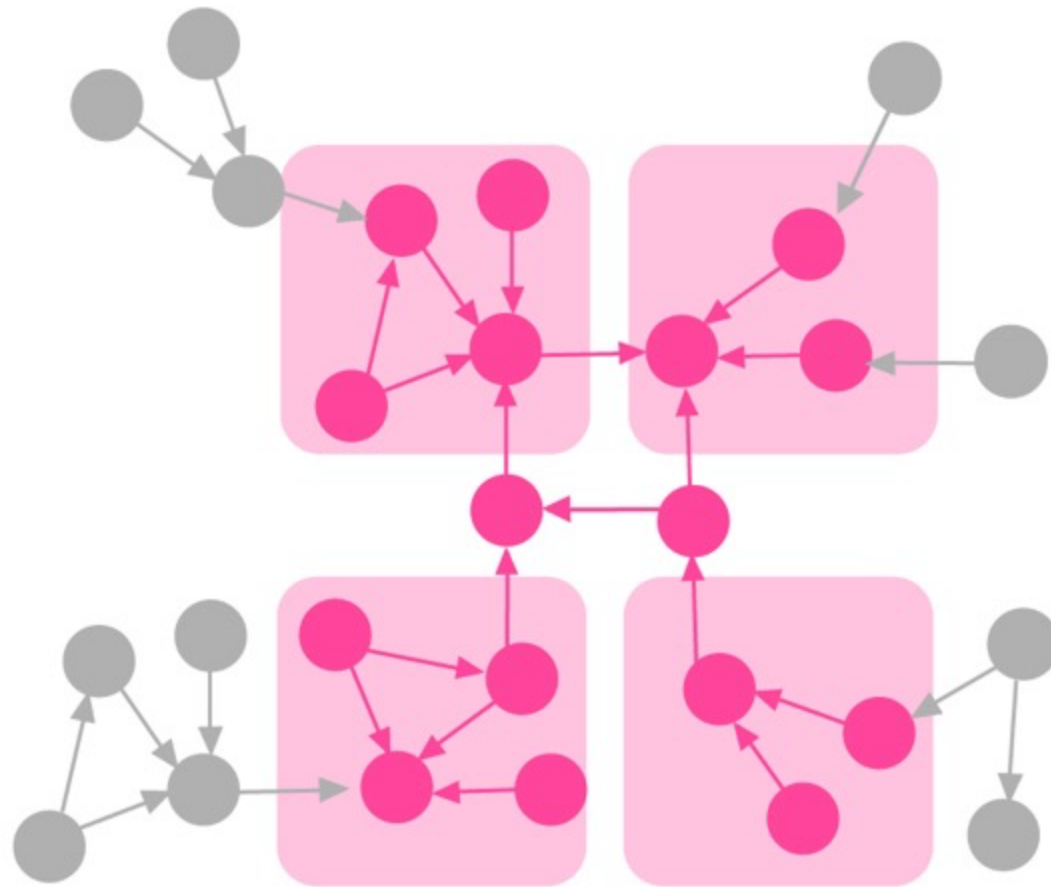


# WHY GRAPHS

- **The variety of graph algorithms can give us more insights from the data.**
- **Extract implicit relationships**

**Group accounts into clusters based on transaction records**

**Identify important accounts, which affect to the money flow very much when they are stopped.**



# CURRENT SITUATION

Visualizer



Graph Databases

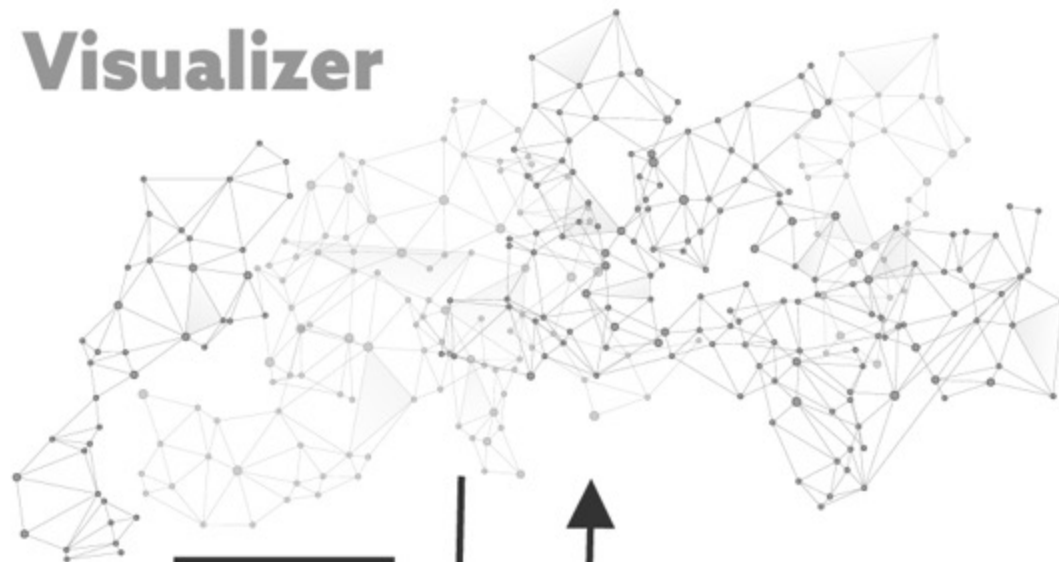


Oracle Labs  
**PGX**



# IDEAL SITUATION

## Visualizer



Rest API

**X2**

## Graph Databases



Oracle Labs  
**PGX**



**X2** (Cross-to)  
Available on GitHub



<https://github.com/g2glab/x2>





**Thank you  
for listening!**