

FIGHTING CRIME WITH BIG DATA

ADM project

POLICE LINE DO NOT CROSS

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MOTIVATION and INSPIRATION

- Crime rising even more steeply
- Intuition behind
- Bigger picture
- Store, use, analyze -----> PREDICT

APPLICATION DOMAIN

Police departments

Policy makers

- > Insert new crime
- > Update crime details
- > Find relevant information
- > Analyze relationships

Law agencies

Statistical analysis centers

DATASET

???

| VictimId | Victim_Age | Victim_Sex | first_name | last_name | address | city |
|----------|------------|------------|------------|-----------|------------------------|--------------|
| 1 | 14 | | Elbert | Scoyles | 36 Hollow Ridge Point | Jacksonville |
| 2 | 14 | | Andrei | Brandone | 63457 Corry Avenue | Van Nuys |
| 3 | 78 F | | Alaster | McCusker | 593 Elgar Parkway | Henderson |
| 4 | 32 F | | Mehetabel | M... | 634 Melrose Park | Springfield |
| 5 | 30 M | | Jabez | H... | 6 Graceland Pass | Olympia |
| 6 | 39 F | | Roseanne | Spong | 50 International Parkv | Huntington |
| 7 | 41 F | | Cavla | Fowlev | 25 Sundown Drive | Denver |

| PdId | City | Location |
|----------|-------|---------------------------------------|
| 1.50E+13 | Aiken | (37.7617007179518, -122.42158168137) |
| 1.50E+13 | Aiken | (37.7841907151119, -122.414406029855) |
| 1.50E+13 | Aiken | (37.7841907151119, -122.414406029855) |
| 1.50E+13 | Aiken | (37.7841907151119, -122.414406029855) |
| 1.50E+13 | Akron | (37.8004887042875, -122.431118543788) |
| 1.50E+13 | Akron | (37.7840813067529, -122.451781767894) |
| 1.46E+13 | Akron | (37.729203356539, -122.374019331833) |
| 1.50E+13 | Akron | (37.729203356539, -122.374019331833) |
| 1.50E+13 | Akron | (37.7878092959561, -122.40556817787) |

| DR_Number | Date_Reported | Date_Occurred | Crime_Code | Crime_Descr | Weapon | Address | City | VictimId | CriminalId | PdId | Status_Description |
|-----------|---------------|---------------|------------|-------------------------|--------|-----------------------|----------------|----------|------------|---------|--------------------|
| 150128751 | 12/31/2015 | 12/30/2015 | 510 | VEHICLE - STOLEN | | 700 N ... | Arlington | 1 | 101 | 1.5E+13 | Invest Cont |
| 150718981 | 12/30/2015 | 12/29/2015 | 510 | VEHICLE - STOLEN | | Saint Elmo | Flushing | 2 | 102 | 1.5E+13 | Invest Cont |
| 150101677 | 12/2/2015 | 12/2/2015 | 230 | ASSAULT WITH DE | | 400 700 Yale St | Pasadena | 3 | 103 | 1.5E+13 | Adult Arrest |
| 150101678 | 12/2/2015 | 12/2/2015 | 230 | ASSAULT WITH DE | | 400 00 S San Pedro St | Philadelphia | 4 | 104 | 1.5E+13 | Adult Arrest |
| 150101679 | 12/3/2015 | 12/3/2015 | 740 | VANDANISM - FERO | | 400 Cottag Home St | Shawnee Missio | 5 | 105 | 1.5E+13 | Invest Cont |
| 150101681 | 12/1/2015 | 12/1/2015 | 31 | THEFT FROM MOTOR VEHICL | | 200 S Olive St | Lexington | 6 | 106 | 1.5E+13 | Invest Cont |
| 150101683 | 12/5/2015 | 12/5/2015 | 5 | INTIMATE PARTNE | | 400 600 S Spring St | Honolulu | 7 | 107 | 1.5E+13 | Invest Cont |
| 150101684 | 12/5/2015 | 12/5/2015 | 40 | BURGLARY, ATTEM | | 400 500 S Alameda St | San Jose | 8 | 108 | 1.5E+13 | Adult Arrest |
| 150101686 | 12/6/2015 | 12/6/2015 | 626 | INTIMATE PARTNE | | 400 500 Wall St | Akron | 9 | 109 | 1.5E+13 | Adult Other |
| 150101695 | 12/9/2015 | 12/9/2015 | 626 | INTIMATE PARTNE | | 400 500 Wall St | N... | 10 | 110 | 1.5E+13 | Adult Other |

| CriminalId | Last Name | First Name | Age | Street | City | State | stateName | Count |
|------------|-----------|------------|-----|------------|--------------|-------|-----------|-------|
| 101 | Sandigan | Boima | 30 | | Jacksonville | AK | Alaska | US |
| 102 | Moore | Donnell | 42 | | Van Nuys | AK | Alaska | US |
| 103 | Lewis | Jonathan | 40 | 400 Block | Henderson | AL | Alabama | US |
| 104 | Adams | Rolando | 2 | 19800 Bloc | Springfield | AL | Alabama | US |
| 105 | Bean | Ronnie | 4 | Block Of | Olympia | AL | Alabama | US |
| 106 | Leonard | Anthony | 18 | 15300 Bloc | Hunting | AL | Alabama | US |
| 107 | Battle | Malcolm | 26 | 10000 Bloc | Denver | AL | Alabama | US |
| 108 | Nti | Joseph | 62 | 11500 Bloc | Jamaica | AR | Arkansas | US |

| | |
|-----|-------------------------|
| 101 | REVOLVER |
| 102 | HAND GUN |
| 103 | RIFLE |
| 104 | SHOTGUN |
| 105 | SAWED OFF RIFLE/SHOTGUN |
| 106 | UNKNOWN FIREARM |
| 107 | OTHER FIREARM |
| 108 | AUTOMATIC WEAPON/SUB-M |
| 109 | SEMI-AUTOMATIC PISTOL |
| 110 | SEMI-AUTOMATIC RIFLE |

TECHNOLOGY



Graph Database

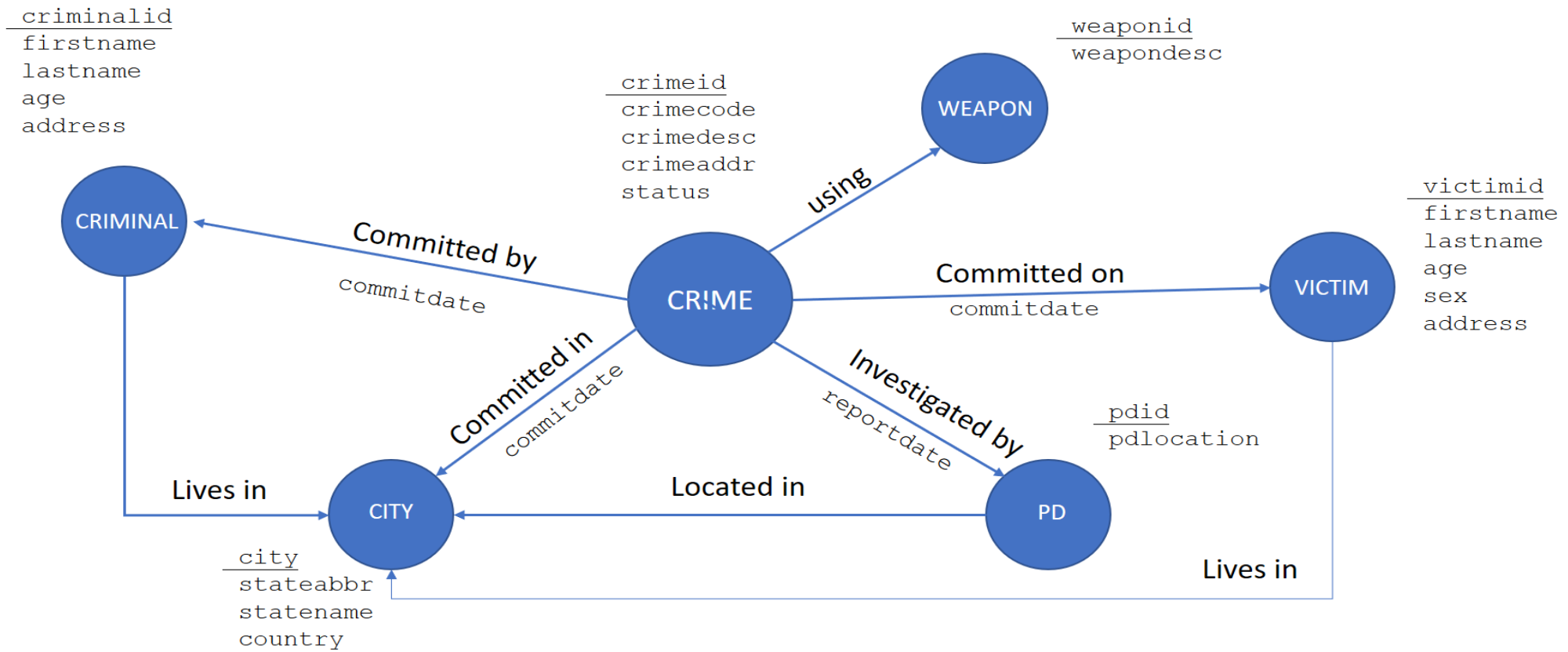
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Cypher

- Dynamic and flexible schema
- ~15000 tuples of data
- Time and cost saving
- Relationship significance
- Identify patterns and insights
- Easy SQL-like Cypher lang.

DATA MODEL

CRIME GRAPH



WORKLOAD

- OLTP + simple 'analytical-style' queries
- Graph traversal
- Interconnectivity of objects



SCALABILITY ISSUES

- Partitioning – NP problem
- Minimal cut point
- Multi-Leader Replication
- Asynchrony
- Eventual consistency
- CAP: focus on CA
- Polyglot persistence

EXTRAS

- E-Governance application target
- Add, find, visualize, analyze
- Good performance
- Speeded up
- Lightweight in memory usage

STOP

Thank you
for attention!

CRIME!

