Understanding Game Changes and Player Behavior with Graph Databases

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Run of Show

- Why graphs?
- Using Graph Databases with Amazon Neptune
- Flight Path Example

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Graphs: Data with Nontrivial Cardinality

- **Mapping relationships between items**
- **Questions are related to the connectivity of items**
- **Relationships themselves have variable parameters**
  - **Ie: Directionality, multiple types of relationships**

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Graph (NoSQL)

Examples

- Social graph
- Recommendations
- Fraud detection

Characteristics

- Stores relationships between data
- SPOG (subject, predicate, object, graph)
- Not optimal for general key searches

Amazon Neptune

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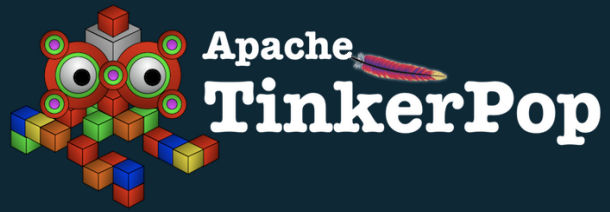
Leading graph models and frameworks

Property graph

Open source Apache TinkerPop

Gremlin traversal language



Resource Description Framework (RDF)

W3C standard

SPARQL Query Language

Many customers want both

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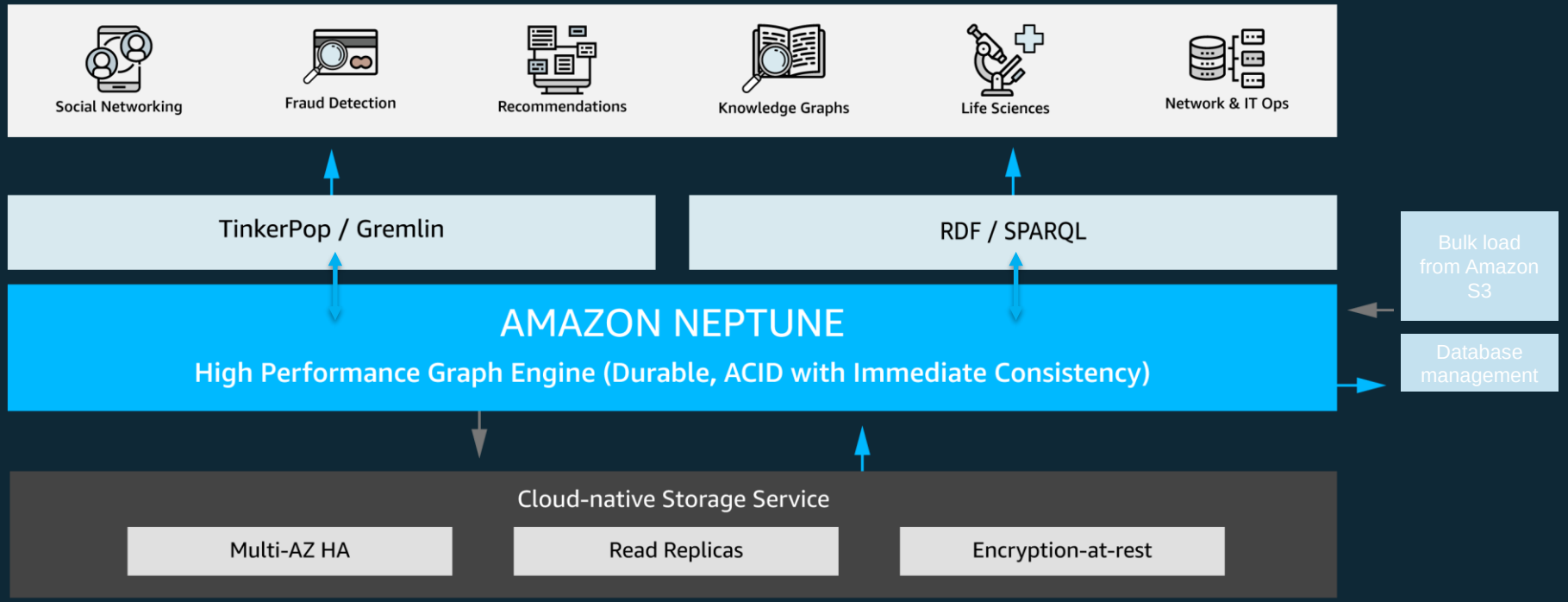
Amazon Neptune high-level architecture



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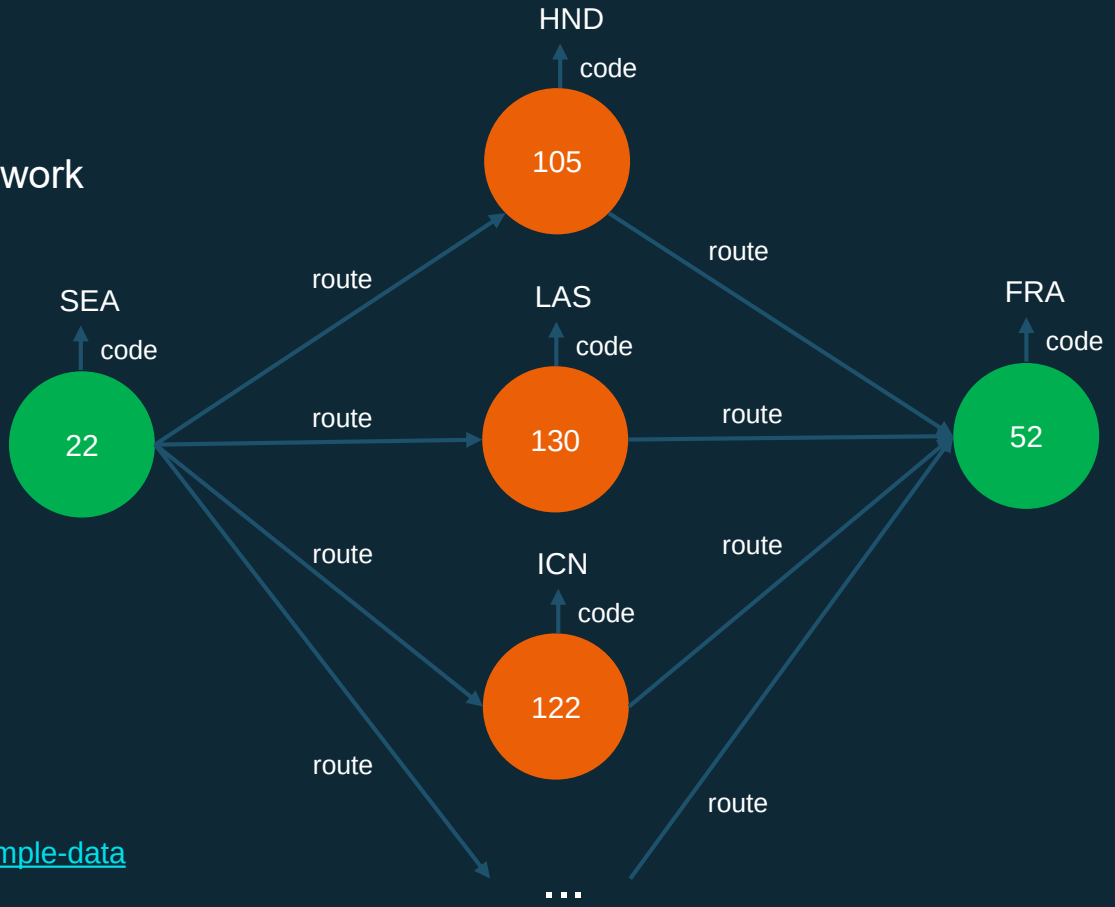
Air routes dataset

- Models the world's airline route network
- Queries operating over the airport connectivity graph
- Sample queries
  - Given
    - Source and target airport
  - Find
    - All one-stop connections



https://github.com/krlawrence/graph/tree/master/sample-data

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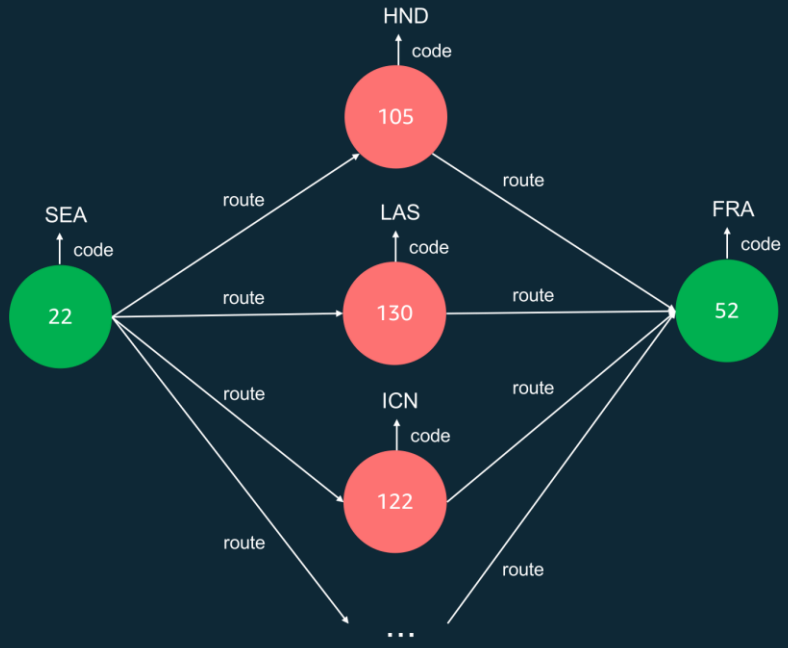
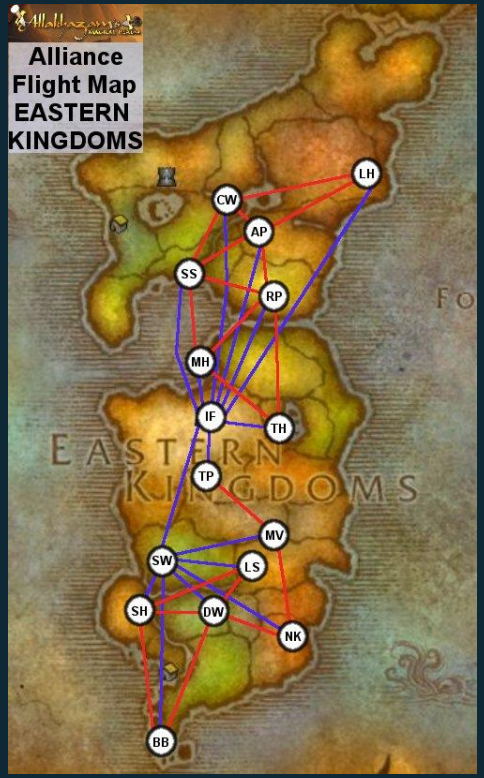
”Find all of the airport codes for one-stop connections from SEA to FRA”


```
# Gremlin

g.V()                  // start out with all vertices

  .has('code','SEA’) // select vertices having code =
‘SEA’

  .out('route’)        // follow ’route’ edge

  .as('via’)           // save node in variable ’via’

  .out('route’)        // follow ‘route edge again

  .has('code','FRA’) // assert we ended up in FRA

  .select('via’)       // jump back to the via airport

  .values('code’)      // select airport code
```



Today's Example: **MMORPG Transit**



https://wow.allakhazam.com/wiki/Category:Flight_Points_%28WoW%29

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Modeling our data: Vertices

	~id	shortcode:String	name:String	zone:String	continent:String	faction:String	discovered:Bool	~label
1	1	LH	Light's Hope Chapel	Eastern Plaguelands	Eastern Kingdoms	Alliance	True	flightpoint
2	2	CW	Chillwind Camp	Western Plaguelands	Eastern Kingdoms	Alliance	True	flightpoint
3	3	AP	Aerie Peak	The Hinterlands	Eastern Kingdoms	Alliance	True	flightpoint
4	4	SS	Southshore	Hillsbrad Foothills	Eastern Kingdoms	Alliance	True	flightpoint
5	5	RP	Refuge Pointe	Arathi Highlands	Eastern Kingdoms	Alliance	True	flightpoint
6	6	MH	Menethil Harbor	Wetlands	Eastern Kingdoms	Alliance	True	flightpoint
7	7	IF	Ironforge	Dun Morogh	Eastern Kingdoms	Alliance	True	flightpoint
8	8	TH	Thelsamar	Loch Modan	Eastern Kingdoms	Alliance	True	flightpoint
9	9	TP	Thorium Point	Searing Gorge	Eastern Kingdoms	Alliance	True	flightpoint
10	10	MV	Morgan's Vigil	Burning Steppes	Eastern Kingdoms	Alliance	True	flightpoint
11	11	SW	Stormwind City	Elwynn Forest	Eastern Kingdoms	Alliance	True	flightpoint
12	12	LS	Lakeshire	Redridge Mountains	Eastern Kingdoms	Alliance	True	flightpoint
13	13	SH	Sentinel Hill	Westfall	Eastern Kingdoms	Alliance	True	flightpoint
14	14	DW	Darkshire	Duskwood	Eastern Kingdoms	Alliance	True	flightpoint
15	15	NK	Nethergarde Keep	Blasted Lands	Eastern Kingdoms	Alliance	True	flightpoint
16	16	BB	Booty Bay	Stranglethorn Vale	Eastern Kingdoms	Neutral	True	flightpoint

Modeling our data: Edges

1	~id	~from	~to	~label	duration:Double	faction:String	prereqs:String
2	LH-CW	1	2	flightpath		Alliance	discovered
3	LH-AP	1	3	flightpath		Alliance	discovered
4	LH-IF	1	7	flightpath		Alliance	discovered
5	CW-AP	2	3	flightpath		Alliance	discovered
6	CW-SS	2	4	flightpath		Alliance	discovered
7	CW-IF	2	7	flightpath		Alliance	discovered
8	AP-SS	3	4	flightpath		Alliance	discovered

Sample Notebook

github.com/nmwalsh/warcraft-travel-graph

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More than one database?

Yes, that’s definitely common.

- Antifraud scenario (item duping)
  - - Compare “bottom up” item acquisition from bosses/players with Neptune to the live inventory list from DynamoDB or Amazon Aurora
- Complex analyses (graph query + player traffic)
  - - Compare “bottom up” item acquisition from bosses/players with Neptune to the live inventory list from DynamoDB or Amazon Aurora

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Thank you!

Visit https://aws.amazon.com/neptune/ for more information.
Have a question after the show?

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