Building a mindset to adapt to single table design in DynamoDB

A philosophical and retrospective rant

Anurag Kale

Cloud Software Architect @ Polestar Cars

AWS Data Hero

What's this about?

- Single Table Design in DynamoDB
- A shift of mindset
- Bridge the functional gap
- Diplomatic way/s to navigate with users in an enterprise landscape
- Some opinionated take aways from my personal journey

$whoami
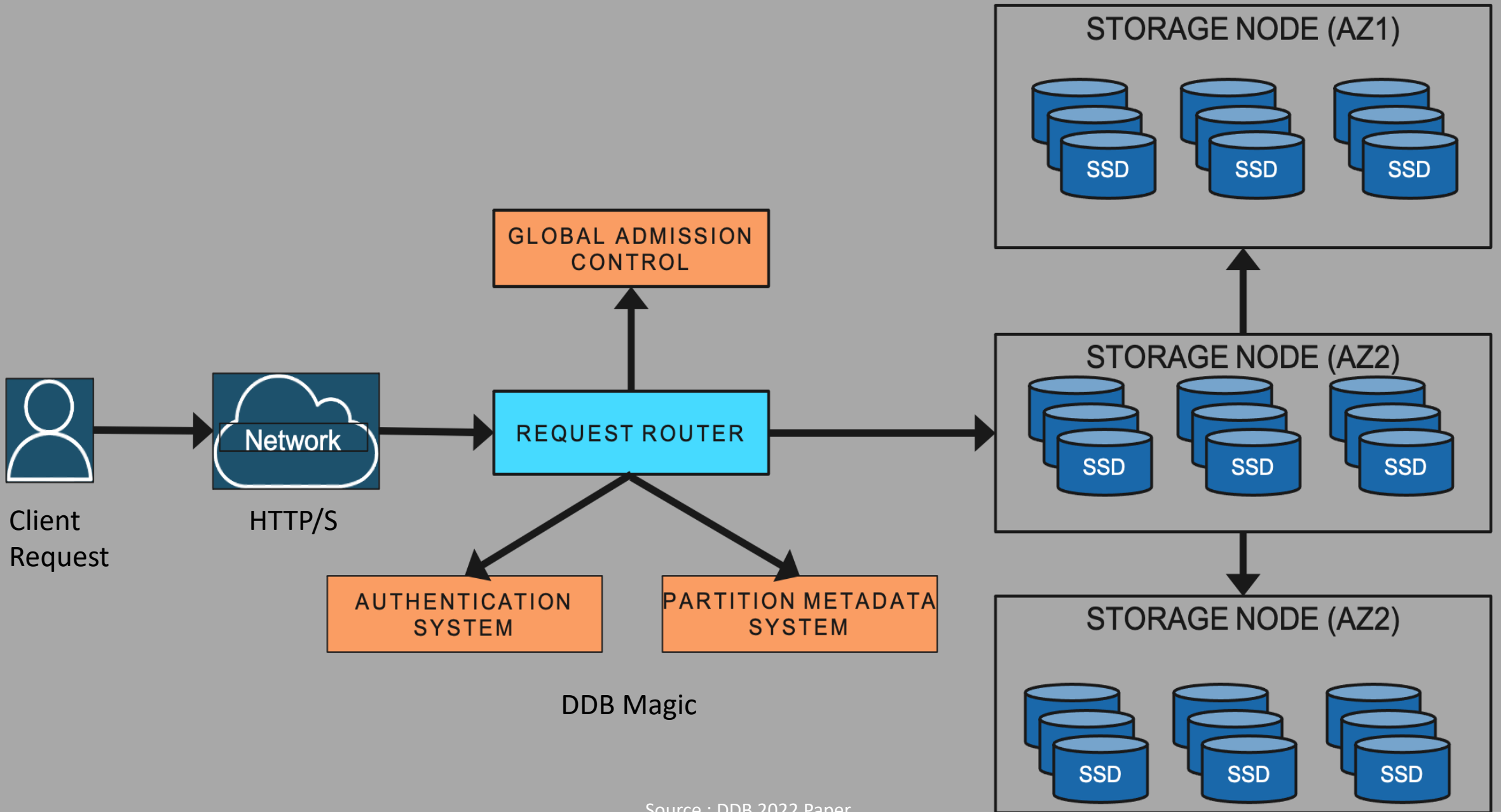
Anurag Kale

Cloud Software Architect at Polestar Digital

AWS Data Hero

Twitter – @iAnuragKale

A refresher

DynamoDB Architecture and Single Table Design

Technical Design Choice
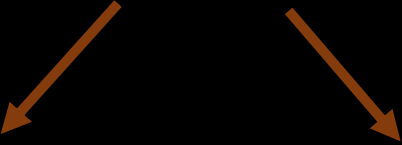Specialisation over Genralisation

Single Table Design

What, why and how

Table + Primary Key

USERID				
122454678	Full Name	Address	Country	Email
	Anurag Kale	Partille	Sweden	anurag.kale@email.co
216497326	Full Name	Address	Country	Email
	Werner Vogels	Amsterdam	Netherlands	wv@amazon.nl

Primary Key = Partition Key + Sort Key

UserID	EmailID				
122454678	anurag.kale@email.co	Full Name	Address	Country	Email
		Anurag Kale	Partille	Sweden	anurag.kale@email.co
216497326	wv@amazon.nl	Full Name	Address	Country	Email
		Werner Vogels	Amsterdam	Netherlands	wv@amazon.nl

Item

UserID	EmailID				
122454678	anurag.kale@email.co	Full Name	Address	Country	Email
		Anurag Kale	Partille	Sweden	anurag.kale@email.co
216497326	wv@amazon.nl	Full Name	Address	Country	Email
		Werner Vogels	Amsterdam	Netherlands	wv@amazon.nl

Item Collection

PK	SK				
User#122454678	Email#anurag.kale@email.co	Full Name	Address	Country	Email
		Anurag Kale	Partille	Sweden	anurag.kale@email.co
User#122454678	Order#1278903	thing	Price	Warehouse	Make
		iPhone	400 €	Stockholm	Apple
User#122454678	Order#1278904	thing	Price	Reseller	DispatchLocation
		Mouse 187	100 €	MySell LLC	NY, USA

What is Single Table Design?

- Specialised & opinionated way to store data in a distributed database.
- Data structure is pre-computed to predictable use cases and patterns
- Optimised for predictable performance (at the cost of functionality)
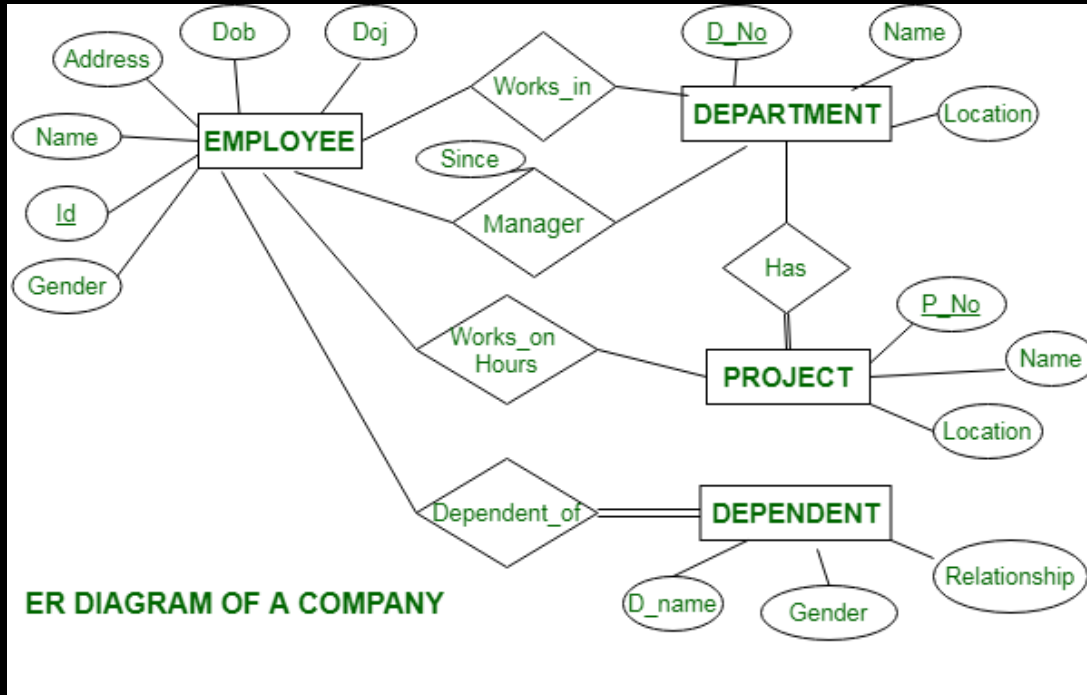- Specialised platform to store transactional data

Mindshift

What should I do?

- Embrace cloud operation model
  - Specilised workloads
  - Distributed responsibility

- Elaborate Design Phase
  - Predict use
  - Pre-empt usage patterns

- Re-train
  - Read - https://www.dynamodbbook.com
  - Implement - https://amazon-dynamodb-labs.workshop.aws
  - Iterate

Navigating Enterprise

How to work with people that do not know DynamoDB?

Isolate Logical and Physical Design

Design SQL's, then translate

SELECT

　　dept.NAME,

　　Count(emp.id)

From Employee emp,

　　INNER JOIN Department dept ON dept.id = emp.id

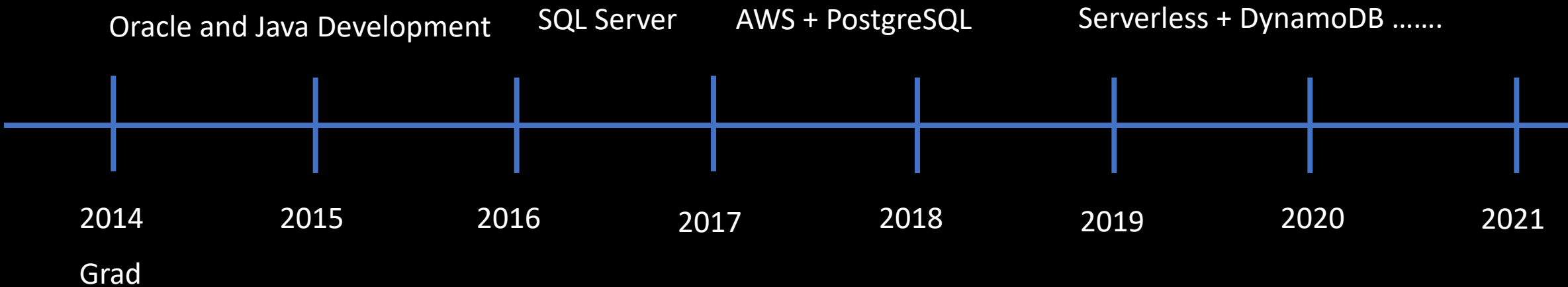Where emp.dept_id is not null

Create Item / Item Collection

PK	SK		
Dept#Sales	Count#200	Created_at	Created_by
		2022-03-21	Count_lambda

Build competance

- Organanise Competance Groups
- Invite experts from withing organisation OR AWS to deliver fine tuned training sessions
- Use AWS Organisations and/or Control Towerfor sandbox accounts
- Buold, fail, iterate

Some personal takeaways

Timeline

Oracle and Java Development   SQL Server   AWS + PostgreSQL   Serverless + DynamoDB …….

2014   2015   2016   2017   2018   2019   2020   2021

Grad

What I learned

- It takes 3-5 iterations to get the model right
- Win some, lose some
- Be a diplomat and meet people in the middle
- Internalise, document and share expereinces
- Put it out there, reach out for feedback
- Use AWS if you are on a support plan
- Talk to Hero's, Community Builders and learn from their experience

In Summary

- Understand the architectural difference
- Get comfortable with specialized workloads
- Reshape and resuse your previous experiences

Thank You!

Twitter - @iAnuragKale

LinkedIn – LI.com/in/anuragkale