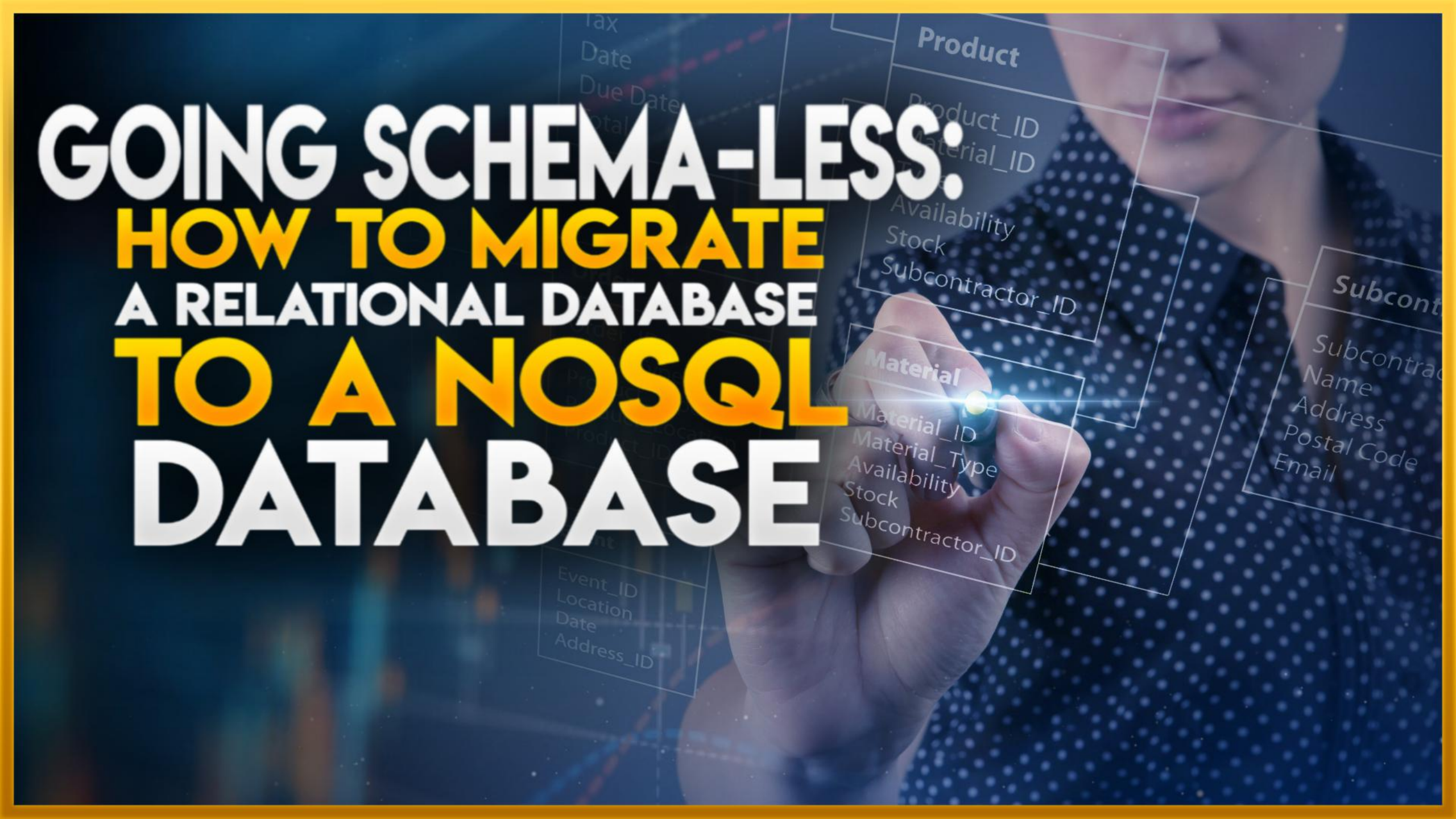

GOING SCHEMA-LESS:
HOW TO MIGRATE
A RELATIONAL DATABASE
TO A NOSQL
DATABASE
Product
Product_ID
Material_ID
Availability
Stock
Subcontractor_ID
Material
Material_ID
Material_Type
Availability
Stock
Subcontractor_ID
Name
Address
Postal Code
Email
Event_ID
Location
Date
Address_ID
Tax
Date
Due Date

Who is Chad Green

chadgreen@chadgreen.com

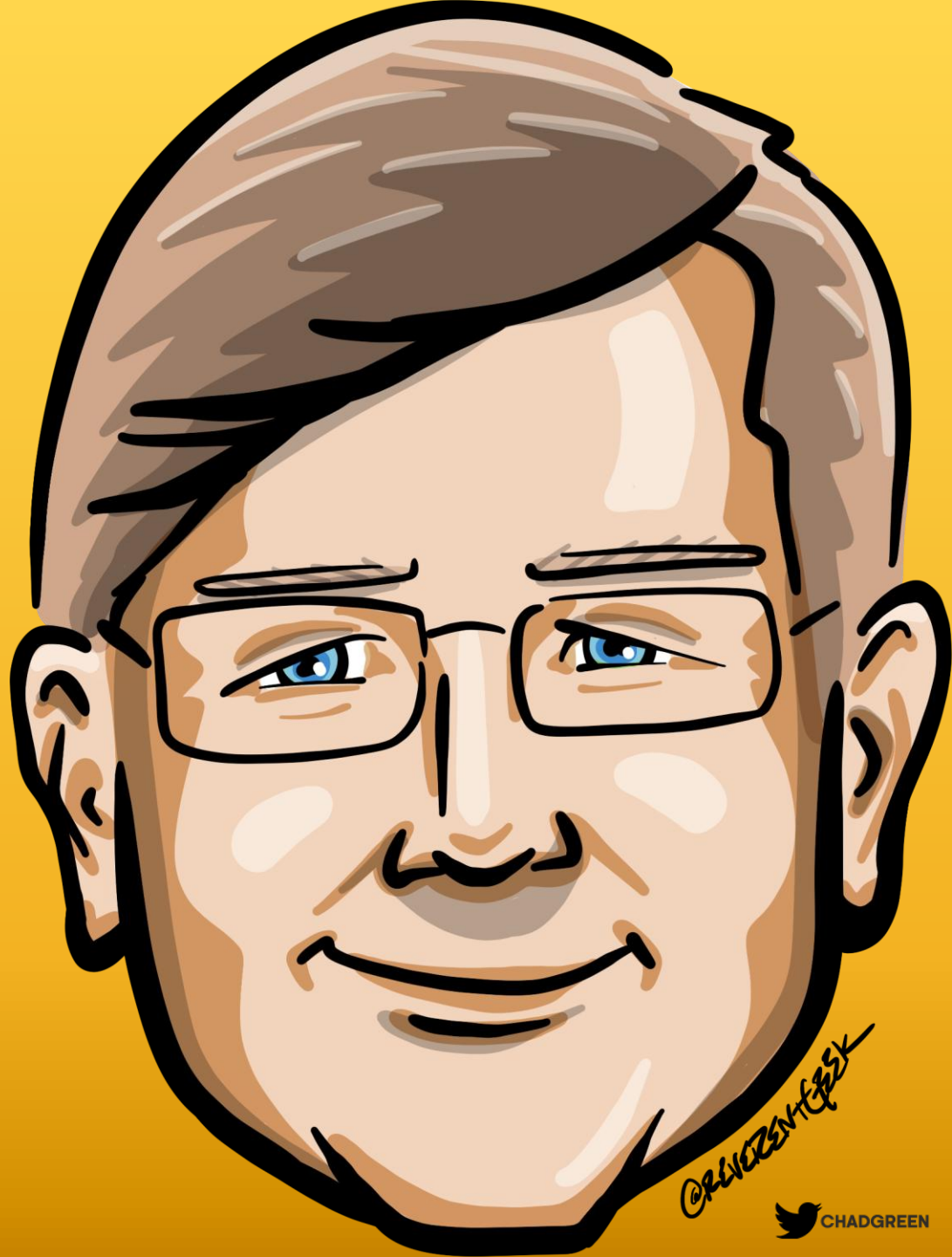
TaleLearnCode

ChadGreen.com

ChadGreen

ChadwickEGreen

Microsoft® Most Valuable Professional



Who is experienced with relational databases?

Who has used NoSQL databases?


How did I get started with NoSQL databases?

What are Relational Databases

Relational Model

- First-order predicate logic
- Described by Edgar Codd in 1969
- Data represented in terms of tuples
- Purpose is to provide declarative method for specifying data and queries

Codd's 12 Rules

0: Foundation Rule

1: Information Rule

2: Guaranteed Access

3: Systematic treatment of NULL values

4: Active Online Catalog

5: Comprehensive data sublanguage

6: View Updating

7: Possible for high-level insert, update, and delete

8: Physical data independence

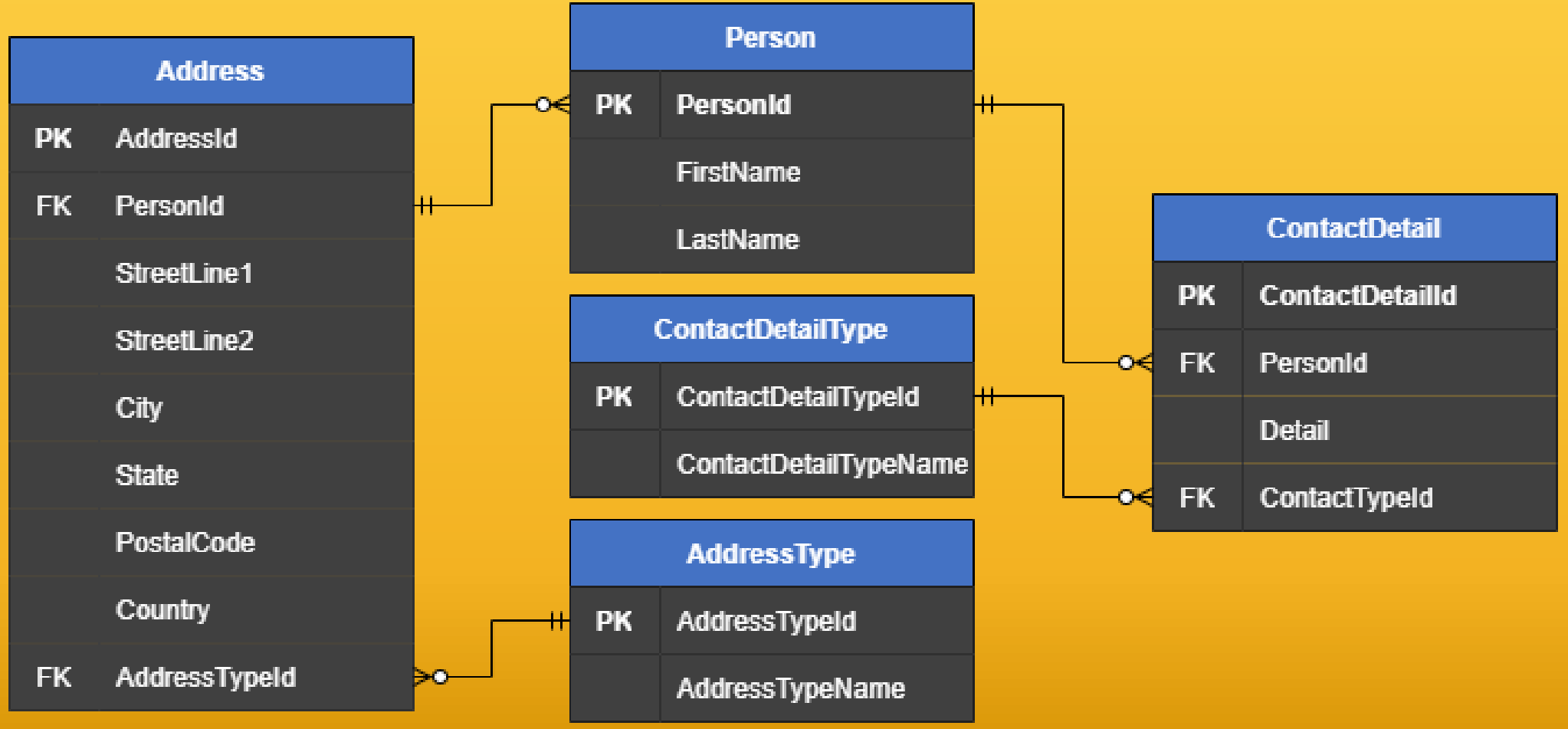
9: Logic data independence

10: Integrity Independence

11: Distribution Independence

12: Nonsubversion Rule

Typical Relational Model



True star of Relational Databases

SQL

Structured Query Language

SEQUEL

True star of Relational Databases

SQ

Structured

By Saufhn - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=87255205

Big Names in Relational Databases

What are NoSQL Databases

What are NoSQL Databases

Modeled in means other than tabular relations

Existed since late 1960s

Increasingly used in big data and real-time web applications

NoSQL Motivations

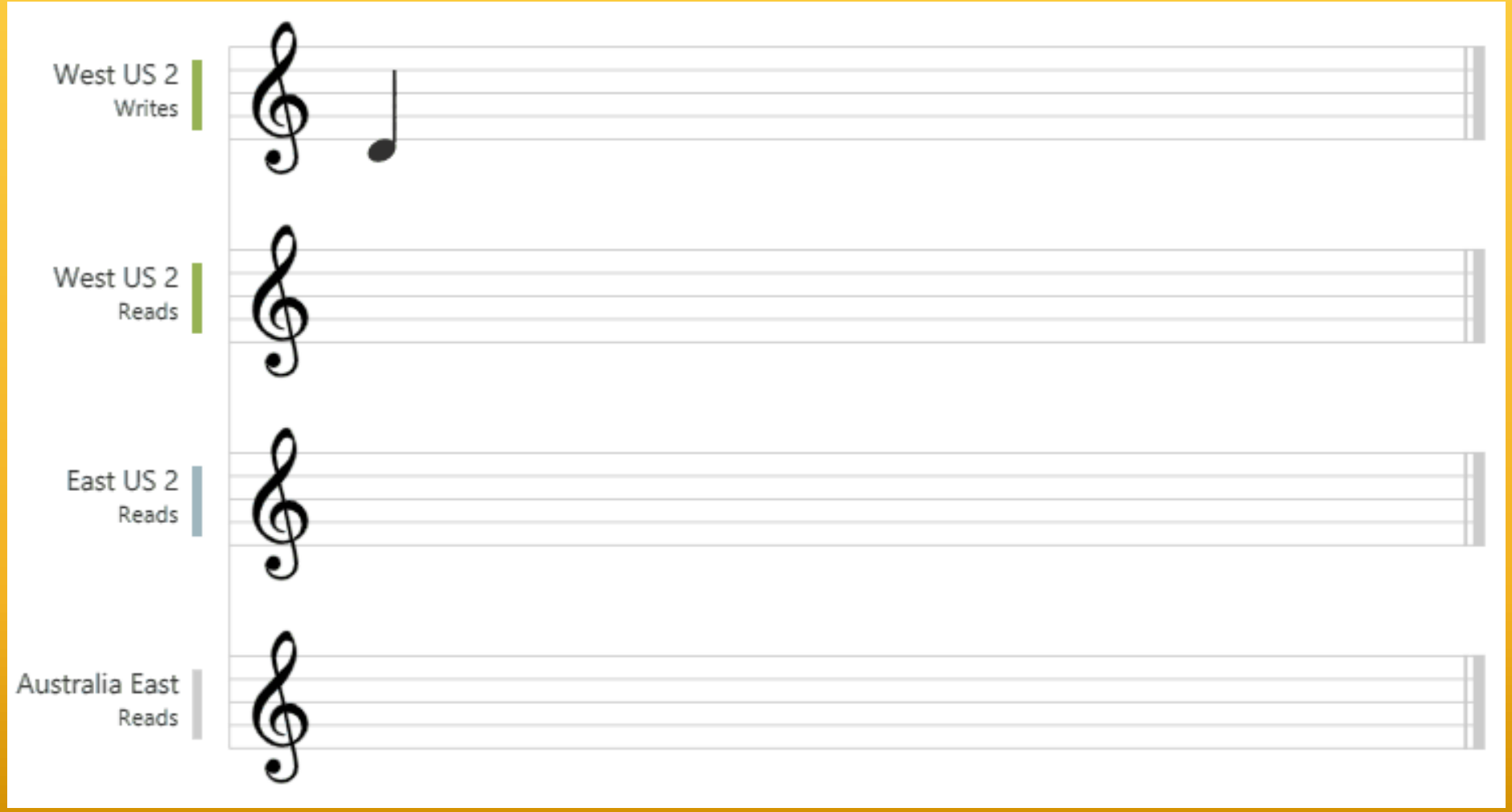
- Simplicity of Design
- Simpler Horizontal Scaling
- Finer Control over Availability
- Limiting Object-Relational Impedance

Availability over Consistency

Relational
ACID Transactions

NoSQL
Eventual Consistency

Eventual Consistency



What's in a Name

NoSQL

What's in a Name

NoSQL

What's in a Name

Not only SQL

Non-SQL

Non-Relational

NoSQL

CHADGREEN

What's in a Name

Not only SQL

Non-SQL

Non-Relational

NoSQL

CHADGREEN

What's in a Name

No-Schema

Not only SQL

Non-SQL

Non-Relational

NoSQL

Many types of NoSQL databases

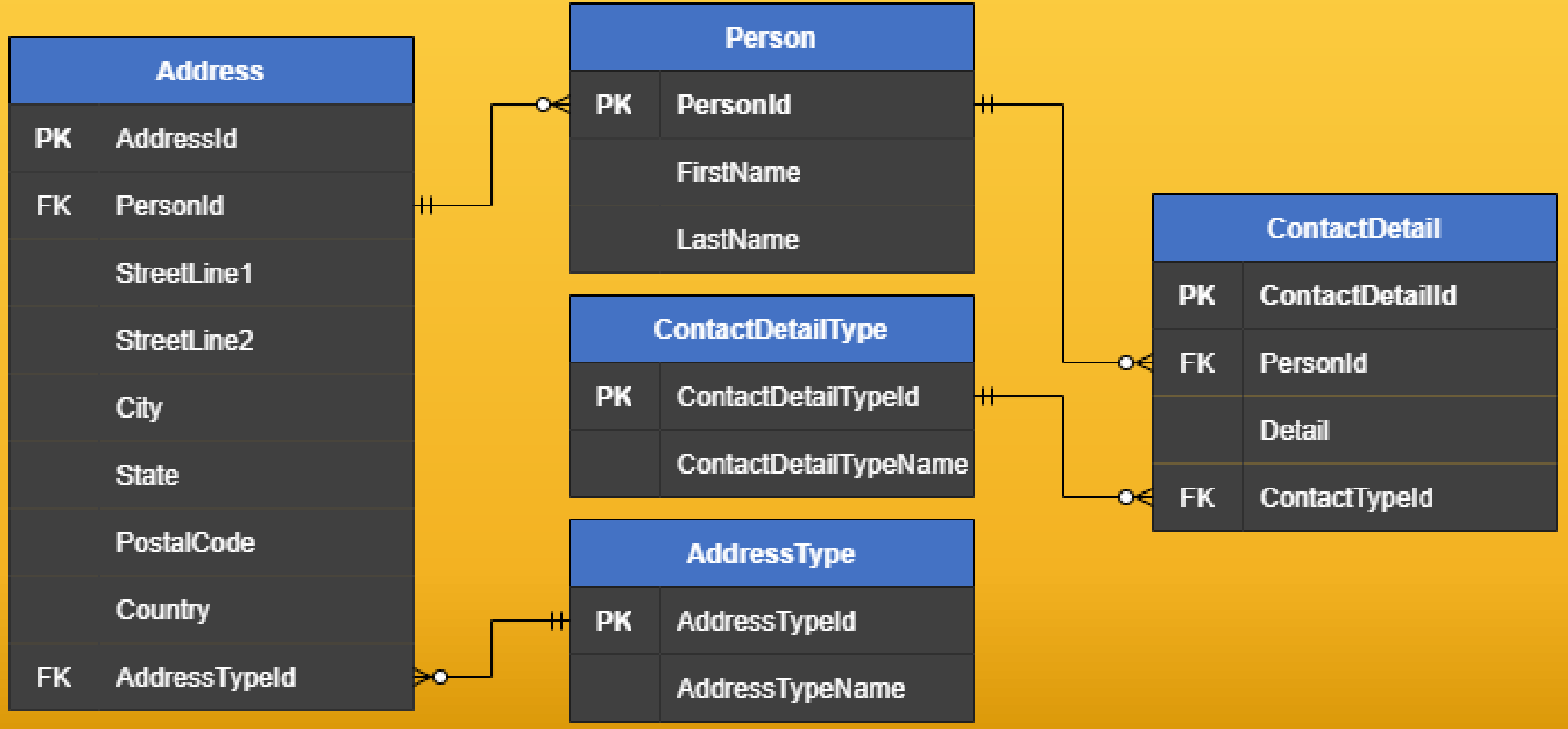
Couchbase

Document

CouchDB

ArangoDB

Typical Relational Model



Same but in a document database

```
{
  "id": "1",
  "firstName": "Thomas",
  "lastName": "Andersen",
  "addresses": [
    {
      "city": "Seattle",
      "state": "WA",
      "type": {
        "name": "Primary"
      }
    }
  ],
  "contactDetails": [
    {
      "detail": "First Detail",
      "type": {
        "name": "A detail type"
      }
    }
  ]
}
```

Many types of NoSQL databases

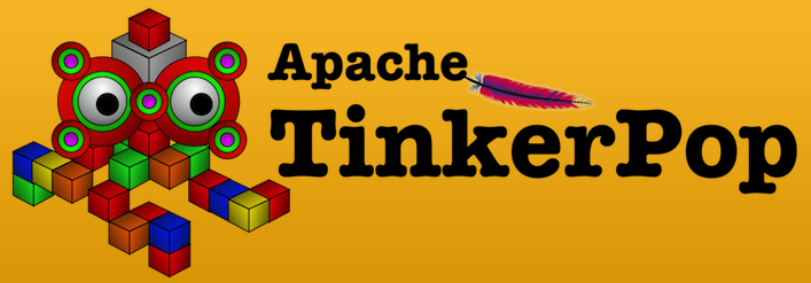
Key-Value

Many types of NoSQL databases

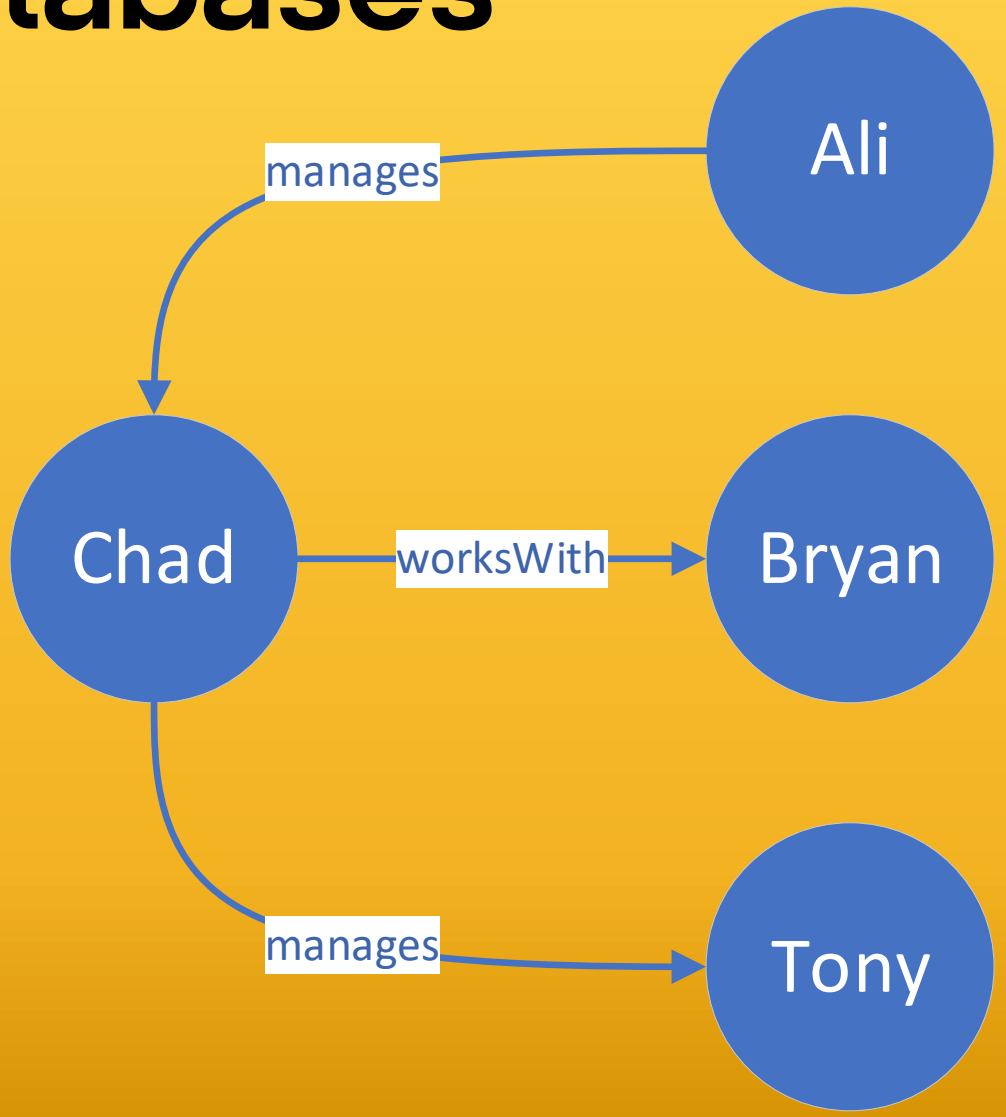
Wide Column

Many types of NoSQL databases

Graph



Graph Databases



Many types of NoSQL databases

Document

Key-Value

Wide Column

Graph

Object

Tabular

Tuple Store

Triple Store

Picking a Data Store

Data Model Comparison

Data Model	Performance	Scalability	Flexibility	Complexity	Functionality
Key-Value Store	High	High	High	None	Variable (None)
Column Store	High	High	Moderate	Low	Minimal
Document Store	High	Variable (High)	High	Low	Variable (Low)
Graph	Variable	Variable	High	High	Graph Theory
Relational	Variable	Variable	Low	Moderate	Relational Algebra

Ben Scofield – NoSQL presentation at CodeMash 2010

Things to think about

Skillset

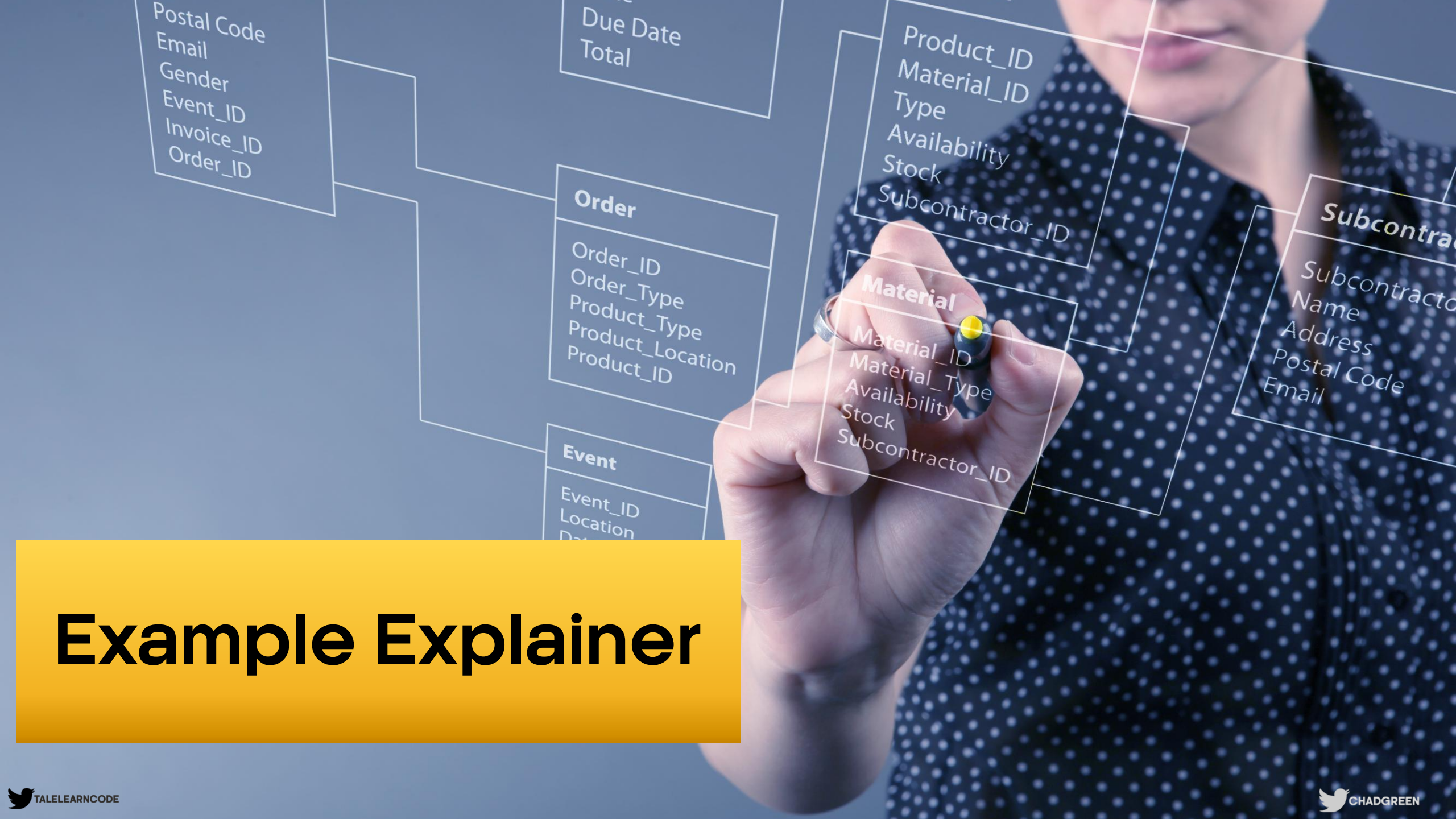
Time to Market

Known Data Structure

Scalability

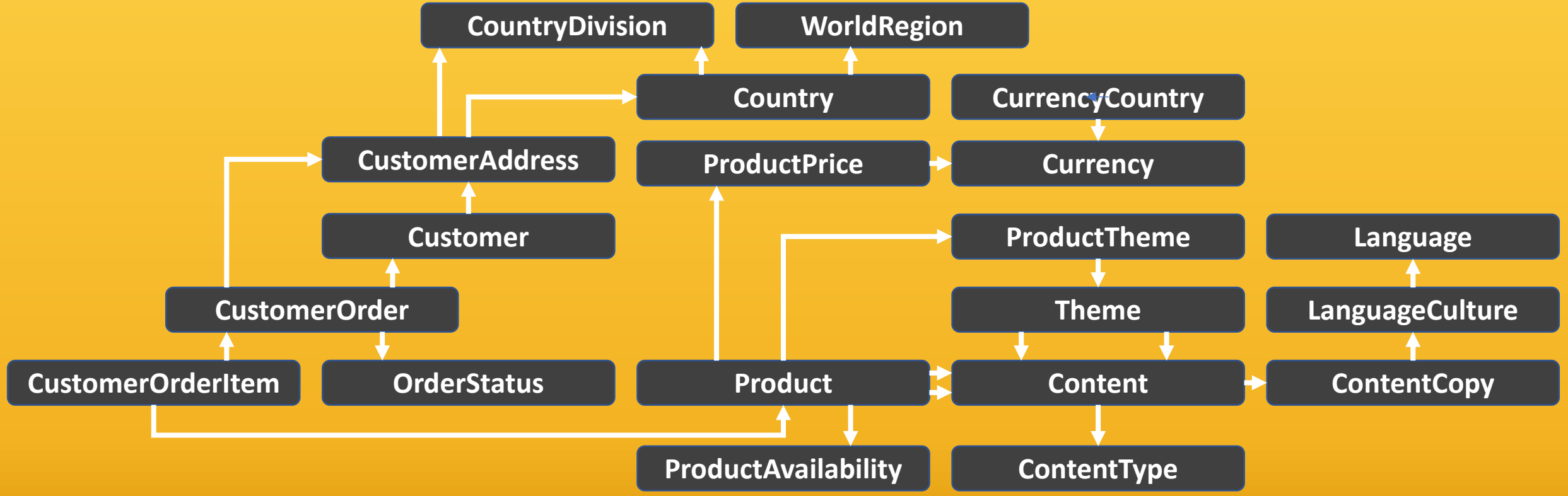
Don’t forget

Hybrid



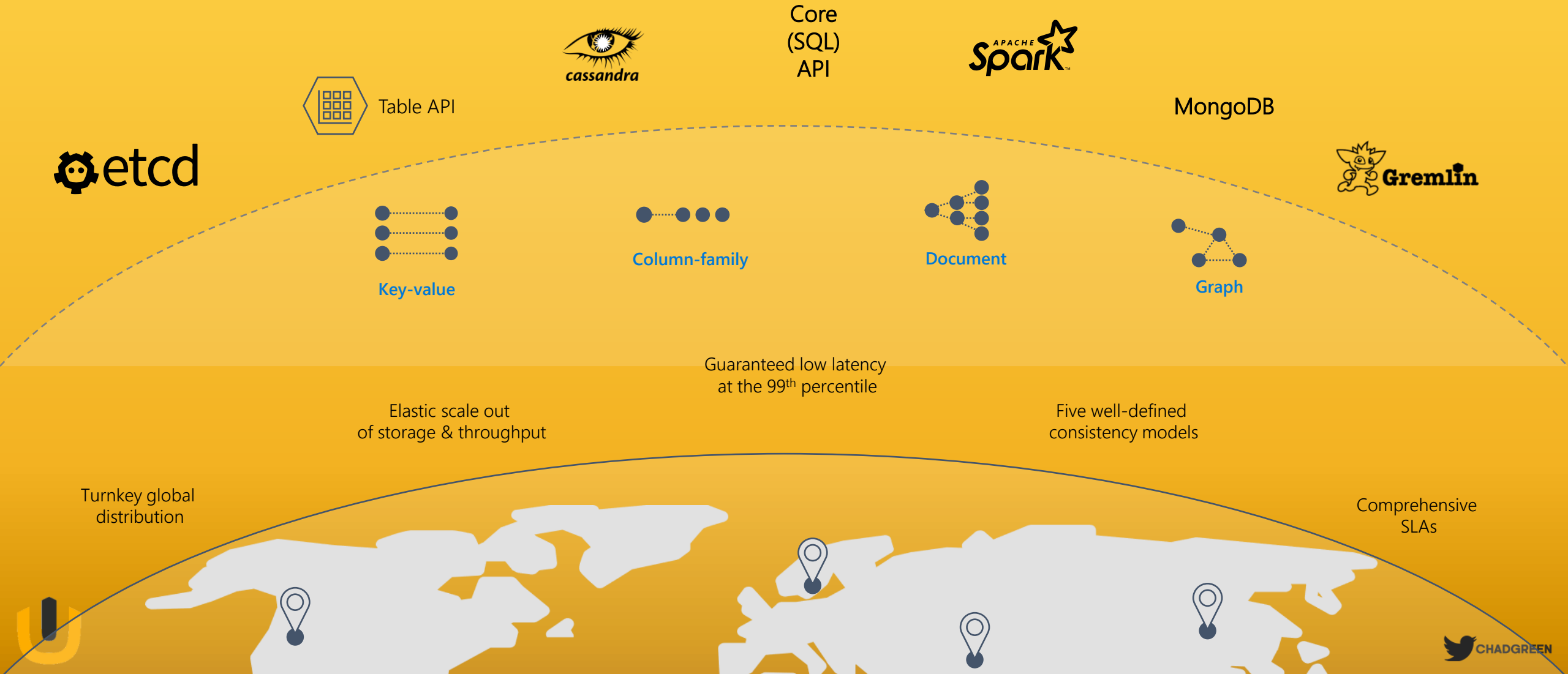
Example Explainer

Data Model


CountryDivision
WorldRegion
Country
CurrencyCountry
CustomerAddress
ProductPrice
Currency
Customer
ProductTheme
Language
CustomerOrder
Theme
LanguageCulture
CustomerOrderItem
OrderStatus
Product
Content
ContentCopy
ProductAvailability
ContentType

Very Quick Into to Cosmos DB

Azure Cosmos DB



Which Azure Cosmos DB Data API?

Core
(SQL)
API

Core (SQL) API

Which Azure Cosmos DB Data API?

Core (SQL) API

MongoDB

Which Azure Cosmos DB Data API?

Core (SQL) API

Table Storage

Which Azure Cosmos DB Data API?

Core (SQL) API

Gremlin

Which Azure Cosmos DB Data API?

Core (SQL) API

Cassandra

Migrating to NoSQL

Database Considerations

- Data Model/API

Database Considerations

- Data Model/API
- Document Structure

Database Considerations

- Data Model/API
- Document Structure
- Partition Key

- Access Patterns
- Even Data Distributions
- Cardinality
- Query Isolation
- Write Patterns
- Data Growth
- Familiarity with Data
- Data Relationship
- Cost Considerations
- Immutable Properties
- Data Size
- Trial and Error

Database Considerations

- Data Model/API
- Document Structure
- Partition Key
- Indexing

Database Considerations

- Data Model/API
- Document Structure
- Partition Key
- Indexing
- Query Performance

Database Considerations

- Data Model/API
- Document Structure
- Partition Key
- Indexing
- Query Performance
- Consistency Level

Database Considerations

- Data Model/API
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- Partition Key
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- Query Performance
- Consistency Level
- Time-to-Live (TTL)

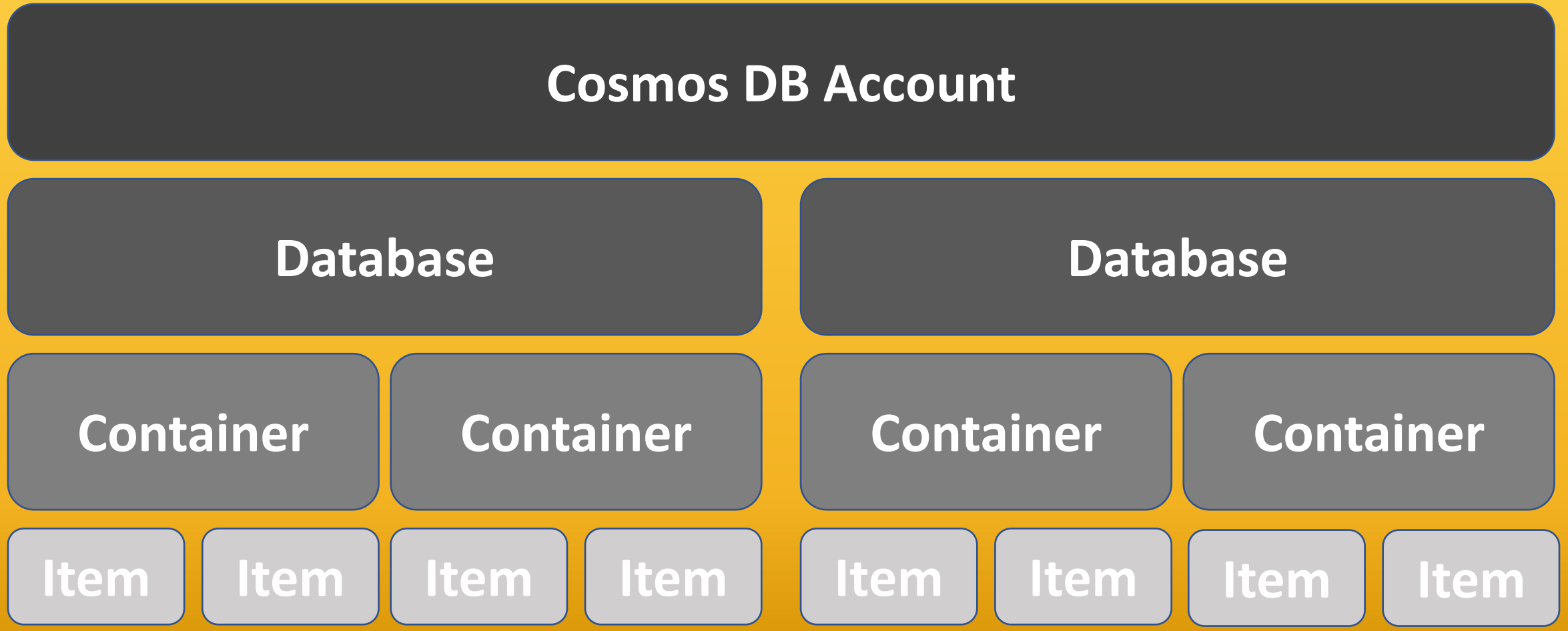
Database Considerations

- Data Model/API
- Document Structure
- Partition Key
- Indexing
- Query Performance
- Consistency Level
- Time-to-Live (TTL)
- Data Migration

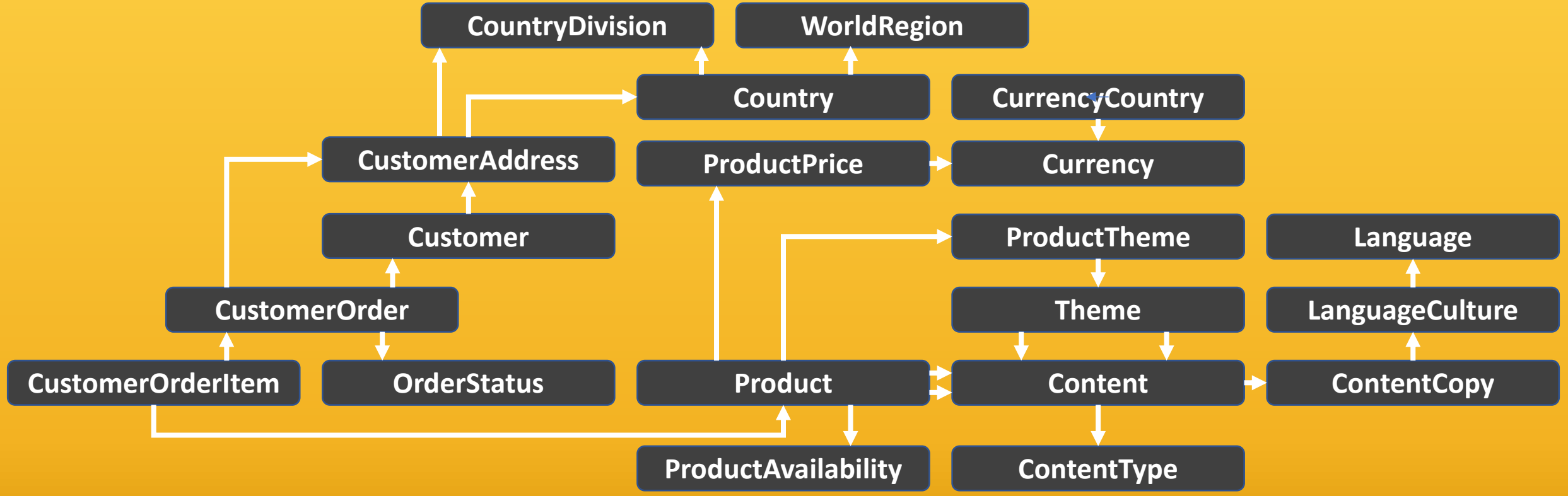
Database Considerations

- Data Model/API
- Document Structure
- Partition Key
- Indexing
- Query Performance
- Consistency Level
- Time-to-Live (TTL)
- Data Migration
- Versioning and Evolution

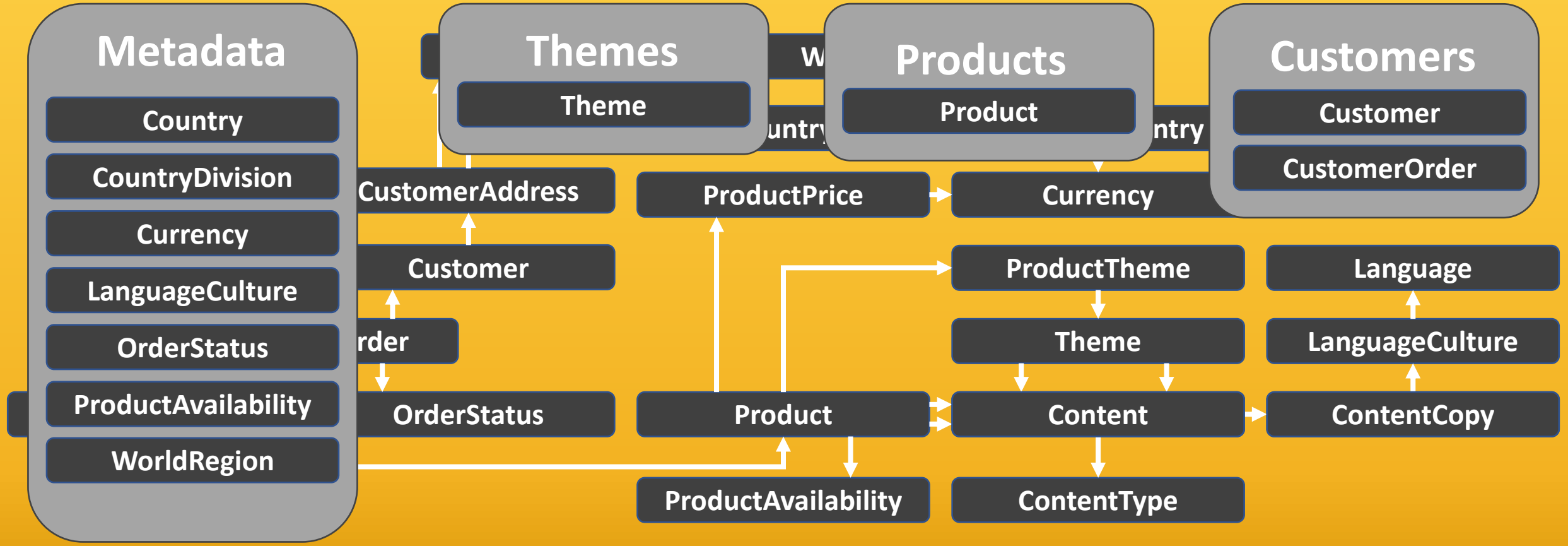
Document Database Structure



Data Model


CountryDivision
WorldRegion
Country
CurrencyCountry
CustomerAddress
ProductPrice
Currency
Customer
ProductTheme
Language
CustomerOrder
Theme
LanguageCulture
CustomerOrderItem
OrderStatus
Product
Content
ContentCopy
ProductAvailability
ContentType

Data Model



CHADGREEN

Data Model

Metadata

- Country
- CountryDivision
- Currency
- LanguageCulture
- OrderStatus
- ProductAvailability
- WorldRegion

Themes

- Theme

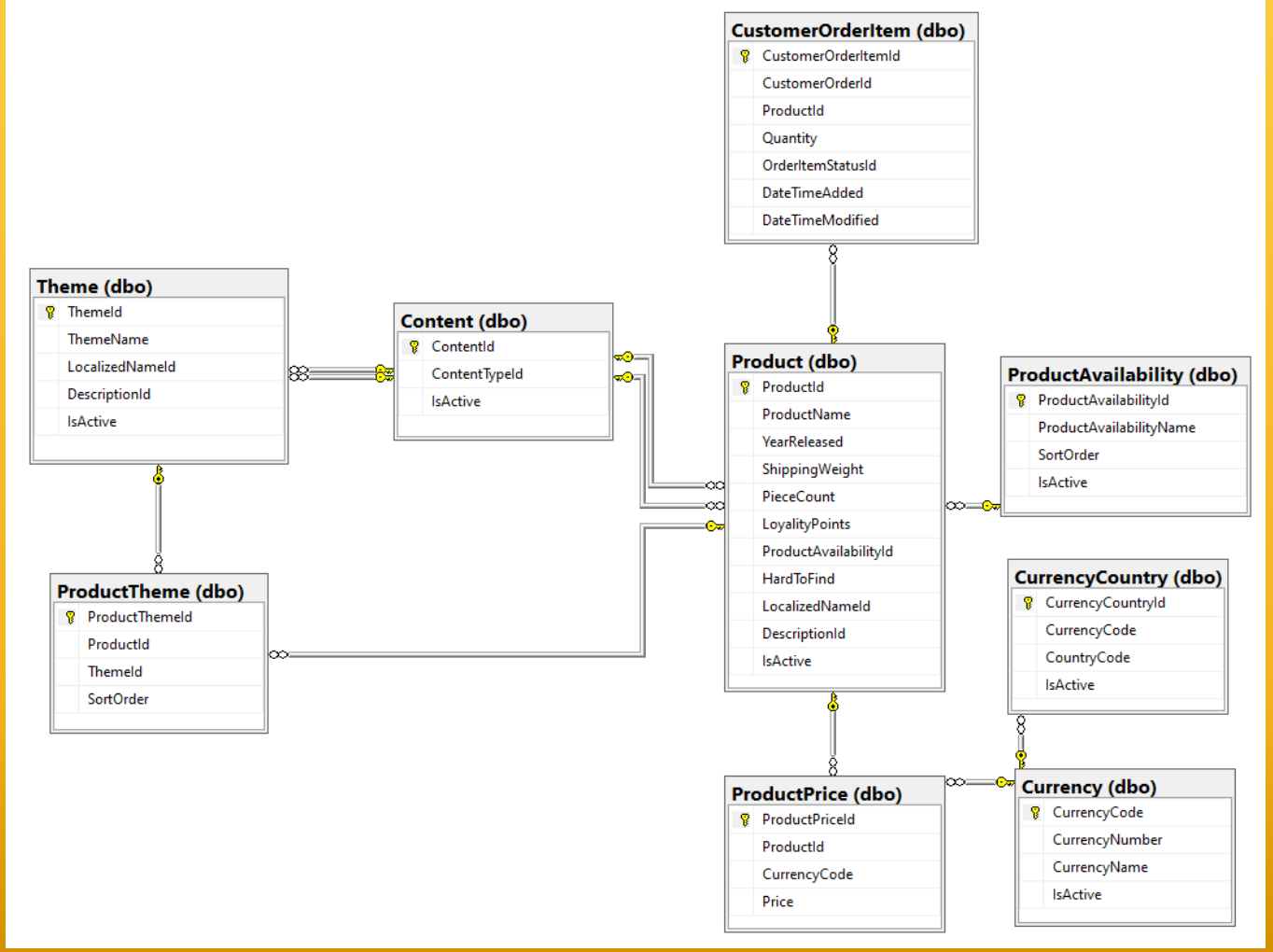
Products

- Product

Customers

- Customer
- CustomerOrder

Data Model - Theme



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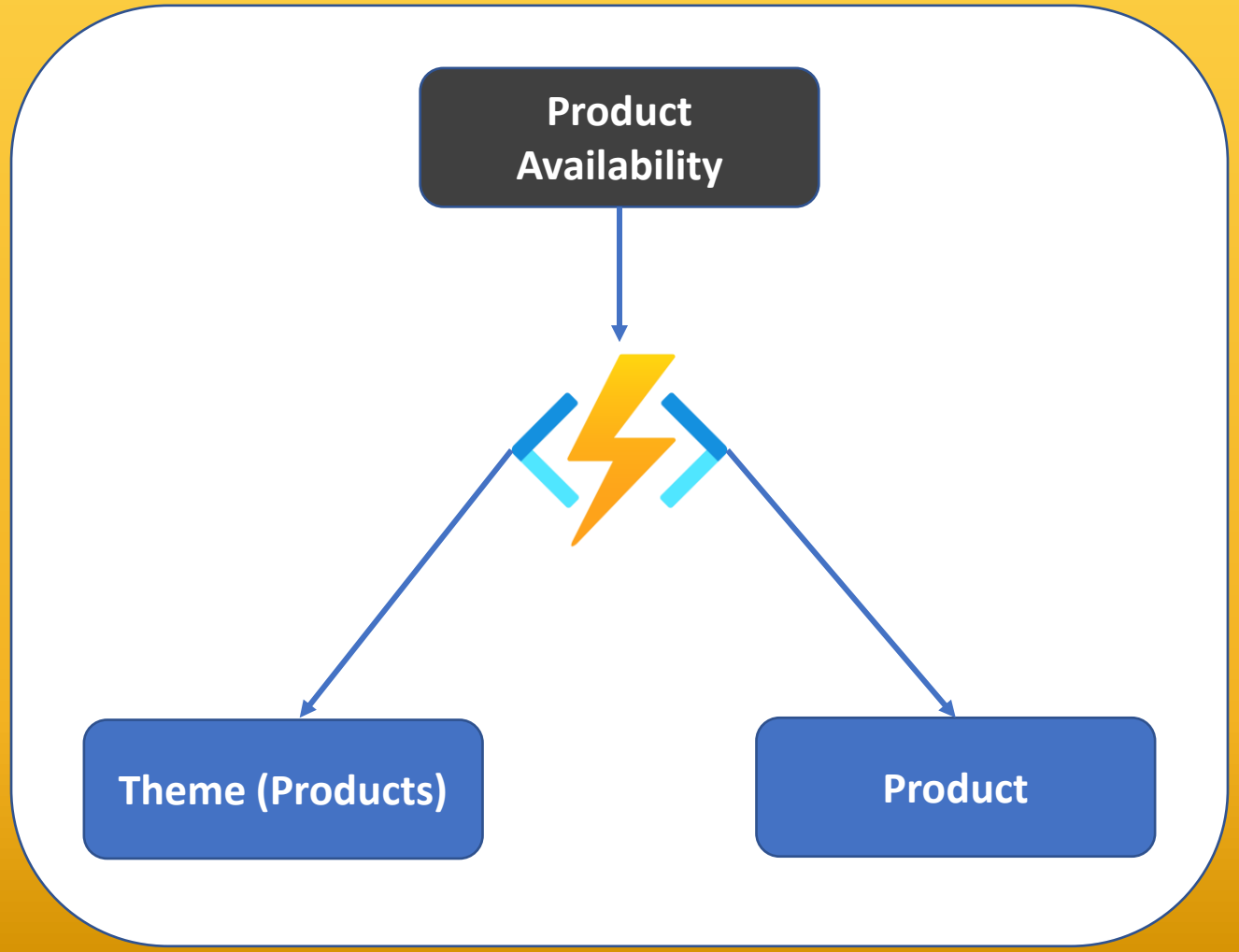
Data Model – Theme

Reference Types



Code Examples

Best Tool(s) for the Job

Thank You

chadgreen@chadgreen.com

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