Extensible Entity Data Modeling @Uber

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Uber

Agenda

01 Transportation Business

02 Extensible Entity Data Model

Transportation Business

Early Days

Rider

Vehicle

Driver

Transportation Today

- Personal Transport
- Food Delivery
- Bikes and Scooters
- Business Rides
- Non emergency Health Rides
- Freight Delivery
- Fleets
- Many more ….

Key Themes

Privacy and Security

Protect customer data

Users & Businesses as Customers

Support users as well as business customers

One Customer, Many Roles

Customers with multiple product centric profiles, beyond riders/drivers

Relationships between Customers

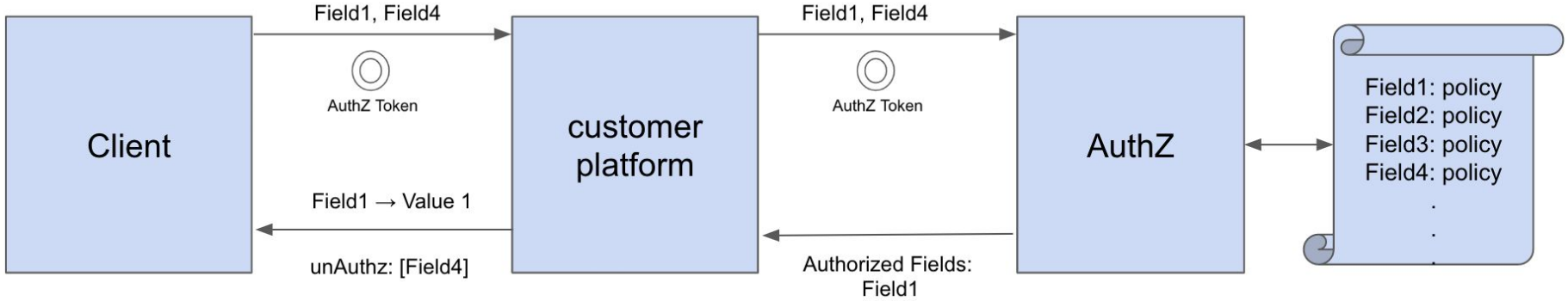
Employees, restaurants chains, multinational enterprise hierarchy

Agility & Extensibility

Easy to add new line of business

Privacy and Security

- Fraud
- Encryption
- Field Level Authorization



One Entity, Many Roles

Rider
Eater
Biker

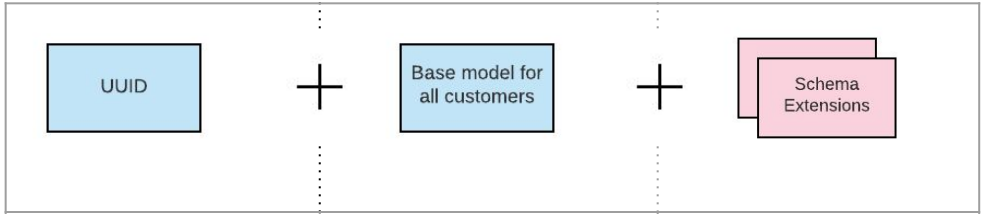
A Restaurant

Fleet Driver
Car Driver
Courier

Customer Types	Rider	Driver	Courier	Restaurants	Employee	...
Common Requirements	Fraud, Safety, Privacy, Encryption, Financial Compliance, . . .					
Specific Requirements	Good Rating, Valid Payment method	Car, Good Rating, Valid driver licence	Bike or Car	Physical location	Employment status	...

Extensible Entity Data Model

Data Model for Entity



Unique identifier	Common schema shared by all customers.	Specific extensions per type of customer and line of business.

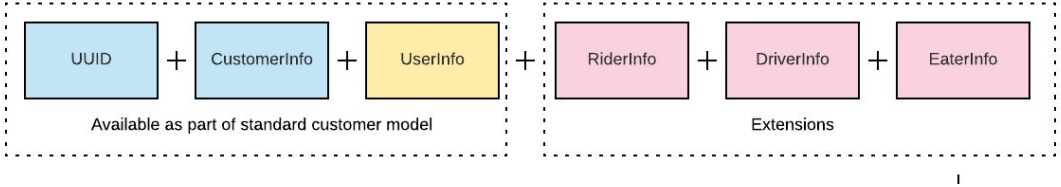
```
message Customer {
  UUID id = 1;
  BaseCustomer base = 2;
  map<string, common.Extension> extensions = 3;
}

message Extension {
  google.protobuf.StringValue name = 1;

  // A serialized schema conforming message,
  // schema controlled by products
  google.protobuf.Any proto = 2;
}
```

Ride Sharing Data Model

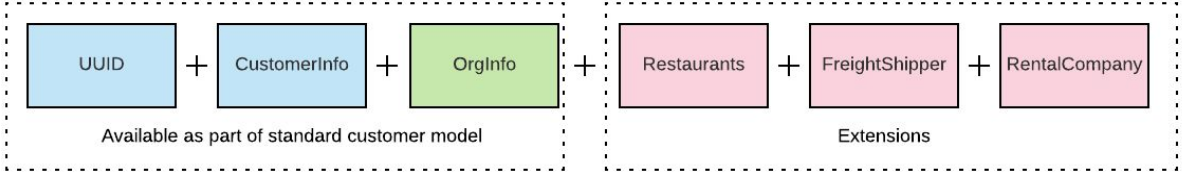
Polymorphic User Data Modeling
Enable the same Uber account to have multiple product centric profiles



Rapid Data Model Extensibility

- Quickly introduce new roles for users, reduced time to market
- Extend existing users with schema validation as business evolves
- Enable self-serve extensions

Business Data Model



Enable first-class entities for new business verticals

Rapid Data Model Extensibility

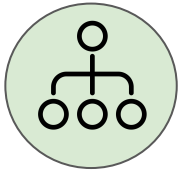
- Quickly introduce new types of business customers, reduced time to market
- Extend existing business with schema validation as they use multiple Uber products
- Enable self-serve extensions

Data Model for Relationships

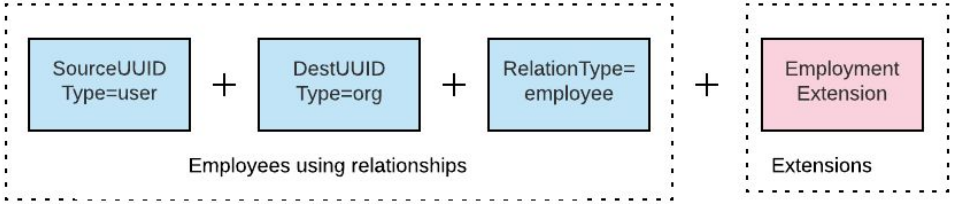
Relationships between entities in a NoSQL distributed infra

The type and uuid of the source customer (either user or business)	The type and uuid of the destination customer.	Unique type for relationship between these two entities	Additional data on the relationship edge

Employee Relationships



Enable many to many relationships between users and businesses

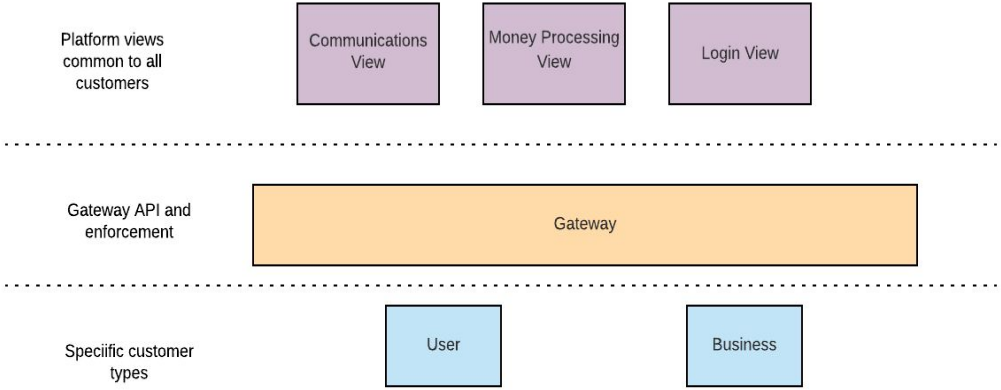


Flexible Model for Relationships in a NoSQL Backend

- Set up user to business relationships, allowing coherent product experience for all employees of a business
- Set up enterprise chains to get global view of accounts

Platform Integrations

- Seamless, common integrations with major platforms
  - Communications
  - Payments
  - Onboarding & Compliance
- Shield platforms that should not care about specific customer types via views
- New types and their semantics are correctly recognized throughout the Uber ecosystem



Thank you!