

RARE NUTRITION



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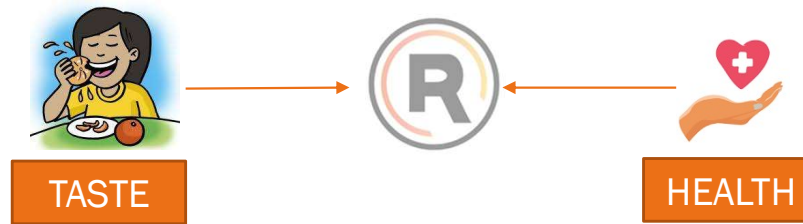
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Current Situation and Project Objective



Overview:

Rare Nutrition is posed as a staple product line across the United States and beyond built on the foundation of healthcare and senior living

Situation:

Currently the organization manages data using excel sheets, but wants to migrate to databases as they have the advantage to handle large volumes of data

Objective:

To create a database for Rare Nutrition that is reliable, up-to-date and that can be used to make decisions across the organization



Business Scenario and Project Overview

Business Rules:

An employee of Rare Nutrition can service a minimum of 1 and a maximum of 3 orders and one order can be serviced by a minimum of 1 and a maximum of 3 employees.

One order can have up to any number of products/items and one order must have at least one product/item. One product can be a part of many orders and must be a part of minimum one order. There are two types of products that Rare Nutrition manufactures –Pancakes and Cakes.

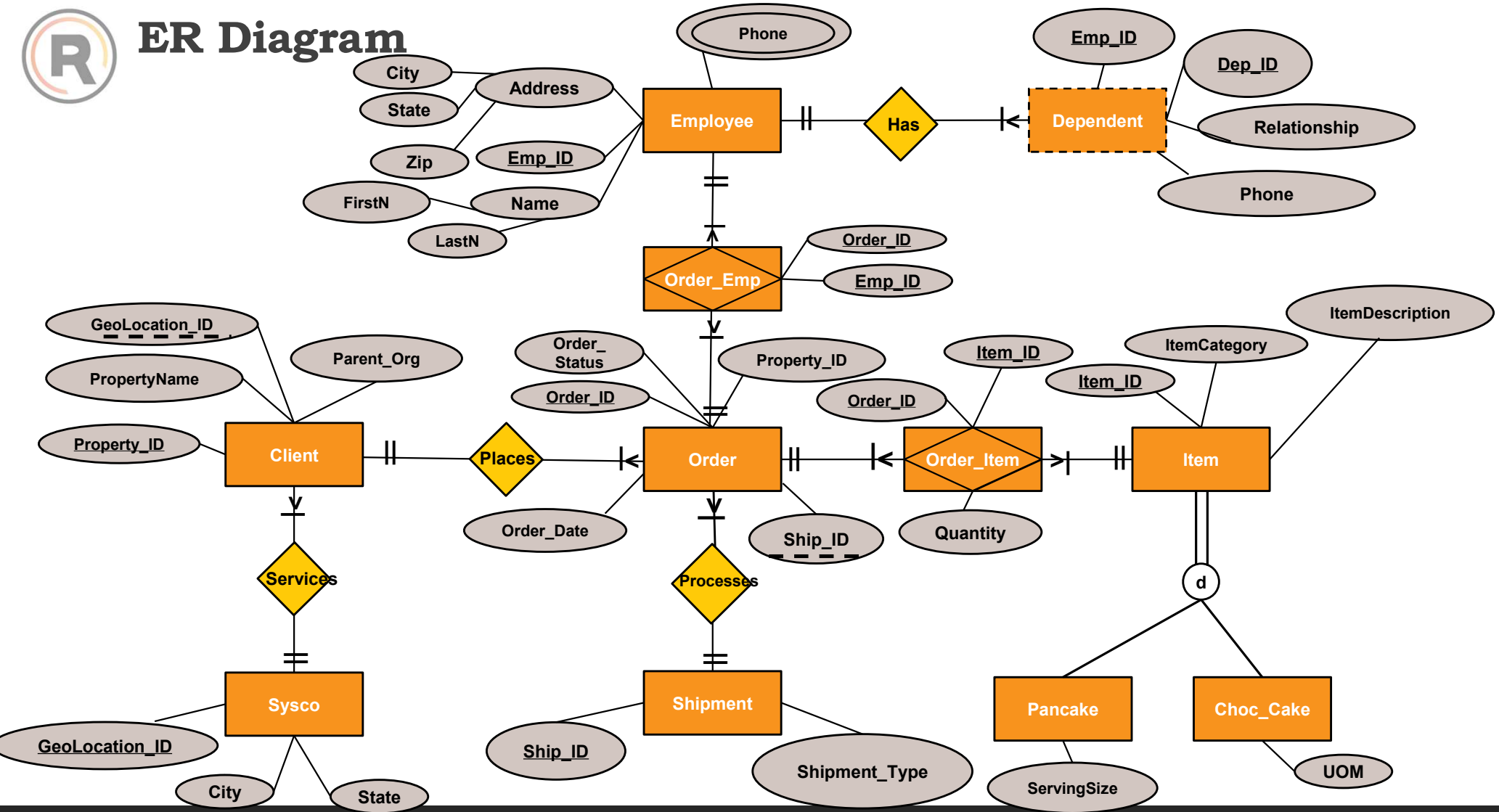
One Order is processed as one and only one shipment and one shipment can have up to 20 orders and must have at least one order.

One Client can be present only in one geo location whereas one geo location can have at least one client and up to many clients.

The information about dependents of the employees also needs to be stored.



ER Diagram





Relational Schema

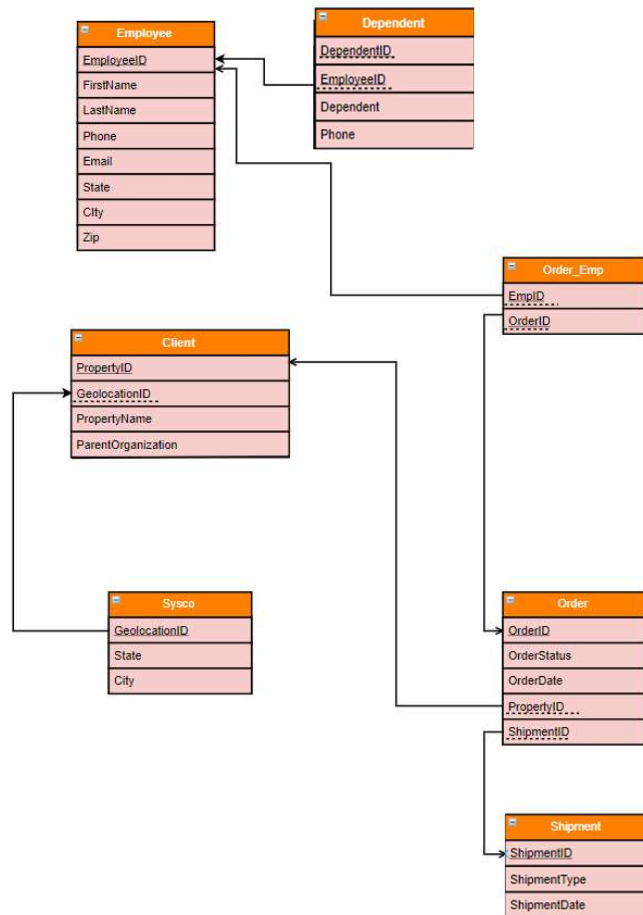


Table Name	Primary Key	Foreign Key
Employee	EmployeeID	
Dependent	EmployeeID, DependentID	EmployeeID, DependentID
Order_Emp	EmplID, OrderID	EmplID, OrderID
Client	PropertyID	GeolocationID
Sysco	GeolocationID	
Order	OrderID	PropertyID, ShipmentID
Order_Item	OrderID, ItemID	OrderID, ItemID
Item	ItemID	
Shipment	ShipmentID	
Pancake	ItemID	ItemID
Choc_cake	ItemID	ItemID



Normalization

Initially, the database consisted of 2 master tables with ~10 columns each

Property ID	Order ID	Parent Organisation	Property Name	GeoLocation ID	State	City	OrderStatus	OrderDate	ShipmentID
128	3948087	Focused Acute Partners	Focused Care at Orange	69OJ7	Texas	Orange	Shipped	5/11/2022	128
108	3977812	Stonegate	Baybrooke Village Care and Rehabilitation Center	C1W33	Texas	McKinney	Shipped	5/25/2022	108
18	4010754	Frontier Management	Sagebrook Senior Living at Bellevue	3JQON	Washington	Bellevue	Shipped	6/5/2022	18
124	4047601	Frontier Management	Homplace Special Care at Oak Harbor	7S096	Washington	Oak Harbor	Shipped	6/23/2022	124
47	4099413	Focused Acute Partners	Focused Care at Crane	N9447	Texas	Crane	Shipped	7/25/2022	47
140	4107687	Stonegate	Accel Rehabilitation Hospital of Plano	B02NJ	Texas	Plano	Shipped	7/29/2022	140
15	4175650	Focused Acute Partners	Focused Care at Summer Place	M6J1L	Texas	Beaumont	Shipped	9/6/2022	15
70	4176867	Frontier Management	Crescent Landing at Garden Grove Memory Care	A4DFX	California	Garden Grove	Shipped	9/7/2022	70
91	4180482	Sonata Senior Living	Sonate Hunter's Creek	8ZBHY	Florida	Kissimmee	Shipped	9/9/2022	91
63	4180483	Frontier Management	The Terrace at Beverly Lake A Memory Care Residence	HCP49	Washington	Everett	Shipped	9/9/2022	63
69	4180484	Frontier Management	Crescent Landing at Fullerton Memory Care	9C4Q8	California	Fullerton	Shipped	9/9/2022	69
14	4185181	Focused Acute Partners	Focused Care at Cedar Bayou	50CLF	Texas	Baytown	Shipped	9/12/2022	14
64	4196944	Pegasus	The Village at Rancho Solano	72PU7	California	Fairfield	Shipped	9/20/2022	64

Insertion Anomaly :

We cannot enter client information as a prospect if they have not placed an order.

Updation Anomaly :

Modification in the name of Frontier Management will cause changes in multiple rows

Deletion Anomaly :

Deleting the highlighted order details will delete information about property too !



Normalization 1st Normal Form

Only `Employees` had multivalued attribute

Old form: ONF

EmployeeID	EmployeePhone
100138	(430) 412-5763,(430) 412-5764
100479	(767) 841-3239
100409	(977) 542-2296
100383	(757) 502-8045
100071	(429) 421-3552
100012	(642) 461-5645
100261	(978) 707-2915
100347	(324) 406-0398
100012	(427) 410-5314,(427) 410-5315
100075	(689) 747-1088,(689) 747-1089
100453	(487) 495-9679
100430	(917) 334-8239



New form: 1NF

EmployeeID	EmployeePhone
100041	(430) 412-5763
100041	(430) 412-5764
100125	(767) 841-3239
100054	(977) 542-2296
100123	(757) 502-8045
100168	(429) 421-3552
100291	(642) 461-5645
100472	(978) 707-2915
100194	(324) 406-0398
100382	(427) 410-5314
100382	(427) 410-5315
100232	(689) 747-1088
100232	(689) 747-1089
100103	(487) 495-9679
100212	(917) 334-8239
100142	(893) 719-145



Normalization 2nd Normal Form

Every tuple contains exactly 1 value for each attribute – 1NF Satisfied.

OrderID	ItemID	ItemCategory	ItemDescription	UOM	OrderStatus	OrderDate	PropertyID	Quantity	ShipmentID	ShipmentType
3948087	BPM911621-1	Pancake	Vegan Pancake Case	0	Shipped	5/11/2022	128	3	6528489	UPS 3 Day Select
3948087	BPM911621-1	Pancake	Vegan Pancake Case	0	Shipped	5/11/2022	128	2	6528489	UPS 3 Day Select
3948087	BPM911621-2	Pancake	Chocolate Pancake Case	0	Shipped	5/11/2022	128	3	6528489	UPS 3 Day Select
3948087	BPM911621-2	Pancake	Chocolate Pancake Case	0	Shipped	5/11/2022	128	2	6528489	UPS 3 Day Select
3948087	BPM911621-4	Pancake	Sweet Potato Pancake Case	0	Shipped	5/11/2022	128	4	6528489	UPS 3 Day Select
3948087	BPM911621-5	Pancake	Blueberry Pancake Case	0	Shipped	5/11/2022	128	3	6528489	UPS 3 Day Select
3948087	BPM911621-6	Pancake	Carrot Pancake Case	0	Shipped	5/11/2022	128	1	6528489	UPS 3 Day Select
3948087	BPM911621-7	Pancake	Japanese Souffle Pancake Case	0	Shipped	5/11/2022	128	2	6528489	UPS 3 Day Select
3948087	BPM911621-8	Pancake	Pineapple Pancake Case	0	Shipped	5/11/2022	128	4	6528489	UPS 3 Day Select
3948087	BPM911621-9	Pancake	Ketto Pancake Case	0	Shipped	5/11/2022	128	3	6528489	UPS 3 Day Select
3948087	CCM910148-2	Cake	Chocolate Cake Pouch	EA	Shipped	5/11/2022	128	1	6528489	UPS 3 Day Select
3948087	CCM910150-2	Cake	Double Chocolate Cake Pouch	EA	Shipped	5/11/2022	128	4	6528489	UPS 3 Day Select
3977812	15113	Cake	Oreo Biscuit Cake Case	CS	Shipped	5/25/2022	108	1	1186304	UPS NDA Saver
3977812	15113	Cake	Oreo Biscuit Cake Case	CS	Shipped	5/25/2022	108	5	1186304	UPS NDA Saver
3977812	15115	Cake	Carrot Cake Case	CS	Shipped	5/25/2022	108	5	1186304	UPS NDA Saver

OrderID, ItemID → Quantity

OrderID → OrderStatus, OrderDate, PropertyID, ShipmentID, ShipmentType

ItemID → ItemCategory, ItemDescription, UOM

Every non-key attribute is **NOT FULLY** functionally dependent on the primary key



Decomposition to 2NF

OrderID (OrderID, OrderStatus, OrderDate, PropertyID, ShipmentID, ShipmentType)

OrderID	OrderStatus	OrderDate	PropertyID	ShipmentID	ShipmentType	Shipment Date
3948087	Shipped	5/11/2022	128	6528489	UPS 3 Day Select	5/14/2022
3977812	Shipped	5/25/2022	108	1186304	UPS NDA Saver	5/28/2022
4010754	Shipped	6/5/2022	18	6528489	UPS 3 Day Select	6/8/2022
4047601	Shipped	6/23/2022	124	3553097	FedEx Ground	6/28/2022

OrderID, ItemID → Quantity

OrderID → OrderStatus, OrderDate, PropertyID, ShipmentID, ShipmentType

ItemID → ItemCategory, ItemDescription

Order_Item(OrderID, ItemID, Quantity)

Item_ID	Order_ID	Quantity
15111	4099413	1
15111	4176867	2
15111	4180482	2
15111	4180483	5
15111	4203335	5
15111	4204075	2
15111	4204075	5
15111	4204100	1

ItemID (ItemID, ItemCategory, ItemDescription, UOM)

ItemID	ItemCategory	ItemDescription	UOM
15111	Cake	Chocolate Cake Case	CS
15112	Cake	Double Chocolate Cake Case	CS
15113	Cake	Oreo Biscuit Cake Case	CS
15114	Cake	Red Velvet Cake Case	CS
15115	Cake	Carrot Cake Case	CS
CCM910148-2	Cake	Chocolate Cake Pouch	EA
CCM910150-2	Cake	Double Chocolate Cake Pouch	EA
CCM910150-4	Cake	Oreo Biscuit Cake Pouch	EA
CCM910150-6	Cake	Red Velvet Cake Pouch	EA



Check if table is in 3rd Normal Form

OrderID (OrderID, OrderStatus, OrderDate, PropertyID, ShipmentID, ShipmentType)

OrderID	OrderStatus	OrderDate	PropertyID	ShipmentID	ShipmentType
4257570	Shipped	7/6/2022	40	3482984	FedEx Priority Overnight
4268423	Shipped	7/15/2022	14	3482984	FedEx Priority Overnight
4280135	Shipped	8/31/2022	101	3482984	FedEx Priority Overnight
4310475	Received	8/14/2022	109	3482984	FedEx Priority Overnight
4338558	Shipped	6/29/2022	124	3482984	FedEx Priority Overnight
4343425	Received	8/25/2022	106	3482984	FedEx Priority Overnight
4366918	Shipped	8/4/2022	43	3482984	FedEx Priority Overnight
4384198	Started	5/13/2022	102	3482984	FedEx Priority Overnight

OrderID → OrderStatus, OrderDate, PropertyID, ShipmentID
ShipmentID → ShipmentType, ShipmentDate

Transitive dependency exists – table NOT in 3NF !!
OrderID → ShipmentID → ShipmentType, ShipmentDate



Resolving into 3NF

OrderID → OrderStatus, OrderDate, PropertyID, ShipmentID
ShipmentID → ShipmentType, ShipmentDate

OrderID	OrderStatus	OrderDate	PropertyID	ShipmentID
4257570	Shipped	7/6/2022	40	3482984
4268423	Shipped	7/15/2022	14	3482984
4280135	Shipped	8/31/2022	101	3482984
4310475	Received	8/14/2022	109	3482984
4338558	Shipped	6/29/2022	124	3482984
4343425	Received	8/25/2022	106	3482984
4366918	Shipped	8/4/2022	43	3482984
4384198	Started	5/13/2022	102	3482984
4387472	Received	6/3/2022	81	3482984
4397784	Started	8/15/2022	139	3482984
4416920	Received	6/17/2022	23	3482984
4436634	Cancelled	6/17/2022	95	3482984

ShipmentID	ShipmentType
2308221	UPS Ground
6231958	WILL CALL
1186304	UPS NDA Saver
551152	UPS Next Day Air
8111357	UPS 2nd Day Air
6261423	UPS Ground Residential
6528489	UPS 3 Day Select
3553097	FedEx Ground
3482984	FedEx Priority Overnight

1NF ✓
2NF ✓
3NF ✓



Sample Data

Orders

OrderID	OrderStatus	OrderDate	PropertyID	ShipmentID
4047601	Shipped	6/23/2022	124	3553097
4196944	Shipped	9/20/2022	64	3553097
4210268	Cancelled	7/23/2022	98	3553097
4265418	Cancelled	6/1/2022	30	3553097
4265766	Cancelled	5/31/2022	35	3553097

Client

PropertyID	Geo Location ID	Parent Organization	PropertyName
1 K19IE		Frontier Management	Crescent Landing at Santa Ana Memory Care
2 9M1AR		Frontier Management	Timberwood Court Memory Care
3 YLN2M		Frontier Management	The Terraces at Via Verde
4 76818		Frontier Management	The Reserve at Amarillo
5 997BK		MBK Senior Living	The Commons at Dallas Ranch

Shipment

ShipmentID	ShipmentType
2308221	UPS Ground
6231958	WILL CALL
1186304	UPS NDA Saver
551152	UPS Next Day Air
8111357	UPS 2nd Day Air

Dependent

EmployeeID	DependentID	Relationship	Contact
200282	1200282	Spouse	951-262-3062
200282	1200283	Child	719-266-2837
200282	1200284	Child	618-625-8313
100226	1100226	Spouse	800-613-8840
100226	1100227	Child	888-447-5594

Item

ItemID	ItemCategory	ItemDescription	UOM	Serving
BPM911621-10	Pancake	Apple Spice Pancake Case		2
BPM911621-3	Pancake	Banana Pancake Case		3
BPM911621-5	Pancake	Blueberry Pancake Case		4
BPM911621-1	Pancake	Buttermilk Pancake Case		2
15115	Cake	Carrot Cake Case	CS	

Employee

EmployeeID	EmployeeFirstName	EmployeeLastName	EmployeeZip	EmployeeCity	EmployeeState	EmployeeEmail
200282	Ait Sidi	Karthikeyan	25193	Sylvester	West Virginia	Ait Ka@rare.com
200201	Chivukula	Enola	60180	Union	Illinois	ChivEn@rare.com
200178	Brown	Mia	51011	Chatsworth	Iowa	BrowMi@rare.com
200060	Champaigne	Brian	66070	Ozawkie	Kansas	ChamBr@rare.com

EmployeePhone

EmployeeID	EmployeePhone
200282	(767) 841-3239
200201	(462) 213-0513
200201	(462) 213-0514
200178	(812) 595-4436

Sysco

GeoLocation ID	State	City
YLN2M	California	Al-Dimas
997BX	California	Antioch
27G16	California	Apple Valley
X5UHN	California	Citrus Heights
563CI	California	Corona

ItemCakes

ItemID	UOM
15111	CS
CCM910148-2	EA
15112	CS
CCM910150-2	EA

ItemPancakes

ItemID	Serving
BPM911621-1	2
BPM911621-2	3
BPM911621-3	3
BPM911621-4	2

Order_Emp

EmployeeID	OrderID
100138	4713000
100028	4593305
100262	4307159
100490	4555452
100392	4745218

Order Item

Item_ID	Order_ID	Quantity
15111	4099413	1
15111	4176867	2
15111	4180482	2
15111	4180483	5
15111	4203335	5

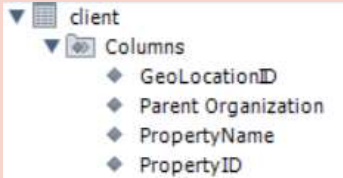
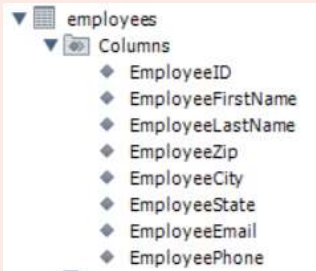
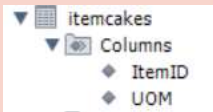
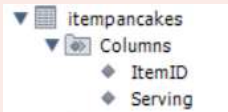


Database

TABLE	ROW COUNT	COL COUNT	DESCRIPTION
Client	142	4	List of clients belonging to a specific geographic region along with details for their parent organization
Employees	51	8	Employee details of people who are involved with preparing the order and shipping them
Itemcake	9	2	A sub-type of Items, which focus on variety of cakes
ItemPancake	12	2	A sub-type of items which focus on variety of pancakes
Items	21	2	Super-type of ItemCake and ItemPancake having generalized description
Order_Employee	74	2	Associative entity of Orders and Employees involved in preparing that order
Order_Item	6309	3	Associative entity of orders and items involved in each order
Orders	556	6	Details of an order to track the order date and shipment date
Shipment	9	2	Shipment type and its unique identifier
Sycso	142	3	Geographical locations where clients can reside

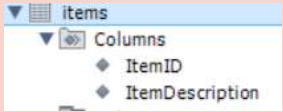
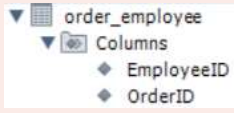
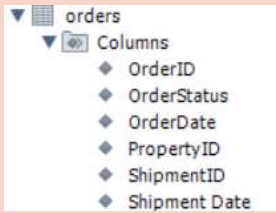
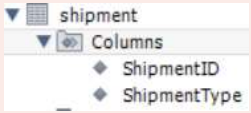
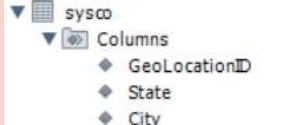


Database (Cont'd)

Table Name	Column List	Primary Key	Foreign Key
Client		PropertyID	GeoLocationID → SysCo(GeoLocationID)
Employees		EmployeeID	
ItemCake		ItemID	ItemID → Items(ItemID)
ItemPancakes		ItemID	ItemID → Items(ItemID)



Database (Cont'd)

Table Name	Column List	Primary Key	Foreign Key
Items		ItemID	
Order_Employee		EmployeeID, OrderID	EmployeeID → Employee(EmployeeID) OrderID → Orders(OrderID)
Orders		OrderID	PropertyID → Client (PropertyID) ShipmentID → Shipment (ShipmentID)
Shipment		ShipmentID	
Sysco		GeoLocationID	



Insights driven from SQL Queries

Sr.No	Queries	Purpose
1	List which clients' orders were cancelled the most?	Re-evaluate engagement with the client for future orders.
2	Which and how many items were ordered by the clients belonging to the parent Organization 'Frontier Management'?	Forecast the sales for Frontier Management and offer incentives based on the past orders for more engagement opportunities.
3	Which item is the most popular	Production can be scaled for that product
4	Which employees made the most orders?	Reward the employees based on the orders they handled
5	In which month the sales were highest and lowest?	Exploration on what factors contributed to low sales to get prepped for the next cycle
6	List the distinct States in which the corresponding Parent Organizations fall under.	Get insights with regards to the presence of Parent Organization
7	How ordered were made from Texas Clients?	Plan distribution based on forecasted orders for pancakes from Texas State
8	Which Cakes were least preferred by Clients from Florida in their order of preference?	Work on the feedback comments to improve the quality of product that is least preferred
9	Which pancake is the most sold to the clients	Scaling the raw material to make the desired pancake
10	Which Shipment Type is most preferred for Orders	Negotiate with the Shipment company for larger consignments.
11	Employee belong to mostly which state?	Using customer demographics, recruitment can be focused there
12	What is the average number of days between Order Received and Shipment?	To improve SLAs in future for faster delivery



Insights driven from SQL Queries

1

List which clients' orders were cancelled the most?

```
-- Which clients' orders were cancelled the most?
SELECT PropertyName, COUNT(1) AS Cancelled_Count
FROM Client C
LEFT JOIN orders O ON O.PropertyID = C.PropertyID
WHERE OrderStatus = 'Cancelled'
GROUP BY PropertyName
HAVING COUNT(1) = (SELECT COUNT(1) AS Cancelled_Count
FROM Client C
LEFT JOIN orders O ON O.PropertyID = C.PropertyID
WHERE OrderStatus = 'Cancelled' GROUP BY C.PropertyName ORDER BY COUNT(1) DESC LIMIT 1)
ORDER BY COUNT(1) DESC;
```

Cancelled Orders

MuirWoods Memory Care 5	Focused Care at Stonebriar 3	Village at LakeWest Independent Living 3	Focused Care at Orange 2	Lakewest Assited Living 2	Magnolia Court Assisted Living and Memory		Orchid Trail Senior Living 2	Pavilion at El Dorado Hills 2	Settlers Ridge Care Center 2
	Homplace Special Care at Oak Harbor 3	Walnut Creek Assisted Living and Memory Care 3	Stonefield Assisted Living and Memory	Timberwood Court Memory Care 2	Villages on MacArthur 2	Accel			
Simpson Place Assited Liing and Skilled Nursing 5	Lennwood Nursing & Rehabilitation 3	Bayside Terrace Assisted Living & Memory Care	The Auberge at Cypresswood 2	Crescent Landing at					
	Sonata Lake Mary 3	Briarcliff Skilled Nursing Center 2	The Auberge at Plano 2	Creston Village					
Crescent Landing at Fullerton Memory Care 3		Crescent Landing at Garden Grove Memory Care	The Auberge at Valley Ranch 2	Focused Care at	Heartis Arlington	Pelican Pointe	Pine Grive	Sonata Bynton Beach	Sonata Viera 1
Elk Grove Park 3	The Commons at Elk Grove 3	Dale Commons 2		Focused Care at	Heartis Longview	Stonemere		The	The
Focused Caer at Pasadena 3	The Groves at Mira Loma Senior Living 3	Edmonds Landing Assited Living 2	The Havens at Antelope Valley 2	Focused Care at	Island House	The Auberge at			
Focused Care at Brenham 3	The Village at Rancho Solano 3	Focused Care at LaMesa 2	The Preserve at Pensacola Senior Living	Focused Care at Fort	Oaks at Lebanon	The Preserve at		The Village at	
				Focused Care at	Ocean Ridge	The Reserve at		Vineyard Heights	

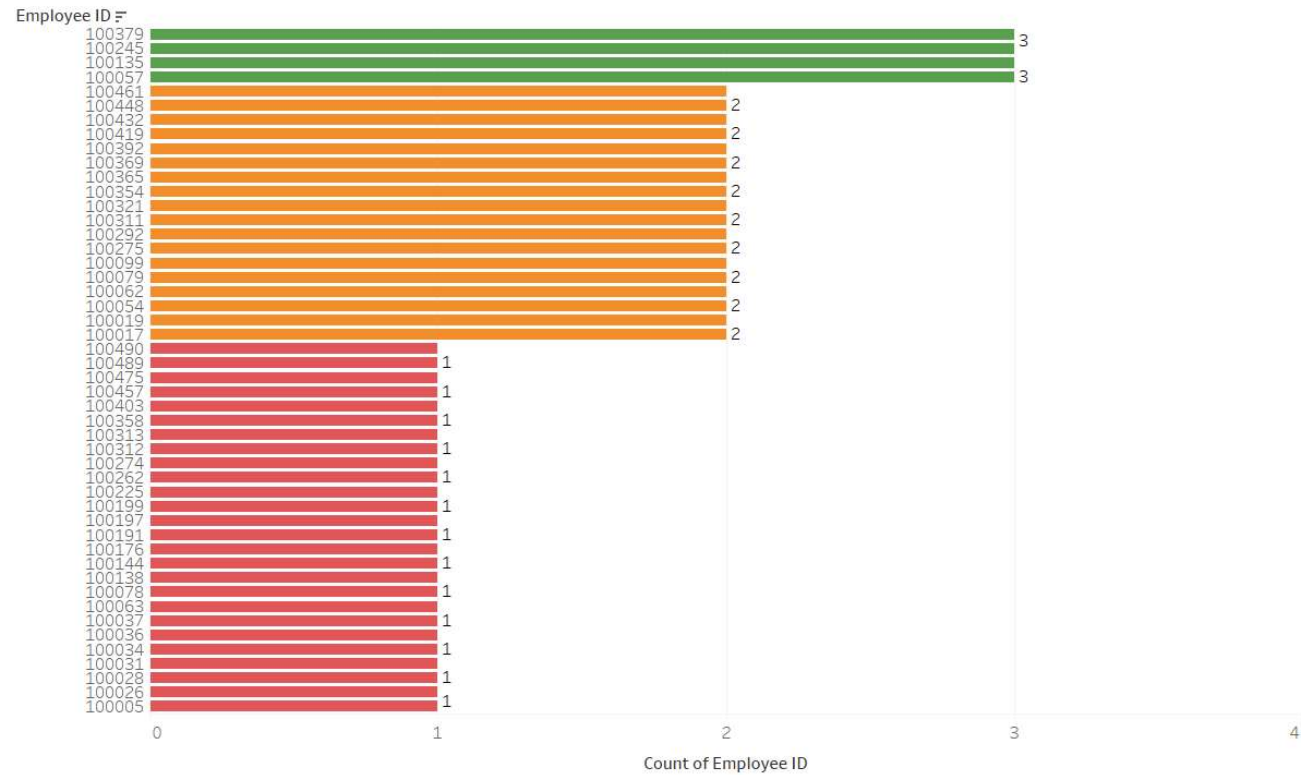


Insights driven from SQL Queries

4 Which employees made the most orders?

```
-- Which employees made the most orders?  
-- Rename the column as CSAT_Rating (could be awarded employee of the month)?  
SELECT COUNT(1) AS CSAT_Rating, EmployeeID  
FROM order_employee  
GROUP BY EmployeeID  
HAVING COUNT(1) =  
(SELECT COUNT(1) FROM order_employee  
GROUP BY EmployeeID ORDER BY COUNT(1) DESC LIMIT 1)  
ORDER BY COUNT(1) DESC;
```

Orders packed by Employees





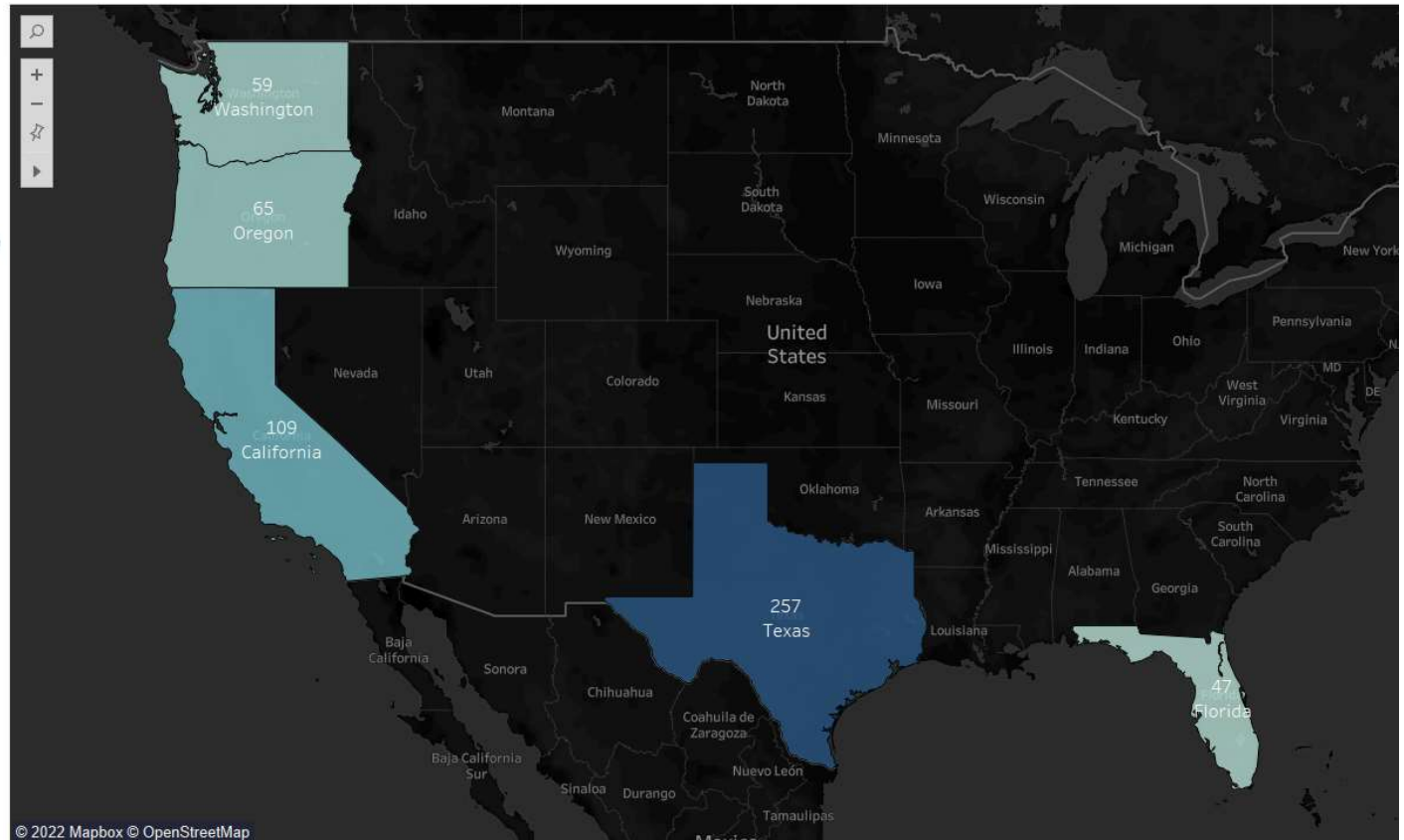
Insights driven from SQL Queries

7

Orders made by each state

```
-- How many order were made from Texas Clients?  
SELECT COUNT(DISTINCT OI.OrderID) AS OrderCount, State  
FROM order_item OI  
INNER JOIN orders O ON O.OrderID= OI.OrderID  
INNER JOIN client C ON C.PropertyID = O.PropertyID  
INNER JOIN sysco S ON S.GeoLocationID = C.GeoLocationID  
AND State = 'Texas'  
GROUP BY State;
```

Orders from various States





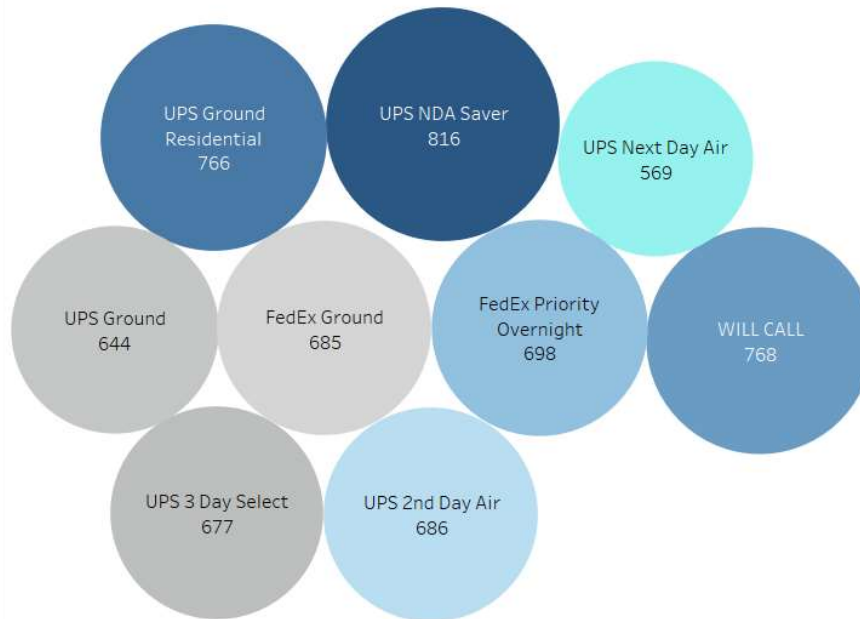
Insights driven from SQL Queries

10

Which Shipment Type is most preferred for Orders

```
-- Which Shipment Type is most preferred for Orders?  
SELECT COUNT(1) AS OrderCount , ShipmentType  
FROM orders O  
LEFT JOIN shipment S ON O.ShipmentID = S.ShipmentID  
GROUP BY ShipmentType  
ORDER BY COUNT(1) DESC;
```

Preferred Shipment Type



Thank You

