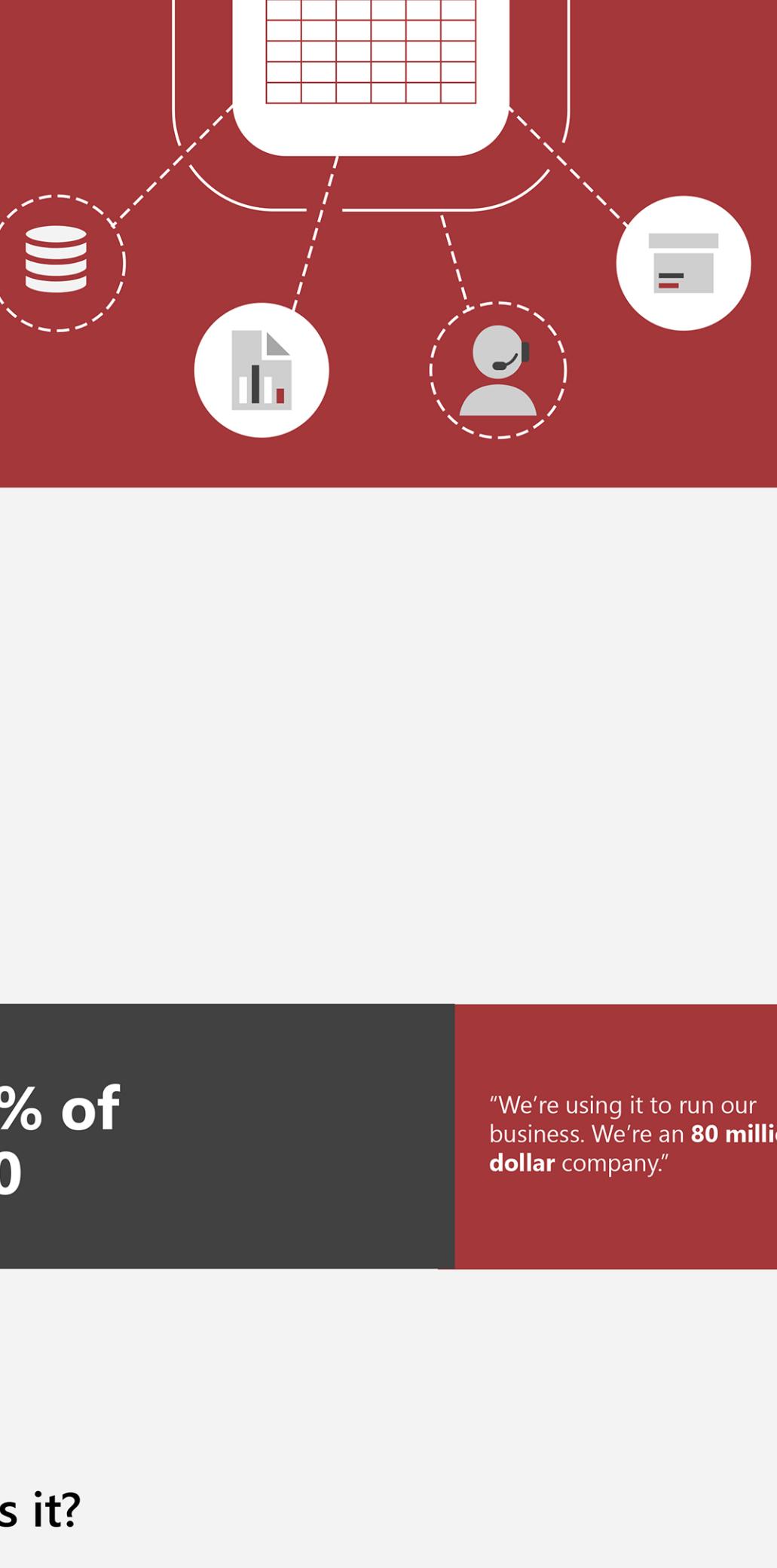




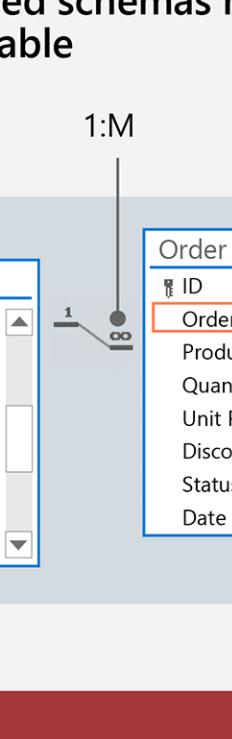
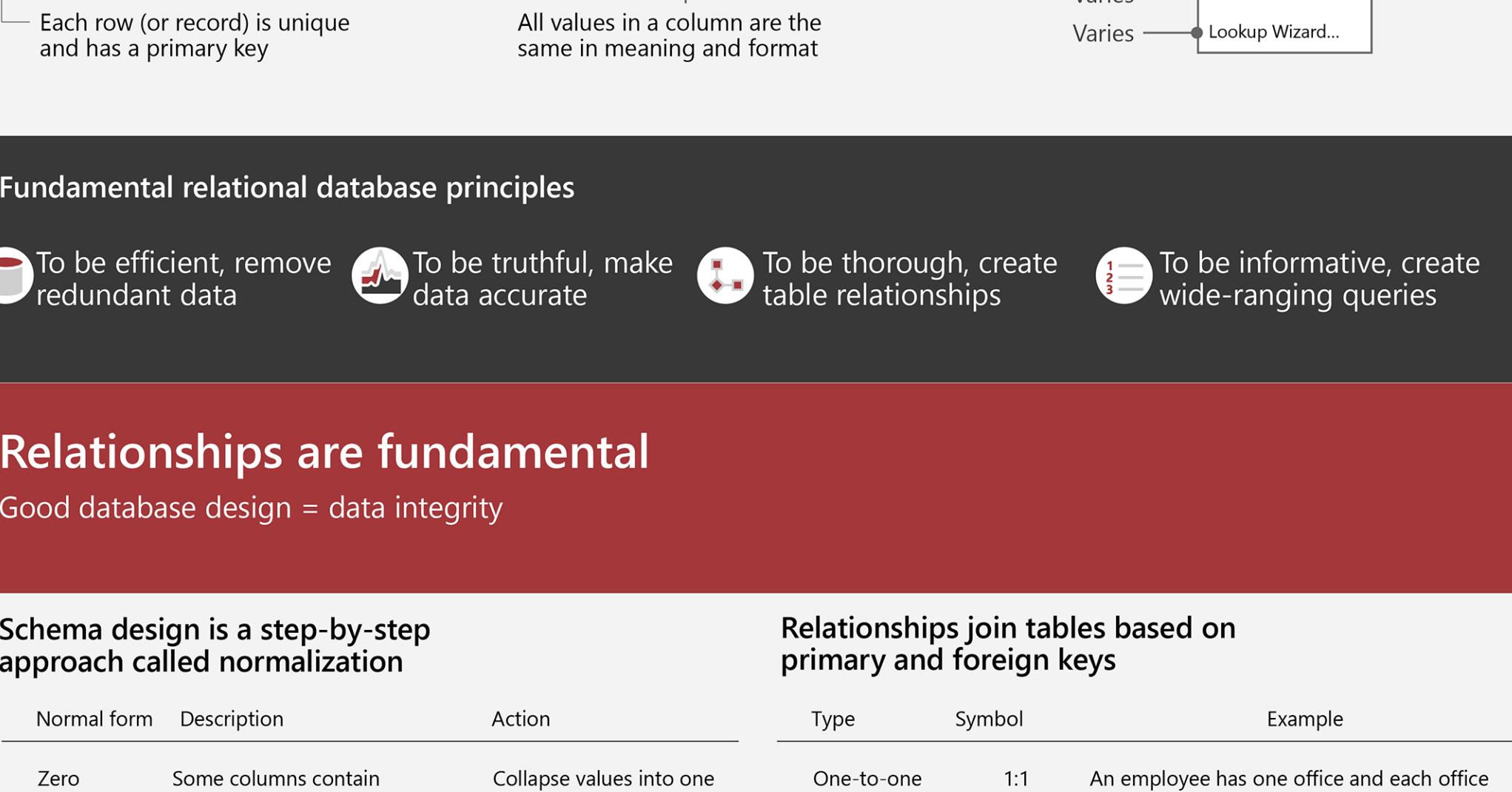
Microsoft Access Concepts



A visual tour of the main ideas behind Access

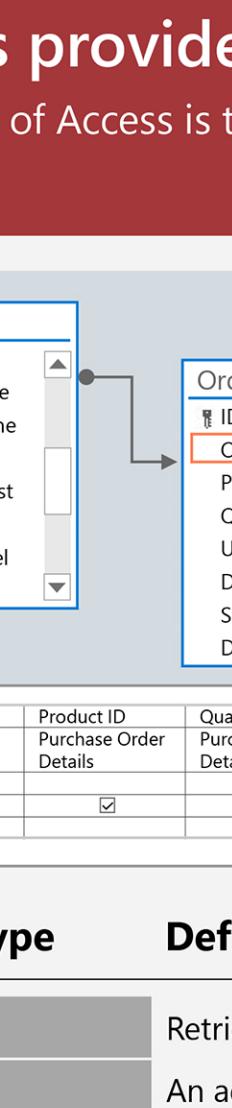
"...relational database technology offers dramatic improvements in productivity both for end users and for application programmers."

E.F. Codd



What is it?

"An operational database that stores, manages and tracks real-time business information and that is **often mission-critical**."



After 25 years, still no alternatives

"What I think Access does, it does extremely well and is the **best bang for the buck**."

Tables, columns, data types

A database structures data like a matrix and adds constraints to keep it that way

Tables and columns are well-defined

A table represents a single subject, such as a person	Each field has a value that represents a single fact
ID ↴ Last Name ↴ First Name ↴ Address ↴	city ↴
1 Freehafer Nancy 123 1st Avenue	Seattle
2 Cencini Andrew 123 2nd Avenue	Bellevue
3 Kotas Jan 123 3rd Avenue	Redmond
4 Sergienko Mariya 123 4th Avenue	Kirkland
5 Thorpe Steven 123 5th Avenue	Seattle
6 Neupffer Michael 123 6th Avenue	Redmond
7 Zane Robert 123 7th Avenue	Seattle

Each row (or record) is unique and has a primary key

All values in a column are the same in meaning and format

A data type indicates the kind of data and the way it's stored

Data Type
< = 255 characters
< = 64,000 characters
1, 2, 4, 8, 16 bytes
8 bytes
8 bytes
4 bytes
1 byte
< = 2 GB
< = 8,192 characters
Varies
Varies
Varies

- < = 255 characters → Short Text
- < = 64,000 characters → Long Text
- 1, 2, 4, 8, 16 bytes → Number
- 8 bytes → Large Number
- 8 bytes → Date/Time
- 4 bytes → Currency
- 1 byte → AutoNumber
- 1 byte → Yes/No
- < = 2 GB → OLE Object
- < = 8,192 characters → Hyperlink
- Varies → Attachment
- Varies → Calculated
- Varies → Lookup Wizard...

Fundamental relational database principles

- To be efficient, remove redundant data
- To be truthful, make data accurate
- To be thorough, create table relationships
- To be informative, create wide-ranging queries

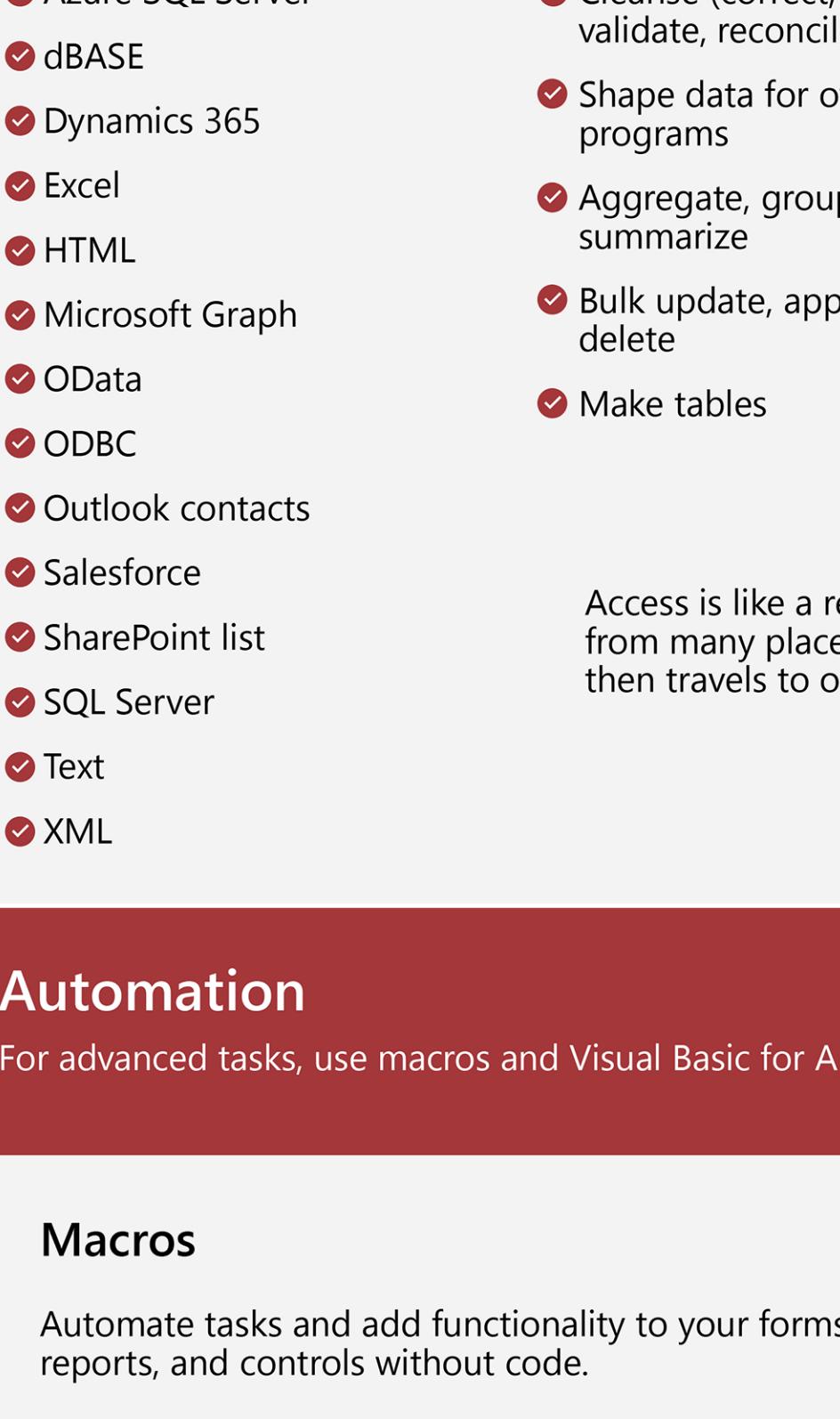
Relationships are fundamental

Good database design = data integrity

Schema design is a step-by-step approach called normalization

Normal form	Description	Action	Type	Symbol	Example
Zero	Some columns contain repeating values	Collapse values into one column	One-to-one	1:1	An employee has one office and each office has one employee
First	Some columns contain redundant data	Remove redundancy	One-to-many	1:M	An employee is within a department, but a department has many employees within it
Second	Some columns are not based on the primary key	Move those columns to other tables	Many-to-many	M:M	Each employee is assigned many projects and each project has many employees assigned to it
Third	All columns are based solely on the primary key	Ready for business			

Well-designed schemas make complex requests doable



Relationships join tables based on primary and foreign keys

Table	Symbol	Example
ORDERS		
CustomerID		
10248 WILMK		
10311 DUMON		

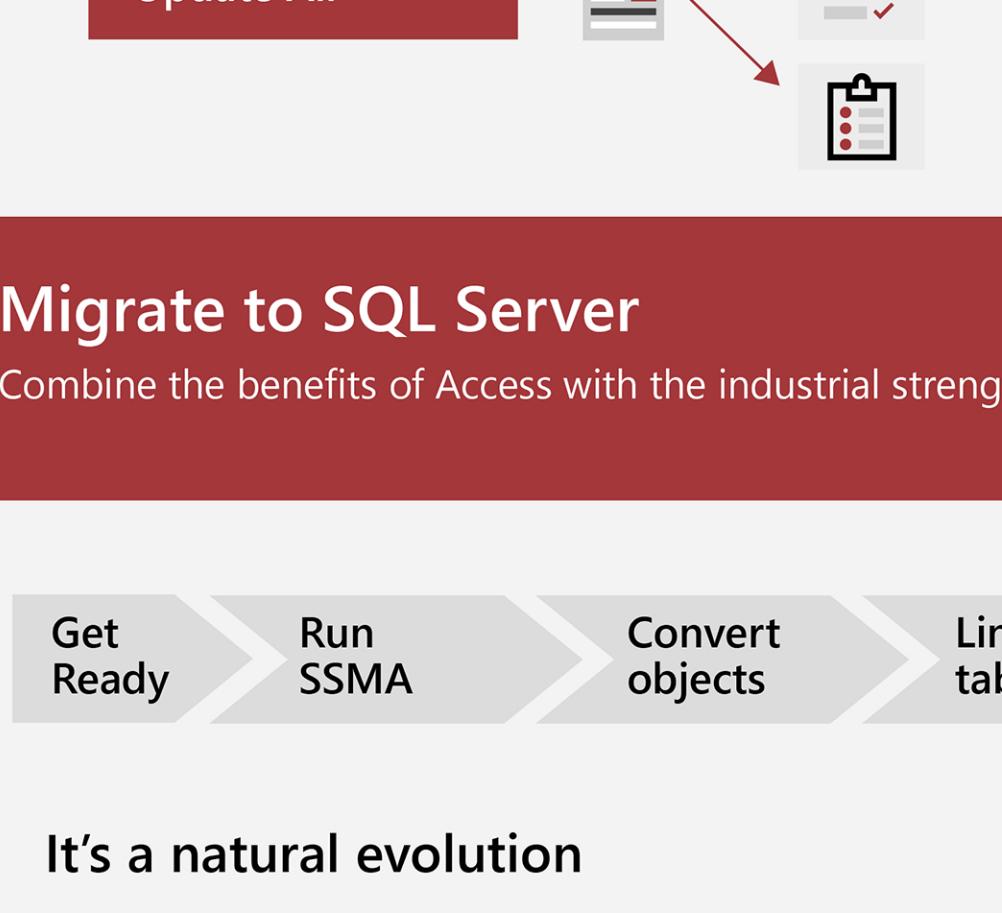
Table	Symbol	Example
PRODUCTS		
ProductID		
11 Queso Cabrales		
42 Singapore Hokkien Fried Me		
69 Gudbrandsdalsost		
72 Mozzarella di Giovanni		

Table	Symbol	Example
ORDER DETAILS		
OrderID		
ProductID		
UnitPrice		
Quantity		

Table	Symbol	Example
ORDERS		
CustomerID		
10248 WILMK		
10248 45		
10248 72		
10311 42		
10311 69		

Queries provide answers

At the heart of Access is the query, which retrieves data or performs data actions



Created By	Product	Quantity
Andrew Cencini	Northwind Traders Green Tea	125
Andrew Cencini	Northwind Traders Coffee	100
Andrew Cencini	Northwind Traders Beer	60
Andrew Cencini	Northwind Traders Chai	40

Query Type Definition

Query Type	Definition
Select	Retrieves only the data that you want, combines data from tables, and defines form and report data sources
Parameter	An ad hoc query that prompts you for field values, and then uses those values as criteria for your query
Totals	A select query that lets you group and summarize data, such as total sales per product
Crosstab	Creates a matrix to re-orient data in rows and columns, and apply aggregate functions such as Count, Sum, Max
Make Table	Creates a new table from a select query
Append	Retrieves data from one or more tables and adds that data to another table
Update	Changes data in a table based on criteria to specify which rows to update
Delete	Removes data from a table based on criteria to specify which rows to remove
Pass-through	Runs a query remotely on a database server to help improve performance

Expressions add value

Calculate values, combine/extract text, specify defaults, validate data

Expressions help enforce business rules

- Must be permanent employee to attend event
- Orders can only be placed on items in stock
- Product codes must be valid when entered

Expressions create meaningful information from data

Task	Expression	Example
Sum line items in a report footer	=Sum([Unit Price])	
Find orders shipped in Q1, 2019	Between #1/1/2019# And #3/31/2019#	
Create a calculated field	Extended Price: [Quantity] * [Unit Price]	

Forms over data

Organize and edit data through rich forms that are windows to your database

Controls are building blocks for forms

Control	Label	Text	Button	Link	Navigation	Option	Combo Box	List Box	Image
Text	Aa	Text							
Button			...						
Link				...					
Navigation					First	Current	Next	New	Filter
Option					Previews	Last	Find		
Combo Box									
List Box									
Image									

Form types

Form	Symbol	Example
Form/ Subform		
Navigation form		
Multiple item form		
Datasheet		
Split form		
Modal dialog box		
Popup form		