

# Working with Common Data Service (CDS) for Apps



# Agenda

- Common Data Service for Apps Overview
- Creating the CDSA Database
- Understanding Entities
- Creating a Custom Entity
- Importing Data into the CDS Database
- Building Model-driven Apps



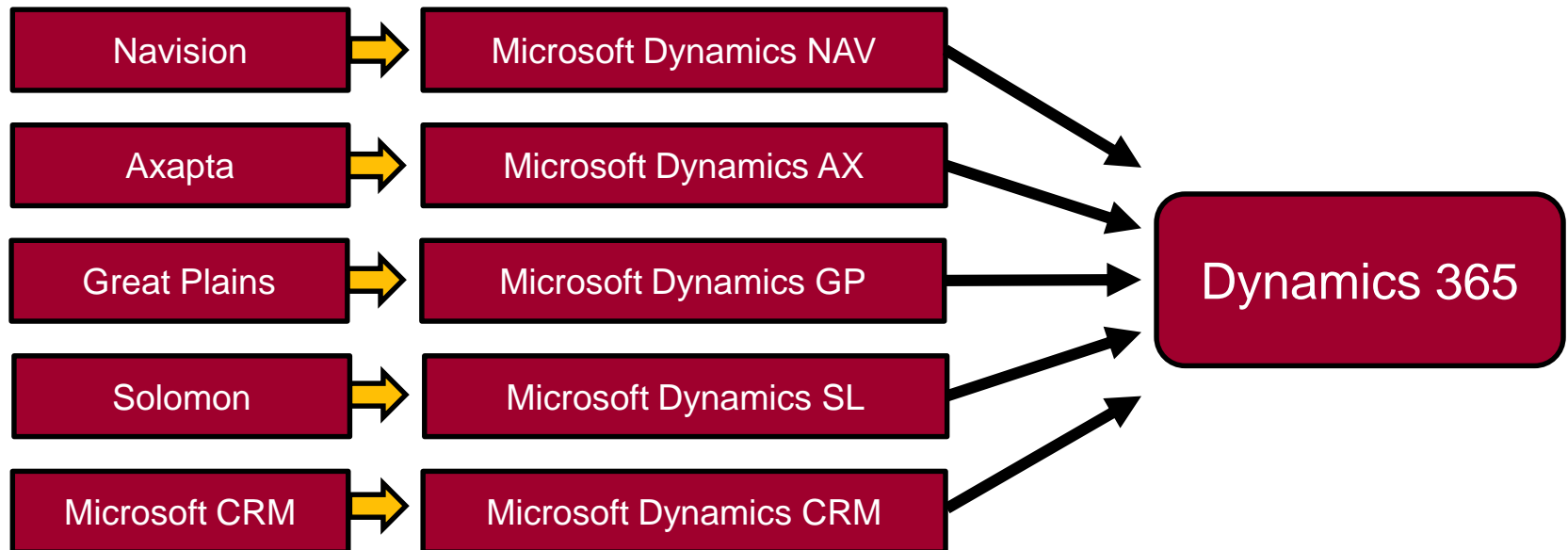
# What is Common Data Service for Apps?

- Platform for building business applications
  - Business application include CRMs, ERPs, etc.
  - Provides common infrastructure
- What does CDS for Apps provide?
  - Standard database schema of common entities
  - Extensible design for extending and creating entities
  - Ability to build entity-specific UI components
  - Ability to build entity-specific business logic
  - Ability to build apps by assembling components



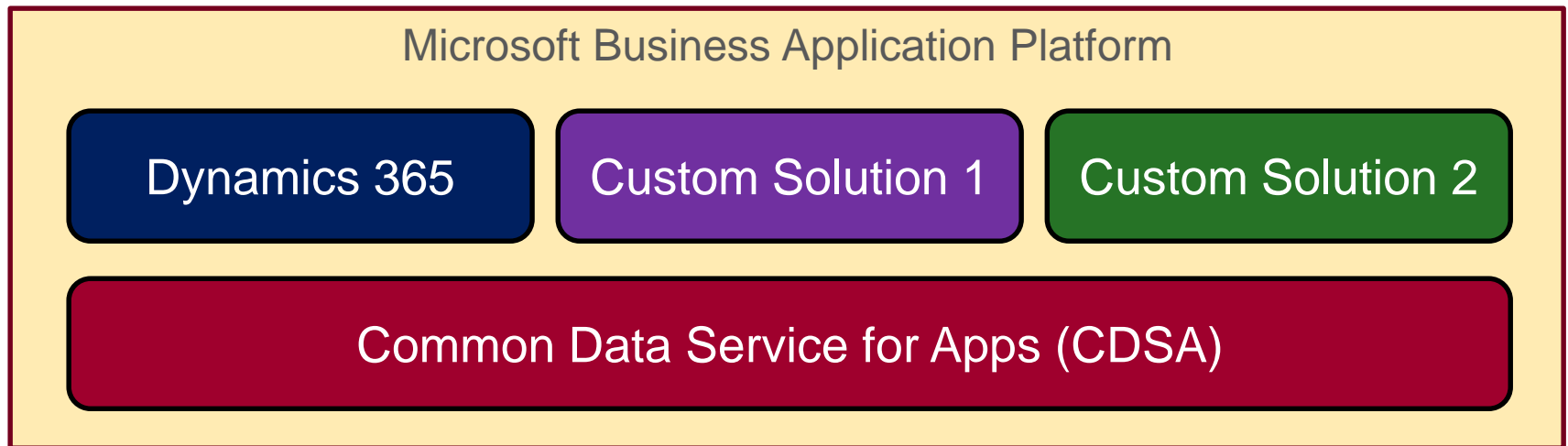
# Evolution of Microsoft Business Application Suite

- Microsoft has acquired many software companies
  - Several acquisitions involved software that targets CRM and ERP
  - Microsoft evolved many software applications into Dynamics suite
  - Dynamics 365 represents evolution from on-premises to cloud



# Birth of a Platform

- Microsoft migrating infrastructure out of Dynamics 365
  - CDSA has infrastructure for building entity-based business solutions
  - Dynamics 365 is now collection of entities with UI and logic
  - Custom solutions can be built using entities with UI and logic
  - CDSA provides foundation of Microsoft Business Application Platform



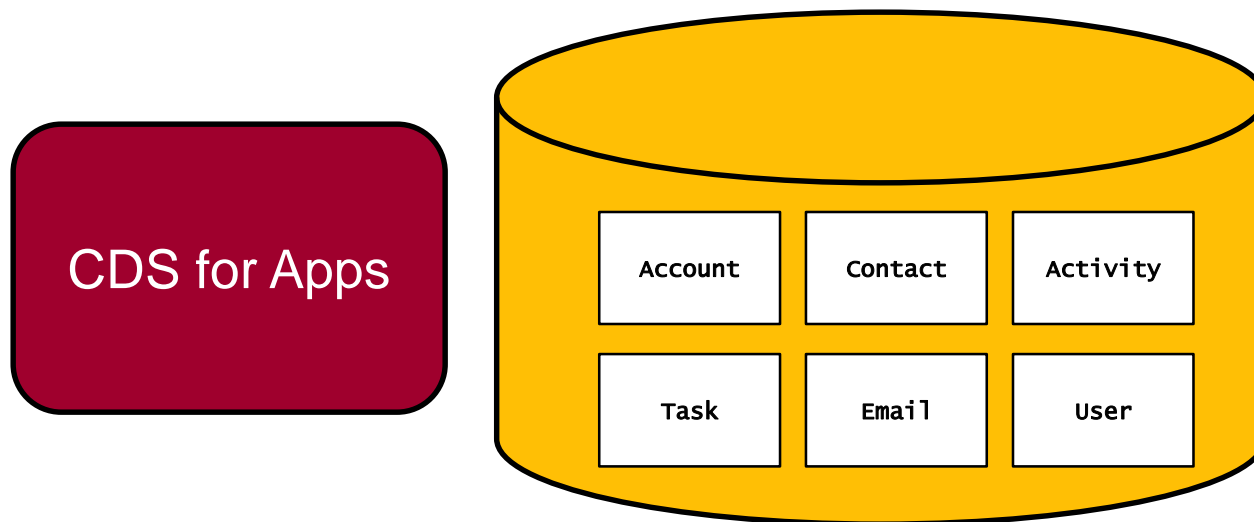
# Common Data Model (CDM)

- What is the Common Data Model (CDM)?
  - Open-sourced definition of standard entities
  - Entities are well-defined, modular, and extensible
  - structural and semantic consistency across apps and deployments
- CDM helps integrate and *disambiguate data* from
  - business processes
  - digital interactions
  - product telemetry
  - people interactions



# Common Database Model Schema

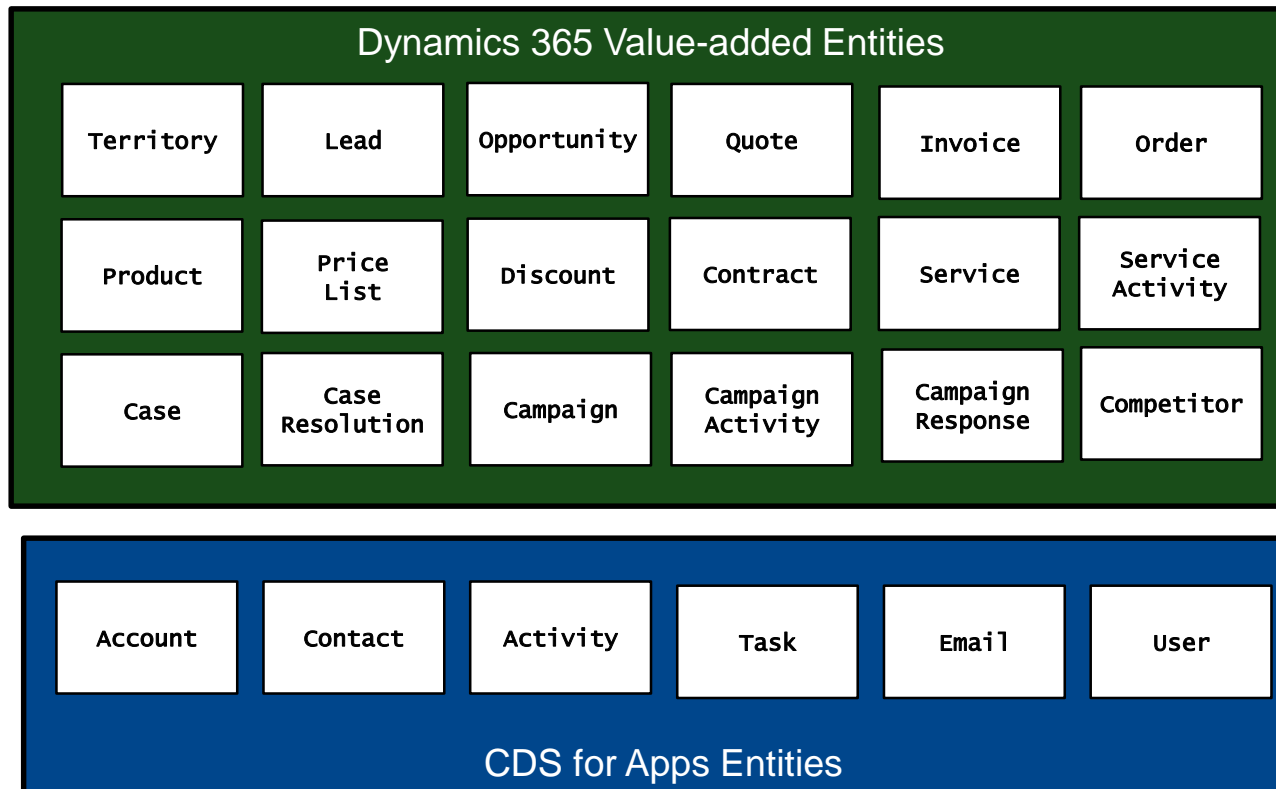
- CDM defines set of entities available to all applications
  - **Account:** represents an business entity that can be invoiced
  - **Contact:** represents a human being
  - **Activity:** represents an event that can be schedule
  - **Task:** represents work item that can be assigned to user or team
  - **Email:** represents email message sent or received
  - **User:** represents system user who can be owner of records





# CDS for Apps vs Dynamics 365 for Sales

- CDS for Apps provides base set of entities
  - Custom solutions can extend and add entities
  - Dynamics 365 add a large set of its own entities





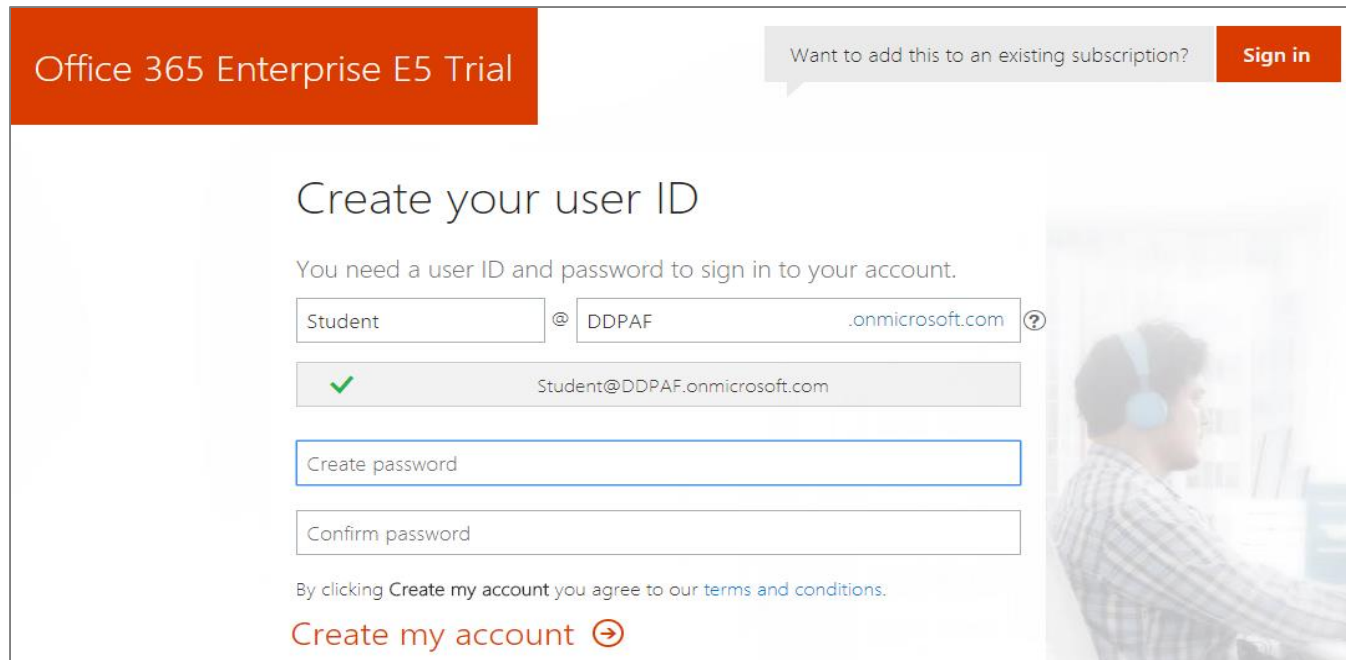
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# Creating an Office 365 E5 Trial Tenant

- Test out CDSA by creating an Office 365 trial tenant
  - Provides an isolated development environment for testing
  - Trial accounts will last for 30 days
  - Use this link:  
<https://go.microsoft.com/fwlink/p/?LinkID=698279&culture=en-US&country=US>



The screenshot shows the 'Office 365 Enterprise E5 Trial' sign-up page. At the top, there's an orange banner with the text 'Office 365 Enterprise E5 Trial'. To the right, a grey box asks 'Want to add this to an existing subscription?' with a 'Sign in' button. The main heading is 'Create your user ID'. Below it, a message states 'You need a user ID and password to sign in to your account.' The form includes three input fields: 'Student' (containing 'Student'), '@' (containing 'DDPAF'), and '.onmicrosoft.com' (containing '.onmicrosoft.com'). A green checkmark and the email 'Student@DDPAF.onmicrosoft.com' are shown below these fields. There are also fields for 'Create password' and 'Confirm password'. At the bottom, a link says 'Create my account' with a right arrow icon. A small image of a person wearing a headset is visible on the right side of the page.

Office 365 Enterprise E5 Trial

Want to add this to an existing subscription? [Sign in](#)

## Create your user ID

You need a user ID and password to sign in to your account.

Student @ DDPAF .onmicrosoft.com ?

✓ Student@DDPAF.onmicrosoft.com

Create password

Confirm password

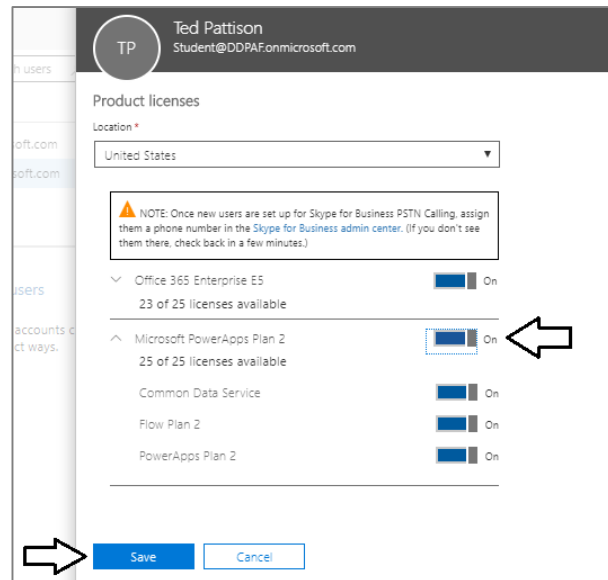
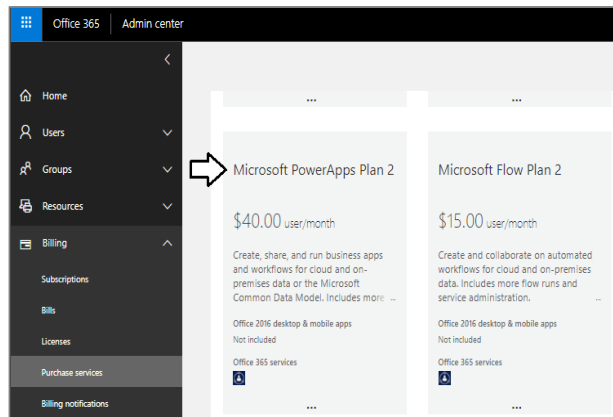
By clicking [Create my account](#) you agree to our [terms and conditions](#).

[Create my account](#) ➔



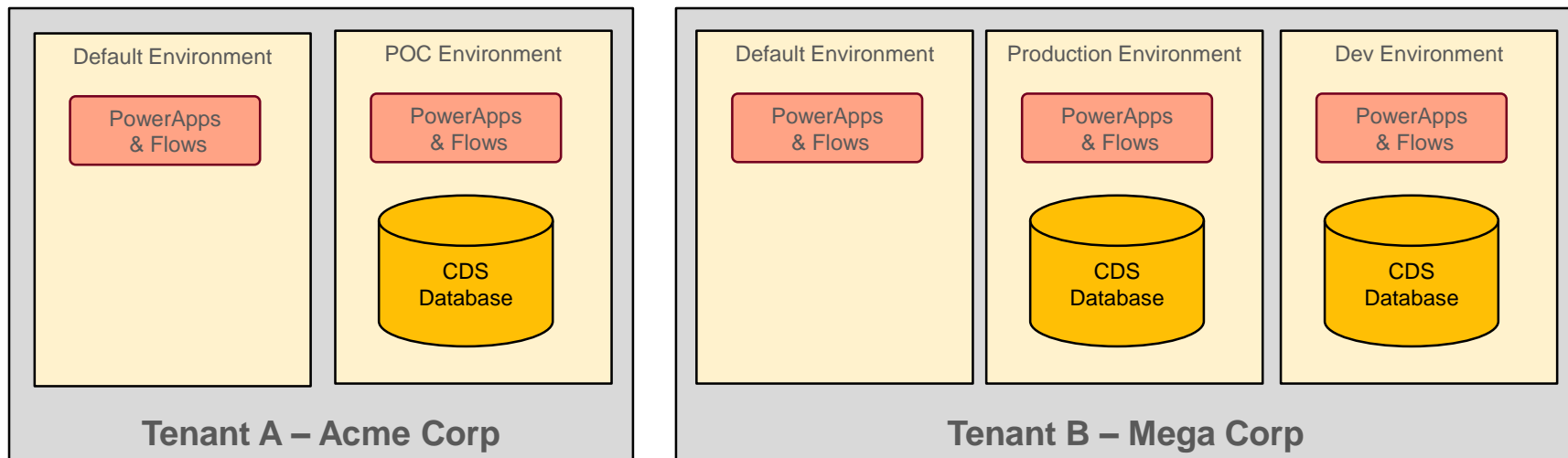
# PowerApps Plan 2

- Certain design tasks require PowerApps Plan 2
  - You can start a 30-day trial for PowerApps Plan 2
  - License must be assigned to individual user accounts



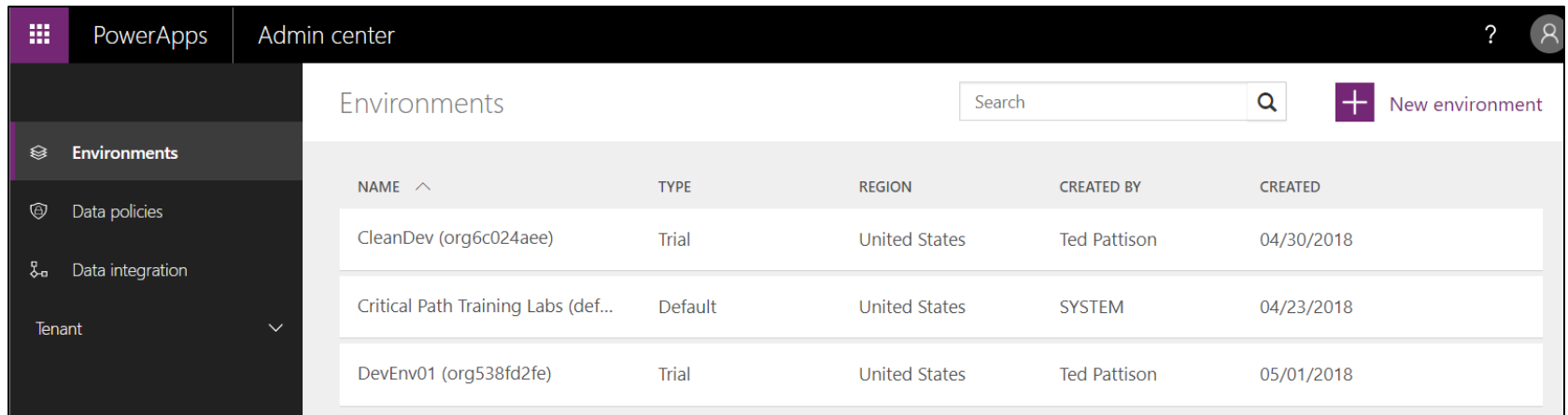
# What is an Environment?

- Environment is container for PowerApps, Flow and the CDS
  - Each environment and its resources exist within a geographic region
  - Environment resources include PowerApps, Flows and CDS database
  - Environment represents a governance and security boundary
  - Every tenant is provisioning with a default environment
  - Administrator can provision additional environments if needed
  - Environment can be provisioned with or without a CDS database
  - Environment can contain only one CDS database



# Environments and CDS for Apps

- Environments managed in PowerApps Admin Center
  - You can configure security and access
  - You can create new environments
- Access to environment controlled at 3 different levels
  - Environmental roles
  - Resource permissions for apps and flows
  - CDS Database roles



PowerApps Admin center

Environments

Search

+ New environment

NAME ^	TYPE	REGION	CREATED BY	CREATED
CleanDev (org6c024aee)	Trial	United States	Ted Pattison	04/30/2018
Critical Path Training Labs (def...	Default	United States	SYSTEM	04/23/2018
DevEnv01 (org538fd2fe)	Trial	United States	Ted Pattison	05/01/2018



# Environment Roles (Admin and Maker)

- Environment Admin role
  - Change role membership
  - Create new environments with or without CDS database
  - View and manage all resources created in environment
  - Set Data Loss Prevention policies
- Environment Maker role
  - Create apps, connections, custom APIs, gateways, and flows
  - Create and extend CDS entities (*requires PowerApps plan 2*)



# Creating the CDS for Apps Database

- Steps to create a new CDS for Apps Database
  1. Navigate to Power Apps Admin Center
  2. Create a new environment
  3. Configure the new environment with a CDS for Apps database
  4. Add option to include sample data [Optional]

### New environment

Create new environments for app and flow development and to maintain separate databases. [Learn more](#)

Environment name

Region ?

United States (default)


Can't be changed once your environment is created.

Environment type ?

Trial

Cancel Create environment

✓ You created an environment



Do you want to create a database?  
(Recommended)

Your environment includes access to the Common Data Service. Create a database to start using it.

- Collect, store, and share data.
- Use data modeling
- Create custom forms
- Manage security and access to data

Skip Create database

### Create a database for this environment ?

Choose the currency and language your data should use.

Currency ?

USD

Language ?

English

☒ Include sample apps and data

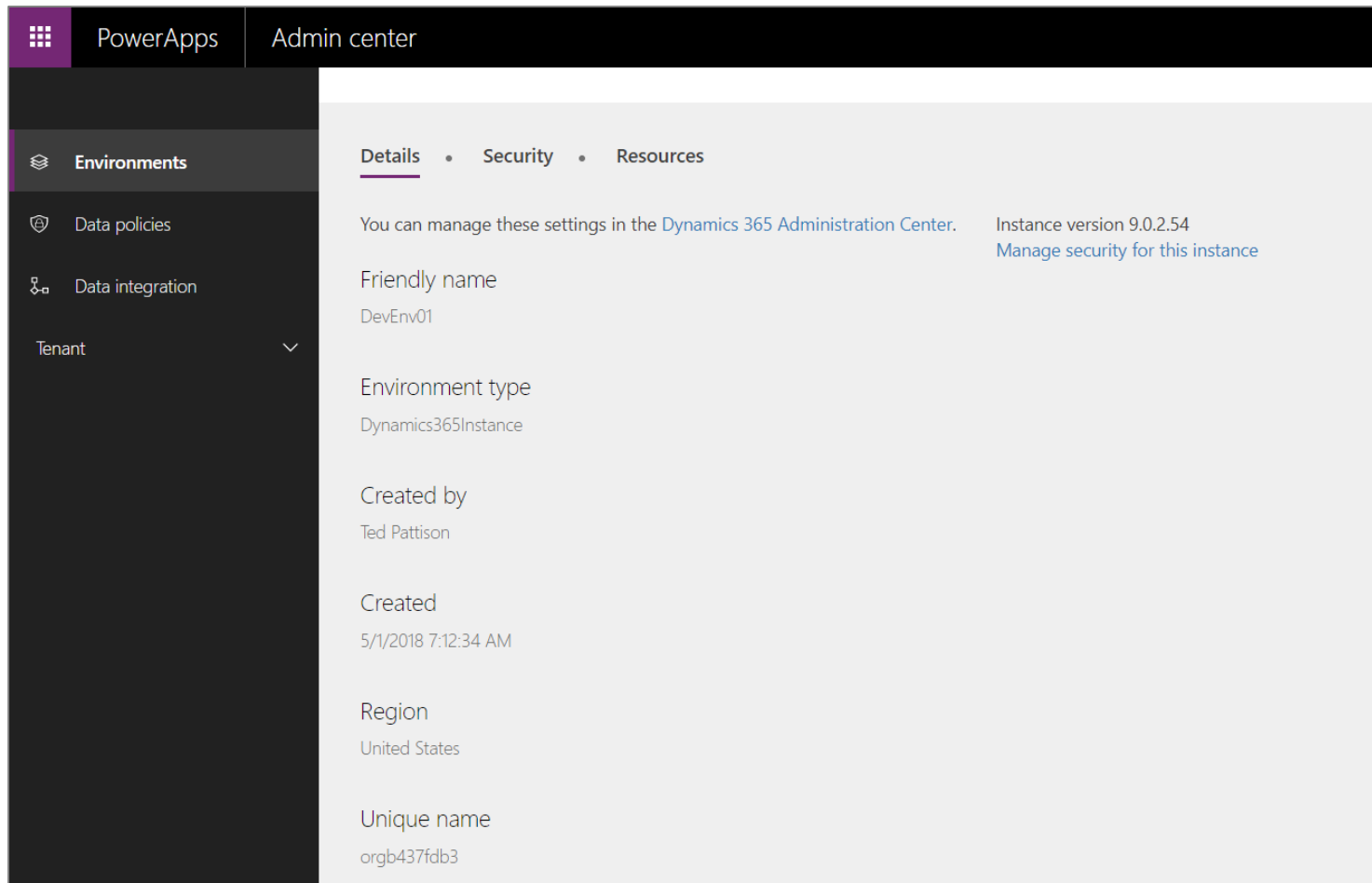
By choosing **Create my database**, you agree Microsoft can use entity and field names that you create (but not content in the database tables) to help improve our common data model. These names may be stored in our diagnostic systems and copied across regions. [Learn more](#)

Cancel Create database





# Examining the New Environment



The screenshot displays the PowerApps Admin center interface. The top navigation bar includes the PowerApps logo and the 'Admin center' title. A left-hand sidebar contains navigation options: 'Environments' (selected), 'Data policies', 'Data integration', and 'Tenant'. The main content area is titled 'Details' and shows the configuration for an environment named 'DevEnv01'. It lists various attributes such as 'Environment type' (Dynamics365Instance), 'Created by' (Ted Pattison), 'Created' (5/1/2018 7:12:34 AM), 'Region' (United States), and 'Unique name' (orgb437fdb3). A note at the top of the details section indicates that settings can be managed in the Dynamics 365 Administration Center and provides a link to manage security for the instance.

PowerApps Admin center

Environments

Data policies

Data integration

Tenant

Details • Security • Resources

You can manage these settings in the [Dynamics 365 Administration Center](#). Instance version 9.0.2.54  
[Manage security for this instance](#)

Friendly name  
DevEnv01

Environment type  
Dynamics365Instance

Created by  
Ted Pattison

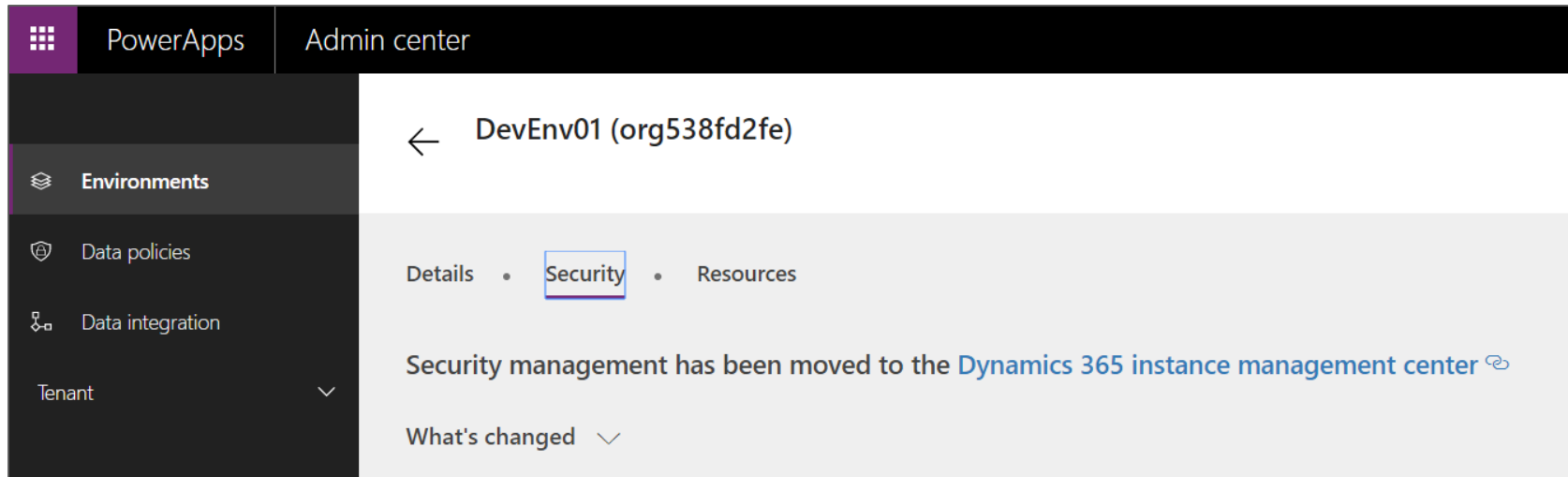
Created  
5/1/2018 7:12:34 AM

Region  
United States

Unique name  
orgb437fdb3



# Configuring Environment Security



The screenshot displays the PowerApps Admin center interface. The top navigation bar includes the PowerApps logo and the text "Admin center". The left sidebar contains a list of navigation items: "Environments", "Data policies", "Data integration", and "Tenant". The main content area is titled "DevEnv01 (org538fd2fe)" and features a breadcrumb trail: "Details • Security • Resources". The "Security" tab is currently selected and highlighted with a blue border. Below the breadcrumb trail, a message states: "Security management has been moved to the [Dynamics 365 instance management center](#)". At the bottom of the main content area, there is a section labeled "What's changed" with a downward-pointing chevron icon.

PowerApps Admin center

← DevEnv01 (org538fd2fe)

Details • Security • Resources





Security management has been moved to the [Dynamics 365 instance management center](#)

What's changed ▾



# Environmental Security Roles

- User access to CDS data based on roles
  - Environment security configured in terms of business units
  - CDS pre-defines common security roles
  - You can define custom security roles as well

Security Roles	
<b>Business Unit:</b> <span>org6c024aee ▾</span>	
 New            More Actions ▾	
<input type="checkbox"/>   Name ↑	Business Unit
Common Data Service User	org6c024aee
Delegate	org6c024aee
Environment Maker	org6c024aee
Product Manager	org6c024aee
System Administrator	org6c024aee
System Customizer	org6c024aee



# Security Role Configuration – Core Records

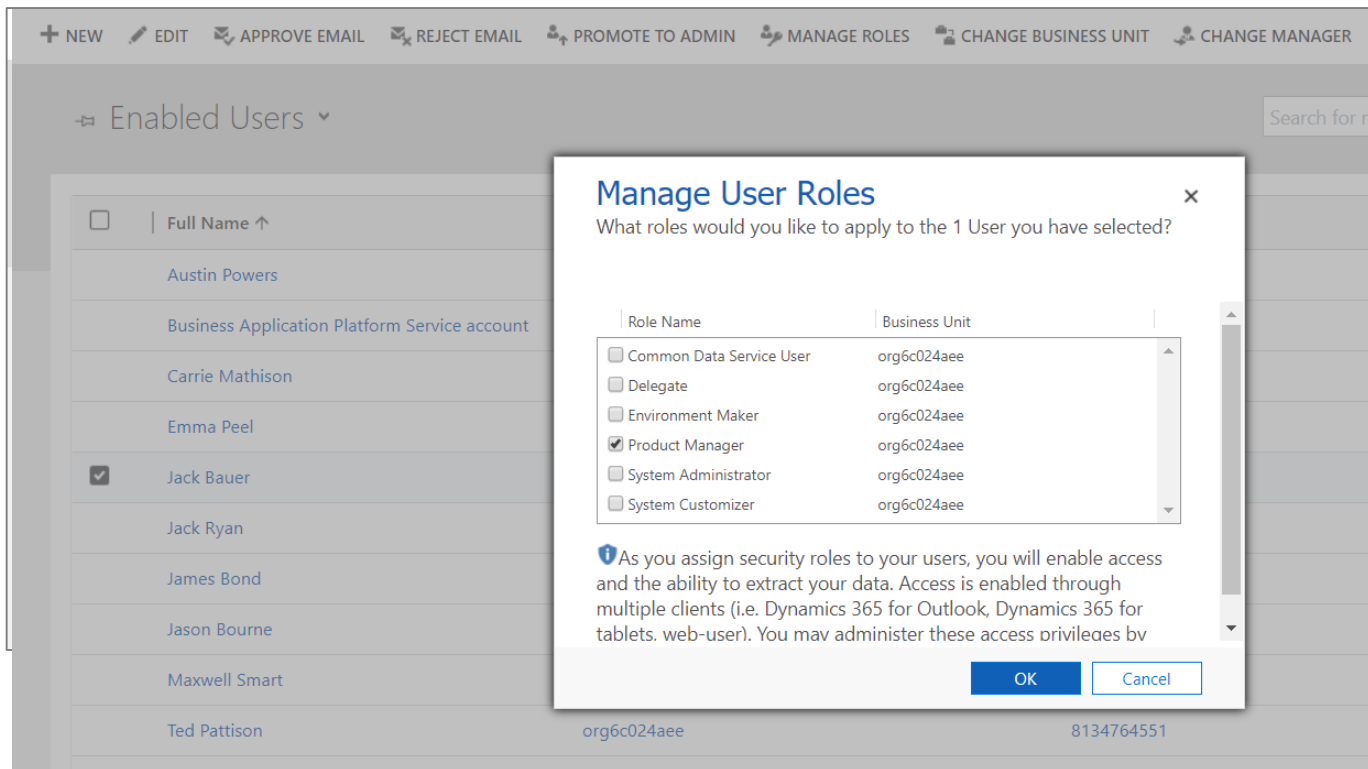
- Roles define access to specific entities
  - Permissions include **create**, **read**, **write**, **delete**, etc.

Security Role: New Security Role								
<div>DetailsCore RecordsBusiness ManagementCustomizationMissing EntitiesBusiness Process FlowsCustom Entities</div>								
Entity	Create	Read	Write	Delete	Append	Append To	Assign	Share
Account								
ACIViewMapper								
Action Card								
Action Card User Settings								
Activity								
Announcement								
Application File								
Connection								
Connection Role								
Contact								
Customer Relationship								
Data Import								
Data Map								
Data Performance Dashboard								
Document Location								
Document Suggestions								
Duplicate Detection Rule								



# Assigning Users to Security Roles

- Roles are assigned to users and groups



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# Inspecting the Standard Entities

PowerApps

Environment  
CleanDev (org6c024aee)

Home

Learn

Apps

Data

Entities

Option sets

Data integration

Connections

Custom connectors

Gateways

Business logic

+ New entity

Get data

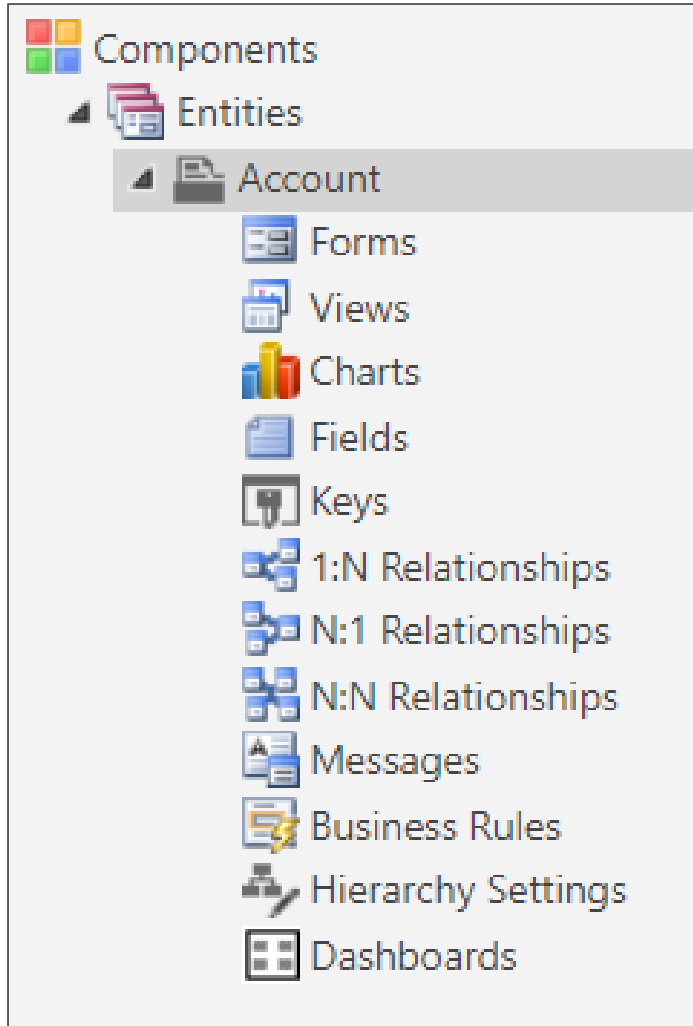
Search

Entities

Entity ↓	Type ↓	Tags ↓
Account	Standard	Master
Activity	Standard	Standard
Address	Standard	Sales
Appointment	Standard	Productivity
Attachment	Standard	Standard
Business Unit	Standard	System
Channel Access Profile	Standard	Standard
Channel Access Profile Rule	Standard	Standard
Channel Access Profile Rule Item	Standard	Standard
Channel Property	System	System
Channel Property Group	System	System
Connection	Standard	Standard
Connection Role	Standard	Standard
Contact	Standard	Master



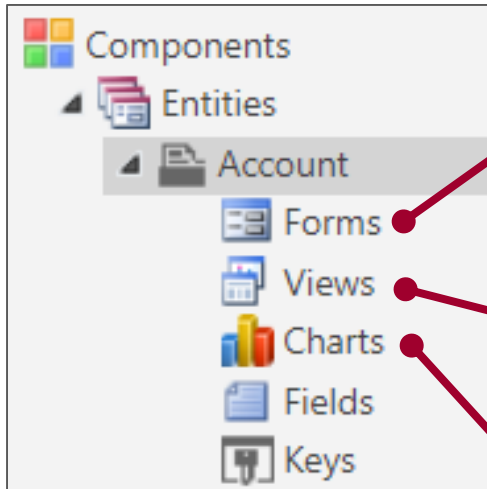
# What Exactly is an Entity?



- Data components
  - Entity, Fields, Option sets, Relationships
- UI components
  - Forms
  - Views
- Logic Components
  - Business rules
  - Business process flows
  - Workflows, Actions & Flows
- Visualization Components
  - Charts
  - Dashboards
  - Power BI components



# Inside an Entity



System Forms **Active Forms** ▾

☐ New ▾ ☐ Delete ☐ Enable Security Roles ☐ Form Order ▾ ☐ Activate ☐ Deactivate ☐ More Actions ▾

Name	Form State	Form Type ↑	State	Customizable	Version	Description
<a href="#">Account Card form</a>	Active	Card	Managed	True	8.0.0.0	Default Account card form.
<a href="#">Account for Interactive experie...</a>	Active	Main	Managed	True	8.0.0.0	Default Interactive experience Account form.
<a href="#">Account</a>	Active	Main	Managed	True	5.0.0.0	Updated default Account form.
<a href="#">Account Quick Create</a>	Active	Quick Create	Managed	True	6.0.0.0	Default quick create form for Account

**View:** All Active Views

☐ New ☐ X ☐ More Actions ▾

Name ↑	Type	State	Customizable	Description
<a href="#">Account Advanced Find View</a>	Advanced Find View	Managed	True	
<a href="#">Account Associated View</a>	Associated View	Managed	True	Displays information about related accounts in the detail form of ...
<a href="#">Account BulkOperation View</a>	Associated View	Managed	True	Display Accounts for BulkOperation View
<a href="#">Account List Member View</a>	Associated View	Managed	True	Displays information about related accounts in the Members subg...

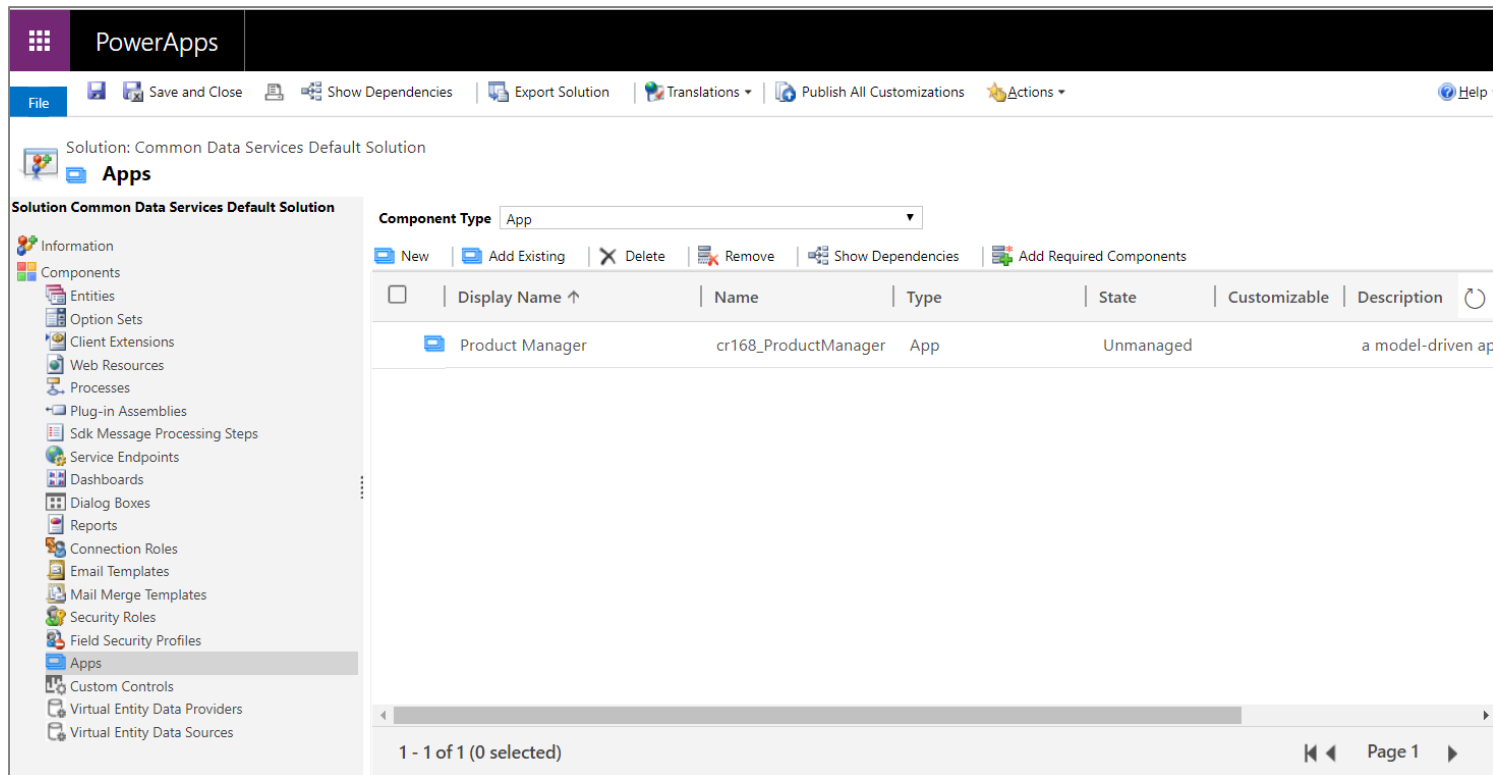
☐ New ☐ X ☐ More Actions ▾

Name ↑	State	Customizable	Description
<a href="#">Accounts by Industry</a>	Managed	True	Shows the total number of accounts by industry.
<a href="#">Accounts by Owner</a>	Managed	True	Shows the total number of accounts by owner.
<a href="#">Accounts by Owner - Tag Chart</a>	Managed	True	Shows the total number of accounts by owner in a tag chart.
<a href="#">New Accounts By Month</a>	Managed	True	Shows the number of new accounts in a month.



# Solution Explorer

- Solution Explorer provides top-level view of customizations
  - Can be challenging to find in current UI experience



# CDM Extensibility

- You can modify most standard entities
  - Modification involves adding fields
  - Existing fields cannot be modified or removed
  - System entities cannot be modified
- You can create custom entities
  - Herein lies the ability to design complex business apps

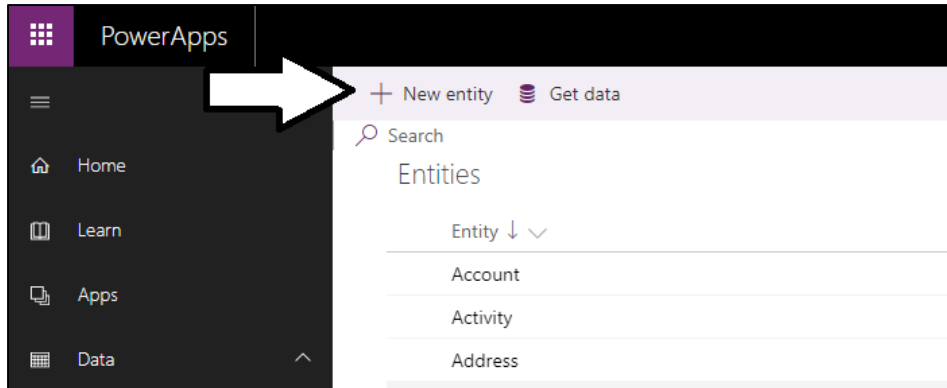


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# Creating a Custom Entity



New entity

Display name \*

Plural display name \*

Name \*

 ⓘ

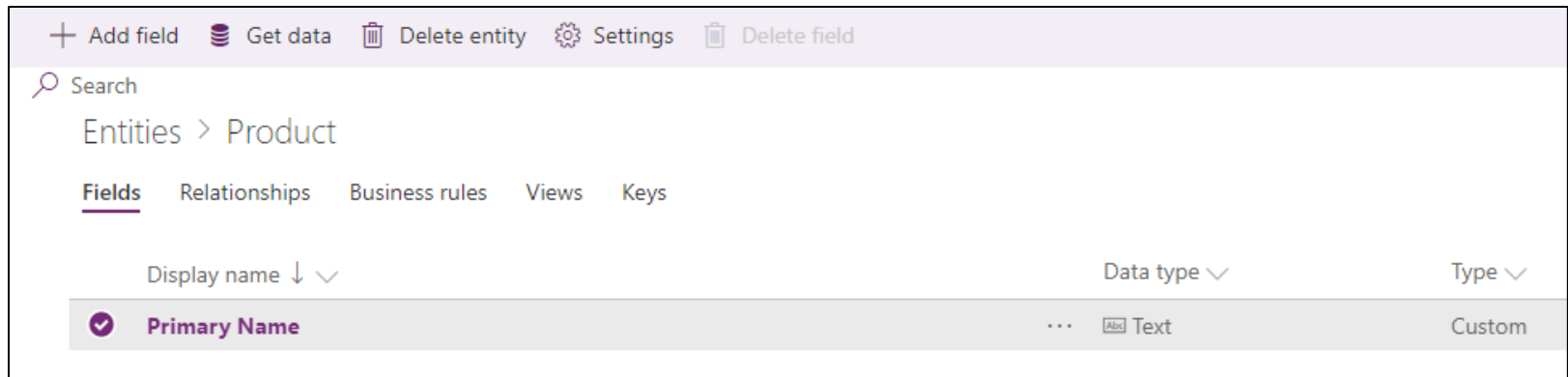
Description

Next Cancel



# Primary Name

- Every entity created with Primary name field
  - Display name can be changed to something more appropriate



The screenshot shows a database management interface. At the top, there is a toolbar with icons and labels for '+ Add field', 'Get data', 'Delete entity', 'Settings', and 'Delete field'. Below this is a search bar with a magnifying glass icon and the text 'Search'. The main content area displays 'Entities > Product'. Underneath, there are tabs for 'Fields', 'Relationships', 'Business rules', 'Views', and 'Keys'. The 'Fields' tab is selected. A table lists the fields for the 'Product' entity. The first field is 'Primary Name', which is marked as the primary field with a checkmark icon. The table has columns for 'Display name', 'Data type', and 'Type'.

Display name ↓	Data type ↓	Type ↓
✓ Primary Name	... Text	Custom





# Adding Fields

- Custom entity can be extended by adding fields

×

Product Code

Display name \*

Product Code

Name \*

cr9be\_ ProductCode i

Data type \*

ABD Text ▼ i

☒ Required

☒ Searchable

Calculated or Rollup i + Add

Advanced options ▼

Done Cancel



# Adding Custom Fields

Entities > Product

Fields

Relationships

Business rules

Views

Keys

Data

Display name ↓ ▾		Data type ▾	Type ▾	Required ▾
List Price	...	Currency	Custom	
List Price (Base)	...	Currency	Custom	
Product Available	...	Two Options	Custom	
Product Category	...	Option Set	Custom	
Product Code	...	Text	Custom	✓
Product Description	...	Text Area	Custom	
Product Image	...	Image	Custom	
Product Name	...	Text	Custom	✓



# Core System Fields Added to All Entities

Entities > Product		
Fields	Relationships	Business rules
Views	Keys	Data
Display name ↓	Data type ↓	
Type ↓		
Created By	...	Lookup System
Created By (Delegate)	...	Lookup System
Created On	...	Date and Time System
Currency	...	Lookup Standard
Exchange Rate	...	%, Decimal Number Standard
Import Sequence Number	...	Whole Number System
List Price	...	Currency Custom
List Price (Base)	...	Currency Custom
Modified By	...	Lookup System
Modified By (Delegate)	...	Lookup System
Modified On	...	Date and Time System
Owner	...	Owner System
Owning Business Unit	...	Lookup System
Owning Team	...	Lookup System
Owning User	...	Lookup System
Product	...	Unique Identifier System
Product Available	...	Two Options Custom
Product Category	...	Option Set Custom
Product Code	...	Text Custom
Product Description	...	Text Area Custom
Product Image	...	Image Custom
Product Name	...	Text Custom
Record Created On	...	Date Only System
Status	...	Option Set System
Status Reason	...	Option Set System
Time Zone Rule Version Number	...	Whole Number System
UTC Conversion Time Zone Code	...	Whole Number System
Version Number	...	Big Integer System

Product	...	Unique Identifier	System
---------	-----	-------------------	--------

Created By	...	Lookup	System
Created By (Delegate)	...	Lookup	System
Created On	...	Date and Time	System

Modified By	...	Lookup	System
Modified By (Delegate)	...	Lookup	System
Modified On	...	Date and Time	System

Owner	...	Owner	System
Owning Business Unit	...	Lookup	System
Owning Team	...	Lookup	System
Owning User	...	Lookup	System

Record Created On	...	Date Only	System
Status	...	Option Set	System
Status Reason	...	Option Set	System
Time Zone Rule Version Number	...	Whole Number	System
UTC Conversion Time Zone Code	...	Whole Number	System
Version Number	...	Big Integer	System



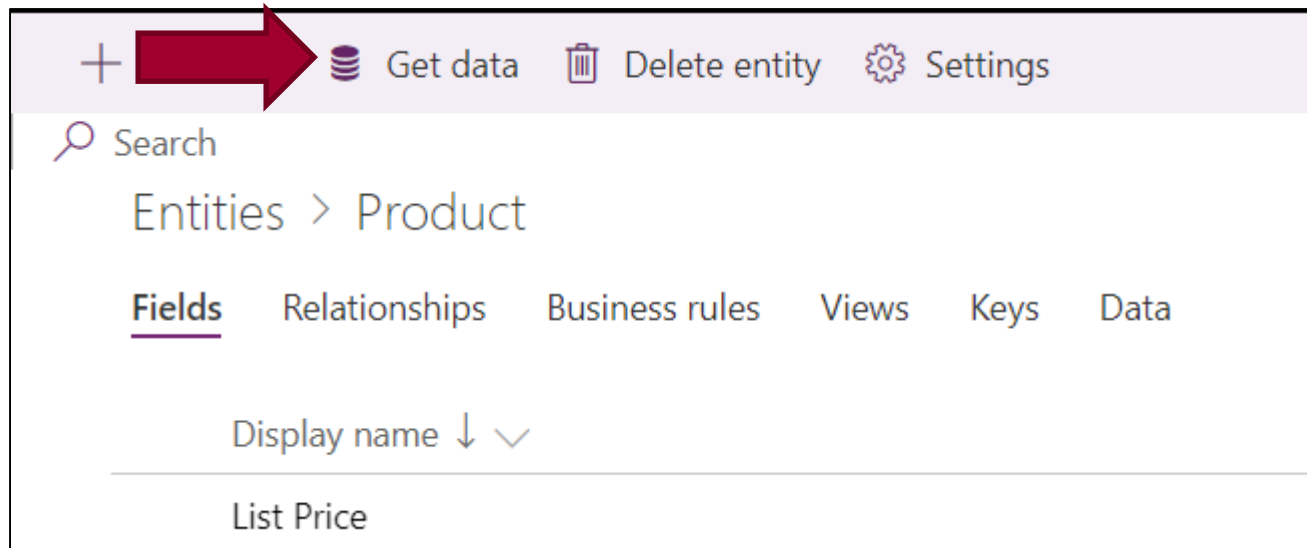
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# Importing Data

- You can import data from external sources
  - Data can be added to table for new or existing entity
  - Importing tools include Power Query in the browser



# Selecting an External Datasource

- Select a supported datasource connector

The screenshot shows the 'Choose Data Source' dialog box in Power Query. The main window is titled 'Connect to Data Source'. On the left, there is a list of data sources, with 'Azure SQL database' selected. The right pane shows the connection settings for this source. The 'Server' field is set to 'cpt.database.windows.net' and the 'Database' field is set to 'WingtipSalesDB'. Under 'Connection credentials', the 'On-premises data gateway' is set to '(none)' and the 'Authentication Kind' is set to 'Basic'. The 'Username' field is set to 'CptStudent' and the 'Password' field is masked with dots. At the bottom, there are 'Back', 'Cancel', and 'Next' buttons.

Choose Data Source

Power Query

Connect to Data Source

Azure SQL database  
Azure

Connection settings

Server  
cpt.database.windows.net

Database  
WingtipSalesDB

Connection credentials

On-premises data gateway  
(none)

Authentication Kind  
Basic

Username  
CptStudent

Password  
\*\*\*\*\*

Back Cancel Next



# Power Query in the Browser

Edit Queries

Get Data

Refresh

Options

Manage Columns

Transform Table

Reduce Rows

Add Column

Add Conditional Column

Combine Tables

Products

Table.TransformColumnTypes("#Replaced Value 2", {"ProductCategoryCode", Int64.Type}))

	ProductCode	Title	Description	ProductCategoryCode	ListPrice	ProductImage
1	WP0001	Batman Action Figure	A super hero who sometim...	0	14.95	Binary
2	WP0002	Captain America Action Fi...	A super action figure that ...	0	12.95	Binary
3	WP0003	GI Joe Action Figure	A classic action figure from...	0	14.95	Binary
4	WP0004	Green Hulk Action Figure	An overly muscular action ...	0	9.95	Binary
5	WP0005	Red Hulk Alter Ego Action ...	A case of anabolic steroids...	0	9.95	Binary
6	WP0006	Godzilla Action Figure	The classic and adorable a...	0	19.95	Binary
7	WP0007	Perry the Platypus Action F...	A platypus who plays an o...	0	21.95	Binary
8	WP0008	Green Angry Bird Action Fi...	A funny looking green bird...	0	4.95	Binary
9	WP0009	Red Angry Bird Action Figu...	A funny looking red bird t...	0	14.95	Binary
10	WP0010	Phineas and Ferb Action Fi...	The dynamic duo of the yo...	0	19.95	Binary
11	WP0011	Black Power Ranger Action...	A particularly violent actio...	0	7.5	Binary
12	WP0012	Woody Action Figure	The lovable, soft-spoken c...	0	9.95	Binary
13	WP0013	Spiderman Action Figure	The classic superhero who ...	0	12.95	Binary
14	WP0014	Twitter Follower Action Fig...	An inexpensive action figur...	0	1	Binary
15	WP0015	Crayloa Crayon Set	A very fun set of crayons i...	1	2.49	Binary
16	WP0016	Sponge Bob Coloring Book	A drawing extravaganza ba...	1	2.95	Binary
17						

Name

Products

Applied Steps

Source

Navigation

Removed Columns

Split Column By D...

Removed Columns 1

Renamed Columns

Removed Columns 2

Replaced Value

Replaced Value 1

Replaced Value 2

Changed Column Type

Next



# Loading Imported Data into Existing Entity

Map Entities

Power Query

×

Queries

Products

☒ Load to existing entity

☐ Load to new entity

☐ Do not load

Destination Entity

cr9be\_Product

▼

Previously loaded data will be overwritten.

Entity Display Name

Product

Entity Description

My Product Entity

Field Mapping

Destination Field	Source Column	Auto-map
cr9be_ProductCode*	ProductCode	▼
cr9be_ProductName*	Title	▼
cr9be_ListPrice	ListPrice	▼
cr9be_listprice_Base	(none)	▼
cr9be_ProductAvailable	(none)	▼
cr9be_ProductCategory	ProductCategoryCode	▼
cr9be_ProductDescription	Description	▼
cr9be_ProductId	(none)	▼
CreatedBy	(none)	▼
CreatedOn	(none)	▼
CreatedOnBehalfBy	(none)	▼

Cancel

Next

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# Moving to Model-driven Apps

- What are the key benefits of model-driven apps?
  - Rich no-code design environment focusing on components
  - Create apps with consistent UI navigation, elements & metaphors
  - Design apps using the building blocks of Dynamics 365
  - Create responsive apps that work on desktop and mobile devices
  - Build apps into solutions that can be distributed and versioned
- What are the steps to building a model-driven app?
  - Model business data using entities in Common Data Model (CDM)
  - Define business processes on top of app-specific entity model
  - Compose the app UI on top of entities and business processes



# MDA Components and Designers

- Model-driven apps assembled using components
  - App designer builds app by adding components
  - Components used to compose app functionality and appearance
  - App metadata consists of components and component properties
- App components separated into four categories
  1. Data components
  2. Logic components
  3. UI components
  4. Visualization components



# Data Components

- Entity
- Field
- Option set field
- Relationship



# UI Components

- App
  - Top-level collection of components
  - Tracks fundamental app properties, client type, and app URL
- Site map
  - Provides navigation across other UI components
- Form
  - Provides set of data-entry fields for a specific entity
- View
  - Read-only view of records for a specific entity
  - Defines display columns, column width, sort behavior and filters



# Logic Components

- Business process flow
  - Interactive logic to walk user through standard business process
  - User moves flow from step to step until flow completes
- Workflow
  - Non-interactive logic to automate business process
  - Once workflow starts, it runs to completion without user interaction
- Actions
  - Logic that can be invoked manually by user
- Business rule
  - Logic to define rule or validation constraints to a form
- Flow
  - Microsoft Flow logic to read or write data to external sources



# Visualization Components

- Chart
  - Standard visualization such as bar chart or map
  - Can be displayed on a view, form or dashboard
- Dashboard
  - Palette for composing visualizations into single view
  - Used to create high-level overview of actionable business data
- Power BI Visual Elements
  - Tiles
  - Dashboards
  - Reports







**DEMO**

# Creating Model-driven Apps

# Summary

- ✓ Common Data Service for Apps Overview
- ✓ Creating a Custom Entity
- ✓ Adding Forms and Views
- ✓ Adding Business Logic
- ✓ Building Model-driven Apps

