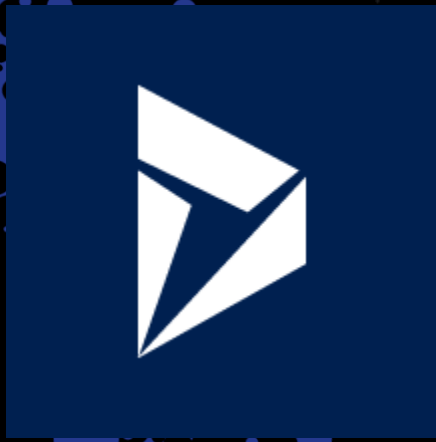


DYNAMICS CON

POWERED BY
DUG



(Low-Code) Automation in the Dataverse





Chad Althaus

- Houston, Texas
- Mechanical Engineer turned Solution Architect
- Power Platform & Dynamics 365 Customer Engagement
- Tweet me @ChadAlthaus
- <http://chadalthaus.com/>



Agenda

What is Automation?

• Automation – “the technique, method, or system of operating or controlling a process by highly automatic means... reducing human intervention to a minimum.” ([Dictionary.com](https://www.dictionary.com))



Low-Code Process Automation

Which Workflow Tool Should I Use?



Power Automate Deep Dive

- Connectors
- Triggers
- Actions
- Tips
- Tools

Terminology

ⓘ Note

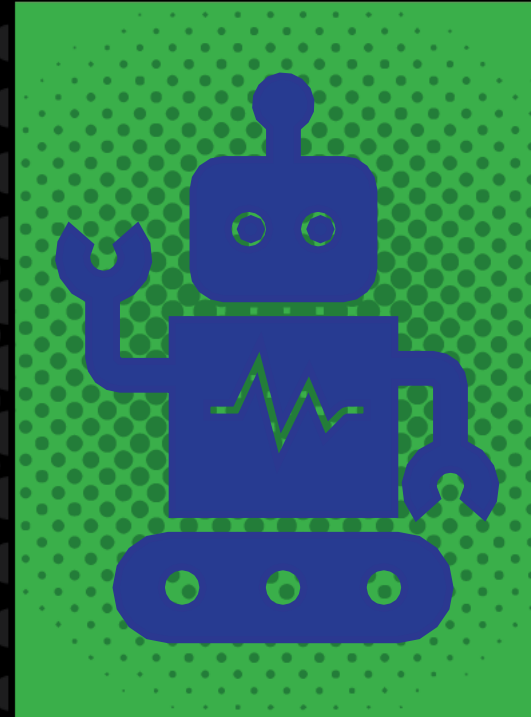
Effective November 2020:

- Common Data Service has been renamed to Microsoft Dataverse. [Learn more](#) ↗
- Some terminology in Microsoft Dataverse has been updated. For example, *entity* is now *table* and *field* is now *column*. [Learn more](#) ↗

This article will be updated soon to reflect the latest terminology.

What is Automation?

- *Automation* – “the technique, method, or system of operating or controlling a process by highly automatic means... reducing human intervention to a minimum.” ([Dictionary.com](https://www.dictionary.com))



Why Automate?

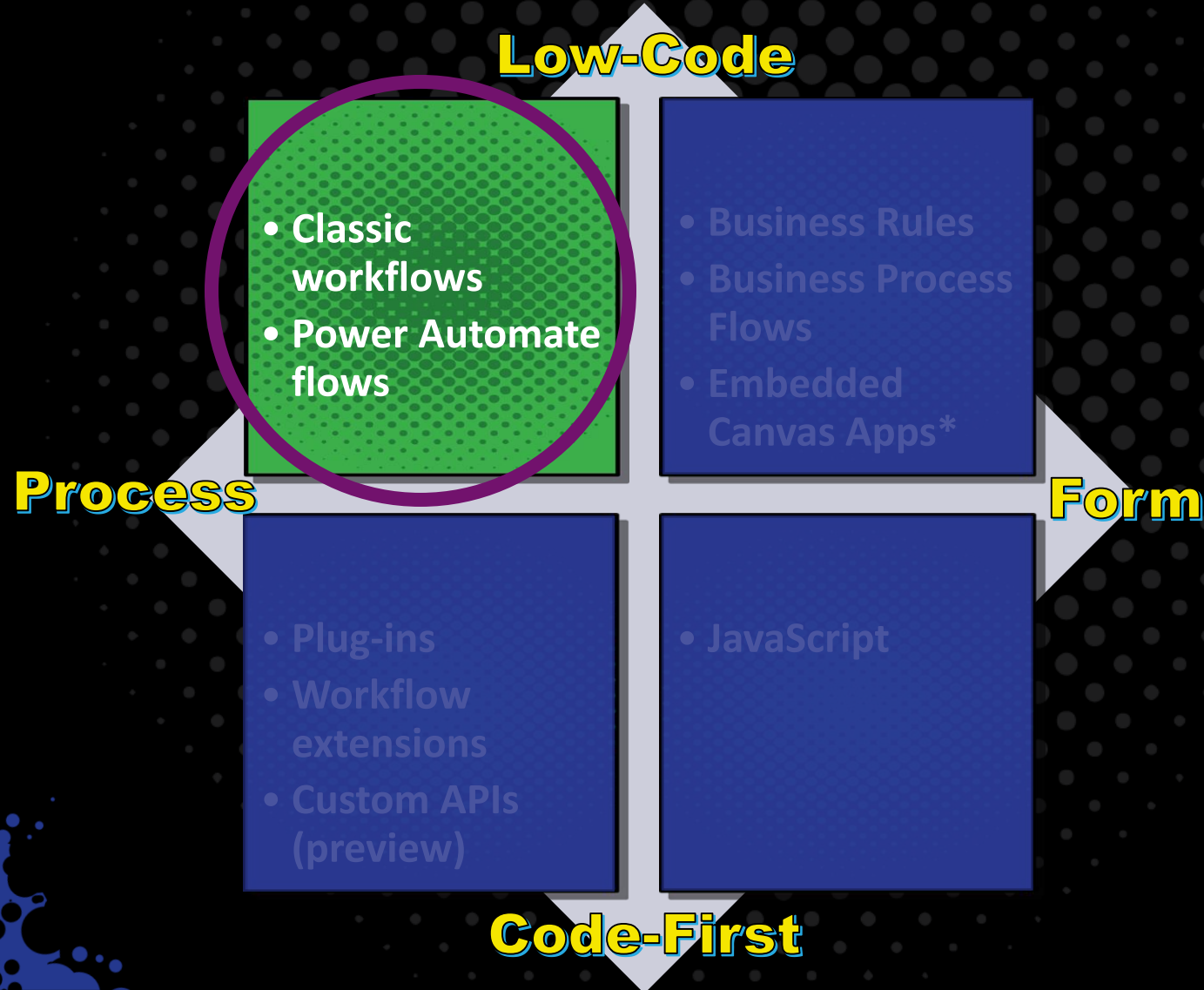
- Eliminate mundane/repetitive tasks
- Make it easier for the users
- Increase user adoption
- Standardize processes
- Enforce business logic
- Improve data quality
- Access external data sources
- Improve communication

Audience

- **Dynamics 365 folks will relate most, but these will apply to anyone working in the Dataverse**
 - Default “personal productivity” environment – citizen developers and makers
 - Enterprise Power Platform environments – IT Power App builders
 - Dynamics 365 Customer Engagement applications – D365 analysts



Options for Automation in the Dataverse





Low-Code Process Automation

Classic Workflows



- Legacy method of process automation
- Background or real-time
- Multiple triggers, including on-demand or child
 - Trigger before an action occurs, rollback (real-time only)
- Create from classic solution explorer
- Solution-aware
- Real-time workflows can run as triggering user
- Option to store run history for background workflows
- Bound to a Dataverse table
- Can only access related data from within the Dataverse

Create Process

Define a new process, or create one from an existing template. You can create four kinds of processes: business process flows, actions, dialogs, and workflows.

Process name: *

Category: *

Entity: *

☒ Run this workflow in the background (recommended)

We recommend using [Microsoft Flow](#) instead of background workflows. [Click here](#) to start building Flows!

Type: ☒ New blank process
☐ New process from an existing template (select from list):

Template Name ↑	Primary Entity	Owner

Properties

OK

Cancel



Process: Demo Workflow

Information

We recommend using [Microsoft Flow](#) instead of background workflows. [Click here](#) to start building Flows!



General

Administration

Notes

Hide Process Properties

Process Name *

Activate As

Available to Run

☒ Run this workflow in the background (recommended)

☐ As an on-demand process

☐ As a child process

Workflow Job Retention

☒ Automatically delete completed workflow jobs (to save disk space)

Entity

Category

Options for Automatic Processes

Scope

Start when: ☒ Record is created

☐ Record status changes

☐ Record is assigned

☐ Record fields change

☐ Record is deleted

Select

Add Step | Insert | Delete this step.

Select this row and click Add Step.



Process: Demo Workflow

Information

Real-time Workflow

General

Administration

Notes

▼ Hide Process Properties

Process Name*

Demo Workflow

Activate As

Process ▾

Entity

Contact

Category

Workflow

Available to Run

☐ Run this workflow in the background (recommended)☐ As an on-demand process☐ As a child process

Workflow Log Retention

☒ Keep logs for workflow jobs that encountered errors

Options for Automatic Processes

Scope

Organization ▾

Start when:

After

After

Before

☒ Record is created☐ Record status changes☐ Record is assigned☐ Record fields change☐ Record is deleted

Select

Execute as:

☐ The owner of the workflow☒ The user who made changes to the record

Custom Actions



- Very similar to real-time workflows
- No triggers - must be called from within a workflow – or using Power Automate!
- Something new – optional input and output arguments
- Can be bound or unbound

You've got an alert for the mailbox 'Chad Althaus'. 2/21/2021 3:38 PM [View Alerts](#)

Create Process

Define a new process, or create one from an existing template. You can create four kinds of processes: business process flows, actions, dialogs, and workflows.

Process name: *

Category: * Entity: *

Type: ☒ New blank process ☐ New process from an existing template (select from list):

Template Name ↑	Primary Entity
	Connector
	Contact
	Contact Price List
	Context item value
	Context variable
	Contract
	Contract Line
	Contract Line Detail Performance
	Contract Performance
	Contract Template
	Conversation
	Conversation Action

[Properties](#)

File

Save and Close

Activate

Show Dependencies

Solution Layers

Actions

Help

Process: Email Contact Owner

Information

GeneralAdministrationNotes

Hide Process Properties

Process Name *Email Contact Owner

Unique Name *caa_EmailContactOwner

Activate AsProcess

Available to Run

☐ As a Business Process Flow action step

Workflow Log Retention

☒ Keep logs for workflow jobs that encountered errors

Hide Process Arguments

Name*	Type	Required	Direction
Message	String	Optional	Input

Name *Message

Type *String

Entity

Required☐

Direction☒ Input ☐ Output

DescriptionMessage to include in email

Add StepInsertDelete this step.

Send email to Contact Owner

Send email:Create New MessageSet Properties

Power Automate



- **Microsoft's new tool for process automation**
- **Includes both cloud flows and desktop flows**
 - Cloud flows – comparable to classic workflows*
 - Focus of this conversation
 - Desktop flows – robotic process automation (RPA);
 - Access to both desktop applications and websites
- **Background only**
- **Access to hundreds of external data sources out of the box through connectors**
- **Numerous new triggers**
 - **Built-in:** schedule, button, location, Power Apps, HTTP request...
 - **Other Connectors:** Teams, Planner, Outlook, Salesforce, RSS...
 - Limited ability to “stack” multiple triggers in a single flow
- **Solution-aware**
- **Not bound to a Dataverse table**
- **30 day run history**



Create a flow in the Dataverse



Home

Learn

Apps

+ Create

Data ▾

Flows

Chatbots ▾

AI Builder ▾

Solutions

+ New ▾ + Add existing ▾ Delete Export Publish all customizations ...

≡ All ▾ Search

Solutions > Automation in the Dataverse

**No components found.**

There are no components to show in this view. Create one or more components to get started. [Learn more](#)



Create a flow within Dataverse for Teams



Activity



Chat



Teams



Calendar



Calls



Power Apps



Apps



Help



Power Apps

[Home](#)[Build](#)[About](#)

Teams + Power Apps

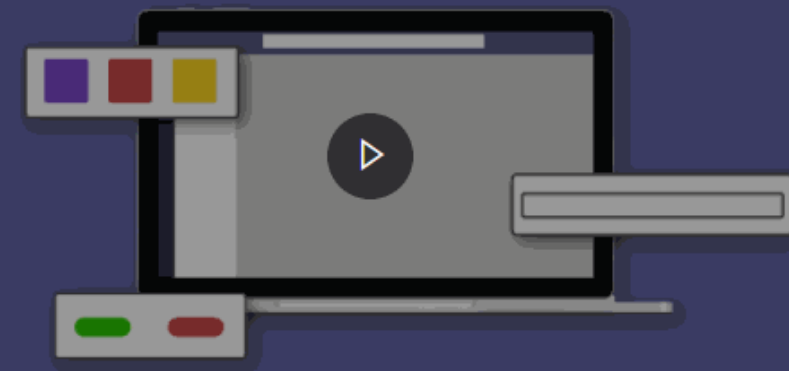
Microsoft Power Apps makes it easy to build apps for your business needs, from tracking time-off requests, managing inventory, submitting expenses, and more. [Learn more](#)

Build an app in 5 minutes

Create an app and connect it to your data to enhance collaboration across your team.

[Create an app](#)

Custom apps



Recent apps

[+ New app](#)

Name

Modified

Owner

Type

Team



Team Collaboration

14 min ago

Chad Althaus

Canvas

powerdemo2020

0:00

Which Workflow Tool Should I Use?

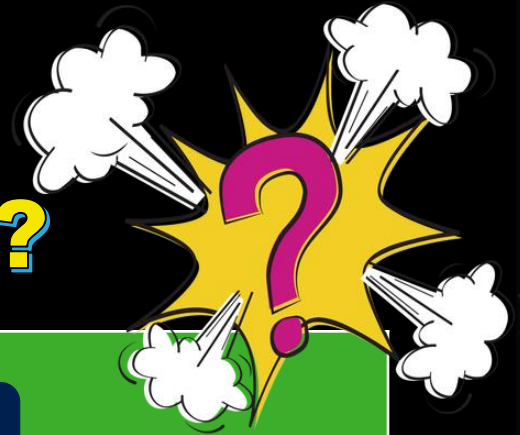









Classic Workflows



Power Automate

Which Workflow Tool Should I Use?



Show updates on the form upon save Rollback changes in case of failure Trigger before an event occurs	Real-time process	
Create a recurring process		
Access data from another source		
Create and call a child process		 
Call a custom action		 

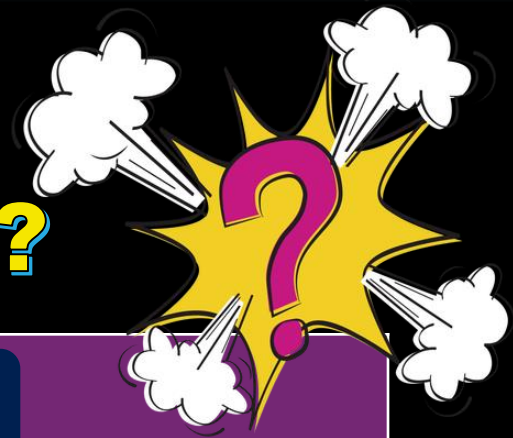









Classic Workflows



Power Automate

Which Workflow Tool Should I Use?



Trigger upon create/update/delete and also make available to run on-demand	
Create a process that runs as triggering user	 
Create a background process that runs as the triggering user	
Create a process within Dataverse for Teams	
Less headache when importing to another environment	
Update all related records – e.g. every contact related to an account	

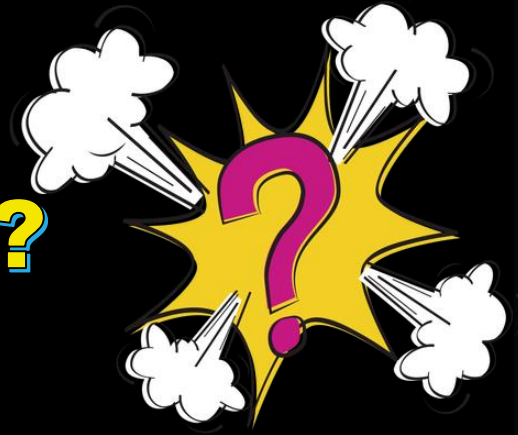


Classic Workflows



Power Automate

Which Workflow Tool Should I Use?



Microsoft's answer?



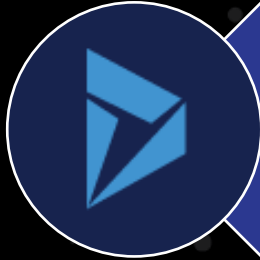
Still needed for real-time processes



Power Automate Deep Dive

- Connectors
 - Triggers
 - Actions
 - Tips
 - Tools

Connector Overview



Dynamics 365 (deprecated) – 1st



Common Data Service – 2nd

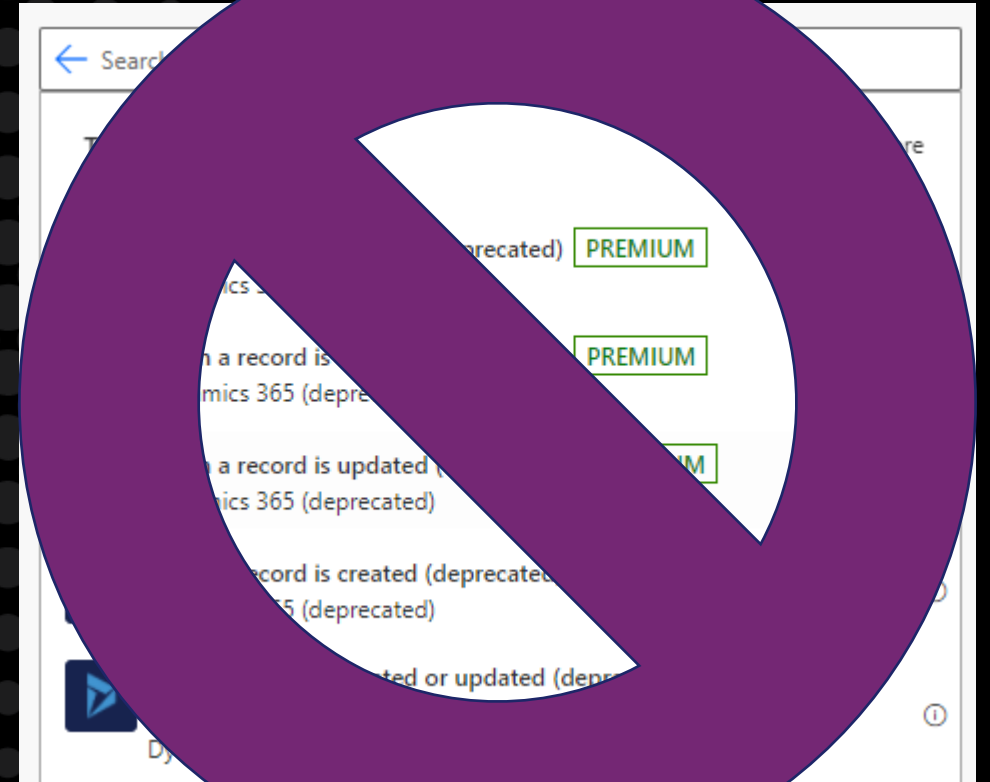
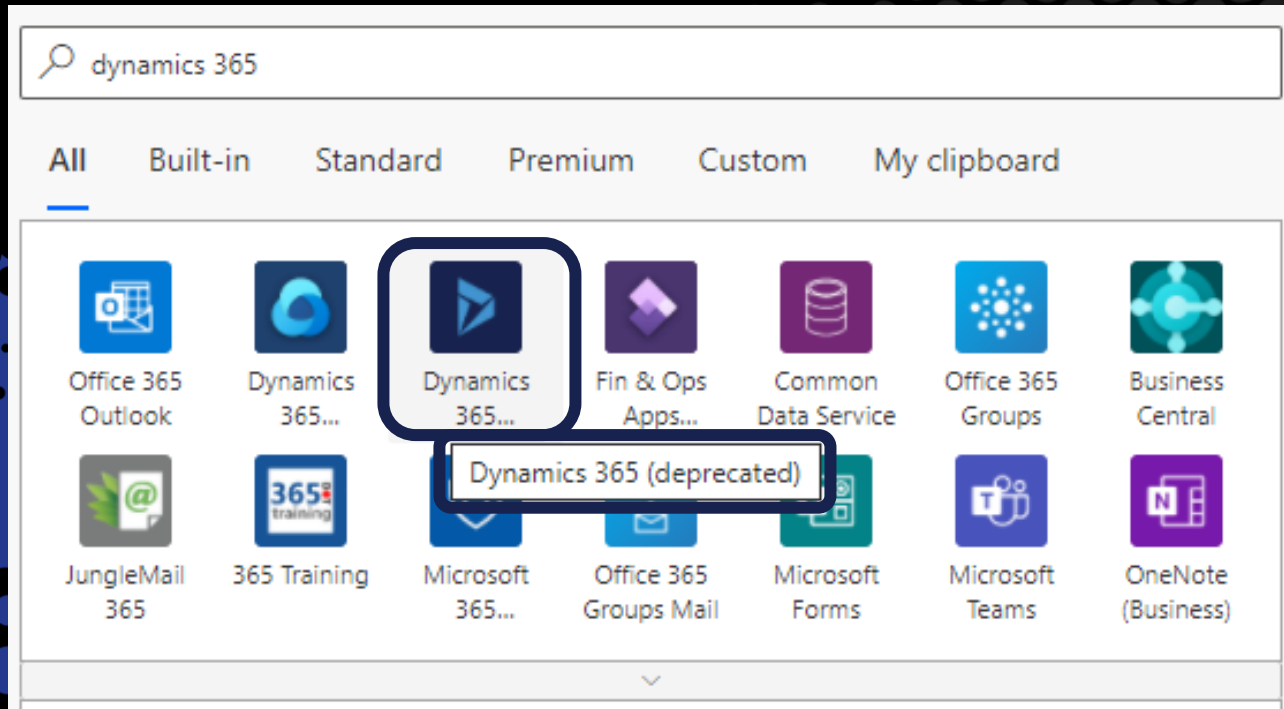


Common Data Service (current environment) – 3rd

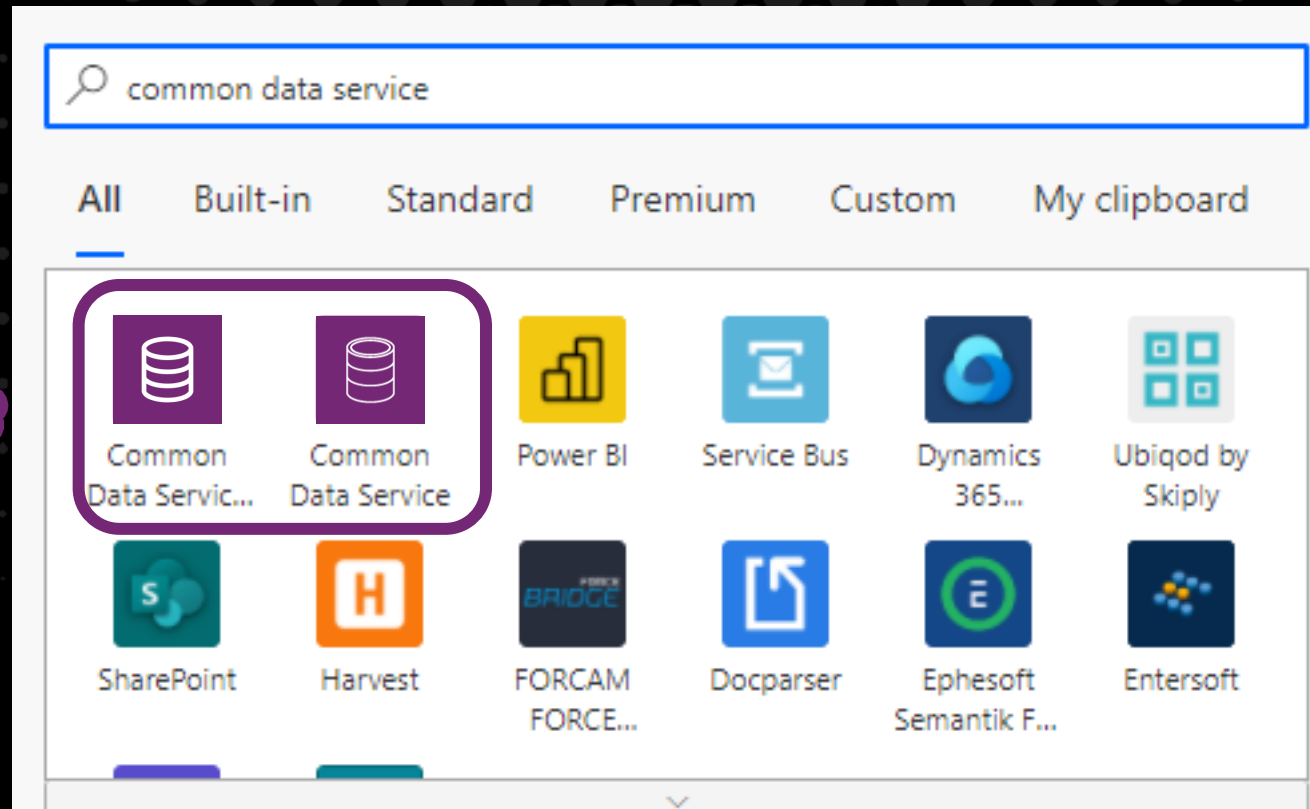
Which do I
use...?



Triggers



Triggers





Triggers



← Search connectors and triggers

Triggers Actions See more

When a flow step is executed **PREMIUM** ⓘ
Common Data Service (current environment)

When a row is created, updated or deleted **PREMIUM** ⓘ
Common Data Service (current environment)

← Search connectors and triggers

Triggers Actions See more

When a record is created **PREMIUM** ⓘ
Common Data Service

When a record is deleted **PREMIUM** ⓘ
Common Data Service


When a record is updated **PREMIUM** ⓘ
Common Data Service

When a row is selected **PREMIUM** ⓘ
Common Data Service



Triggers



 When a row is added, modified or deleted ? ...

* Change type

Choose when the flow triggers

'Change type' is required.

* Table name

Choose a table

'Table name' is required.

* Scope

Choose a scope to limit which rows can trigger the flow

'Scope' is required.

Column filter

Enter a comma-separated list of column unique names. The flow triggers if any of them are modified

Row filter


Enter an OData style filter expression to determine which rows can trigger the flow

Delay until

Enter a time to delay the trigger evaluation, eg. 2020-01-01T10:10:00Z

Run as

Choose the running user for steps where invoker connections are used

 When a record is updated ? ...

* Environment

Select an Environment.

'Environment' is required.

* Entity Name

Select an Entity.

'Entity Name' is required.

* Scope

Scope.

'Scope' is required.

Attribute Filters Item - 1


+ Add new item

[Hide advanced options](#) ^








Actions












 Common Data Service (current environment)

← Search connectors and actions

Triggers Actions






-  Add a new row **PREMIUM**
Common Data Service (current environment)
-  Delete a row **PREMIUM**
Common Data Service (current environment)
-  Download a file or an image **PREMIUM**
Common Data Service (current environment)
-  Get a row by ID **PREMIUM**
Common Data Service (current environment)
-  List rows **PREMIUM**
Common Data Service (current environment)

-  Perform a bound action **PREMIUM**
Common Data Service (current environment)
-  Perform an unbound action **PREMIUM**
Common Data Service (current environment)
-  Predict using AI Builder models **PREMIUM**
Common Data Service (current environment)
-  Relate rows **PREMIUM**
Common Data Service (current environment)
-  Unrelate rows **PREMIUM**
Common Data Service (current environment)
-  Update an existing row **PREMIUM**
Common Data Service (current environment)
-  Upload a file or an image **PREMIUM**
Common Data Service (current environment)
-  Perform a changeset request **PREMIUM**
Common Data Service (current environment)

 Common Data Service

← Search connectors and actions

Triggers Actions

-  Create a new record **PREMIUM**
Common Data Service
-  Get record **PREMIUM**
Common Data Service
-  List records **PREMIUM**
Common Data Service
-  Update a record **PREMIUM**
Common Data Service
-  Delete a record **PREMIUM**
Common Data Service



Power Automate Tips


Tips for using the CDS(ce) connector

1. OData formatting
2. Limit flow runs using filters
3. Expand Query
4. Choose credentials to use
5. Never use spaces for multiple filtering columns
6. Set N:N relationships
7. Cannot update using a null value
8. Combine the CDS and CDS(ce) connectors
9. Call custom actions


1. OData formatting

- **Must use OData ID when setting lookup columns:**

1. Use dynamic content from a previous step, "Odata.Id"

Owner (Owners)  OData Id x


2. Specify the table type using the pluralized logical name

Owner (Owners)  systemusers(Owner (Value) x)

- **Note – lookup columns now have two parts – a Type and Value**

```
"_ownerid_value": "c3d1b502-e073-eb11-b1ab-002248049a69",  
"_ownerid_type": "systemusers",
```


2. Limit flow runs using filters

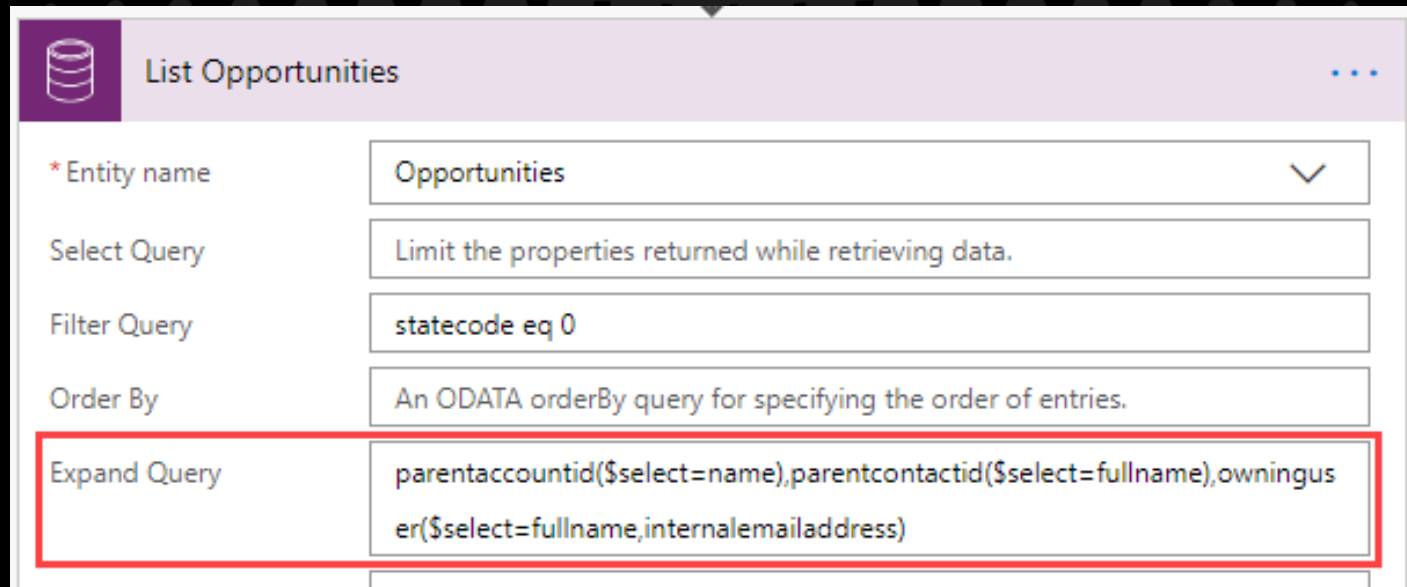
 When a row is added, modified or deleted ? ...

* Change type	Update	▼
* Table name	Contacts	▼
* Scope	Organization	▼
Column filter	emailaddress1	
Row filter	donotbulkemail ne 1	
Delay until	Enter a time to delay the trigger evaluation, eg. 2020-01-01T10:10:00Z	
Run as	Choose the running user for steps where invoker connections are used	▼

Hide advanced options ^

3. Expand Query

- **Retrieve columns from a related table**
 - Available in “List rows” and “Get a row by ID”
 - Eliminate need for an extra “Get a row by ID” step



The screenshot shows a web interface for 'List Opportunities'. It features a purple header bar with a database icon and the title 'List Opportunities'. Below the header, there are several input fields for configuring the query. The 'Expand Query' field is highlighted with a red rectangular border. The text in the 'Expand Query' field is: `parentaccountid($select=name),parentcontactid($select=fullname),owninguser($select=fullname,internalemailaddress)`.

List Opportunities	
* Entity name	Opportunities
Select Query	Limit the properties returned while retrieving data.
Filter Query	statecode eq 0
Order By	An ODATA orderBy query for specifying the order of entries.
Expand Query	parentaccountid(\$select=name),parentcontactid(\$select=fullname),owninguser(\$select=fullname,internalemailaddress)

4. Choose credentials to use

The image shows a workflow editor interface. On the left, the 'Run as' dropdown menu is open, displaying the following options: 'Process Owner', 'Record Owner', 'Triggering User' (highlighted with a green box), and 'Enter custom value'. The dropdown title is 'Choose the running user for steps where invoker connections are used'. To the right, a 'More options' menu is open, listing actions such as 'Copy to my clipboard (Preview)', 'Rename', 'Add a comment', 'Static result (Preview)', 'Settings', 'Configure run after', 'Peek code', and 'Delete'. The 'More options' menu is also highlighted with a green box. At the bottom of the 'More options' menu, the option 'Use invoker's connection' is selected, indicated by a blue checkmark and highlighted with a green box.

Run as

Choose the running user for steps where invoker connections are used

- Process Owner
- Record Owner
- Triggering User
- Enter custom value

Hide advanced options

Copy to my clipboard (Preview)

Rename

Add a comment

Static result (Preview)

Settings

Configure run after

Peek code

Delete

Use invoker's connection

5. Never use spaces for multiple filtering columns

Column filter

emailaddress1,ownerid|






Column filter







emailaddress1, ownerid



6. Set N:N relationships

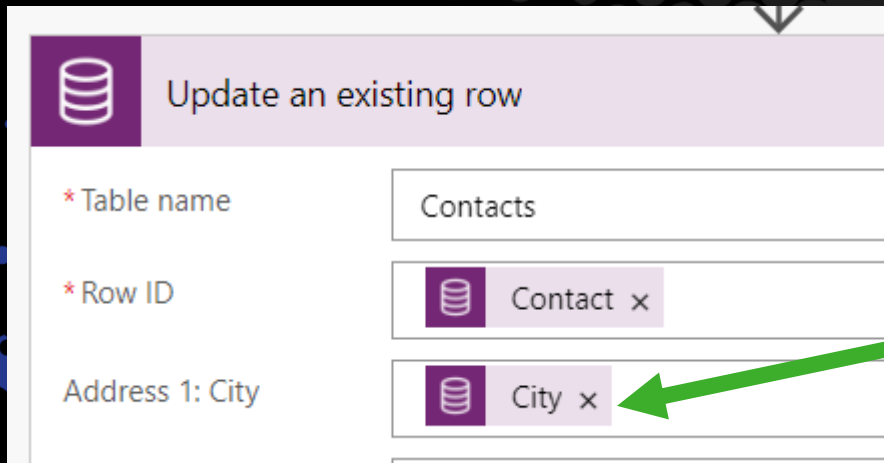
↓

 Relate Business Partner and Account records  

* Table name	Business Partner 
* Row ID	 Business Partner (Value) 
* Relationship	Account - bmi_bmi_businesspartner_account 
* Relate with	 OData Id 

7. Cannot update using a null value

- Dynamic content in an update step will fail if null
- CDS classic connector does not have this issue



The screenshot shows the 'Update an existing row' configuration window. It has a title bar with a database icon and the text 'Update an existing row'. Below the title bar, there are three rows of configuration fields:

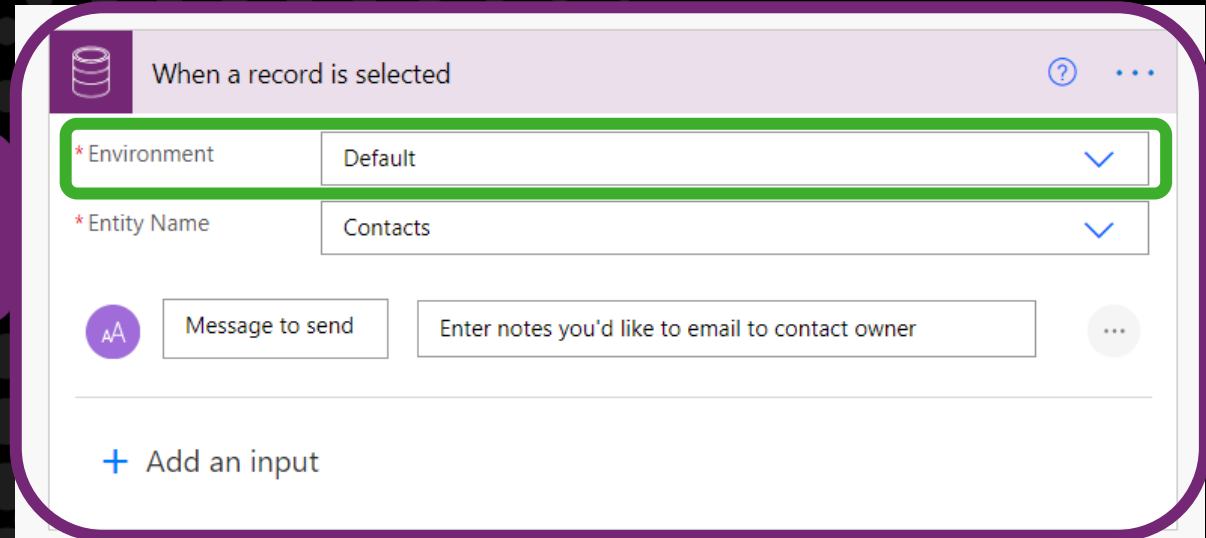
Field Label	Value
* Table name	Contacts
* Row ID	Contact x
Address 1: City	City x

Flow run fails if City is null



8. Combine the CDS and CDS(ce) connectors

- Get the best of both worlds
- BUT - beware of crossing environments!
 - Always select “Default” environment

A screenshot of the SAP CDS connector configuration interface. The title bar says 'When a record is selected'. It has two dropdown menus: '* Environment' set to 'Default' and '* Entity Name' set to 'Contacts'. Below these are two input fields: 'Message to send' and 'Enter notes you'd like to email to contact owner'. At the bottom is a '+ Add an input' button. A green border highlights the 'Environment' dropdown.

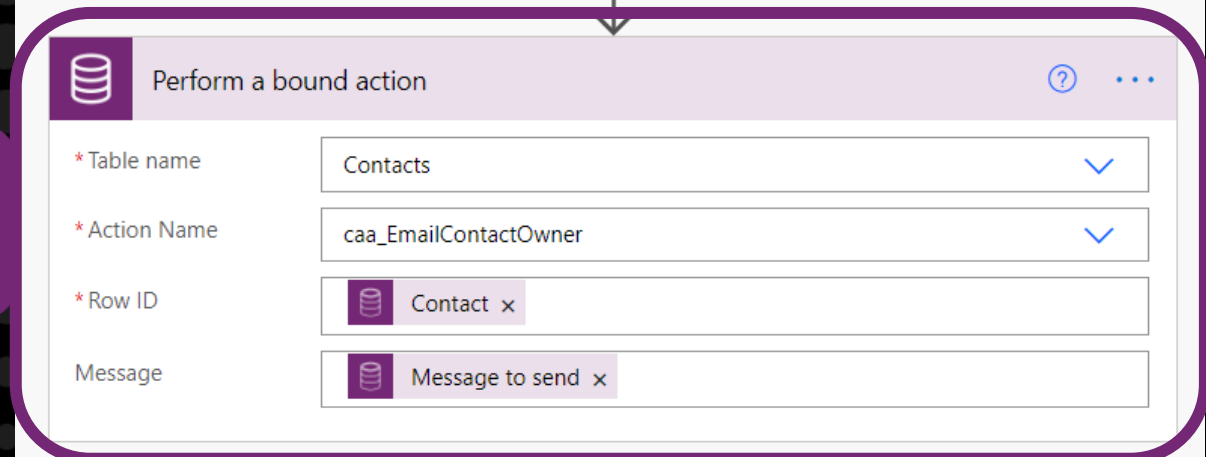
When a record is selected

* Environment Default

* Entity Name Contacts

Message to send Enter notes you'd like to email to contact owner

+ Add an input

A screenshot of the SAP CDS(ce) connector configuration interface. The title bar says 'Perform a bound action'. It has three dropdown menus: '* Table name' set to 'Contacts', '* Action Name' set to 'caa_EmailContactOwner', and '* Row ID' set to 'Contact'. Below these are two input fields: 'Message' and 'Message to send'. An arrow points from the CDS connector interface above to this one.

Perform a bound action

* Table name Contacts

* Action Name caa_EmailContactOwner

* Row ID Contact

Message Message to send

9. Call custom actions

Working on solution: Automation in the Dataverse

General Administration Notes

▼ Hide Process Properties

Process Name * Email Contact Owner

Unique Name * **caa_EmailContactOwner**

Entity Contact

Category Action

Activate As Process

Enable rollback ☒

Available to Run

☐ As a Business Process Flow action step

Workflow Log Retention

☒ Keep logs for workflow jobs that encountered errors

▼ Hide Process Arguments

Name	Type	Required	Direction
Message	String	Optional	Input

Name * Type * Entity Required Direction Description

Boolean

Input

When a record is selected

* Environment Default

* Entity Name Contacts

Message to send Enter notes you'd like to email to contact owner

+ Add an input

Perform a bound action

Entity name Contacts

* Action Name **caa_EmailContactOwner**

* Row ID Contact x

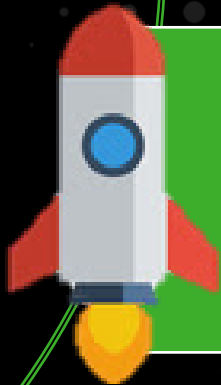
Message Message to send x

Helpful Tools



FetchXML Builder

- XRM Toolbox



Level up for Dynamics 365/Power Apps

- Extension to Google Chrome/Edge



Tools FetchXML Builder (Default En... FetchXML Builder (Default En... x

New Clone Repository Open Save Undo Redo Execute (F5) View Bulk Data Updater

Query Builder Result View FetchXML x

fetch top:50
 entity contact
 attribute createdon
 filter
 condition createdon last-seven
 condition accountid null

```
<fetch top="50" >  
  <entity name="contact" >  
    <attribute name="createdon" />  
    <filter>  
      <condition attribute="createdon" operator="last-seven" />  
      <condition attribute="accountid" operator="null" />  
    </filter>  
  </entity>  
</fetch>
```

Power Automate List Records Parameters

Select	createdon
Aggr.transf.	
Filter query	(Microsoft.Dynamics.CRM.Last7Days(PropertyName='createdon') and
Order By	
Top Count	50
Expand Query	

Click links above to copy!

FetchXML Ctrl+E
SQL Query
Power Automate Parameters
OData 4.0 (WebAPI)
OData 2.0
QueryExpression
FetchXML C# code
FetchXML JavaScript code
Reset window layout

Level up for Dynamics 365/Power Apps v3.5.7

Help

Report Issue

FORMS

NAVIGATION

VIEW

IMPERSONATE

LOGICAL NAMES

CLEAR LOGICAL NAMES

BLUR FIELDS

RESET BLUR

ownerid

Attribute Name	Value
_ownerid_value@OData.Community.Display.V1.FormattedValue	Chad Althaus
_ownerid_value@Microsoft.Dynamics.CRM.associatednavigationproperty	ownerid
_ownerid_value@Microsoft.Dynamics.CRM.lookuplogicalname	systemuser
_ownerid_value	c3d1b502-e073-eb11-b1ab-002248049a69

SHOW OPTIONSET VALUES

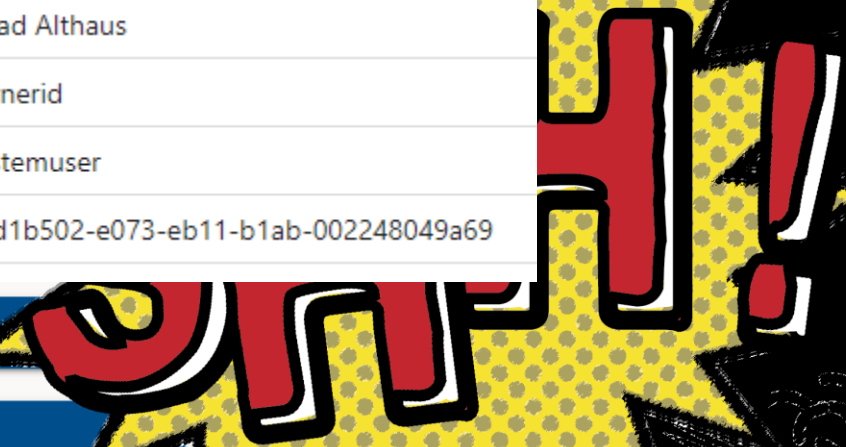
CLONE RECORD

REFRESH + AUTOSAVE OFF

TOGGLE TABS

PROCESSES & BUSINESS RULES

RECORD PROPERTIES



Thank you!



Series of related blog posts coming
at <https://www.chadalhaus.com/>