


Chapter 1: Let's Get the Basics out of the Way

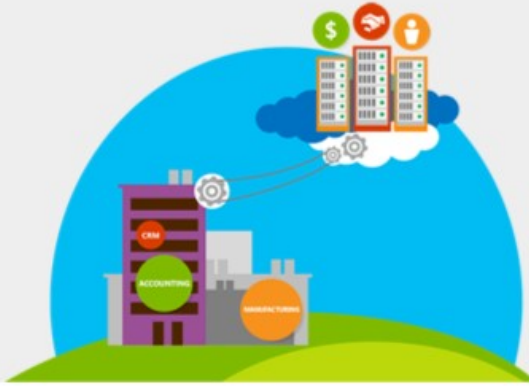


AL Language
Microsoft | 26,153 installs | 63,977 downloads

AL development tools for Dynamics 365 Business Central

[Install](#) [Trouble Installing?](#)

WELCOME



THIS IS YOUR SANDBOX ENVIRONMENT (PREVIEW) FOR DYNAMICS 365 BUSINESS CENTRAL

This environment is for you to try out different product features without affecting data or settings in your production environment. You can use it for different non-production activities such as test, demonstration, or development.

This Sandbox environment feature is provided as a free preview solely for testing, development and evaluation. You will not use the Sandbox in a live operating environment. Microsoft may, in its sole discretion, change the Sandbox environment or subject it to a fee for a final, commercial version, if any, or may elect not to release

[Learn More](#) ↗



Microsoft

Dynamics 365 Business Central Sandbox Environment

13.3.27233.0 (W1)

SQL Server
localhost\SQLEXPRESS
CRONUS

Download Self Signed Certificate

The Dynamics 365 Business Central Sandbox Environment is secured with a self-signed certificate. In order to connect to the environment, you must trust this certificate. Select operating system and browser to view the process for downloading and trusting the certificate:

[Download Certificate](#)

[Windows \(Edge/IE/Chrome\)](#)

[Windows \(Firefox\)](#)

[Windows Phone](#)

[iOS \(Safari\)](#)

[Android](#)

Remote Desktop Access

You can connect to the server in the Dynamics 365 Business Central Sandbox Environment by following this link. If connections to RDP fails, you might need to add an incoming rule to the networksecurity group allowing port 3389 for IP address 198.200.94.124.

[Connect](#)

Installation complete

You can view the installation status by following this link.

[View Installation Status](#)

Access the Dynamics 365 Business Central Sandbox Environment

Choose these links to access the Dynamics 365 Business Central Sandbox Environment using the Web Client.

[Web Client](#)

If you have installed the Microsoft Dynamics NAV Universal App on your phone, tablet or desktop computer and want to configure the app to connect to this Dynamics 365 Business Central Sandbox Environment, choose this link.

[Configure App](#)

Access the Dynamics 365 Business Central Sandbox Environment using Web Services

The Dynamics 365 Business Central Sandbox Environment exposes functionality as SOAP web services. Choose this link to view the web services.

[View SOAP Web Services](#)

The Dynamics 365 Business Central Sandbox Environment exposes data as restful OData web services. Choose this link to view the web services.

[View OData Web Services](#)

The Dynamics 365 Business Central Sandbox Environment exposes the API endpoint. APIs are exposed using <API Base

[View API base URL](#)

Url>/<Publisher>/<Group>/<Version>/<Entity>. Choose this link to get the base URL for the APIs.

Example: <https://testbookvm.northcentralus.cloudapp.azure.com:7048/nav/api/microsoft/automation/beta/companies>

Access the Dynamics 365 Business Central Sandbox Environment using Visual Studio Code

Download the AL Language Customization for Visual Studio Code (.vsix)

[al-2.1.79379](#)

launchjson settings:

```
"server": "https://testbookvm.northcentralus.cloudapp.azure.com",  
"serverInstance": "NAV",  
"tenant": "",  
"authentication": "UserPassword",
```

```
"server": "https://testbookvm.northcentralus.cloudapp.azure.com",  
"serverInstance": "NAV",  
"tenant": "",  
"authentication": "UserPassword",
```

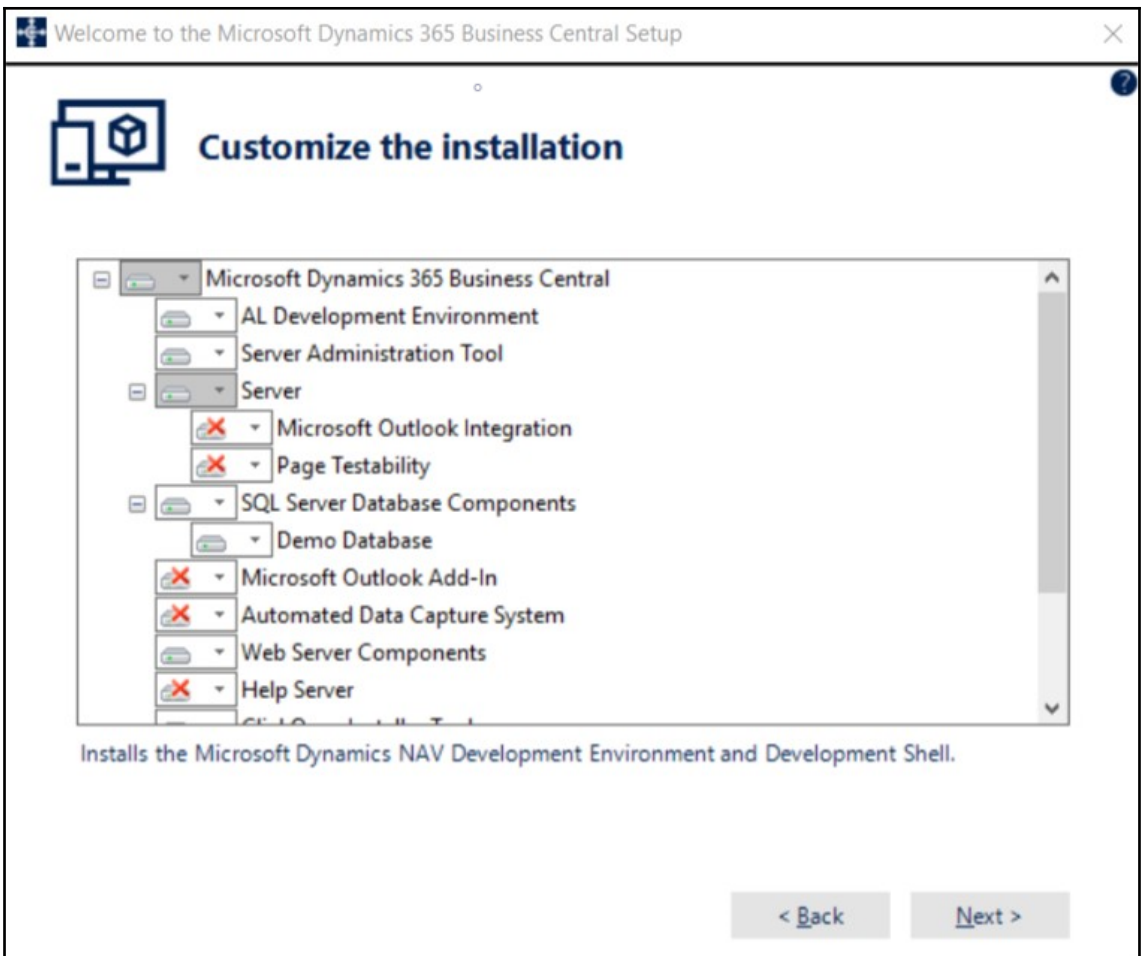
User name:

Password:

Sign In

© 2018 Microsoft. All rights reserved. | [Privacy](#)

```
Web Client      : http://mybccontainer/NAV/  
Dev. Server    : http://mybccontainer  
Dev. ServerInstance : NAV
```



```
└─ .alpackages
   └─ Microsoft_Application_13.1.26046.0.app
      └─ Microsoft_System_13.0.12929.0.app
```

Dynamics 365 | Business Central | Environment Sandbox

CRONUS Canada, Inc. | < Finance | Cash Management | Sales | Purchasing | Approvals >

Television Show List: | Search | + New | X Delete | Edit In Excel

CODE	NAME	STATUS
(There is nothing to show in this view)		

Dynamics 365 | Business Central | Environment Sandbox

Television Show Card

General

Code * Status Active

Name First Aired

Synopsis

First Aired 3/15/2019

Last Aired 3/2/2019

Created By

Validation Results

Last Aired cannot be earlier than First Aired

CODE	NAME	STATUS	CREATED BY
SHOW1	Sample television show	Active	MIKE

PERMISSION SETS


Search + New Edit List Delete Process Edit In Excel

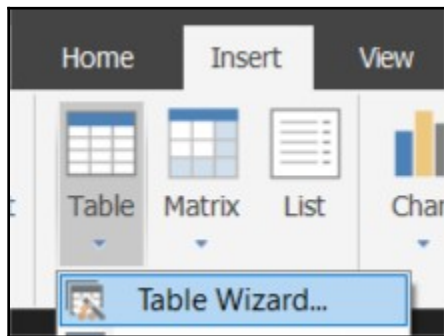
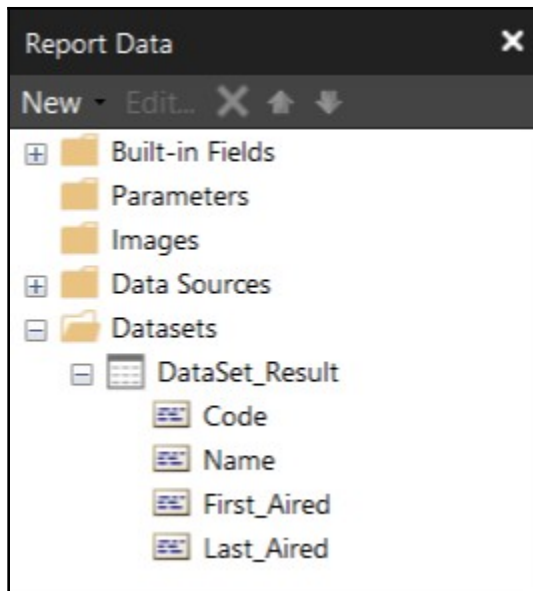
PERMISSION SET ▼	NAME	TYPE
TVSHOW	Television Show	Extension

Permission Set TVSHOW

OBJECT TYPE	OBJECT ID	OBJECT NAME	READ PERMISSI...	INSERT PERMISSI...	MODIFY PERMISSI...	DELETE PERMISSI...	EXECUTE PERMISSI...
Table Data	50100	Television Show	Yes	Yes	Yes	Yes	
Table	50100	Television Show					Yes
Page	50100	Television Show Card					Yes
Page	50101	Television Show List					Yes

- Television Shows Report.al
- Television Shows Report.rdlc

 **Open**
Open a saved report.




New Table or Matrix ✕

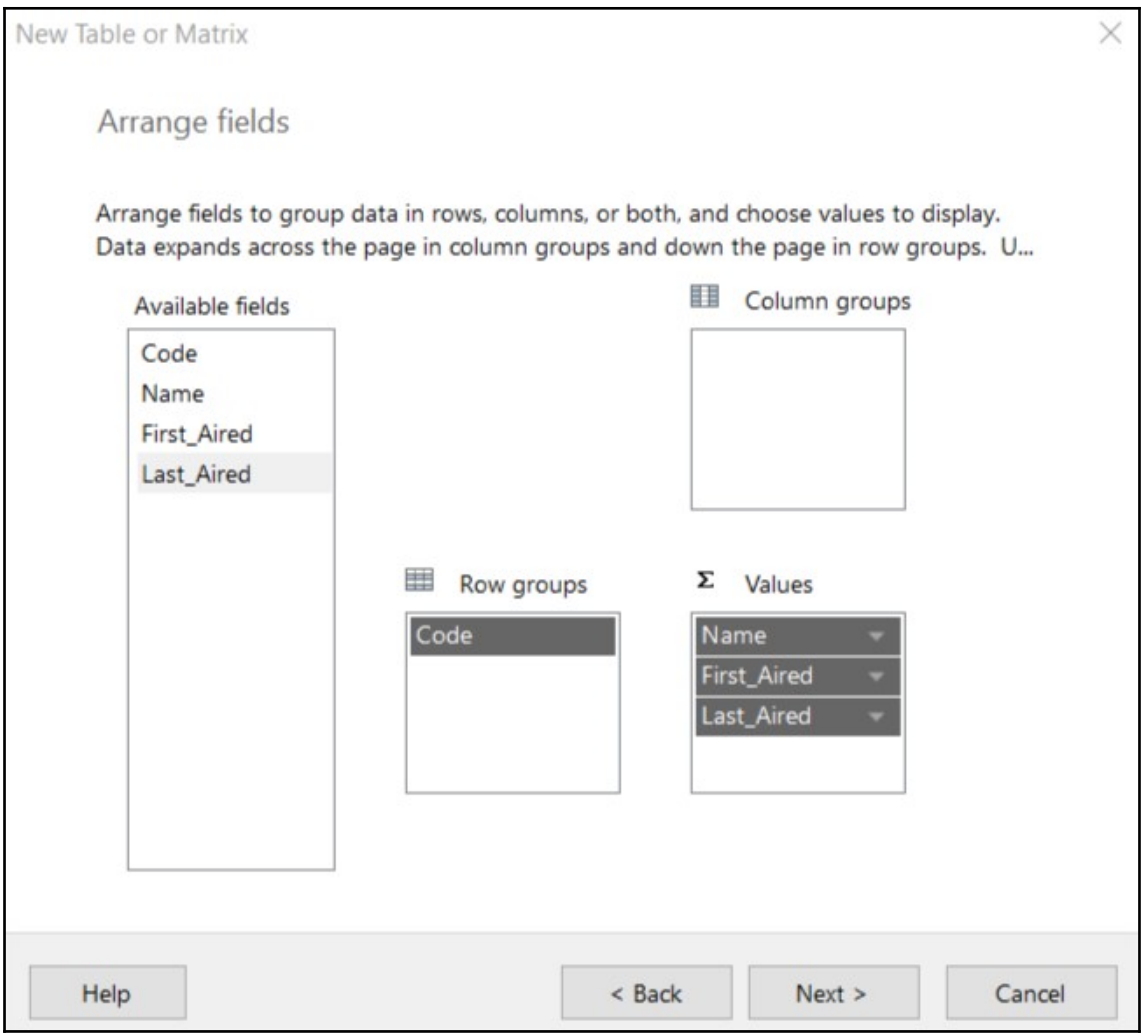
Choose a dataset

Choose a dataset

Choose an existing dataset in this report or a shared dataset

 **DataSet_Result**
(in this Report) Code, Name, First_Aired, Last_Aired

Create a dataset



New Table or Matrix ✕

Choose the layout

If you choose to show subtotals and grand totals, you can place them above or below the group. Stepped reports show hierarchical structure with indented groups in the sa...

Options:


- Show subtotals and grand totals
 - Blocked, subtotal below
 - Blocked, subtotal above
 - Stepped, subtotal above
- Expand/collapse groups

Preview

Code	Name	First Aired	L
[Code]	[Name]	[First_Aired]	[Las

Help < Back Next > Cancel

Code	Name	First Aired	Last Aired
[Code]	[Name]	[First_Aired]	[Last_Aired]

EDIT - TELEVISION SHOWS REPORT 

Television Show

Show results:

Where: is:



And: is:


And: is:


And: is:

Chapter 2: Customizing What's Already There

Television Viewing Country ... Canada ▼
Canada
United States
United Kingdom

[Navigate](#) Report Less options
es ▼  Documents ▼  Customer Television Shows

 You need to define a favorite television show for Customer 50000.

Purch  ALProject1 | Television Show List ▼ More

Type Inventory ▼

Attachments

Documents

Description	ANTWERP Conference Table	<ul style="list-style-type: none">MoveRemoveShow under "Show more"Show when collapsedExclude from Quick Entry
Inventory		
Shelf No.		
Quantity on Hand	10 ...	

← EVENT RECORDER ↗

Record Events ⏏

CALL ORDER	EVENT TYPE	HIT COUNT	OBJECT TYPE	OBJECT NAME	EVENT NAME	ELEMENT NAME
------------	------------	-----------	-------------	-------------	------------	--------------

EVENT RECORDER ↗

Record Events ⏏

CALL ORDER	EVENT TYPE	HIT COUNT	OBJECT TYPE	OBJECT NAME	EVENT NAME	ELEMENT NAME
1	Trigger Event	1	Page	Sales Order	OnAfterGetRecordEvent	
2	Trigger Event	1	Page	Sales Order	OnBeforeActionEvent	Release
3	Custom Eve...	1	Codeunit	Prepayment Mgt.	OnBeforeTestSalesPrepayment	
4	Custom Eve...	1	Codeunit	Release Sales D...	OnBeforeManualReleaseSalesD...	
5	Custom Eve...	1	Codeunit	Release Sales D...	OnBeforePerformManualRelease	
6	Custom Eve...	1	Codeunit	Release Sales D...	OnBeforeReleaseSalesDoc	
7	Custom Eve...	1	Table	Sales Header	OnCheckSalesReleaseRestrictio...	
8	Custom Eve...	1	Codeunit	Release Sales D...	OnCodeOnAfterCheck	
9	Custom Eve...	1	Codeunit	Release Sales D...	OnBeforeCalcInvDiscount	
10	Custom Eve...	1	Codeunit	Release Sales D...	OnBeforeModifySalesDoc	
11	Custom Eve...	1	Codeunit	Prepayment Mgt.	OnBeforeTestSalesPrepayment	
12	Trigger Event	1	Table	Sales Tax Amou...	OnBeforeInsertEvent	

Customer Listing Sunday, March 31, 2019 2:56 PM

CRONUS Canada, Inc. Page 1
MIKE

All amounts are in CAD.

No.	Name and Address Contact and Phone Number	Customer Posting Group	Blocked Comment	Discounts Inv. / Item	Customer Tax Area Code	Terms Fin Chrg	Salesperson Currency Code	Credit Limit (\$) Balance (\$)
10000	Adatum Corporation 360 Main Street, Suite 1150 Winnipeg, MB R3C 3Z3 Robert Townes	DOMESTIC	No	10000	MB	1M	PS	18,216.96
20000	Trey Research 1950 Meadowvale Blvd. Mississauga, ON L5N 8L9 Helen Ray	DOMESTIC	No	20000	ON	14D	PS	4,908.72

Customer Listing With Television Shows

Wednesday, April 17, 2019 5:52 PM

Page No. 1

MIKE

Customer	Television Show Code	Television Show Name	Favorite
Adatum Corporation	TV1	Television Show 1	✓
	TV2	Television Show 2	
Trey Research			
School of Fine Art			

Views ✕

All

Filter list by:

✕ No.

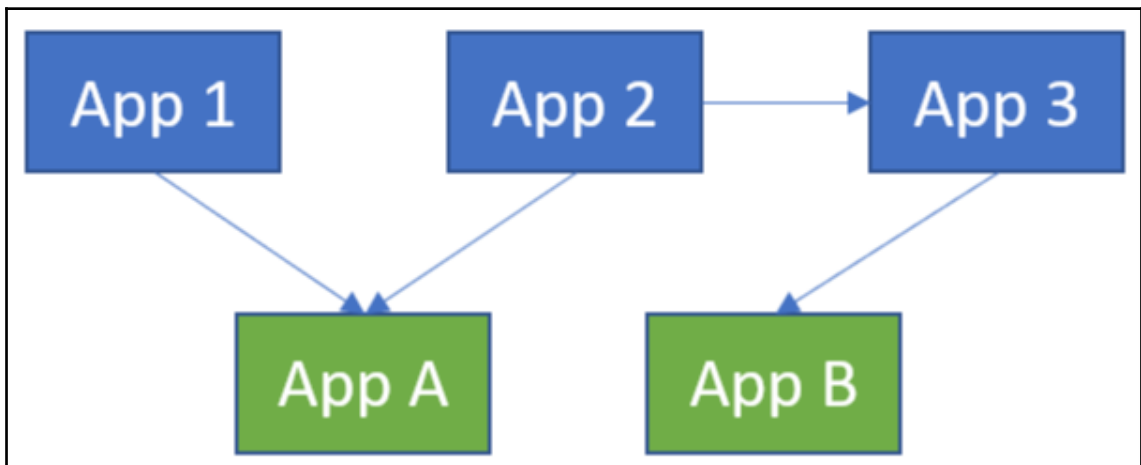
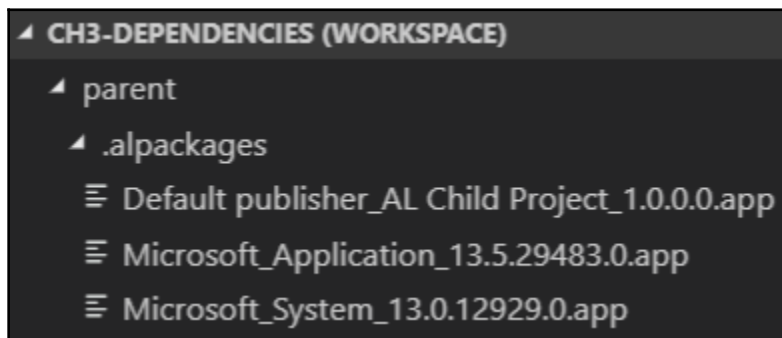
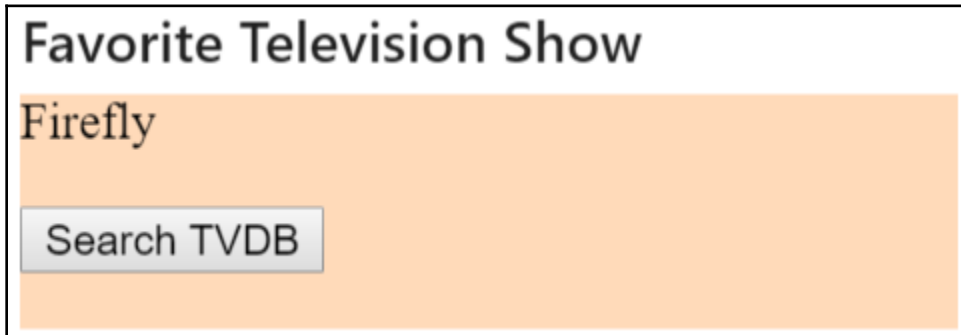
∨

+ Filter...

Television Shows



Chapter 3: Let's Go Beyond



Translations
ALProject1.g.xlf

```

ALProject1.g.xlf x
1 <?xml version="1.0" encoding="utf-8"?>
2 <xliff version="1.2" xmlns="urn:oasis:names:tc:xliff:document:1.2" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="urn:oasis:
3 <file datatype="xml" source-language="en-US" target-language="en-US" original="ALProject1">
4 <body>
5 <group id="body">
6 <trans-unit id="Table 2502664837 - Field 4190130733 - Property 2879900210" size-unit="char" translate="yes" xml:space="preserve">
7 <source>Customer No.</source>
8 <note from="Developer" annotates="general" priority="2"></note>
9 <note from="Xliff Generator" annotates="general" priority="3">Table Customer Television Show - Field Customer No. - Property Caption</note>
10 </trans-unit>
11 <trans-unit id="Table 2502664837 - Field 2025947974 - Property 2879900210" size-unit="char" translate="yes" xml:space="preserve">
12 <source>Television Show Code</source>
13 <note from="Developer" annotates="general" priority="2"></note>
14 <note from="Xliff Generator" annotates="general" priority="3">Table Customer Television Show - Field Television Show Code - Property Caption</note>
15 </trans-unit>
16 <trans-unit id="Table 2502664837 - Field 2640982432 - Property 2879900210" size-unit="char" translate="yes" xml:space="preserve">
17 <source>Favorite</source>
18 <note from="Developer" annotates="general" priority="2"></note>
19 <note from="Xliff Generator" annotates="general" priority="3">Table Customer Television Show - Field Favorite - Property Caption</note>

```

← CUSTOMER TELEVISION SHOWS

Rechercher + Nouveau Modifier la liste Supprimer Page

CODE DE LA TÉLÉVISION	FAVORITE
TV1	<input type="checkbox"/>

Manual Setup: All | television | Open in Excel | More options

NAME	DESCRIPTION	AREA	KEYWORDS
Television Show Setup	Set up television show application.	Sales	television, show, tv, setup

NAME ▼	STATUS
Load Television Shows	Not Completed

LOAD TELEVISION SHOWS ↗ ✕

✓


Select the genre(s) of television shows you want to load.

Comedy

Drama

Family

CODE ▼	NAME
TV1000	Seinfeld
TV1001	Friends
TV1002	The Simpsons
TV1003	The Big Bang Theory
TV1004	The Office

NAME ▼	STATUS
Load Television Shows	 Completed


 License successfully stored





 License retrieved: TESTLIC123

CUSTOMER CARD

40000 · Alpine Ski House

Customer 40000 has no television shows. Do you want to set some up?

Process  Open in Excel | Actions Less options

 Create Task  Set Task to Ready  Delete Task  Refresh Page

Result

Task last ran: 4/30/2019 9:44 PM

ID	RUN CODEUNIT	NOT BEFORE	IS READY
{2b9f9cb3-d163-4bfe-8f79-65ff195e5d24}	50109	4/30/2019 10:00 PM	<input type="checkbox"/>
{e890e7e2-3497-4114-9872-7207edcfe9cc}	50109	4/30/2019 10:00 PM	<input type="checkbox"/>
{2c511d76-a71d-4d63-b3f4-bc225ee4ca10}	50109	4/30/2019 10:00 PM	<input type="checkbox"/>

AI: Assembly Probing Paths
 Sets the list of directory paths where the compiler should search for referenced .NET assemblies.
[Edit in settings.json](#)

DotNet Example Page

Process Show Attached  Open in Excel | Actions Less options

Group


Enter the base number:

Enter the power to be...



3 to the power of 5 is 243

OK

 Error 5/2/2019 10:01:44 PM MicrosoftDynamicsNavServer\$BC130 707 (33)

<

Event 707, MicrosoftDynamicsNavServer\$BC130

General Details

The description for Event ID 707 from source MicrosoftDynamicsNavServer\$BC130 cannot be found. Either the component that raises this event is not installed or the installation is corrupted. You can install or repair the component on the local computer.

If the event originated on another computer, the display information had to be saved with the event.

The following information was included with the event:

Server instance: BC130

Category: Page Action

ClientSessionId: 4076b516-718e-43fb-8403-92a996b923a1

ClientActivityId: 30028059-84d4-416d-85f3-c291694e5265

ServerSessionUniqueId: 4a0a6b6d-3d0b-4fa9-8f72-d3b57073323c

ServerActivityId: 16ba8d77-e8b0-4454-8916-2979667100c4

EventTime: 05/03/2019 02:01:11

Message <pi><pi>A critical event</pi></pi>

ProcessId: 12424

Tag: TelEx-000

ThreadId: 15

CounterInformation:

The message resource is present but the message was not found in the message table

Timestamp ↓	Level	Opcode Name	Object Type	Object Id	Object Extension Id	Object Extension Info	Function Name
4/30/2019, 9:37:59 PM	4	Stop	Page	50,109	0e8ea749-e...	ALProject1 by Default publisher 1.0.0.0	OnAction
4/30/2019, 9:37:59 PM	4	Start	Page	50,109	0e8ea749-e...	ALProject1 by Default publisher 1.0.0.0	OnAction
4/30/2019, 9:37:58 PM	4	Stop	Page	50,109	0e8ea749-e...	ALProject1 by Default publisher 1.0.0.0	OnAction
4/30/2019, 9:37:58 PM	4	Start	Page	50,109	0e8ea749-e...	ALProject1 by Default publisher 1.0.0.0	OnAction
4/30/2019, 9:37:57 PM	4	Start	Page	50,109	0e8ea749-e...	ALProject1 by Default publisher 1.0.0.0	OnAction
4/30/2019, 9:37:57 PM	4	Stop	Page	50,109	0e8ea749-e...	ALProject1 by Default publisher 1.0.0.0	OnAction
4/30/2019, 9:37:56 PM	4	Stop	CodeUnit	50,109	0e8ea749-e...	ALProject1 by Default publisher 1.0.0.0	OnRun

Chapter 4: Testing and Debugging - You Just Gotta Do It

```
2 references
64 local procedure VerifyDates()
65 var
66     FirstAiredDateCannotBeLaterErr: Label '%1 cannot be earlier than %2';
67 begin
68     if "Last Aired" = 0D then
69         exit;
70
71     if "First Aired" > "Last Aired" then
72         Error(FirstAiredDateCannotBeLaterErr,
73             FieldCaption("Last Aired"),
74             FieldCaption("First Aired"));
75     end;
76 }
```



```
└─ VARIABLES
  └─ Globals
    └─ Locals
      └─ <Database Statistics>
          Current SQL Latency (ms): 1.9983
          Number of SQL Executes: 372
          Number of SQL Row Reads: 5078
      └─ <Last Executed SQL Statements>
          └─ SQL0
          └─ SQL1
          └─ SQL2
          └─ SQL3
          └─ SQL4
          └─ SQL5
          └─ SQL6
          └─ SQL7
          └─ SQL8
              Statement: SELECT "21"."timestamp","21"."Entry
              Execution Time (UTC): 5/9/2019 1:20:27 AM
              Duration (ms): 10.8786
              Approx. Rows Read: 1
          └─ SQL9
              Statement: SELECT "25"."timestamp","25"."Entry
              Execution Time (UTC): 5/9/2019 1:20:47 AM
              Duration (ms): 122.1196
              Approx. Rows Read: 1
```

Suite Name DEFAULT ...

Manage Delete Lines Get Test Codeunits Run Run Selected Next Error ...

<input type="checkbox"/>	LINE TYPE	CODEUNIT ID	NAME	HIT OBJECTS	RUN	RESULT	FIRST ERROR
<input checked="" type="checkbox"/>	Codeunit	139540	Sales Forecast Tests	-	<input checked="" type="checkbox"/>		-
<input checked="" type="checkbox"/>	Function	139540	TestCreatePurchaseLineAction	-	<input checked="" type="checkbox"/>		-
	Function	139540	TestCreatePurchaseInvoice	-	<input checked="" type="checkbox"/>		-
	Function	139540	TestSendItemSalesForecastNoti...	-	<input checked="" type="checkbox"/>		-
	Function	139540	TestNotEnoughHistoricalData	-	<input checked="" type="checkbox"/>		-
	Function	139540	TestGetSingleInstance	-	<input checked="" type="checkbox"/>		-

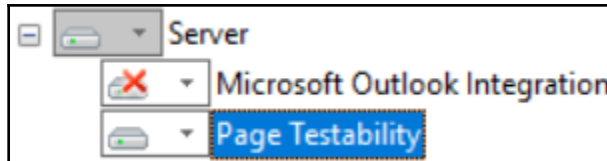
LINE TYPE	CODEUNIT ID	NAME	HIT OBJECTS	RUN	RESULT	FIRST ERROR
Codeunit	139540	Sales Forecast Tests	-	<input checked="" type="checkbox"/>	Failure	Microsoft.Dynamics.Nav.Types.Excepti...
Function	139540	TestCreatePurchaseLineAction	-	<input checked="" type="checkbox"/>	Success	-
Function	139540	TestCreatePurchaseInvoice	-	<input checked="" type="checkbox"/>	Success	-
Function	139540	TestSendItemSalesForecastNotification...	-	<input checked="" type="checkbox"/>	Success	-
Function	139540	TestNotEnoughHistoricalData	-	<input checked="" type="checkbox"/>	Success	-
Function	139540	TestGetSingleInstance	-	<input checked="" type="checkbox"/>	Failure	Microsoft.Dynamics.Nav.Types.Excepti...
Function	139540	TestGetCredentialsThrowsErrorIfNotValid	-	<input checked="" type="checkbox"/>	Success	-
Function	139540	TestMissingApiUriOpenSetup	-	<input checked="" type="checkbox"/>	Failure	The value "" can't be evaluated into ty...
Function	139540	TestTimeout	-	<input checked="" type="checkbox"/>	Success	-
Function	139540	TestCreatePurchaseOrder	-	<input checked="" type="checkbox"/>	Success	-
Function	139540	TestCreateRecurringJobQueueEntry	-	<input checked="" type="checkbox"/>	Success	-
Function	139540	TestCreateNonRecurringJobQueueEntry	-	<input checked="" type="checkbox"/>	Success	-
Function	139540	TestKeyNeededBeforeScheduledExecuti...	-	<input checked="" type="checkbox"/>	Failure	Assert.ExpectedError failed. Expected: ...
Function	139540	TestSetupScheduledExecution	-	<input checked="" type="checkbox"/>	Success	-
Function	139540	TestUpdateForecastActionThrowsErrorIf...	-	<input checked="" type="checkbox"/>	Failure	Assert.ExpectedError failed. Expected: ...
Function	139540	TestVarianceTooHighMsg	-	<input checked="" type="checkbox"/>	Success	-

```

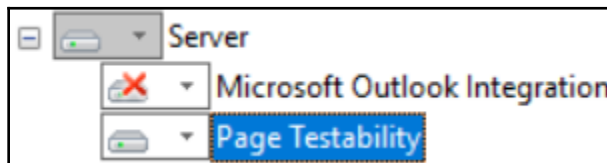
└─ .alpackages
  └─ Default_publisher_ALProject1_1.0.0.0.app
  └─ Microsoft_Application_14.0.29537.29654.app
  └─ Microsoft_System_14.0.29530.29573.app
  └─ Microsoft_Test_14.0.29654.0.app

```

LINE TYPE	NAME	HIT OBJECTS	RUN	RESULT	FIRST ERROR
Codeunit	My Test	-	<input checked="" type="checkbox"/>	Failure	The Television Show does not ...
Function	SuccessTest	-	<input checked="" type="checkbox"/>	Success	-
Function	FailureTest	-	<input checked="" type="checkbox"/>	Failure	The Television Show does not ...



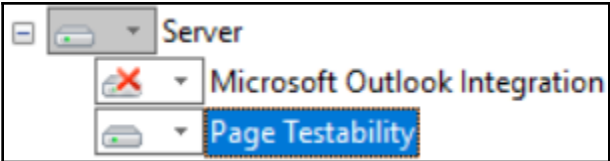
LINE TYPE	CODEUNIT ID	NAME	HIT OBJECTS	RUN	RESULT
Codeunit	50150	My Test	-	<input checked="" type="checkbox"/>	Failure
Function	50150	SuccessTest	-	<input checked="" type="checkbox"/>	Success
Function	50150	FailureTest	-	<input checked="" type="checkbox"/>	Failure
Function	50150	TestPageTest	-	<input checked="" type="checkbox"/>	Success



Failure	<u>Unhandled UI: Confirm</u>
---------	-------------------------------------

TestConfirmHandler	-	<input checked="" type="checkbox"/>	Success
--------------------	---	-------------------------------------	----------------

```
procedure HandleConfirmDialog()
    The signature of procedure 'HandleConfirmDialog' does not match the signature required
    by attribute 'ConfirmHandler'. The expected signature is:
    HandleConfirmDialog(Question: Text[1024], var Reply: Boolean). AL(AL0241)
[ConfirmHa
0 references Quick Fix... Peek Problem
procedure HandleConfirmDialog()
begin
end;
```




Chapter 5: Old School, Meet New School

1000 · Bicycle


Item

Description


My CAL Table Code




Create Stockkeeping
Unit




Calculate Counting
Period




Templates



Apply Template...



Save as Template...





My CAL Action

Functions


Type	ID	Name	Modified	Version List
	27	Item	✓	NAVW111.00.00.27667
	50000	My CAL Table	✓	
	30	Item Card	✓	NAVW111.00.00.24742
	50000	My CAL Table List	✓	

Name ^

 Modification - Item Card(Page 30).al

 Modification - Item(Table 27).al

 Page 50000 - My CAL Table List.al

 Table 50000 - My CAL Table.al

▲ ALPROJECT

▸ .alpackages

▸ .vscode

 app.json

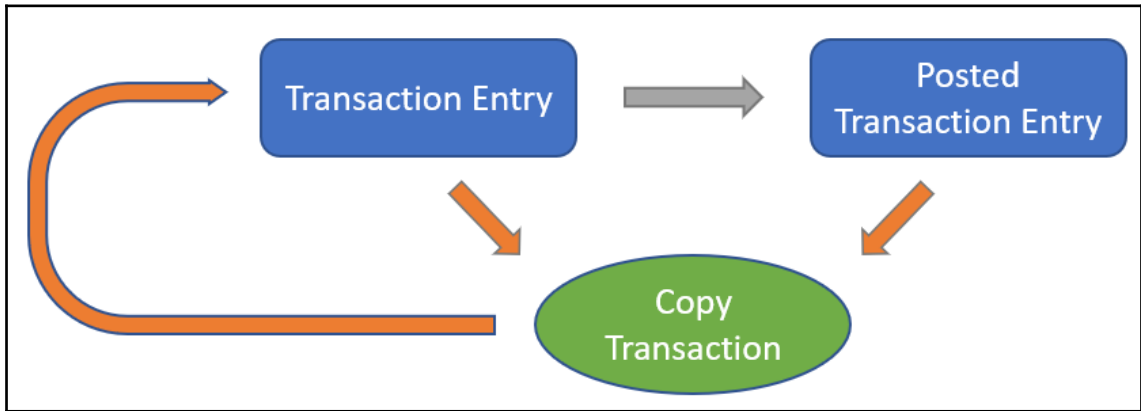
☰ Modification - Item Card(Page 30).al

☰ Modification - Item(Table 27).al




☰ Page 50000 - My CAL Table List.al

☰ Table 50000 - My CAL Table.al

Chapter 6: Making Your App Extensible





Chapter 7: Business Central for All


← ...SHOW CARD | WORK DATE: 2019-04-08  +  ✓ SAVED 

TV1000






Actions Navigate

General

Code	TV1000	First Aired	
Name	Seinfeld	Last Aired	
Synopsis		TVMaze ID	530
Status	Active		

 Episode information has successfully been downloaded.

OK

 Search + New  Edit List  Delete  Reload  Open in Excel More options

Filters

Filter list by:
× Service Name

+ Filter...

OBJECT TYPE	OBJECT ID	OBJECT NAME	SERVICE NAME ▼
Page	50111	Episodes	tvshowepisodes
Page	50100	Television Show Card	tvshows

```

Invoke-RestMethod -Uri $url -Method GET -Headers $headers | ConvertTo-
{
  "@odata.context": "https://api.businesscentral.dynamics.com/v1.0/"
  "value": [
    {
      "id": "36cd1cf7-7cd2-4ac9-9345-0a6fc3ab7ba2",
      "systemVersion": "32630",
      "name": "CRONUS Canada, Inc.",
      "displayName": "CRONUS Canada, Inc.",
      "businessProfileId": ""
    },
    {
      "id": "23cf5e81-a13f-420a-b102-83d688b4aba3",
      "systemVersion": "32630",
      "name": "My Company",
      "displayName": "",
      "businessProfileId": ""
    }
  ]
}

```

```

1928-S - AMSTERDAM Lamp
1920-S - ANTWERP Conference Table
1900-S - PARIS Guest Chair, black
1964-S - TOKYO Guest Chair, blue
1936-S - BERLIN Guest Chair, yellow
1965-W - Conference Bundle 2-8
1908-S - LONDON Swivel Chair, blue
1972-S - MUNICH Swivel Chair, yellow
1896-S - ATHENS Desk
1968-S - MEXICO Swivel Chair, black
1988-S - SEOUL Guest Chair, red
1960-S - ROME Guest Chair, green
1906-S - ATHENS Mobile Pedestal
1969-W - Conference Package 1
1996-S - ATLANTA Whiteboard, base
1929-W - Conference Bundle 1-8
1953-W - Guest Section 1
2000-S - SYDNEY Swivel Chair, green
1980-S - MOSCOW Swivel Chair, red
1925-W - Conference Bundle 1-6

```

```

@odata.etag      : w/"jzQ00zd4RVQzWk5NMDZsTGZTbFFsL0JkY1N6eUzzTjM2dE40MU5kZnFseX1WdE09MTswMDSn"
id              : 6546983c-6fe0-4050-a44d-a4cdd00f3e03
number         : 1002
displayName    : My Api item
type          : Inventory
itemCategoryId : 8404c4b1-a4cc-4e37-8103-f558c30d0c5e
itemCategoryCode : MISC
bLocked       : False
baseUnitOfMeasureId : d254d8f7-ac6c-44a0-8299-4c34df434d68
gtin          :
inventory     : 0
unitPrice    : 0
priceIncludesTax : False
unitCost     : 0
taxGroupId   : d0cf0351-2b88-419f-96c5-ff36618762e4
taxGroupCode : TAXABLE
lastModifiedDateTime : 2019-06-14T01:56:44.63Z
baseUnitOfMeasure : @[code=PCS; displayName=Piece; symbol=; unitConversion=]

```

```

[{"@odata.etag": "w/\":zQ002p05m1oanQyTT0qWfXWfHCaw5kL3dmTkhbtVSRXRia3hFczkx0EpwdfK9MTswMDSn\"", "Code": "TV1000", "Name": "Seinfeld", "Status": "Active", "Synopsis": ""},
{"@odata.etag": "w/\":zQ002F0HEU1Y0R0XZQL0xabbz0EUNLSX3VY1E4UDJ0aF3jYX3WkR4dkR851k9HTswMDSn\"", "Code": "TV1001", "Name": "Friends", "Status": "Active", "Synopsis": ""},
{"@odata.etag": "w/\":zQ002nL0Q2kTF35e1pUE9JTD00DVUa2M1YR1Q2119WZ2iAFHQQR2TjNnc2c9HTswMDSn\"", "Code": "TV1002", "Name": "The Simpsons", "Status": "Active", "Synopsis": ""},
{"@odata.etag": "w/\":zQ0000J3VHFjaUpaN2pzTDg1V1VGYUhaQnZTR0VwaTRNbENJb1NoVw35VXVQ1E9HTswMDSn\"", "Code": "TV1003", "Name": "The Big Bang Theory", "Status": "Active", "Synopsis": ""},
{"@odata.etag": "w/\":zQ003RyVhYQY1Q0b3p0c0RVMX0M1TEVnNdpSUs5Lysz5m5raJ0tZeptV1m2TQ9MTswMDSn\"", "Code": "TV1004", "Name": "The Office", "Status": "Active", "Synopsis": ""},
{"@odata.etag": "w/\":zQ003ZxVtWNRZdE1aZH2pVDN3Mj1UG1S21pXNV1La0VYd21Ga0B2U3UyUk9HTswMDSn\"", "Code": "TV2000", "Name": "The Wire", "Status": "Active", "Synopsis": ""},
{"@odata.etag": "w/\":zQ003p1RzV0DjFvcKzZ2ppT0U3MxDPzKRYqj1GhU04VFZkdU9xUDV0E0tHS1E9HTswMDSn\"", "Code": "TV2001", "Name": "The Sopranos", "Status": "Active", "Synopsis": ""},
{"@odata.etag": "w/\":zQ002N1Y3Fp0E4cXVTWVBSdFRtQJhka0UwdXQ0G1uc1dZrZdm5EtBk0z0G69HTswMDSn\"", "Code": "TV2002", "Name": "Mad Men", "Status": "Active", "Synopsis": ""},
{"@odata.etag": "w/\":zQ002ZYc1BVL3Ym1NBu0v0bYh954A4J0WkQc5xZQ5YUkwcVpUk0y20g9HTswMDSn\"", "Code": "TV2003", "Name": "Deadwood", "Status": "Active", "Synopsis": ""},
{"@odata.etag": "w/\":zQ002g20Uz5eEvRy9vntjVgJdNjFoHEtCHQ21EVDNDpFafAZz11mhz10U9HTswMDSn\"", "Code": "TV2004", "Name": "Breaking Bad", "Status": "Active", "Synopsis": ""},
{"@odata.etag": "w/\":zQ0031rTRFKQRXZ1FRkHxYVQBDF56pPN1VISDZyHfCL0hJ51FM0W1sk1U9HTswMDSn\"", "Code": "TV3000", "Name": "Full House", "Status": "Active", "Synopsis": ""},
{"@odata.etag": "w/\":zQ0005J00EXt3ZJm1E8kV1eE5ym9FRJdgaJZKT21CbL1Mdi5Y5XVHVEE5U9HTswMDSn\"", "Code": "TV3001", "Name": "The Andy Griffith Show", "Status": "Active", "Synopsis": ""},
{"@odata.etag": "w/\":zQ001ppNk8zNEtJM1NjXVIZd0xPb190NUJQuMVLVhKNEZM0JnUDZM0U08NU9HTswMDSn\"", "Code": "TV3002", "Name": "The Wonder Years", "Status": "Active", "Synopsis": ""},
{"@odata.etag": "w/\":zQ002x0U2RkzR2WmRHt05nayeTzSHBde1nd1ZBVGFRzJWTCt10WZQQTJPK0E9HTswMDSn\"", "Code": "TV3003", "Name": "Peppa Pig", "Status": "Active", "Synopsis": ""},
{"@odata.etag": "w/\":zQ001NvUkd2T1ZvTHIyaEHRDBROWFTRepQZwt2RXpWkKJRTG82VmrLZHN1N009HTswMDSn\"", "Code": "TV3004", "Name": "Looney Toons", "Status": "Active", "Synopsis": ""}]

```

✕


OData feed

Basic
 Advanced

URL

/70/Sandbox/ODataV3/Company('CRONUS%20Canada%2C%20Inc.)/customersdemo

OData feed ✕

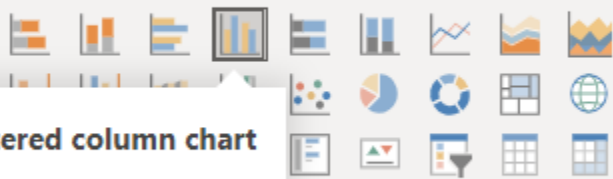
 <https://api.businesscentral.dynamics.com/v1.0/3a02...>

User name


Password

Select which level to apply these settings to

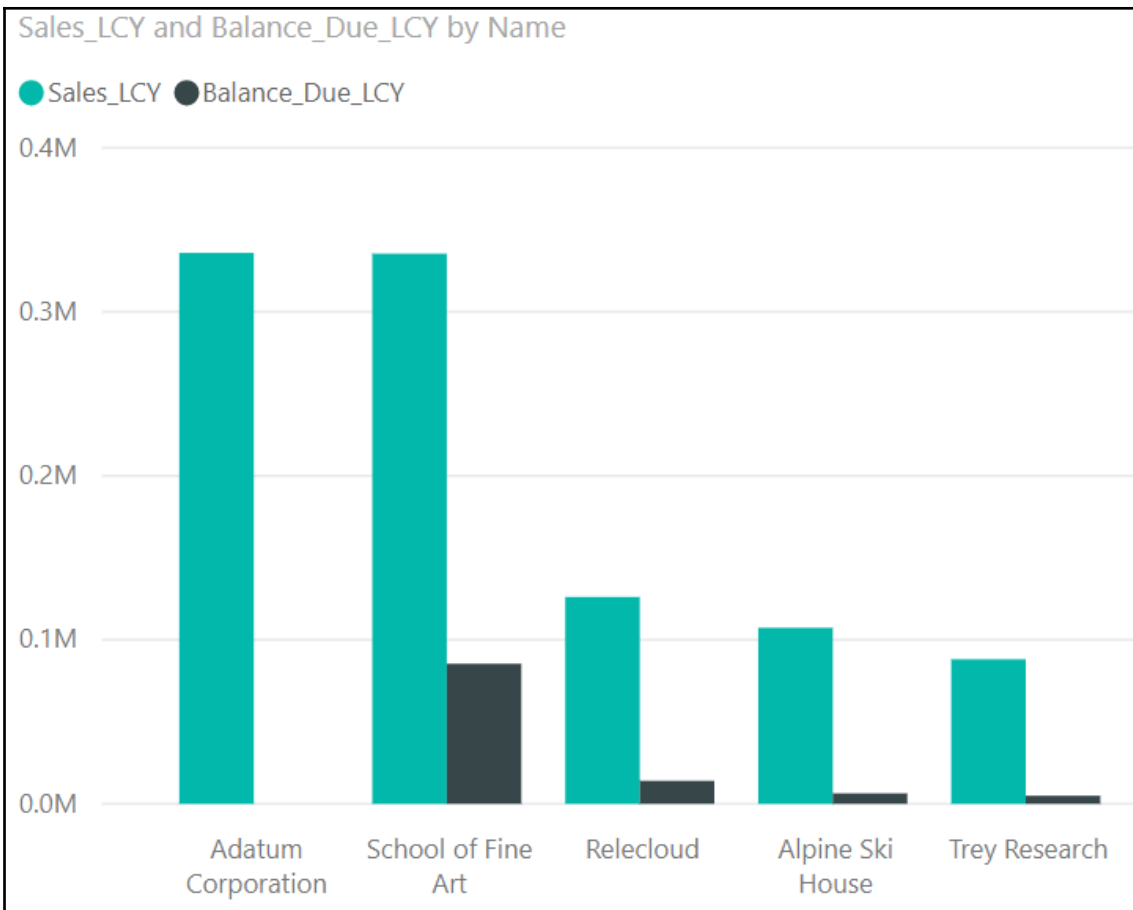
Visualizations >

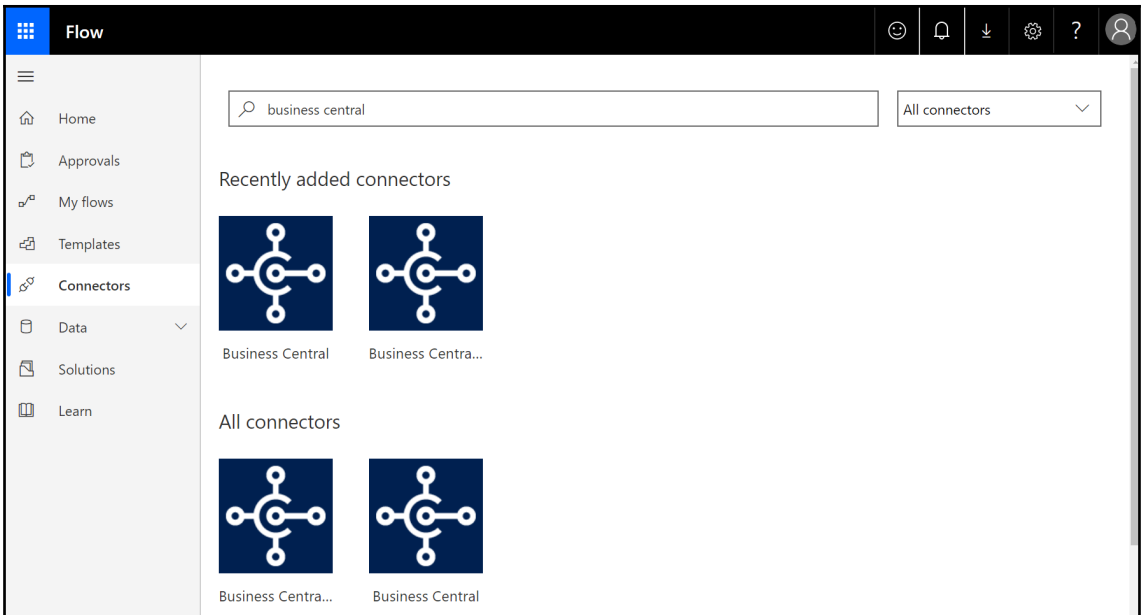


Clustered column chart

R Py  ...

Axis	
Name	∨ ×
Legend	
Add data fields here	
Value	
Sales_LCY	∨ ×
Balance_Due_LCY	∨ ×






- ☰
- 🏠 Home
- 📄 Approvals
- 📄 My flows
- 📄 Templates
- 🔗 Connectors
- 📄 Data
- 📄 Solutions
- 📄 Learn










Business Central (Preview)


Dynamics 365 Business Central is a business management solution for small and mid-sized organizations that automates and streamlines business processes and helps you manage your business.

[See documentation](#)



Triggers - A trigger is an event that starts a flow

 When a record is changed	 When a record is created	 When a record is deleted
 When a record is modified	 When a customer approval is requested	 When a general journal batch approval is requested
 When a general journal line approval is requested	 When a purchase document approval is requested	 When a sales document approval is requested


When a record is modified (Preview)
⋮

*** Company name**

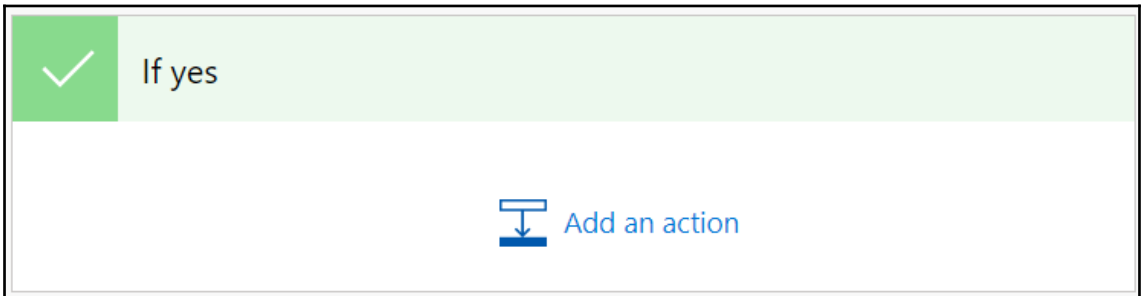
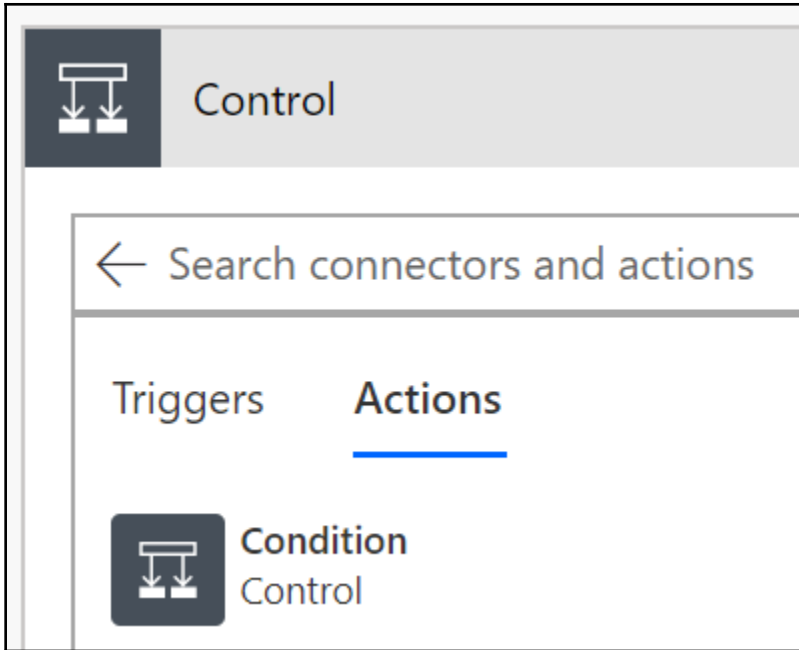
CRONUS Canada, Inc.
▼




*** Table name**

customers
▼

[Show advanced options](#) ▼

+ New step




Triggers	<u>Actions</u>
	 Condition Control
	 Send me a mobile notification Notifications
	 Send me an email notification Notifications

* Subject

NOTICE: A customer has been blocked from receiving shipments

* Body

The following customer has been blocked from receiving any shipments:

 displayName ×

Current balance: \$  balance ×

Amount overdue: \$  overdueAmount ×

Test Flow

- I'll perform the trigger action
- Using data from previous runs
Choose data from a list of previous runs:

Test

Cancel



Your flow ran successfully.

NOTICE: A customer has been blocked from receiving shipments



Microsoft Flow <maccount@microsoft.com>

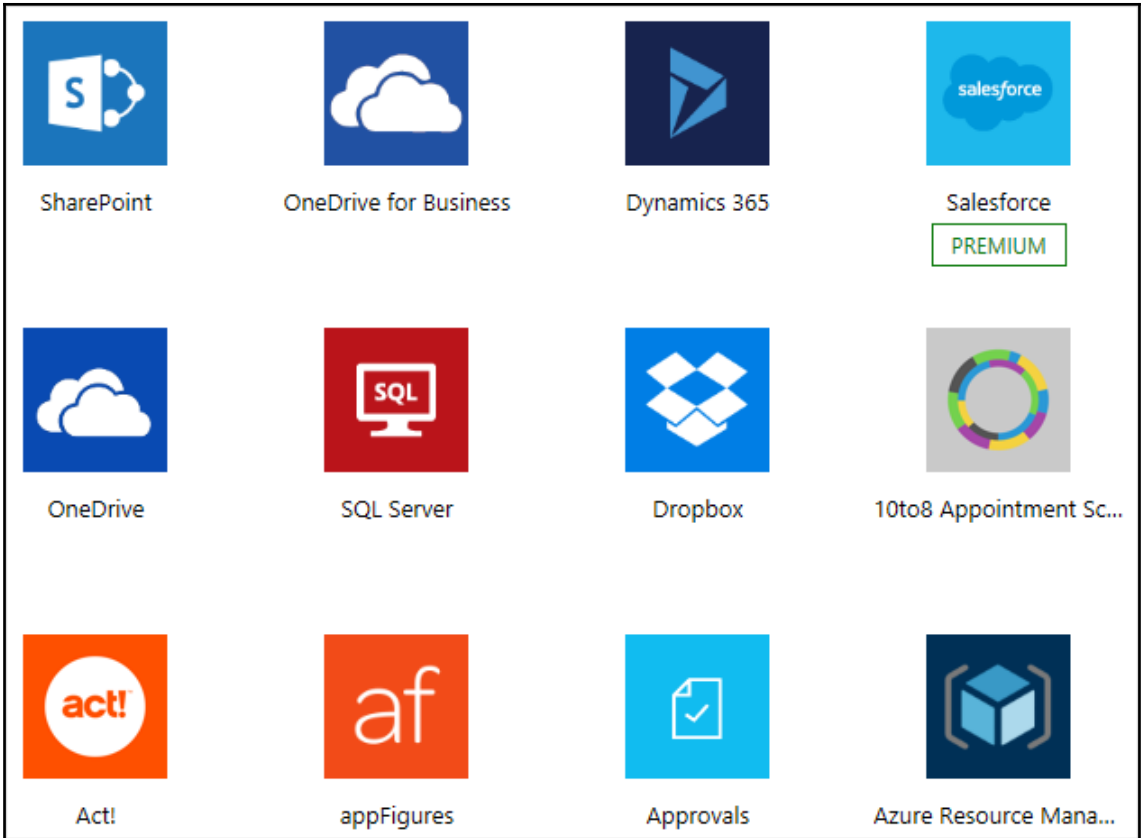
9:24 PM

To: Michael Glue




Microsoft Flow

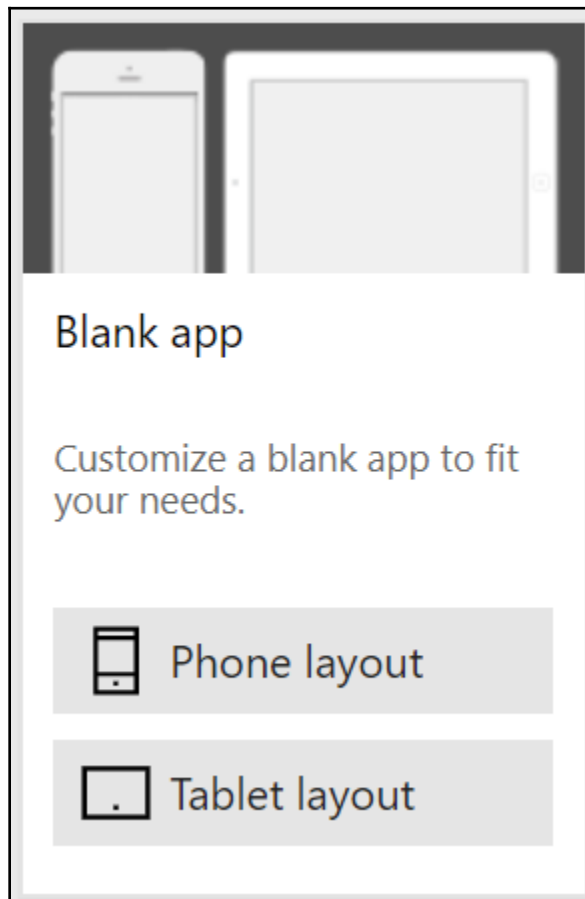
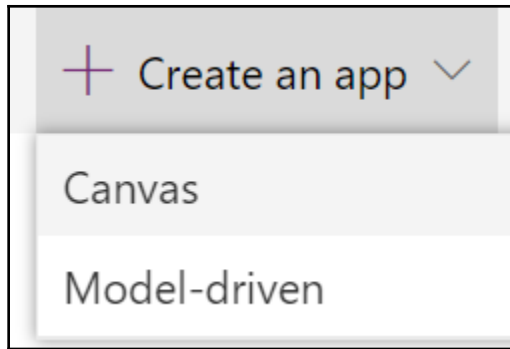
The following customer has been blocked from receiving any shipments: Trey Research Current balance: \$4908.72 Amount overdue: \$4908.72

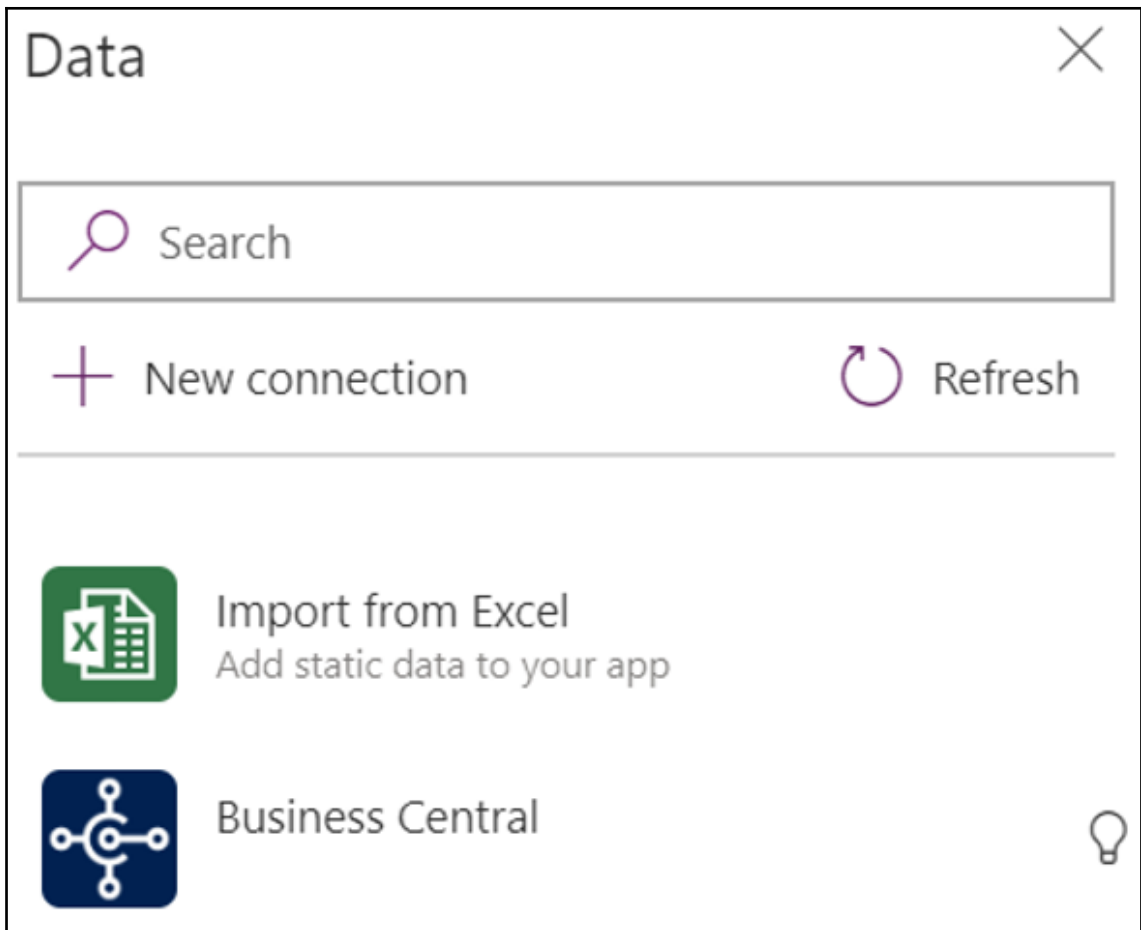


+ New connection

 Business Central (preview)
Microsoft


 Apps







Data ×



← Choose a dataset



 Search



 CRONUS Canada, Inc.

customers

 Gallery ∨

  →

  →

  →

Vertical

GALLERY ?

Gallery1

Properties Rules Advanced

Items customers ▼

Fields Edit

Data ✕

Body1

address ∨

Display value

street ∨

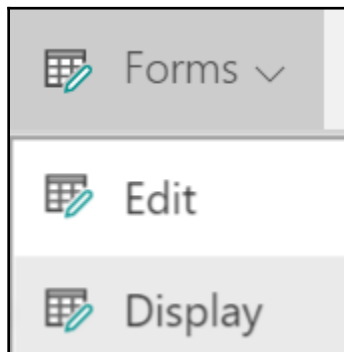
Subtitle3


displayName ∨

Title3

number ∨

10000 Adatum Corporation 360 Main Street, Suite 1150	>
50000 Relecloud 858 Beatty Street, 6th Floor	>
40000 Alpine Ski House 110 - 9th Avenue SW, 8th Floor	>
20000 Trey Research 1950 Meadowvale Blvd.	>



10000 Adatum Corporation 360 Main Street, Suite 1150	>
50000 Relecloud 858 Beatty Street, 6th Floor	>
40000 Alpine Ski House 110 - 9th Avenue SW, 8th Floor	>
20000 Trey Research 1950 Meadowvale Blvd.	>
 <p>This form isn't connected to any data yet Connect to data</p>	

DISPLAY

FormViewer2

Properties Rules **Advanced**

Search for a property ...

DATA

DataSource

customers

Item

Gallery1.Selected

DISPLAY ?

FormViewer2

Properties Rules Advanced

Data source ▼

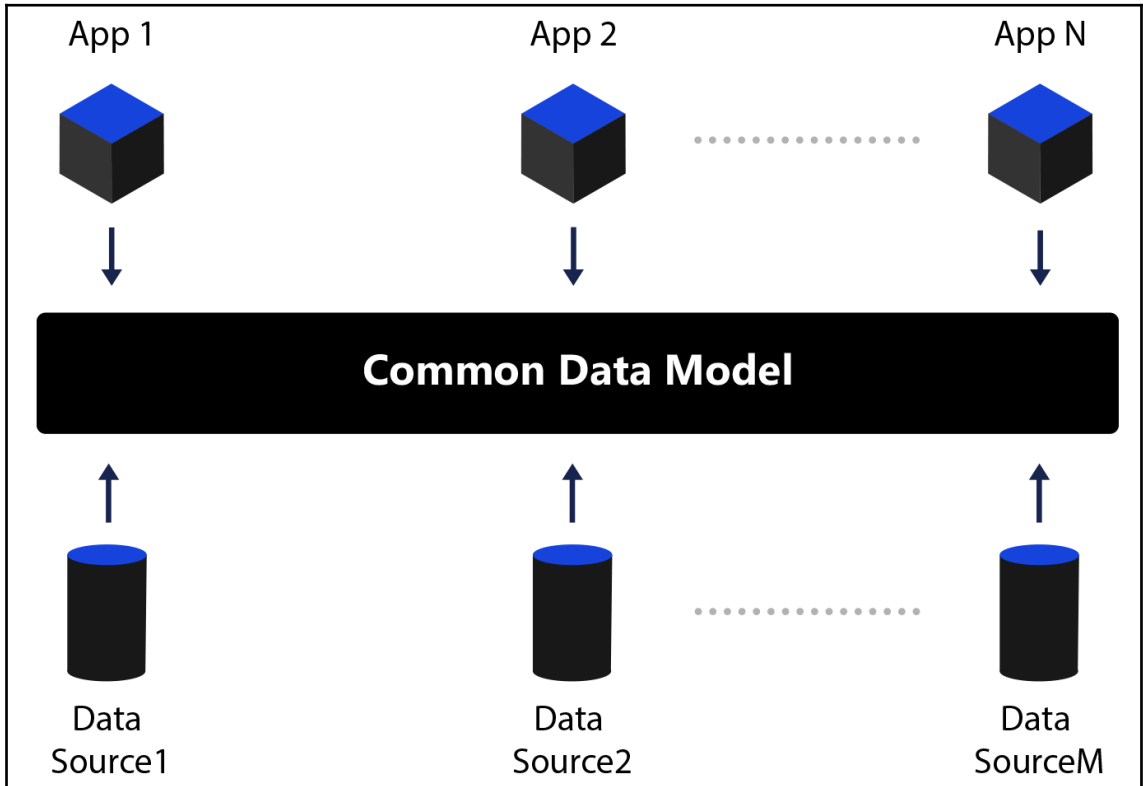
Fields Edit fields

^ email ...

Control type

▼

10000 Adatum Corporation 360 Main Street, Suite 1150	>
50000 Relecloud 858 Beatty Street, 6th Floor	>
40000 Alpine Ski House 110 - 9th Avenue SW, 8th Floor	>
20000 Trey Research 1950 Meadowvale Blvd.	>
balance 6363.11 overdueAmount 6363.11 email ian.deberry@contoso.com	



Microsoft Azure

Home > New

New

Search the Marketplace

Azure Marketplace [See all](#)

Popular

- Get started
- Recently created
- AI + Machine Learning
- Analytics
- Blockchain
- Compute**
- Containers
- Databases
- Developer Tools
- DevOps
- Identity
- Integration
- Internet of Things
- Media
- Mixed Reality
- IT & Management Tools
- Networking
- Software as a Service (SaaS)
- Security
- Storage
- Web

Windows Server 2016 Datacenter
Quickstart tutorial

Ubuntu Server 18.04 LTS
Learn more

Web App
Quickstart tutorial

SQL Database
Quickstart tutorial

Function App
Quickstart tutorial

Azure Cosmos DB
Quickstart tutorial

Kubernetes Service
Quickstart tutorial

DevOps Project
Quickstart tutorial

Storage account
Quickstart tutorial

Show recently created items

Function App

Create

* App name
demoBusinessCentralApp ✓
.azurewebsites.net

* Subscription
Visual Studio Enterprise ▾

* Resource Group ⓘ
 Create new Use existing
demoBusinessCentralApp ✓

* OS
 Windows Linux

* Hosting Plan ⓘ
Consumption Plan ▾

* Location
Central US ▾

* Runtime Stack
.NET Core ▾

* Storage ⓘ
 Create new Use existing
demobusinesscenbe30 ✓

Application Insights
demoBusinessCentralApp >

■■■ Deployment in progress... Running ✕

Deployment to resource group 'demoBusinessCentralApp' is in progress.

a minute ago

✓ Deployment succeeded


Deployment 'Microsoft.FunctionApp994b2bfe-aba9' to resource group 'demoBusinessCentralApp' was successful.

[Go to resource](#) [Pin to dashboard](#)


a few seconds ago

▼ ⚡ demoBusinessCentralApp ↻ »

▼ ☰ Functions +

 **In-portal**

Author functions quickly in the portal



Webhook + API

A function that will be run whenever it receives an HTTP request

run.csx Save ▶ Run [</> Get function URL](#)

Get function URL ×

Key	URL
default (Function key) ▼	https://demobusinesscentralapp.azurewebsites.net/api/HttpTrigge Copy


Chapter 8: DevOps - Don't Live without It


Create new project ✕

Project name *

Description

Visibility

 **Public**
Anyone on the internet can view the project. Certain features like TFVC are not supported.

 **Private** ⦿
Only people you give access to will be able to view this project.

^ Advanced

Version control ?

Work item process ?

Azure DevOps | mike0511 / televisionShow / Overview / Summary

televisionShow

Private Invite

Project stats

No stats are available at this moment
Setup a service to see project activity.

Members 1

MG

televisionShow

Overview

Summary

Dashboards

Wiki

Boards

Repos

Pipelines

Test Plans

Artifacts

Boards

Repos

Pipelines

Test Plans

Artifacts

or manage your services

or initialize with a README or gitignore

Add a README

Add a .gitignore: None

Initialize

master televisionShow / Type to find a file or folder... Set up build Fork Clone

televisionShow

Contents History README + New Upload file(s) Download as Zip

Name ↑	Last change	Commits
m+ README.md	just now	2abc32be Added README...


/ televisionShow / Repos / Files / televisionShow

Clone repository

Clone Git repository using command line or IDE



Command line


HTTPS SSH




https:// @dev.azure.com/mike0511/televis... 

Generate Git credentials

IDE

 Clone in VS Code | 

 Having problems authenticating in Git? Be sure to get the latest version of [Git for Windows](#) or our plugins for [IntelliJ](#), [Eclipse](#), [Android Studio](#) or [Windows command line](#).

 Would you like to open the cloned repository, or add it to the current workspace?  

Source: Git (Extension)

Open Repository

Add to Workspace

▲ TELEVISIONSHOW

📘 README.md

▲ TELEVISIONSHOW

▸ .alpackages

▸ .vscode

▸ src

▸ Translations

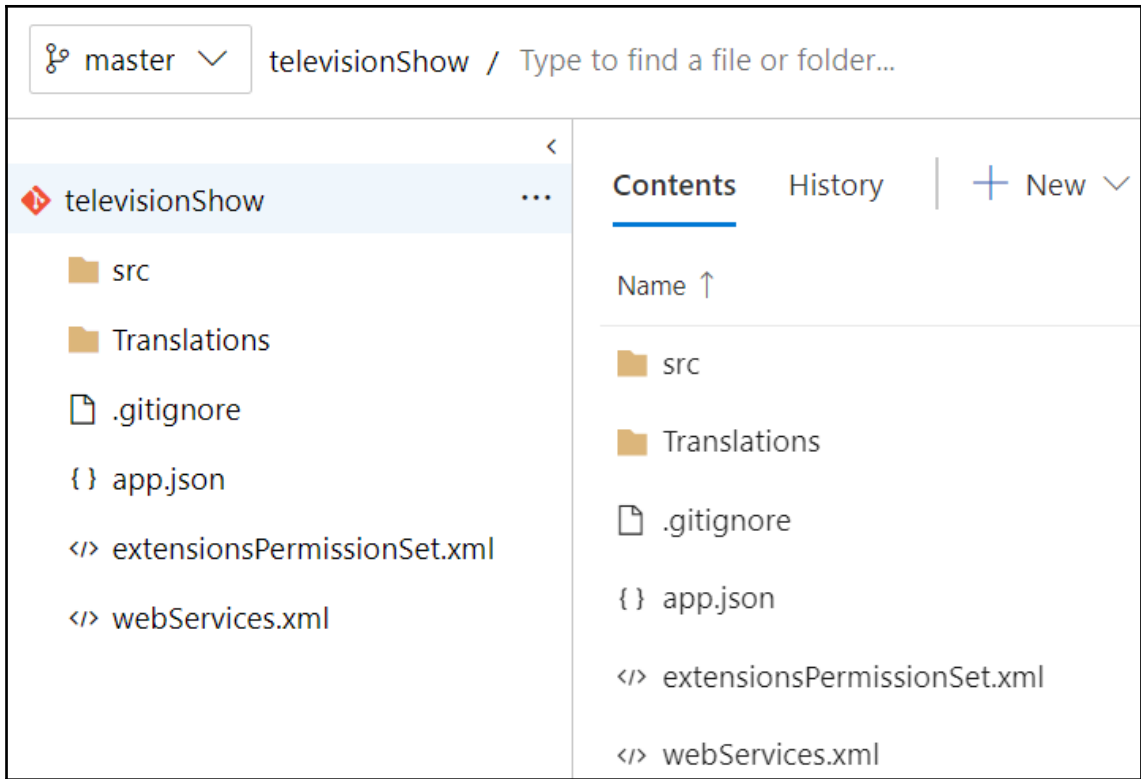
🔒 .gitignore

📄 app.json

📄 extensionsPermissionSet.xml

📄 webServices.xml

🔄 01 1↑



Add agent pool

Add an agent pool for use with this project. You may select an existing agent pool from the organization or create a new one.

New Existing

televisionShow-local

Grant access permission to all pipelines

Pipelines

Agent pools

Parallel jobs






Settings

Release retention

Service connections

Repos

Repositories

-  Azure Pipelines
-  **Hosted VS2017**
Azure Pipelines
-  **Hosted Windows 2019 with VS2019**
Azure Pipelines
-  **Hosted Windows Container**
Azure Pipelines
-  **televisionShow-local**
Michael Glue



televisionShow-local

Update all agents

New agent

Jobs
Agents
Details
Security

Get the agent
✕

Windows

macOS

Linux

x64

x86


System prerequisites

Configure your account

Configure your account by following the steps outlined here.

Download the agent

Download



```
Service vstsagent.mike0511.televisionShow-local.DESKTOP-MIKE successfully installed
Service vstsagent.mike0511.televisionShow-local.DESKTOP-MIKE successfully set recovery option
Service vstsagent.mike0511.televisionShow-local.DESKTOP-MIKE successfully set to delayed auto start
Service vstsagent.mike0511.televisionShow-local.DESKTOP-MIKE successfully configured
Service vstsagent.mike0511.televisionShow-local.DESKTOP-MIKE started successfully
```

televisionShow-local

Update all agents [New agent](#)

Jobs **Agents** Details Security

Name	Last run	Current status	Enabled
DESKTOP-MIKE ● Online		Idle	<input checked="" type="checkbox"/> On

New pipeline

Where is your code?



Azure Repos Git **YAML**

Free private Git repositories, pull requests, and code search



Bitbucket Cloud **YAML**

Hosted by Atlassian



GitHub **YAML**

Home to the world's largest community of developers



GitHub Enterprise Server **YAML**

The self-hosted version of GitHub Enterprise



Other Git

Any generic Git repository



Subversion

Centralized version control by Apache

Save and run



Saving will commit `/azure-pipelines.yml` to the repository.

Commit message

Set up CI with Azure Pipelines

Optional extended description

Add an optional description...

- Commit directly to the master branch.
- Create a new branch for this commit and start a pull request.

Save and run

✓ #20190627.1: Set up CI with Azure Pipelines

Triggered just now for Michael Glue  televisionShow  master  2bd7b79

Logs Summary Tests

Job

Pool: Hosted Ubuntu 1604 · Agent: Hosted Agent

- ✓ Prepare job · succeeded
- ✓ Initialize job · succeeded
- ✓ Checkout · succeeded
- ✓ Run a one-line script · succeeded
- ✓ Run a multi-line script · succeeded
- ✓ Post-job: Checkout · succeeded
- ✓ Finalize Job · succeeded
- ✓ Report build status · succeeded



Build #20190702.3 has been queued.

Triggered today at 9:08 pm for Michael Glue ↻ televisionShow 📦 master 📄 b776923

Logs Summary Tests

Job

Started: 7/1/2019, 9:09:01 PM

Pool: televisionShow-local · Agent: bc15app1

2m 44s

- ✓ Initialize job · succeeded <1s
- ✓ Checkout · succeeded 3s
- ✓ Install NavContainerHelper · succeeded 2s

🔄 Create Build Container  2m 37s

```
Registering event sources
Creating DotNetCore Web Server Instance
Enabling Financials User Experience
Creating http download site
Setting SA Password and enabling SA
Creating admin as SQL User and add to sysadmin
```

Commit

Build #



changed success message
CI build for Michael Glue



20190702.8

✓ #20190702.8: changed success message

Triggered today at 9:21 pm for Michael Glue ↻ televisionShow 📦 master 📄 eb9d321



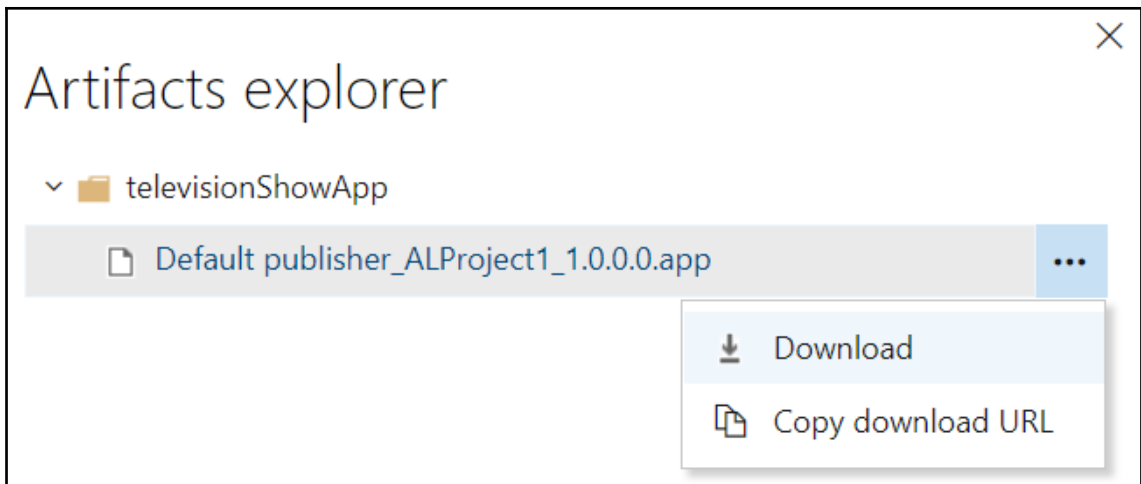
Release



Artifacts




televisionShowApp





Select a template

Or start with an  **Empty job**

Featured




Azure App Service deployment


Deploy your application to Azure App Service. Choose from Web App on Windows, Linux, containers, Function Apps, or WebJobs.



Deploy a Java app to Azure App Service

Deploy a Java application to an Azure Web App.

Artifacts |  **Add**

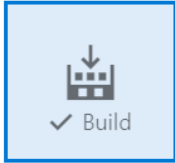
 Add an artifact



Schedule
not set

Add an artifact

Source type



✓ Build



Azure Repos ...



GitHub



TFVC

5 more artifact types ▾

Project * ⓘ

televisionShow ▾

Source (build pipeline) * ⓘ

televisionShow ▾

Default version * ⓘ

Latest ▾

Source alias * ⓘ

televisionShowApp

Continuous deployment trigger

Build: televisionShowApp

Enabled

Creates a release every time a new build is available.

Build branch filters ⓘ


No filters added.

+ Add | ▾


- Branch filter
- The build pipeline's default branch

Agent selection ^

Agent pool ⓘ | Pool information | Manage ↗

televisionShow-local ▾ 

Agent job

 Run on agent



Add tasks



Refresh



powershell




PowerShell

Run a PowerShell script on Linux, macOS, or Windows


Create a new release




New release pipeline

 Pipeline ^

Click on a stage to change its trigger from automated to manual.

 Create testing

Stages for a trigger change from automated to manual. 

Create testing environment




Create testing environment



Release-1



20190...  master

7/2/2019, 8:40:13 PM

Stages

Create testing enviro

Not deployed

 Deploy

 Logs

Create testing environment

In progress

3/4 tasks

Setup container

00:51

Cancel

Logs

The image shows a standard Windows-style progress dialog box. At the top, the title 'Create testing environment' is displayed in a bold, dark font. Below the title, the status 'In progress' is shown with a blue circular arrow icon. A progress indicator consists of a blue arc that is approximately three-quarters full, with the text '3/4 tasks' centered inside it. To the right of the progress indicator, the text 'Setup container' is displayed, and below it is a timer icon followed by the time '00:51'. At the bottom of the dialog, there are two buttons: 'Cancel' with a red 'X' icon and 'Logs' with a list icon.

✓ Initialize job · succeeded

✓ Download artifact - televisionShowApp - televisionShowApp · succeeded

🔄 Setup container

```
Docker Client Version is 18.09.6
Docker Server Version is 18.09.6
Pulling image mcr.microsoft.com/businesscentral/sandbox:us-1tsc2019
us-1tsc2019: Pulling from businesscentral/sandbox
Using image mcr.microsoft.com/businesscentral/sandbox:us-1tsc2019
Creating Container release
PublicDnsName is release
Using NavUserPassword Authentication
Starting Local SQL Server
Starting Internet Information Server
Creating Self Signed Certificate
```



Create testing enviro



✓ Succeeded



on 7/4/2019, 8:43 PM






Branch Commit

 master Default Compare  ... 2abc32be

- + New branch
-  New pull request
- ☆ Remove from my favorites
-  Delete branch

-  View files
-  View history

-  Lock
-  Branch policies
-  Branch security

Protect this branch

- Setting a Required policy will enforce the use of pull requests when updating the branch
- Setting a Required policy will prevent branch deletion
- Manage permissions for this branch on the [Security page](#)

Require a minimum number of reviewers

Require approval from a specified number of reviewers on pull requests.

Minimum number of reviewers

- Allow users to approve their own changes.
- Allow completion even if some reviewers vote "Waiting" or "Reject".
- Reset code reviewer votes when there are new changes.

Branch



master

Default

Compare



Visual Studio Code

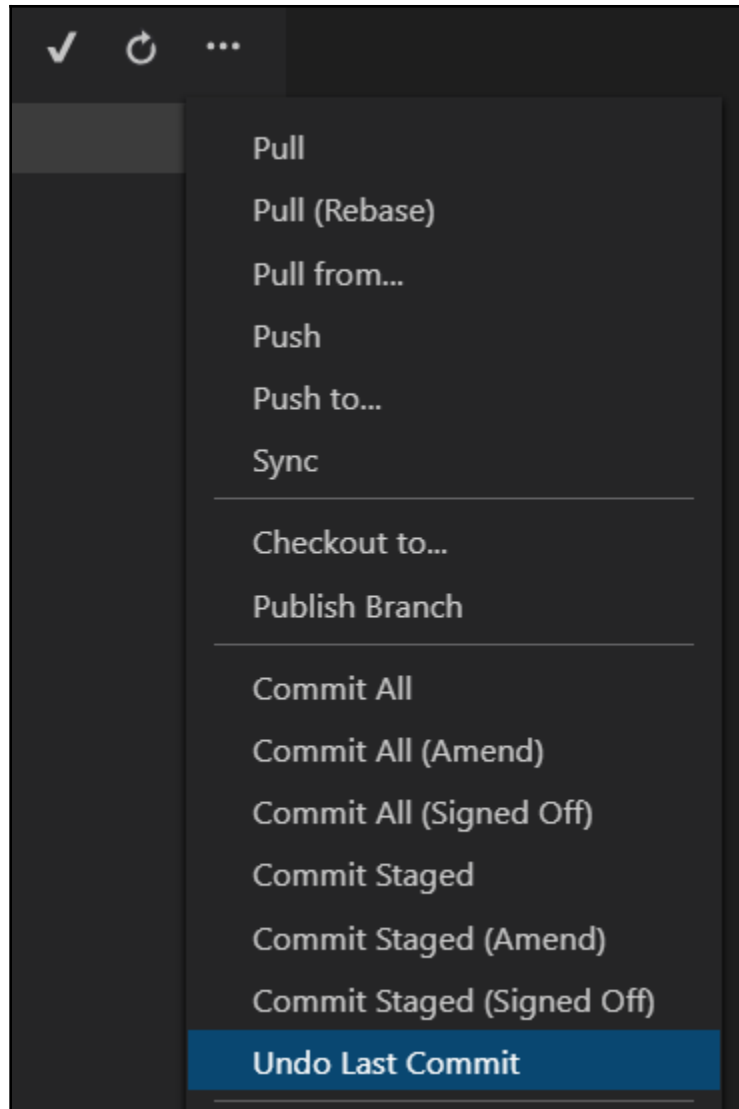


Can't push refs to remote. Try running 'Pull' first to integrate your changes.

Open Git Log




Cancel

```
! [remote rejected] master -> master (TF402455: Pushes to this branch are not permitted; you must use a pull request to update this branch.)
```



Mine		All	Stale							
Branch	Commit	Author	Authored Date	Behind Ahead	Status	Pull Request				
master Default Compare	eb9d321d	MikeGlue	7/2/2019							
minorUpdate	86b9567d	MikeGlue	5 minutes ago	0 1		New pull request				

New Pull Request

 minorUpdate into  master 

Title *

Add label

Description

Markdown supported.

 **B** *I*      @ # 

changed error message

Reviewers

Work Items

Create

1 **COMPLETED** changed error message

Michael Glue `minorUpdate` into `master`

Overview Files Updates Commits

Michael Glue completed the pull request on 7/5/2019 2:46 AM (just now). Cherry-pick Revert

`f08c9eef` `φ` `MG` Merged PR 1: changed error message...

Description ^

changed error message

Show everything ▼ 🔍

`MG` Add a comment...

- `MG` Michael Glue completed the pull request just now
- ✓ Approved by `MG` Michael Glue 2 minutes ago
- `MG` Michael Glue joined as a reviewer 2 minutes ago
- Created by `MG` Michael Glue 3 minutes ago

Commit	Message
<code>f08c9eef</code>	Merged PR 1: changed error message



Check Customer Television Shows.al +1 -1

/src/codeunit/Check Customer Television Shows.al

```
...
8     local procedure ValidateFavoriteShowExists(CustomerNo: Code[20])
9     var
10        CustomerTelevisionShow: Record "Customer Television Show";
11 -     NoFavoriteShowErr: Label 'You need to define a favorite television show for Customer %1.';
12     begin
13        CustomerTelevisionShow.SetRange("Customer No.", CustomerNo);
14        CustomerTelevisionShow.SetRange(Favorite, true);
...
```

```
...
8     local procedure ValidateFavoriteShowExists(CustomerNo: Code[20])
9     var
10        CustomerTelevisionShow: Record "Customer Television Show";
11 +     NoFavoriteShowErr: Label 'There is no favorite television show for Customer %1.';
12     begin
13        CustomerTelevisionShow.SetRange("Customer No.", CustomerNo);
14        CustomerTelevisionShow.SetRange(Favorite, true);
...
```

Chapter 9: Time to Share Your Application!

The version of the runtime that the project is targeting. The project can be published to the server with an earlier or the same runtime version.

The available options are:

- 3.0: Business Central Spring '19 Release
- 2.2: Business Central Fall '18 Release CU 2
- 1.0: Business Central Spring '18 Release

```
"runtime": "2.3",
```

2.3

Major Version

1.0 : Business Central Spring 2018
2.0 : Business Central Fall 2018
3.0 : Business Central Spring 2019

Minor Version

(Cumulative Update)
0.1 : Update 1
0.2 : Update 2
0.3 : Update 3

```
Copy C:\temp\certificate.pfx to container release (c:\run\certificate.pfx)
Signing C:\ProgramData\NavContainerHelper\Extensions\release\my\Default publisher_ALProject1_1.0.0.0.app
Done Adding Additional Store
Successfully signed: C:\ProgramData\NavContainerHelper\Extensions\release\my\Default publisher_ALProject1_1.0.0.0.app
```




Search Page



NAME	PUBLISHER	OPERATION TYPE	STATUS	SCHEDULE	APP VERSI...	STARTED DATE
ALProject1	: Default publisher	Upload	InProgress	Immediate	1.1.0.0	2019-07-10 11:49 PM