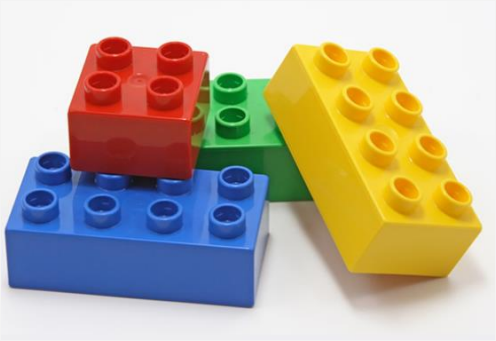
CI/CD for Dynamics/PowerApps

The Building Blocks



About myself

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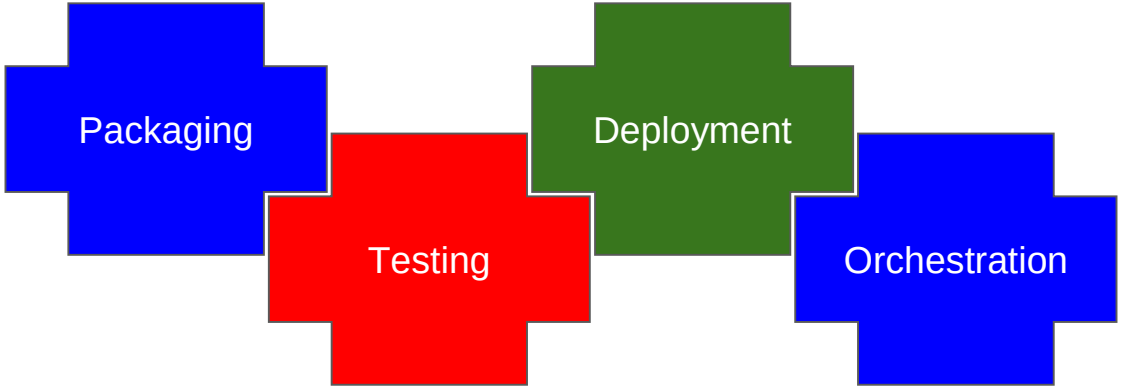
Twitter: https://twitter.com/ashlega

CI/CD Puzzle



- **Solutions**
- **Solution Packager**

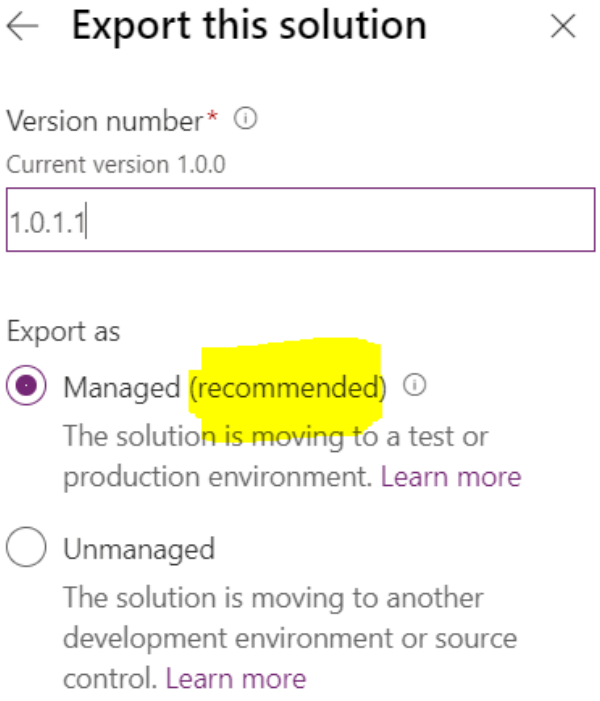
- **Easy Repro**
- Fake XRM

- **Build Tools**
- Configuration Data

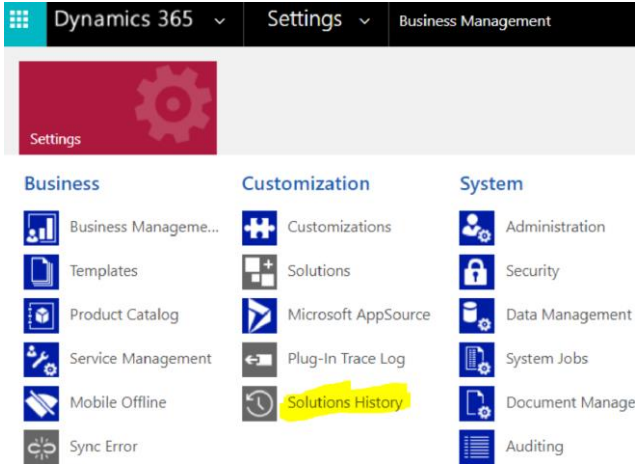
- **DevOps**

Packaging: Managed vs Unmanaged

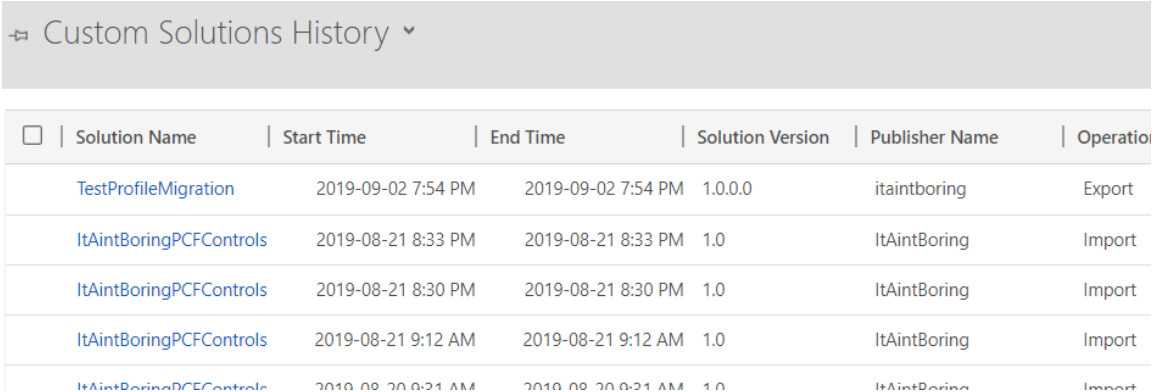
- Microsoft recommends managed solutions for any environment other than dev
- At least two reasons for that: ability to prevent modifications of certain solution components, and, also, ability to delete components by installing a newer version of the managed solution
- Does this settle the old argument? Not necessarily, but, since managed solutions are recommended, it's a good enough reason to at least try using them



Packaging: Solution History



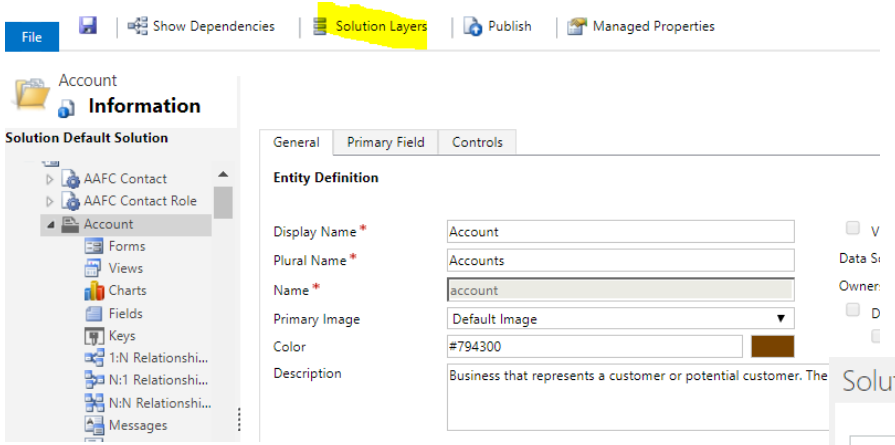
- Which solutions were involved
- What happened to them (export, import, etc)
- When did it happen



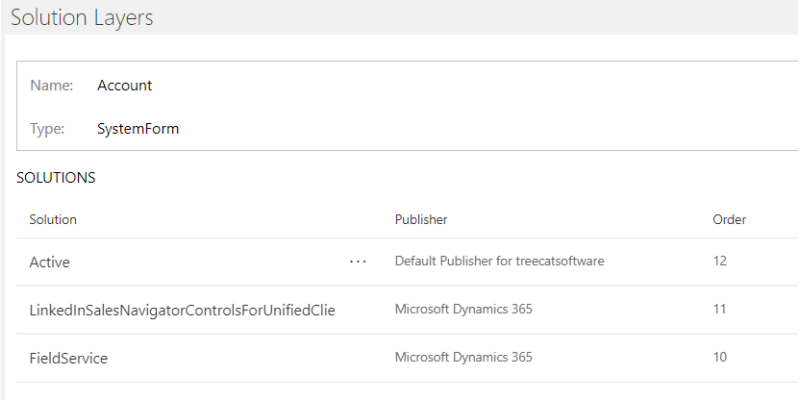
Custom Solutions History

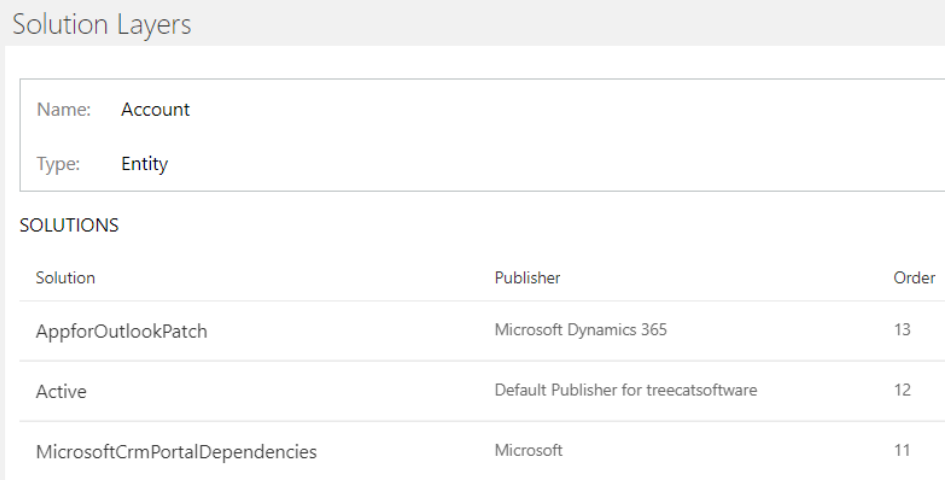
Solution Name	Start Time	End Time	Solution Version	Publisher Name	Operatio
TestProfileMigration	2019-09-02 7:54 PM	2019-09-02 7:54 PM	1.0.0.0	itaintboring	Export
ItAintBoringPCFControls	2019-08-21 8:33 PM	2019-08-21 8:33 PM	1.0	ItAintBoring	Import
ItAintBoringPCFControls	2019-08-21 8:30 PM	2019-08-21 8:30 PM	1.0	ItAintBoring	Import
ItAintBoringPCFControls	2019-08-21 9:12 AM	2019-08-21 9:12 AM	1.0	ItAintBoring	Import
ItAintBoringPCFControls	2019-08-20 9:31 AM	2019-08-20 9:31 AM	1.0	ItAintBoring	Import

Packaging: Solution Layers

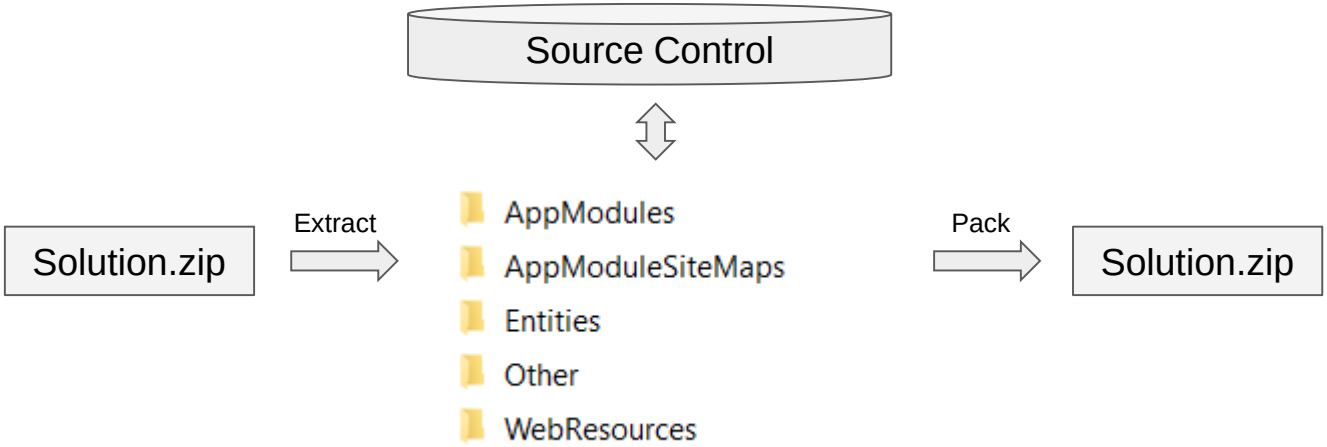


For the individual solution components (entities, forms, fields, etc), we can now see the layers of solutions which included changes to that component





Packaging: SolutionPackager



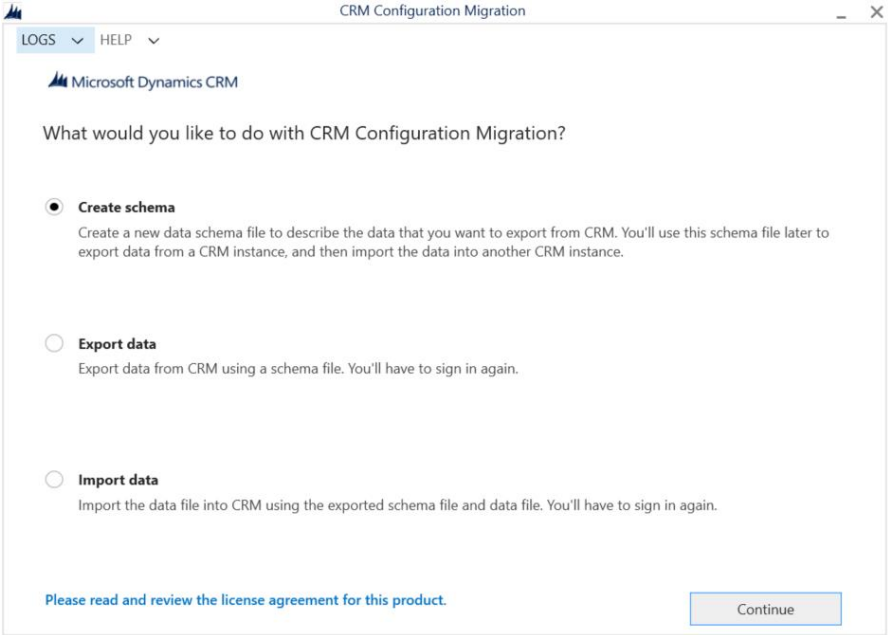
- Recommended by Microsoft for source control “integration”
- Makes XML merge somewhat easier
- While packing, provides self-validation
- Deployment to the target environment ensures ultimate solution validation
- Download script: https://docs.microsoft.com/en-us/dynamics365/customer-engagement/developer/download-tools-nuget

Configuration Migration Tool

- Works for configuration data migration
- Earlier, it would have to be started manually. As an alternative, package deployer can utilize configuration migration tool files
- There is a powershell module now:

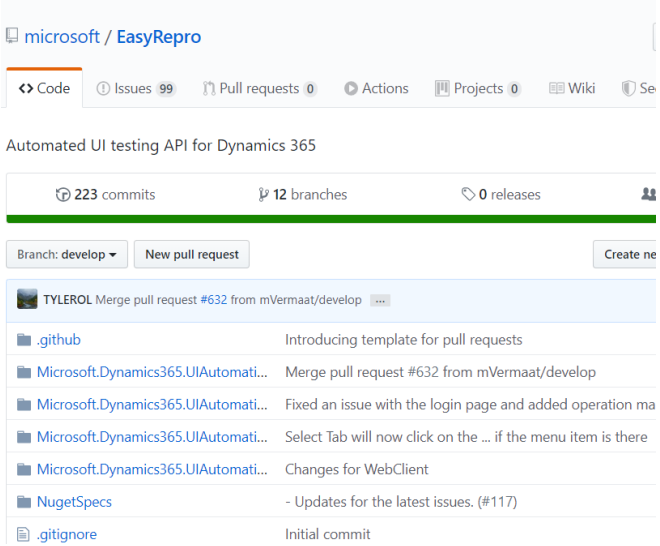
  https://www.powershellgallery.com/packages/Microsoft.Xrm.Tooling.ConfigurationMigration

- Advanced filtering and/or data transformation is still not supported



Testing: EasyRepro

- The purpose of this library is to provide Dynamics customers the ability to facilitate automated UI testing for their **model-driven** app projects
- It is built on top of Selenium
- It knows how to work with PowerApps/Dynamics - usually, there is no need to work with HTML directly
- Can be easily added to the DevOps pipelines
- https://github.com/microsoft/EasyRepro

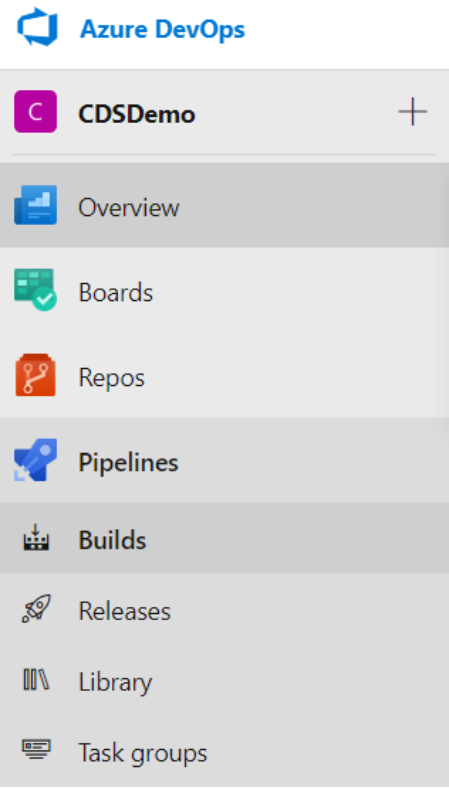



```
xrmApp.Navigation.OpenApp(UCIAppName.Sales);

xrmApp.Navigation.OpenSubArea("Sales", "Accounts");
```

Orchestration: DevOps

- Build and release pipelines
- Source code repository (git)
- Ability to run PowerShell in the pipelines
- Ability to trigger the pipelines automatically
- Hosted agents
- Public and private projects



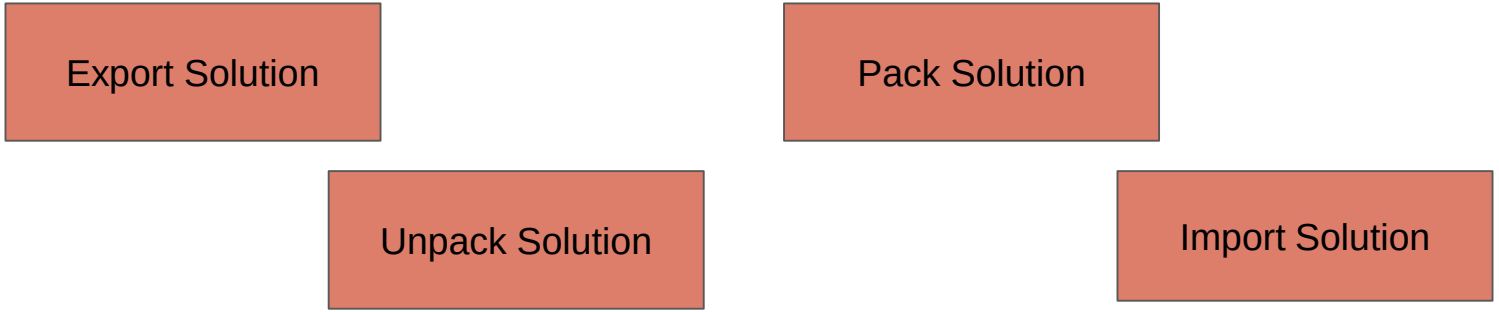
Orchestration: PowerApps Build Tools

Blog > ALM - Application Lifecycle Management > PowerApps

Automate your application lifecycle management (ALM) with PowerApps Build Tools (Preview)

Per Mikkelsen, Principal Program Manager, Wednesday, July 10, 2019

- Public Preview since June 20, 2019
- https://powerapps.microsoft.com/en-us/blog/automate-your-application-lifecycle-management-alm-with-powerapps-build-tools-preview/



Demo pipelines

Export and Unpack

- Will export solution from the branch dev environment
- Will unpack it
- Will check it into the repo

Build and Test

(triggers automatically on the master branch)

- Will build managed solution from the source control
- Will import it into the branch QA environment
- Will run the test
- Will create build artefacts

Prepare Dev

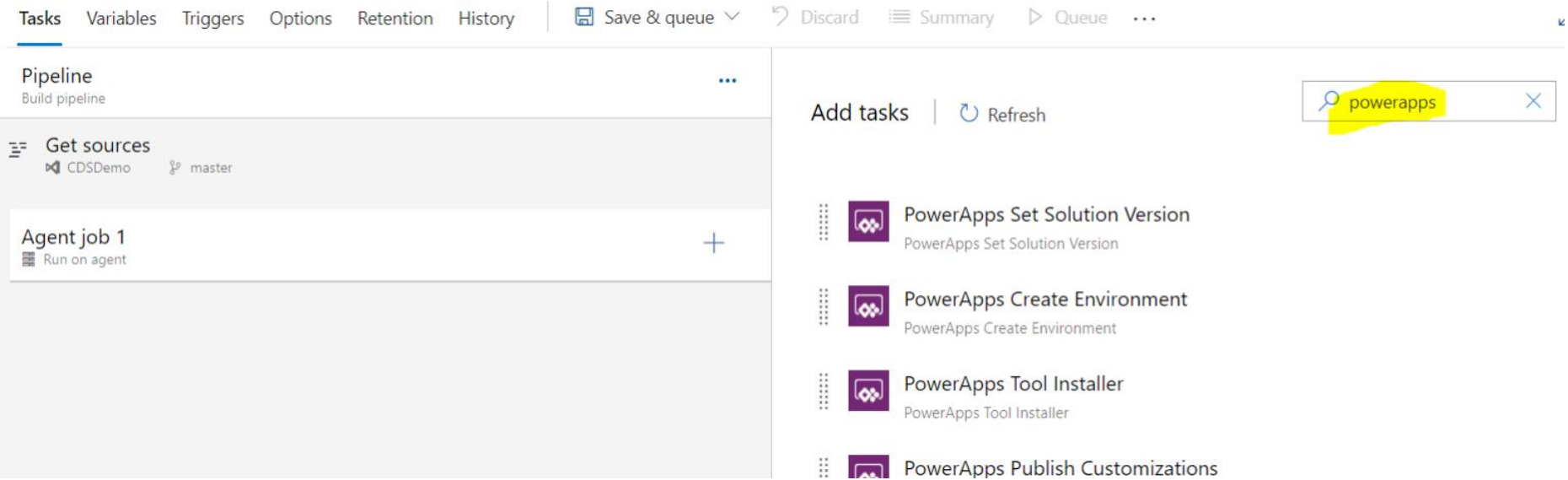
- Will build unmanaged solution from the source control
- Will import it into the branch Dev environment

Assumptions for the demo

Everything is already in the source control, always deploying complete solution, no configuration data

Building a pipeline

Get the tools: https://marketplace.visualstudio.com/items?itemName=microsoft-IsvExpTools.PowerApps-BuildTools



Demo scenario

A new developer who just joined the team is tasked with adding a new feature. There are a few steps involved:

- Setting up a dev environment
- Setting up a test environment
- Getting unmanaged solution from the source control into the dev environment
- Implementing new feature in the dev environment
- Running regression tests
- Pushing unpacked solution to the source control (on the branch)
- Re-testing managed solution in the test instance
- Merging into master branch
- Re-testing in the master test instance and creating a build artefact

LET’S REVIEW THE PIPELINES,

PREPARE DEV ENVIRONMENT FOR THE BRANCH,

& MAKE A CHANGE IN THE SOLUTION

Demo Steps

- Create a branch
- Set up branch connection
- Deploy solution from the source control to the new dev environment using a pipeline

```
ashle@DESKTOP-MV5HBTU MINGW64 /c/Work/Projects/CDSDemo (master)
$ git checkout -b Feature1
Switched to a new branch 'Feature1'

ashle@DESKTOP-MV5HBTU MINGW64 /c/Work/Projects/CDSDemo (Feature1)
$ git push origin Feature1
Total 0 (delta 0), reused 0 (delta 0)
To https://dev.azure.com/itaintboring/_git/CDSDemo
 * [new branch]      Feature1 -> Feature1

ashle@DESKTOP-MV5HBTU MINGW64 /c/Work/Projects/CDSDemo (Feature1)
$ |
```

git branch -D Feature1

git push origin --delete Feature1

Logs Summary Tests

Job

Started: 9/23/2019, 9:21:31 PM

Pool: Hosted VS2017 · Agent: Hosted Agent

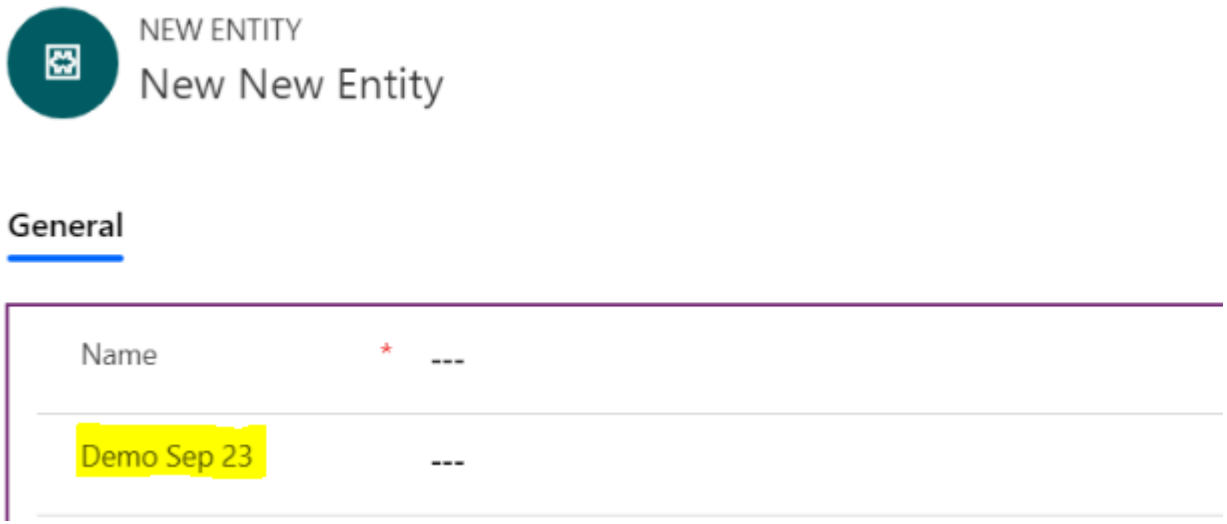
··· 2m 51s

Prepare job	succeeded	<1s
Initialize job	succeeded	1s
Checkout	succeeded	12s
Replace solution code files	succeeded	1s
PowerApps Tool Installer	succeeded	26s
PowerApps Pack Solution (Unmanaged)	succeeded	3s
PowerApps Import Solution	1 error	2m 4s

```
The request channel timed out while waiting for a reply after 00:02:00. Increase the timeout value passed to the call to Request or increase the SendTimeout value on the Binding. The time allotted to this operation may have been a portion of a longer timeout.
```

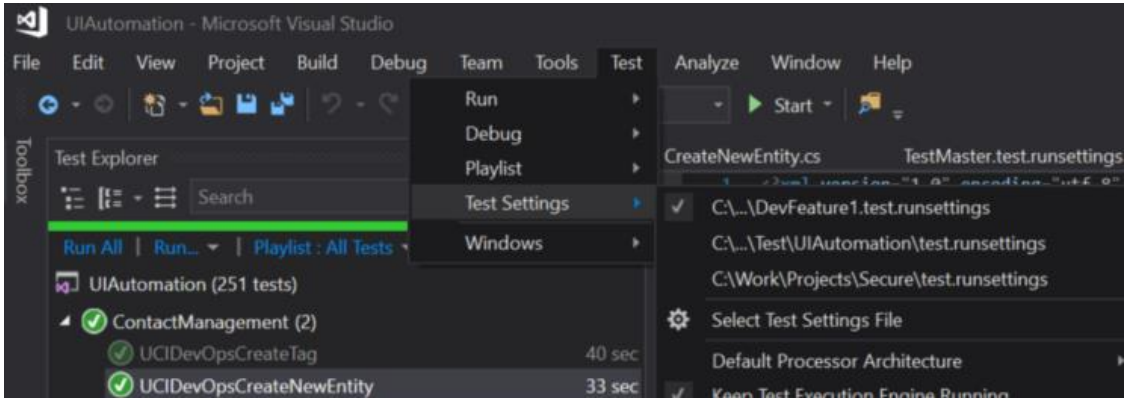
Post-job: Checkout	succeeded	<1s
Finalize Job	succeeded	<1s
Report build status	succeeded	<1s

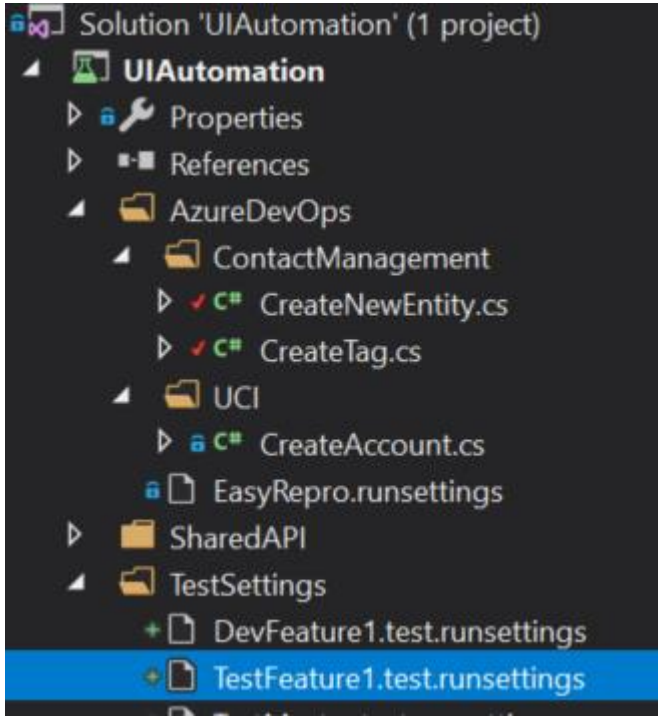
Make a change (Add a new field, put it on the form)



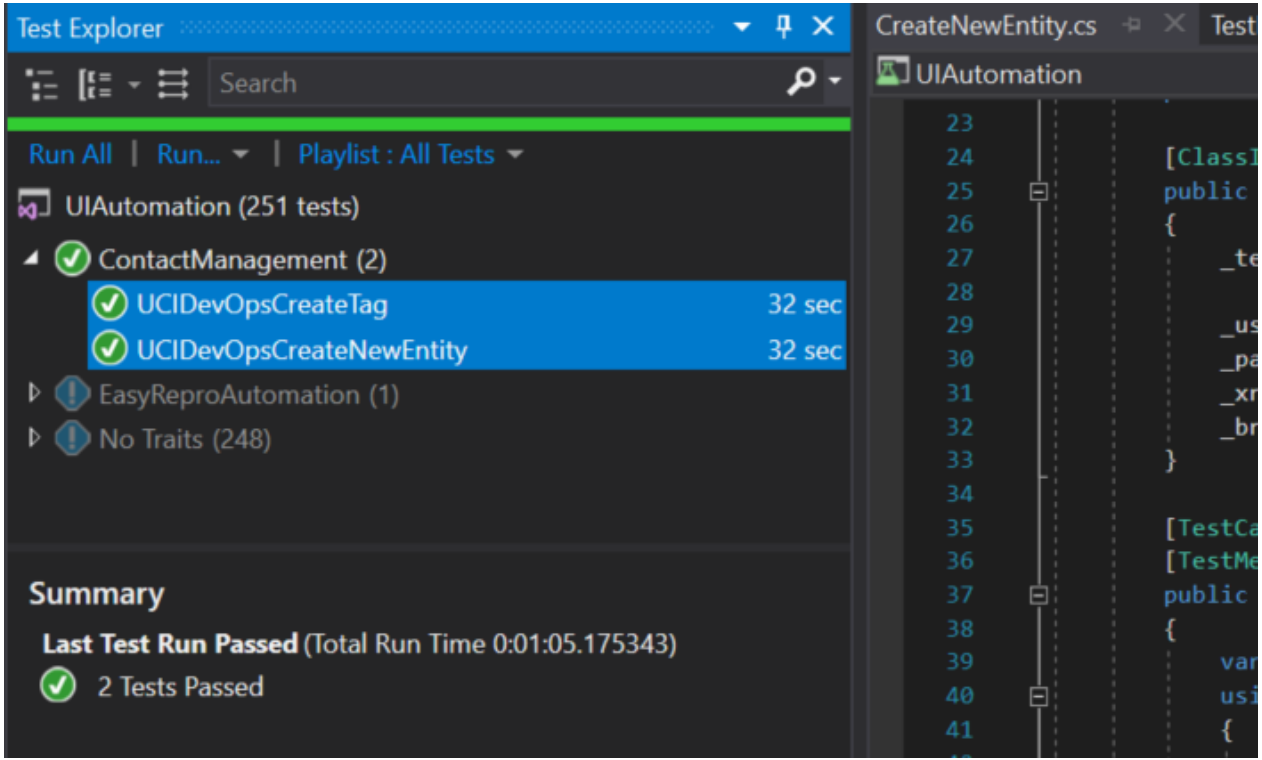
Add test.runsettings files to the UIAutomation

- For Dev environment
- For Test environment





Update the tests and run them manually in the feature Dev environment



Commit and push updated tests to the remote

- git commit -am “test settings”
- git push origin Feature1

Demo Steps

- Export solution and push it into the branch using a pipeline
- Build and test Feature 1 branch
- Merge into Master
- A test on the master branch will start automatically

Export and unpack solution on Feature1 branch

Set up to be started manually - there is no trigger for this one since solution updates are happening in the CDS/Dynamics environment

itaintboring / CDSDemo / Pipelines / Builds / Export and Unpack / #20190925.1

#20190925.1: **Updated test**

Manually run today at 9:30 pm by Alex Shlega CDSDemo Feature1 cd866fb

Logs Summary Tests

Job

Pool: Azure Pipelines · Agent: Hosted Agent

- Prepare job · succeeded
- Initialize job · succeeded
- Checkout · succeeded
- PowerApps Tool Installer · succeeded
- PowerApps Export Solution · succeeded
- PowerApps Export Managed Solution · succeeded
- PowerApps Unpack Solution · succeeded
- Git push to origin · succeeded
- Post-job: Checkout · succeeded
- Finalize Job · succeeded
- Report build status · succeeded

Run Build and Test pipeline

Set up to trigger automatically on the master branch <u>only.</u> Build artefacts will be created on the master branch <u>only</u> as well

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Search

Manually run today at 10:18 pm by Alex Shlega CDSDemo Feature1 481ecd5

Logs Summary Tests

Job

Pool: Hosted VS2017 · Agent: Hosted Agent

Started: 9/24/2019, 10:18:20 PM

··· 4m 25s

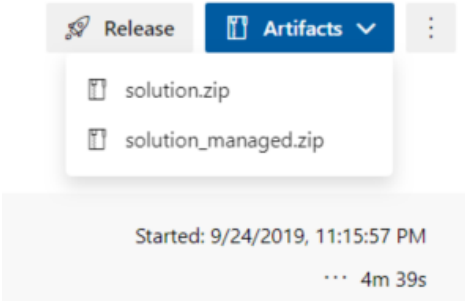
Prepare job · succeeded	<1s
Initialize job · succeeded	4s
Checkout · succeeded	9s
Replace solution code files · succeeded	1s
PowerApps Tool Installer · succeeded	23s
PowerApps Pack Solution · succeeded	3s
PowerApps Pack Solution (Unmanaged) · succeeded	1s
PowerApps Import Solution · succeeded	59s
Build test solution · succeeded 1 warning	23s
Visual Studio Test Platform Installer · succeeded	8s
Run the tests · succeeded	2m 10s
Publish Pipeline Artifact (solution_managed.zip) · skipped	
Publish Pipeline Artifact (solution.zip) · skipped	
Post-job: Checkout · succeeded	<1s
Finalize Job · succeeded	<1s

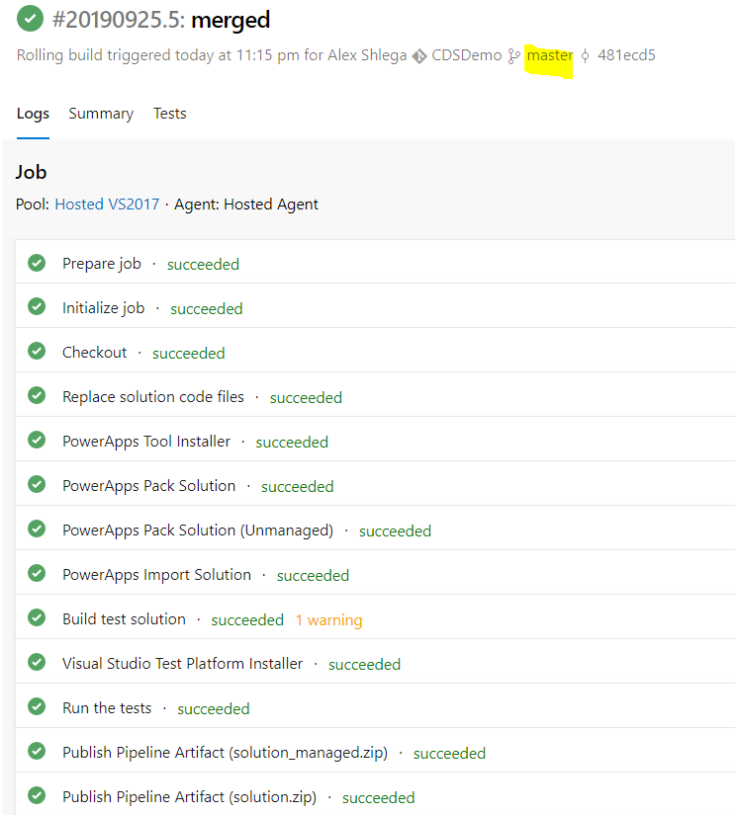
Merge Feature1 changes into Master

- git checkout Feature1
- git pull origin Feature1
- git checkout master
- git merge -X theirs Feature1
- git add .
- git commit -m “...”
- git push origin master

Run Build and Test pipeline

- Once there is a commit on the master branch, the test starts automatically (no need to start it manually)
- Build artefacts are created as a result





What have we achieved?

- Started with creating a branch and corresponding dev/test environments
- Used a pipeline to deploy unmanaged solution to the dev environment from the source control
- Made a configuration change
- Updated the tests
- Used a pipeline to export solution from CDS and put it in the repo
- Used a pipeline to re-test managed solution in the branch test environment
- Merged all those changes into master
- Build and test pipeline started automatically on the master branch
- As a result, we have everything in the source control, and we have a managed solution for release (as an artifact on the pipeline)

Known limitations of the build tools

- 2 minutes timeout
- No dedicated “solution upgrade” task

Other notes

- It’s a relatively involved process
- Requires understanding of git & devops

Q & A