

Estimate Your Microsoft Dynamics 365 Upgrade Cost

September 28, 2017



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2017/2018
INNER CIRCLE
for Microsoft Dynamics



Introductions

- Jen Wisemore – Business Development Manager
 - 19 years working with Dynamics AX/D365, implementation and sales
- Joel Leichty – Director of Product Management
 - 15 years working with Dynamics AX/D365, both as an end-user and consultant
 - Microsoft MVP since 2013
- Paramesh Rajan – Program Director, Partner & ISV Services
 - 18 years working with GP/AX/D365, in development, delivery, and sales

Agenda

- Webinar series on AX2012 upgrades (2nd of 3 webinars)
- Availability of tools and code for upgrade work
- Discuss 12 cost components of an upgrade
 - Key cost drivers in each component
 - Estimating metrics if available

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UPGRADE WEBINAR SERIES

SAGlobal Upgrade Webinar Series

- Why Upgrade Microsoft Dynamics AX 2012 to Microsoft Dynamics 365
 - Link: <http://advantedge.saglobal.com/events/why-upgrade-microsoft-dynamics-ax-2012-to-microsoft-dynamics-365-video.html>
- Estimate your Microsoft Dynamics 365 Upgrade Cost
 - Today
- Upgrade Best Practices
 - Thursday, October 26th at 12:30 Eastern Time

UPGRADE AVAILABILITY

Upgrade Availability

- Code upgrade tool is released and stable
 - Access via LCS (Lifecycle Services)
- Database upgrade process is in preview
 - Yammer group from Microsoft
 - Classes/deployable package in application suite of latest D365FO release

UPGRADE COMPONENTS

Upgrade Components

Code Upgrade

Database Upgrade

Environments

Integrations

BI & Reporting

Other Cloud Considerations

Implementing New Features

Training

Technical & Functional Verification

Go Live Cutover

Project Management

User Licenses

Upgrade Components

CODE UPGRADE

Code Upgrade - Customizations

- Degree of customizations
 - Amount
 - Complexity
 - Low end: few data model changes
 - High end: UI changes, SSRS changes, redesign due to overlays in classes
 - Estimating Considerations
 - Our swag factor: 20-50% of original dev effort in AX2012
 - Estimate based on the various activities to compile your solution on D365

Tasks to Do Before Code Upgrade

- Perform cleanup on your AX2012 code base. This is a perfect opportunity for you to clean up your code!
 - remove all unused objects, anything _DEL
 - if you have several model and are only interested in upgrading specific models, create a model store with what you need,
 - remove any unused customizations on standard objects
 - Remove enterprise portal related objects also remove DMF related objects
 - Make sure your model is compiled, sync and CIL error free
 - Update any form design patterns
 - Take your AX2012 model store and deploy on a new environment, optional
- As a next step complete the LCS code upgrade analysis

Code Upgrade: Effort Estimate Pointers

Task	Details	Low Minutes	High Minutes
LCS task list	Task list report generated by LCS code upgrade	10	30
Code conflicts	Compile errors due to deprecated objects, changes in standard code, change in parameters, any references to the application platform or application foundation objects.	5	20
Form patterns	Run from patterns report from VS, update all forms that are set to auto	120	240
CAR report issues	Missing delete actions, nested loops, display methods	5	30
BP fixes	11 BP checks, fix them all, undefined labels, deprecated data sources	5	15
Unit testing	Consider time for runtime errors. Unit test design changes, objects that were modified during compile fix. Verify code is executing as expected.	20% on the dev effort	

Effort Estimate example



Moniker	Count	Unique records	Unique records - after removing deprecated	Duplicate records	Estimates for Base error type In Minutes	Estimates for Duplicate error type In Minutes	Estimates for Base error type In Minutes	Estimates for Dupliate error type In Minutes	Total estimates for this Error type
InvalidQualifier	68	21	21	47	18	14	378	658	18
TypeNotFound	58	19	15	43	17	11	255	473	13
ClassDoesNotContainMethod	56	21	21	35	17	11	357	385	13
TableDoesNotContainField	38	15	15	23	16	10	240	230	8
ClassOrTableNotFound	37	14	13	24	16	10	208	240	8
NotDeclared	21	8	0	21	16	10	0	210	3.5
ClassNotFound	8	8	0	8	15	15	0	120	2
ClassDoesNotContainStaticMethod	7	7	0	7	15	15	0	105	1.75
ParameterExtra	6	6	0	6	15	15	0	90	1.5
ClassOrInterfaceNotFound	3	3	0	3	15	15	0	45	0.75
IllegalToken	3	3	0	3	15	15	0	45	0.75
ImplicitConversionNotAllowed	3	3	0	3	15	15	0	45	0.75
MacroNotDefined	3	3	0	3	15	15	0	45	0.75
SuperNotAllowed	3	3	0	3	15	15	0	45	0.75
TypeMustBeTable	3	3	0	3	15	15	0	45	0.75
TableDoesNotContainIndex	2	2	0	2	15	15	0	30	0.5
UnrelatedTypes	2	2	0	2	15	15	0	30	0.5
VariableNotFound	2	2	0	2	15	15	0	30	0.5
CaseLabelConflict	1	1	0	1	15	15	0	15	0.25
ConfigurationKeyDoesNotExist	1	1	0	1	15	15	0	15	0.25
ExpressionNotType	1	1	0	1	15	15	0	15	0.25
FormCodeGenerationError	1	1	0	1	15	15	0	15	0.25
FormNotFound	1	1	0	1	15	15	0	15	0.25
ModuleHardSealed	1	1	0	1	15	15	0	15	0.25
MustBeMap	1	1	0	1	15	15	0	15	0.25
NoSuchFunction	1	1	0	1	15	15	0	15	0.25
TableDisplayEditReturnTypeUnknown	1	1	0	1	15	15	0	15	0.25
TableNotFound	1	1	0	1	15	15	0	15	0.25
UnderlyingFieldTypeNotFound	1	1	0	1	15	15	0	15	0.25
UnhandledException	1	1	1	0	15	15	15	0	0.25
Total count	335	155	86	249	460	426	1453	3036	77.75

Code Upgrade - Approach

- Approach
 - Big bang compile OR feature by feature?
 - How well do you know your code base?
 - Level of deprecation expected with upgrade?
 - Off to the side or deeply embedded?
 - Estimating Considerations
 - Small to medium level of customizations and off to the side - big bang compile probably less effort
 - Not keeping everything? Put into branch and do one feature at a time approach probably better

Code Upgrade – ISV Solutions

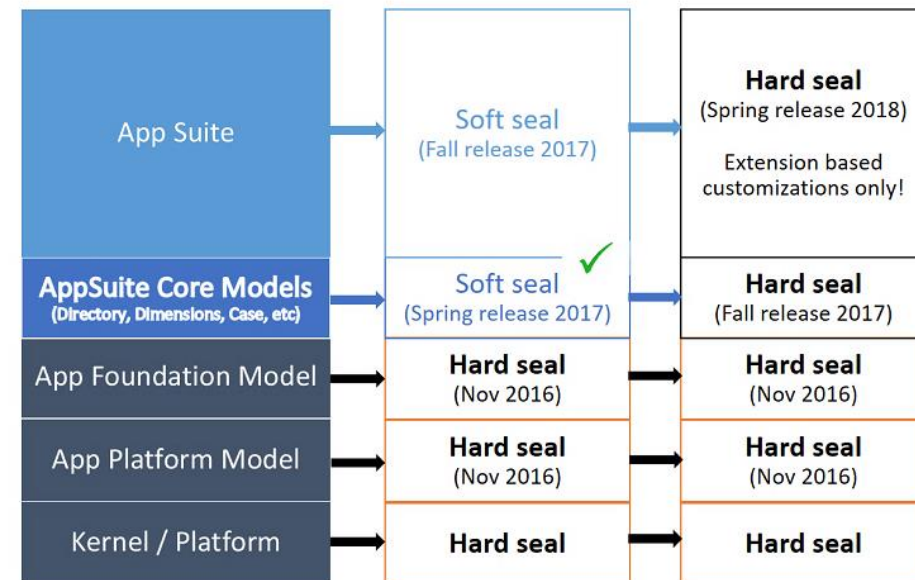
- Number of ISV solutions
 - Can you deprecate any?
 - Readiness of ISV on Dynamics 365
 - Ask to see their “CAR Report” (customization analysis)
 - Do they have a versioning strategy that aligns with Microsoft releases?
 - Is their solution available on AppSource?
 - Number of Dynamics 365 referenceable implementations?
 - Estimating Considerations
 - Depends on the ISV solution of course, but if you sense they are not far on the Dynamics 365 path, add extra hours

Code Upgrade - Extension Refactoring

- Overlay customization method is being eliminated, must refactor to extension model
- Run CAR report on your code
- See previous webinar:
<http://advantedge.saglobal.com/events/extension-in-dynamics-365-operations-webinar.html>

Release roadmap

Dynamics 365 for Finance and Operations – Enterprise Edition



Code Upgrade – Extension Refactoring

- Analyze CAR report for over layering objects
- Extension effort is based on the following. Analyze the changes by complexity
 1. Standard table modified with additional fields or property changes, index changes, field groups, relations
 2. Additional elements in the base enums
 3. Adding a new Switch statement within an existing Switch statement
 4. Adding a new parameter to an existing method
 5. Additional statements within IF conditions
 6. Form modifications adding new fields, overriding click method, additional changes in init method to control the visibility of the standard controls
 7. Changes before or after super, move it to pre or post
 8. Protected methods modifications, use chain of command feature
 9. Inline method
- Document any changes which cannot be extended and need to be redesigned or report to Microsoft, log extensibility request in VSTS
- Consider moving all custom objects to your package

Extensions Estimate Pointers

Areas	Category	Effort Low Minutes	Effort High Minutes
New methods that can be moved to class extensions.	Yes	60	120
Condition added within a method	Refactor	60	120
Additional case added to the switch statement	Yes	60	120
Private method changes	Refactor	30	60
Protected method changes	Yes	30	60
Form extensions	Yes	120	240
Method access specifier changed to protected from private	MS	60	120
Implementing COC	Yes	60	180
Overriding standard code	No		

Category	Description
No	Cannot be done with the current framework
Refactor	Can be extended with some level of refactoring
Report to MS	Change request required to be reported to Microsoft
Yes	Can be extended

Extensions estimate example



Object Type	Application Foundation		Application Platform		Application Suite			Calendar	
Classes		1		1	216	83		18	
Forms	1	1			78	13	2	13	
Tables		1		1	105	79	1	29	1
Macro Dictionary									
Base Enums	2			1	12			1	
Extended Data Types				4	13			1	
Map					10	4			
Views					2	1			
Reports					3			8	
Queries					2				
Security Roles									
Security Privilege									
Security Policies									
Security Duty									
Menu items Display					1			2	
Menu items Action					1				
Menus					2	1			
AggregateDimension			1			1			
Security Privilege					43			7	

Estimated minutes/size

	XL - 20%	L - 20%	M - 20%	S - 40%
	64	64	63	128
	23	23	22	46
	46	46	45	92
	0	0	0	0
	4	4	2	7
	5	5	2	9
	4	4	1	7
	0	1	1	1
	3	3	0	5
	0	1	1	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	0	0	0
	0	1	1	1
	0	1	0	0
	1	1	1	0
	0	1	1	0
	10	10	10	20

Total App suite objects
Estimated minutes/size

	160	165	150	316
	60	50	40	30



Code Upgrade – Data Entities

- Access to data is only through data entities
- New task to add into your dev methodology
- Impacts data migration, company copy, integrations, and BI in a big way
- Estimating Considerations: 2- 3 hours per data entity
- Tasks include:
 1. Creation of data entities
 2. Preparation of sample files
 3. Testing import and export
 4. Documentation
 5. Set indexes on the actual tables (if not already available)
 6. Security

Code Upgrade – Additional Add-ons

- Need to plan time for:
 - Microsoft releases during upgrade effort window
 - Monthly platform release
 - Twice yearly application release
- Continuing modifications in AX2012 that need incremental lifting
- VSTS branch management
 - Can get complex with multiple branch scenarios, need to plan time for management and merging
 - Sometimes manual merge is necessary

Upgrade Components

DATABASE UPGRADE

Database Upgrade

- Good news:
 - Initial runs were decent performance
 - AX2012 to D365 100 GB database took 6 hours
 - Upgrade process applied data compression that reduced 100 GB to 20GB then run upgrade scripts
- Not so good news:
 - Process different than previous AX upgrade tools
 - No upgrade cockpit to monitor, all done through “run books”
 - Once mastered, process is easier but initially can be hard to know what has run successfully
 - Need to query scripts to see status

Database Upgrade – Estimating Considerations

- Data structure similar between AX2012 and Dynamics 365 so likely not as many iterations needed
 - Where we used to do 6 or 7 with an AX2009 to AX2012 upgrade, probably now 3 or 4 needed
- How modified is your data schema?
- Relationship between your modification level/code upgrade effort
 - Lots of mods, likely more time on DB upgrade too
- Complex areas
 - High amount of document handling attachments
 - Can't run script to move to Azure storage until in production
 - Encryption fields– manual re-entry
 - Virtual tables conversion, flatten out using scripts

Database Upgrade Considerations

- AX2012 readiness, install Pre-upgrade checklist KB 4035163 and all other hot fixes, download the latest binaries
- Ensure you maintain the element IDs when you upgrade, replicate the ModelElement into business database
- Setup user mapping, import email information into system
- Run the upgrade on a tier 1 environment first eventually repeat process on tier 2 environment
- Develop any custom data upgrade scripts
- Backup database to Azure Storage and copy across environment using AzCopy
- Time the upgrade, if you encounter errors do a script, fix and move on, repeat the process
- Repeat process of upgrade on Tier 2 environment, export the SQL database to backpack file using SQLPackage.exe. Upload bacpac file to Azure storage, download to Tier 2 and import bacpac to Azure SQL.

Upgrade Components

ENVIRONMENTS

Environments – Incremental Costs

- Receive two sandbox environments plus production with license costs
- Plan on at least one extra for database upgrade testing
- Other scenarios:
 - Performance/load testing
 - Build
 - Demo/investigation
 - Test
 - UAT
- Assume \$2K – 10K per month depending on size of box

Environments - Management

- Deployment much easier in Dynamics 365 than AX 2012
- Moving code and databases between environments more time consuming

Upgrade Components

INTEGRATIONS

Integrations

- New technologies – assume new design and re-write
- All inbound/outbound data must travel through data entities
 - No access to database
 - Denormalized sets of data (customer, vendor, purchase order, etc.)
- Microsoft has released a set of standard data entities covering primarily master data and open transactions
 - Focus has been implementation and migration readiness
 - No transaction data entities yet
- Most partners write custom data entities for integration
 - Control of own destiny, not take dependency on Microsoft
 - Standard ones may not be available yet

Integrations - Typical Delivery Mechanisms

- 1) D365 Operations Data Management Framework (DMF)
 - Simple file import and export
 - Can be scheduled
- 2) D365 Operations as active agent using D365 batchable classes
 - For exports/push, classes read data from D365 entities or tables and push them into foreign web services
 - For imports/pull, classes pull data from foreign web services and write to D365 data entities or tables.
- 3) Integration Tools
 - Microsoft Logic Apps, Rapidionline, Scribe, Boomi
- 4) Custom C# Apps
 - Custom programs consume D365 entities and push/pull from other systems
 - Industry standard http post/get to consume the services represented by the entities
 - Tools available to make OData programming easier

Upgrade Components

BI & REPORTING

BI & Reporting – Shift in Technology

- Likely total re-write
- Built-in data warehouse tools
 - Data entities, entity store, embedded power BI
 - Assume significant dev effort to convert AX 2012 SSAS cubes
- Incremental costs for additional capabilities
 - “Bring your own database” Azure costs
 - Power BI.com licenses
 - Azure tabular cubes
 - Additional windows servers to host components

BI & Reporting - Estimating

- What transactional tables are used for key reports/BI?
 - i.e. TaxTrans, AssetTrans, InventTrans, etc
 - Approximately 4-8 hours to expose these as well as design data entities
 - Some transactional reporting Microsoft provides through Embedded Power BI
- How many master tables are used for key reports/BI?
 - Many master tables already available as data entities
 - Often new master data entities are required to make joining to transaction tables easier

Upgrade Components

OTHER CLOUD CONSIDERATIONS

Enterprise Architecture

Additional cloud components may influence D365FO requirements during upgrade

- Azure Active Directory
- Office 365
- Additional Dynamics 365 Product Implementations
 - Talent
 - Sales (CRM)
 - Power Apps
- Additional Cloud Services
 - Microsoft Flow
 - 3rd Party Tools

Upgrade Components

IMPLEMENTING NEW FEATURES

Implementing New Features

- Review “What’s New” materials for feature consideration
 - <https://docs.microsoft.com/en-us/dynamics365/unified-operations/dev-itpro/get-started/whats-new-changed>
- Be conservative on what you add into scope as it will bring additional time on all fronts: setup/config, data migration, mods, training, project management, etc.
- Consider later phases for deploying new features

Upgrade Components

TRAINING

Training

- Yes, you still need to do it
- Train key users to do end user training
- Training materials often in old process so plan time to update or extra hand-holding with users
- Expect learning curve in new UI features
 - Navigation, Browser based UI, Task guides

Upgrade Components

TECHNICAL & FUNCTIONAL VERIFICATION

Verification – Cost Drivers

- # Modules deployed
- UAT scripts – do you have them still?
 - Add cost for updating and/or re-writing
- Assume 80-90% of original implementation testing hours
 - Have more familiarity with processes but will still need to work through testing
- Include time for testing auxiliary areas:
 - Reports, batch processing, integrations
- Functional clean-up can reduce across all areas upgrade, not just testing
 - Close old open transactions, etc.

Upgrade Components

GO LIVE/CUTOVER

Go Live/Cutover

- Plan for technical and functional support for first 10 days and first month end as a minimum
- Similar staffing level as implementation

Upgrade Components

PROJECT MANAGEMENT

Project Management – Cost Drivers

- Simultaneous work streams add management complexity
- VSTS tools have payoff but will need time investment initially
- Assume 10-15% of hours for PM

Upgrade Components

USER LICENSES

New User Model

AX2012 Enterprise

Functional

Task

Unified Operations	Activity	Team Members	Device
<ul style="list-style-type: none"> This license includes full read, edit and approval access across the entire ERP solution 	<ul style="list-style-type: none"> This license includes the rights to: <ul style="list-style-type: none"> Approve invoices <ul style="list-style-type: none"> Approve all Activity related transactions Create or edit the items related to the following capabilities: warehousing, receiving, shipping, production orders, purchase orders, sales orders, project activities, vendor maintenance, and all budgets Operate a POS device, store manager device, shop floor device, or warehouse device 	<ul style="list-style-type: none"> This license includes read access across any and all Dynamics 365 apps as well as the rights to: <ul style="list-style-type: none"> Record any type of time <ul style="list-style-type: none"> Record any type of expenses Approval of time, expense, invoices Manage personal information Manage direct employee activities in human resources Create requisitions Create or edit the items related to the following capabilities: quality control, service orders, and department level budgets 	<ul style="list-style-type: none"> This license provides multiple users with access through a device to operate a point of sale device, shop floor device, warehouse device or store manager device.

Dynamics 365 Application Plans / Users Pricing



Applications

Users

DYNAMICS 365 PLAN

CUSTOMER ENGAGEMENT PLAN

POWER APPS

SALES

FIELD SERVICE

CUSTOMER SERVICE

PSA

CRM applications

UNIFIED OPERATIONS PLAN

POWER APPS

RETAIL

FINANCE & OPERATIONS

Included w/ Unified Operations

TALENT

ERP applications

DEVICE

ACTIVITY

TEAM MEMBERS

Upgrade Incentives

- Microsoft is offering upgrade incentives until 2019, check with your partner
 - Especially if purchased on enterprise agreement (EA)
- Enterprise and Functional user licenses translate to Unified Operations license or full D365 Plan license with only an “cloud component” incremental charge

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ADVANTEDGE

Need help?

- SAGlobal is an approved “Microsoft Development Center”
- We can assist in creating, upgrading, and maintaining your ISV, partner, or customer solution
- Contact Jen Wisemore for more details (JenW@SAGlobal.com | +1 425.444.0945)

AXUG Summit
Booth #669

Open Q&A
Sessions –
Stop by booth
for schedule

