

Integrating project service automation for Microsoft Dynamics CRM with external systems

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AUTHOR: JOHN BURROWS

COMPANY: Microsoft Corporation

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Introduction

The project service automation capabilities for Microsoft Dynamics CRM allow project-based organizations to efficiently manage the operations of their businesses. Project operations consist of managing the opportunity, quoting the work, planning the work, resourcing the projects, managing projects to the plan and billing for the work done along with actually doing the work. ERP systems sit in the back of the business and account for the results of business operations after the fact. The project service automation solution specializes in project operations and does not include any accounting functions, so it requires that the transactions that have financial implications are captured and fed to the ERP system for proper accounting. This white paper will illustrate the goals, methods, and considerations necessary when integrating the project service automation solution with a back-end financial system.

Integration goals

The goal of the project service automation solution is to maximize the potential of project-based organizations by delivering the work efficiently and capturing business transactions as part of that effort. The project service automation solution does not account for those transactions according to accounting rules and standards such as GAAP or IFRS. ERP systems are designed to properly account for business transactions according to accounting rules. The goal of integration between the project service automation solution and an ERP financial system is to account for those business transactions captured by the project service automation solution according to the pertinent accounting rules.

Integration architecture

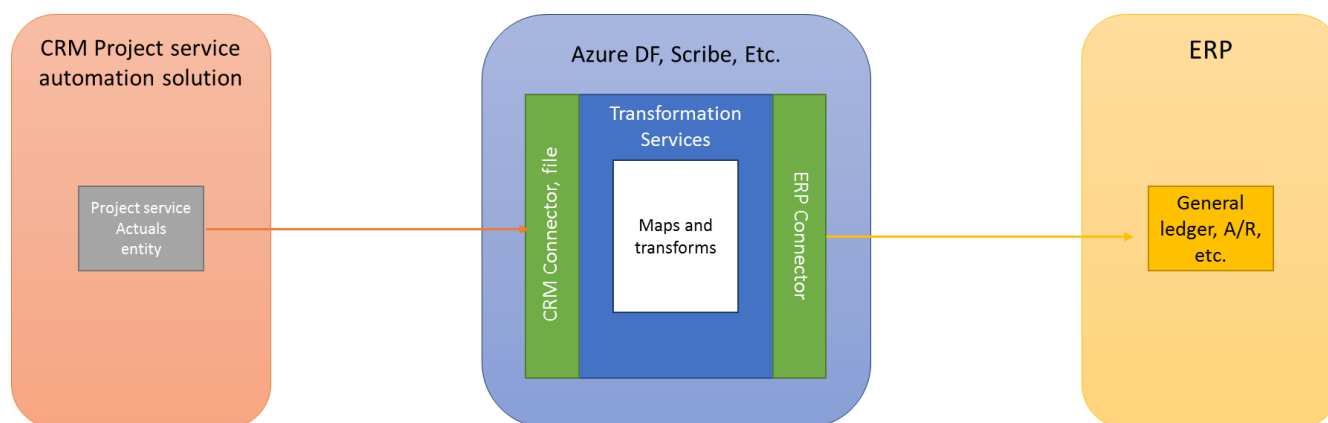


Figure 1—Example integration architecture

You can integrate the project service automation solution with an ERP system by using an integration technology, such as Azure Data Factory, Scribe, or Dell Boomi. The integration layer will use connectors to connect project service automation and the ERP so they can exchange data. The integration layer will also contain a transformation service where the message formats would be transformed appropriately. This will include mapping the data and applying the logic to merge the data into the structures required by the receiving system's target objects.

Methods of integration

There are multiple methods for integrating the project service automation solution with an external system. The following scenarios are some of the more common ones used when integrating project service automation with an external system.

General ledger integration

You can integrate the financial results of transactions in project service automation directly with an external ERP system's general ledger integration. The following sections detail common accounting scenarios and how they can be integrated with an external ERP's G/L.

Project service automation transactions

The project service automation solution captures sales and cost transactions in the Actuals entity. The Actuals entity is the source for integrating the project services automation solution with an external ERP system. When transactions such as time and expense are approved, entries for unbilled sales and cost are entered into the Actuals entity. On the sales side, when you invoice a customer, the unbilled sales amount is offset with a negative entry and project services automation creates a billed sales amount in the Actuals entity. The following diagram illustrates the flow and effect on the Actuals entity for a consultant entering time, a manager approving the time, and the time entry subsequently billed to the customer.

CRM project service solution

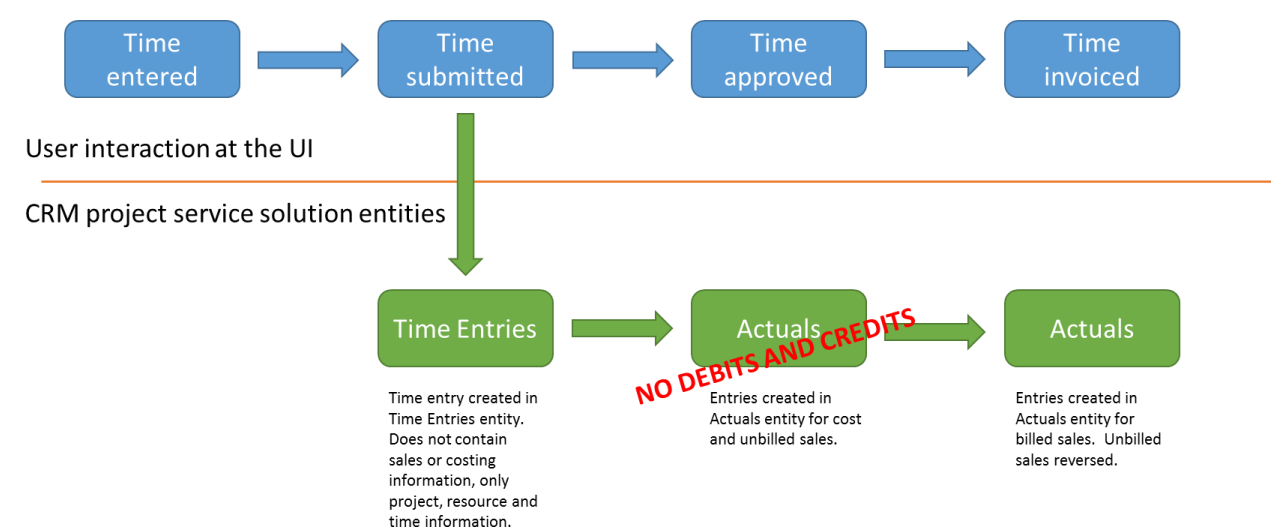


Figure 2—Flow of time entry in the project service automation solution

When you enter time into the project service automation solution, an entry is made in the Time Entries entity to capture the details for the time entry, but no sales pricing or costing is done at this step. When a manager approves the time, the relevant sales and cost prices are applied, and entries for the unbilled sales amount and cost are made in the Actuals entity. The following example illustrates an excerpt of the entries in the Actuals entity.

Document date	Transaction type	Transaction class	Customer	Contract	Contract org	Resource	Resource org	Resource role	Billing type	Quantity	Unit price	Amount
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12/3/15	Cost	Time	Alpine ski house	Alpine CRM	Contoso – US	Ashley Chinn	Contoso – US	Project Mgr	Chargeable	8.0	50.00	400.00
12/3/15	Unbilled sales	Time	Alpine ski house	Alpine CRM	Contoso – US	Ashley Chinn	Contoso – US	Project Mgr	Chargeable	8.0	100.00	800.00

The transaction type Time represents the cost of the resource performing the work. It is calculated from cost rates established in the system. The transaction type Unbilled Sales represents the billable value of the work performed and is calculated using the sales prices established in the system.

Revenue accrual in the ERP system

You can use the unbilled sales transactions Actuals table as the basis of an accrual of revenue in the ERP system. Apply the following logic in the transformation layer to create a general ledger journal entry to accrue revenue.

IF Transaction type = “Unbilled Sales” and Billing type = “Chargeable” and amount is Positive
THEN

Account type = “Ledger” and Account = “160500” and Amount is Debit and Offset
account type = “Ledger” and Offset account = “420200”

The IF block finds all unbilled sales transactions that are chargeable and have a positive amount. It then maps the amount to the ledger account 160500, which represents a Work in Process account on the balance sheet as a debit. It also offsets the amount to the ledger account 420200, which represents accrued revenue on the P&L as a credit. The resulting journal entry would look like this.

DR	160500 WIP	800.00	
	CR	420200 Accrued Revenue	800.00

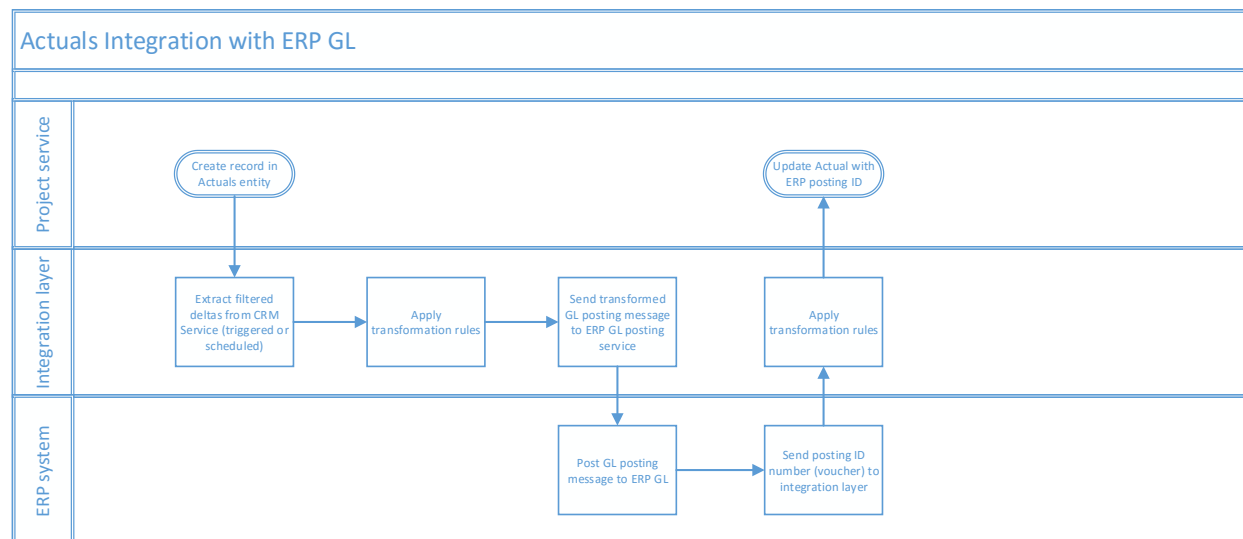


Figure 3—Integration of actuals from the project service automation solution to an ERP general ledger

Cost allocation in the ERP system

Some companies allocate a cost amount related to the direct cost of a worker working on projects from general and administrative salary and wages accounts in the P&L to cost of sales accounts in the P&L based on standard costs for the worker. In the earlier example, the transaction type Time represents the cost of the worker’s time

performing a project task at the cost rates established in the system. Apply the following logic in the transformation layer to create a general ledger journal entry to reclassify project costs.

IF Contract org = Resource org

THEN

Not Intercompany

ELSE

Intercompany

IF Not Intercompany and Transaction type = “Cost” and Transaction class = “Time” and amount is Positive

THEN

Account type = “Ledger” and Account = “540100” and Amount is Debit and Offset
account type = “Ledger” and Offset account = “603100”

The first IF block compares the project’s organization with the resource’s organization. If they are the same, the project and resource are in the same business organization. If they are different, it could be an intercompany transaction, depending on how the business organizations are modeled in the project service automation solution. See the Intercompany section later in this document for further details on intercompany transactions.

The second IF block finds all Time transactions that have a positive amount. It then maps the amount to the ledger account 540100, which represents project labor expense in the cost of sales area of the P&L as a debit. It then offsets the amount to the ledger account 630100, which represents project labor payroll offset in the general and administrative section of the P&L as a credit. The resulting journal entry would look like this.

DR	540100 Project Labor Expense	400.00	
CR	630100 Project Labor Payroll Offset	400.00	

Invoiced revenue in the ERP system

We recommend that you invoice customers in the native invoicing functionality in the project service automation solution. This means you will need to integrate the invoiced transactions in project service automation into the Accounts Receivable module of the ERP system for subsequent collection. When you invoice an unbilled sales transaction, the project service automation solution reverses the unbilled transaction and creates a new billed sales transaction in the Actuals entity. When you invoice the unbilled sales transaction, the system creates two records in the Actuals entity.

Document date	Transaction type	Transaction class	Customer	Contract	Contract org	Resource	Resource org	Resource role	Billing type	Quantity	Unit price	Amount
12/3/15	Unbilled sales	Time	Alpine ski house	Alpine CRM	Contoso – US	Ashley Chinn	Contoso – US	Project Mgr	Chargeable	- 8.0	100.00	-800.00
12/3/15	Billed sales	Time	Alpine ski house	Alpine CRM	Contoso – US	Ashley Chinn	Contoso – US	Project Mgr	Chargeable	8.0	100.00	800.00

Some organizations will reverse the revenue accrual on the P&L and replace it with an invoiced revenue account. Others just clear the WIP account and establish the receivable in A/R. In our example, we will do both. Within the transformation layer, apply the following logic to create a general ledger journal entry to establish the receivable and invoiced revenue and reverse the WIP and accrued revenue.

IF Transaction type = “Unbilled Sales” and Billing type = “Chargeable” and amount is Negative

THEN

Account type = “Ledger” and Account = “420200” and Amount is Debit and Offset
account type = “Ledger” and Offset account = “160500”

IF Transaction type = “Billed Sales” and Billing type = “Chargeable” and amount is Positive

THEN

Account type = “Customer” and Account = “US_SI_00003” and Amount is Debit and
Offset account type = “Ledger” and Offset account = “411100”

The first IF block finds all unbilled sales transactions that are chargeable and have an amount that is negative (unbilled items that are being reversed due to billing). It then maps the amount to the ledger account 420200, which represents accrued revenue in the P&L as a debit. It then offsets the amount to the ledger account 160500, which represents a work in process account on the balance sheet as a credit. The resulting journal entry would look like this.

DR	420200 Accrued Revenue	800.00	
	CR	160500 WIP	800.00

The second IF block finds all billed sales transactions that are chargeable and have a positive amount. It then maps the amount to the customer account “US_SI_00003,” which establishes the receivable in the A/R module of the ERP as a debit. It offsets the amount to the ledger account 411100, which represents invoiced revenue in the P&L as a credit. The resulting journal entry would look like this.

DR	Customer US_SI_00003 – Alpine Ski House	800.00	
	CR	411100 Invoiced Revenue	800.00

Intercompany resource sharing

Project service automation allows global companies to share resources across boundaries using the organizational unit to apply pricing between units. For further details on the organizational unit, see the whitepaper “Advanced Guide to Quoting, Pricing and Billing for Projects.”

Intercompany transactions are identified by both the contracting and resourcing organization unit and the transaction type in the Actuals entity. The following example illustrates how the integration logic would handle an intercompany transaction.

The two organizations used in this example are Contoso US and Contoso UK.

Name	Currency	Cost price sheet
Contoso US	USD	US Cost rate 2016
Contoso UK	GBP	UK Cost rate 2016

The two org units each include a developer bookable resource.

Name	Org. unit
William	Contoso UK
Tricia	Contoso US

Contoso US has sales and cost price lists.

Sales price list

ID	Date effectivity	Currency	
US bill rate 2016	1/1/2016 – 12/31/2016	USD	
Lines	Role	Org. unit	Bill rate
	Developer	Contoso US	150 USD
	Developer	Contoso UK	150 USD

Note that the sales price for a developer in Contoso US is \$150 USD, regardless of the org unit the developer is resourced from.

Cost price list

ID	Date effectivity	Currency	
US cost rate 2016	1/1/2016 – 12/31/2016	USD	
Lines	Role	Org. unit	Cost rate
	Developer	Contoso US	100 USD
	Developer	Contoso UK	120 USD

Note that the cost price in Contoso US for a developer sourced from Contoso US is \$100 USD, but it's \$120 USD for a developer sourced from Contoso UK. This is the transfer price between Contoso US and Contoso UK for a developer.

Contoso UK has the following sales and cost price lists.

Sales Price list

ID	Date effectivity	Currency	
UK bill rate 2016	1/1/2016 – 12/31/2016	GBP	
Lines	Role	Org. unit	Bill rate
	Developer	Contoso UK	100 GBP

Cost price list

ID	Date effectivity	Currency	
UK cost rate 2016	1/1/2016 – 12/31/2016	GBP	
Lines	Role	Org. unit	Cost rate
	Developer	Contoso UK	50 GBP

Contoso US has a contract for a shopping site implementation for Adventure Works. Contoso US is the contracting organization unit for this contract.

ID	Name	Customer	Org. unit	Sales territory	Price list
Contract A	Shopping site implementation	Adventure Works	Contoso US	US – Central	US bill rate 2016

On April 15, both Tricia and William enter 8 hours for Contract A.

Date	Resource	Time	Role
4/15	Tricia (US)	8 hrs	Developer
4/15	William (UK)	8 hrs	Developer

Tricia is a Contoso US developer. When her time entry is approved, the following transactions are created in the Actuals entity.

Document date	Transaction type	Transaction class	Project	Contract	Contract org	Resource	Resource org	Resource role	Billing type	Quantity	Unit price	Amount
4/15/16	Cost	Time	Project A	Contract A	Contoso – US	Tricia	Contoso – US	Developer	Chargeable	8.0	100.00 USD	800.00 USD

4/15/16	Unbilled sales	Time	Project A	Contract A	Contoso – US	Tricia	Contoso – US	Developer	Chargeable	8.0	150.00 USD	1,200.00 USD
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The revenue accrual and cost reclassification follow the same integration logic.

William is a Contoso UK developer working on the contract owned by Contoso US. When his time is approved, the following transactions are created in the Actuals entity.

Document date	Transaction type	Transaction class	Project	Contract	Contract org	Resource	Resource org	Resource role	Billing type	Quantity	Unit price	Amount
4/15/16	Cost	Time	Project A	Contract A	Contoso – US	William	Contoso – UK	Developer	Chargeable	8.0	120.00 USD	960.00 USD
4/15/16	Unbilled sales	Time	Project A	Contract A	Contoso – US	William	Contoso – UK	Developer	Chargeable	8.0	150.00 USD	1,200.00 USD
4/15/16	Resourcing unit cost	Time	Project A		Contoso – UK	William	Contoso – UK	Developer	Chargeable	8.0	50.00 GBP	400.00 GBP
4/15/16	Inter-organizational sales	Time	Project A		Contoso – UK	William	Contoso – UK	Developer	Chargeable	8.0	120 USD	960.00 USD

The first two actuals are similar to Tricia's, even though the contracting and resourcing organizations are the same. For the revenue accrual, the same integration logic would run and the entries generated would be the same.

The cost reclassification logic would not run. An intercompany project cost entry would need to be generated instead. The logic would look like this on the contracting organization's general ledger.

IF Contract org = Resource org

THEN

Not Intercompany

ELSE

Intercompany

IF Intercompany and Transaction type = "Cost" and Transaction class = "Time" and amount is Positive

THEN

Account type = "Ledger" and Account = "545100" and Amount is Debit and Offset
account type = "Ledger" and Offset account = "345100"

Where general ledger account 545100 is intercompany project cost and general ledger account 345100 is intercompany payable to Contoso UK, which establishes the amount due from Contoso US to Contoso UK.

The resulting journal entry on Contoso US's general ledger would be as follows:

DR	545100 Intercompany project cost	960.00 USD
CR	345100 Intercompany payable – Contoso UK	960.00 USD

You need to create the following two entries on the resourcing organization’s general ledger.

IF Transaction type = “Resourcing unit cost” and Transaction class = “Time” and amount is Positive
THEN

Account type = “Ledger” and Account = “540100” and Amount is Debit and Offset
account type = “Ledger” and Offset account = “603100”

This general ledger journal serves to reclassify the cost of a resource from a general and administrative general ledger account (603100) to a project cost of sales account (540100). This reclassification uses the same method as the non-intercompany cost reclassification entry described earlier.

The resulting journal entry on Contoso UK’s general ledger would be as follows.

DR	540100 Project Labor Expense	400.00 GBP
CR	345100 Project Labor Payroll Offset	400.00 GBP

Additionally, there needs to be an entry on the resourcing organization’s general ledger for the intercompany receivable (due from) from Contoso US.

IF Transaction type = “Inter-organizational sales” and Transaction class = “Time” and amount is Positive
THEN

Account type = “Ledger” and Account = “240100” and Amount is Debit and Offset
account type = “Ledger” and Offset account = “403100”

Where general ledger account 240100 is intercompany receivable from Contoso US, which establishes the due from Contoso US to Contoso UK, and general ledger account 403100 is intercompany revenue.

The resulting journal entry on Contoso UK’s general ledger would be as follows.

DR	240100 Intercompany receivable – Contoso US	960.00 USD
CR	403100 Intercompany revenue	960.00 USD

Expense report employee payable integration

With the project service automation capabilities in Dynamics CRM, users can create and submit expense reports, and managers can approve them. However, the recording of the payable to the user and subsequent reimbursing payment to them happens inside the accounts payable module of an ERP or accounting system. Integration with the project service automation solution happens at an accounts payable journal entry level, much the same as in the sales section described earlier. The Actuals entity serves as the basis for the records to be integrated, and an integration layer extracts, filters, and transforms the records for consumption by the ERP. For example, Tricia, a developer, enters an expense report against a project for airfare of \$700. The record in the project service automation solution actuals would look something like this.

Document date	Transaction type	Transaction class	Project	Contract	Contract org	Resource	Resource org	Expense category	Billing type	Quantity	Unit price	Amount
12/3/15	Cost	Expense	Alpine CRM	Alpine CRM	Contoso – US	Tricia	Contoso – US	Airfare	Chargeable	1.0	700.00	700.00

The integration layer needs to map to the correct legal entity using the resource org. It also must map to the correct A/P account based on the resource, as well as offset to the correct general ledger based on the expense category. The transformation logic would look something like this.

IF Transaction type = “Cost” and Transaction class = “Expense” and amount is Positive

THEN

Account type = “Vendor” and Account = “US_SI_00456” and Amount is “Credit”

IF Expense category = “Airfare”

THEN Offset account type = “Ledger” and Offset account = “756100”

It will be easier if the transformation layer keeps a lookup table that maps the resource to the vendor account in the ERP. Alternatively, one could customize the project service automation bookable resource to include a field to contain the external system ID for each resource. Also, depending on the number of expense categories, a lookup table in the integration layer that maps the categories to the ERP general ledger accounts might also be a good idea.

Invoice integration

Some organizations may wish to invoice their customers out of their ERP system instead of using the project service automation capabilities for Dynamics CRM. We recommend using the project service automation solution for invoicing and integrating at the A/R module level with the ERP. However, one can integrate to the ERP invoice. There are a number of considerations that you must address to do this successfully, however.

The invoice in the target ERP system must allow free entry of line items. For example, instead of picking from a list of products or items with standard sales prices, you must be able to enter line items with free quantities and sales prices along with descriptions. This adds a level of complexity, because lines from project service must then be mapped to products or items within the ERP system.

If there is no way to enter a free form line, you must maintain service items in the ERP item master and establish a mapping in the integration layer between project service invoice lines and items in the ERP. Additionally, you will have to allow free entry of item pricing from the project service automation solution, which means you will have to make project service the system of record for item prices. If this cannot be done in the ERP, you will need to keep the item prices in both the project service automation solution and the ERP in sync to avoid reconciliation issues.

Secondly, the records in the project service automation solution Actuals entity is very detailed. Unless you can produce very detailed invoices from the ERP, some level of summarization is necessary to produce an acceptable invoice. The project service automation capabilities for CRM do not include the functionality to summarize records from the Actuals entity, so this capability would have to be developed in the integration layer.

Finally, if the ERP is calculating taxes on the lines sent from the project service automation solution, there will need to be a mapping and enrichment of those items to include the attributes necessary for the ERP’s tax calculation engine to correctly apply taxes to the invoice. These attributes might need to be added to the project service automation solution via a customization, and mapping logic might need to be applied within the integration layer.

Time and expense integration

The following are common scenarios used when integrating project service automation with external timekeeping and expense reporting systems.

Time entry integration

Although project service automation includes a robust set of capabilities for capturing time and approving time entries, some organizations might have existing external time-entry systems that they need to continue using. Project service automation includes two patterns for integrating with an external time system.

Submitted in external system, approved in the project service automation solution

In this scenario, you enter and submit time in an external timekeeping system and integrate it into the project service automation solution. The project service automation solution either approves the submitted time entries or rejects them back to the external systems. Time entries are integrated into the Time Entry entity of the project service automation solution with the status of submitted. The submitted time will appear on the Approvals page in the project service automation solution for the project approver.

In the case where the submitted time is approved, the transactions carry on as if the time had been entered directly in the project service automation solution. That is, the system creates Actuals. In the case of time entry rejection, you must make a fundamental decision.

One option is to take care of the rejected time of in the project service automation solution. This means that you correct the rejected time in the project service automation solution. The down side to this approach is that the external system loses connection with the corrected entry when you make the correction.

The second method is to return the rejected time entry back to the external system for correction and resubmission. This option is much more complicated than the first because you must have a service that can capture the rejected time entries and then update the corresponding external time entry in the external system along with the project service automation entry.

After the time entry is corrected, it will be resubmitted to the project service automation solution. The integration must either delete the rejected entry in the project service automation solution so the correction can be created as new, or update the rejected entry and resubmit it. All of the components are available for this integration, but customers must develop the integration itself because no out of the box solution is offered. Because of this, we recommend using the following approach to integrating with an external time system.

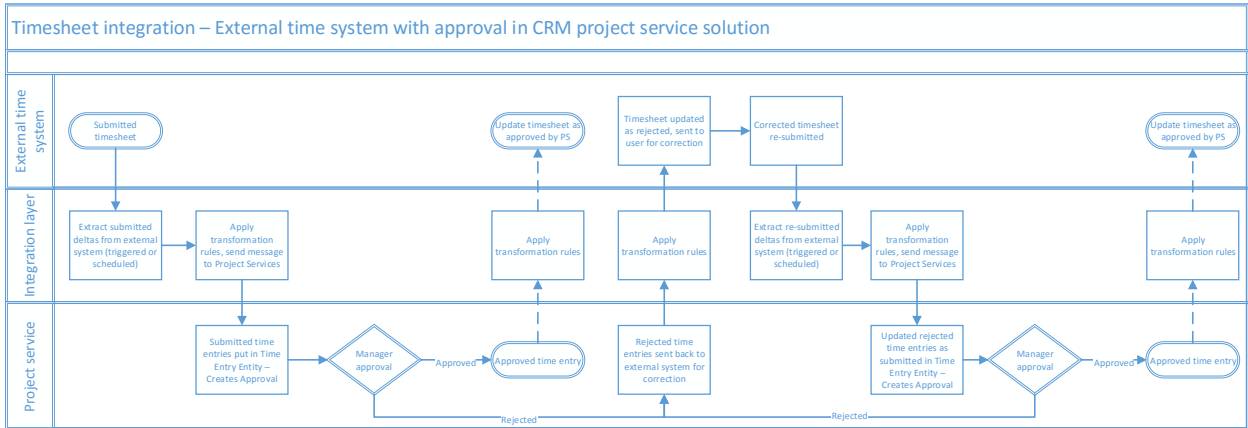


Figure 4—Timesheet integration with time approval in the project service automation solution

Submitted and approved in external system

In this scenario, the external system takes care of the time-entry, submission, approval, rejection, correction, and resubmission process. The project service automation solution only integrates approved time entries. The time entry is pushed to the project service automation solution only after the time entry is approved.

In this case, the integration is much simpler because the project service automation solution receives only approved entries. The integration does not have to deal with any feedback from project server automation to the external system for approval or rejection. The external system will be integrating with the Time Entry entity. Approved time records will integrate into that entity with the status of Approved. The business logic of the project service automation solution will generate the actuals once the records are imported into the Time Entry entity.

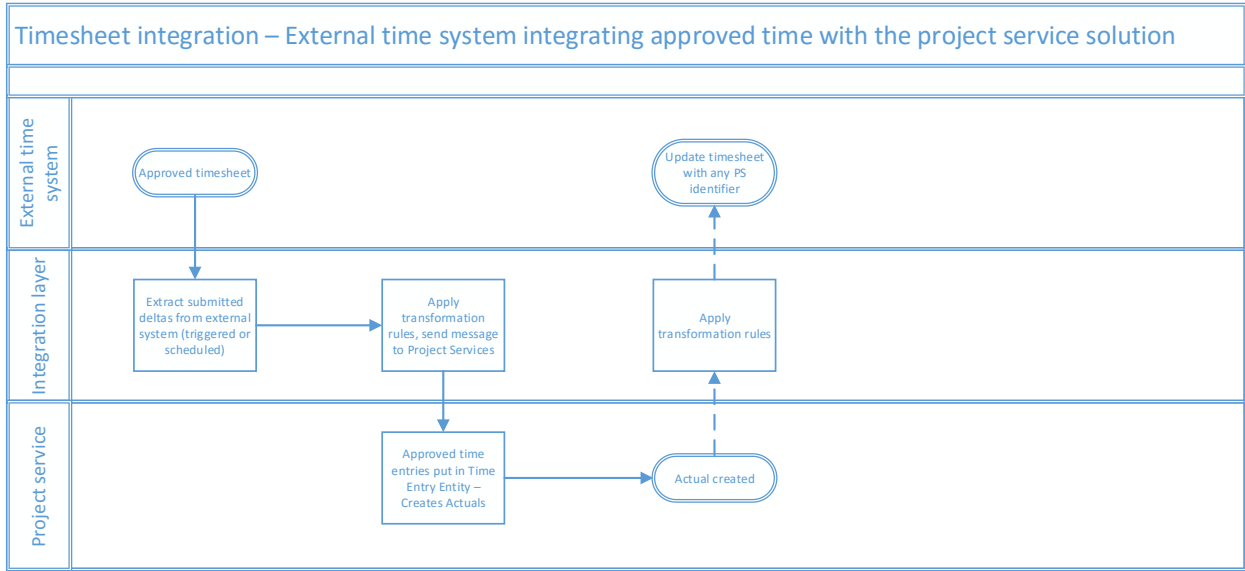


Figure 5—Timesheet integration with submission and approval in an external system

Expense report integration

Project service automation includes a robust set of capabilities for capturing and approving expenses. However, some organizations might have existing external expense reporting systems that they might need to continue using. You have two patterns available for integrating an external expense report system with the project service automation solution.

Submitted in external system, approved in the project service automation solution

In this scenario, expenses are entered and submitted in an external expense reporting system and integrated into project service automation as submitted expense reports. The submitted entries are then either approved in the project service automation solution or rejected back to the external system. Expense entries are integrated into the Expense entity of project service automation with the status of Submitted. The submitted expenses will appear on the approver's Approvals page in the project service automation solution.

When the submitted expense is approved, the transactions carry on as if the time had been entered directly in the project service automation solution. That is, the system creates actuals. In the case of expense entry rejection, you must make a fundamental decision regarding the integration.

One option is to take care of the rejected expenses in the project service automation solution. That means that the submitter of the rejected expense corrects and resubmits it in the project service automation solution. The down side to this approach is that the external system’s transaction loses connection with corrected entry when you make the correction.

The second method is to return the rejected expense entry back to the external system for correction and resubmission. This option is much more complicated than the first. You must have a service that can capture the rejected expense entries, and then update the corresponding external expense entry in both the external system and the project service automation Expense entity. Once corrected, the expense entry will be re-submitted to the project service automation solution.

The integration must either delete the rejected entry in the project service automation solution so the correction can be created as a new record to be approved, or it must update the rejected entry and resubmit it for approval. All of the components are available for this integration, but customers must develop the integration itself because project service automation doesn’t offer an out of the box solution to this scenario. Because of this, we recommend the next approach, which requires submission and approval of expenses in the external system for integration with an external time system.

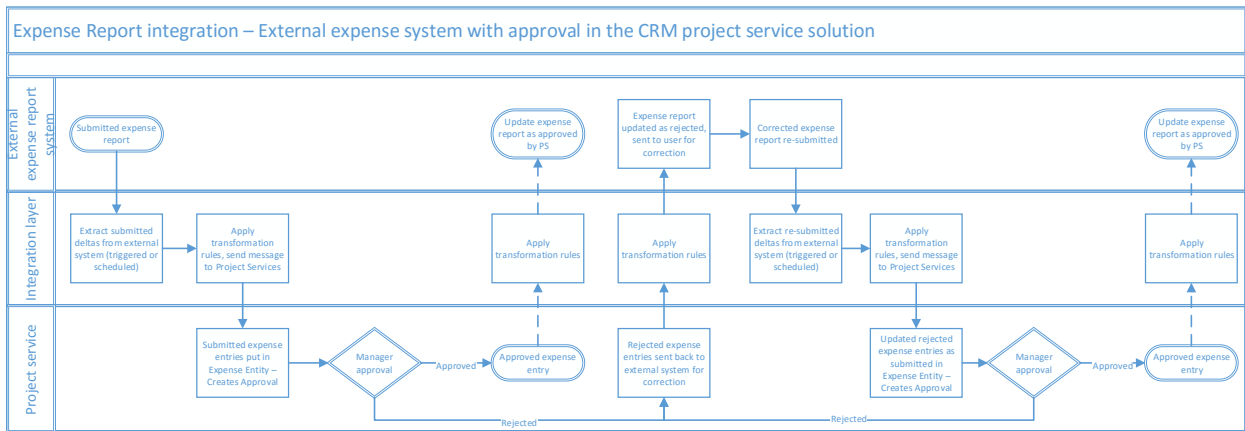


Figure 6—Expense report integration with expense approval in project service automation

Submitted and approved in external system

In this scenario, the external system takes care of the expense report entry, submission, approval, rejection, correction, and re-submission process. The project service automation solution only integrates approved expense entries. The expense entry is pushed to the project service automation solution only after the expense entry is approved.

In this case, the integration is much simpler. The project service automation solution only receives approved entries, so the integration does not have to deal with any feedback from project server automation to the external system for approval or rejection. Again, the external system will be integrating with the Expense entity. Approved expense records will integrate into that entity with the status of Approved. The business logic of the project service automation solution will generate the actuals once the records are imported into the Expense entity.

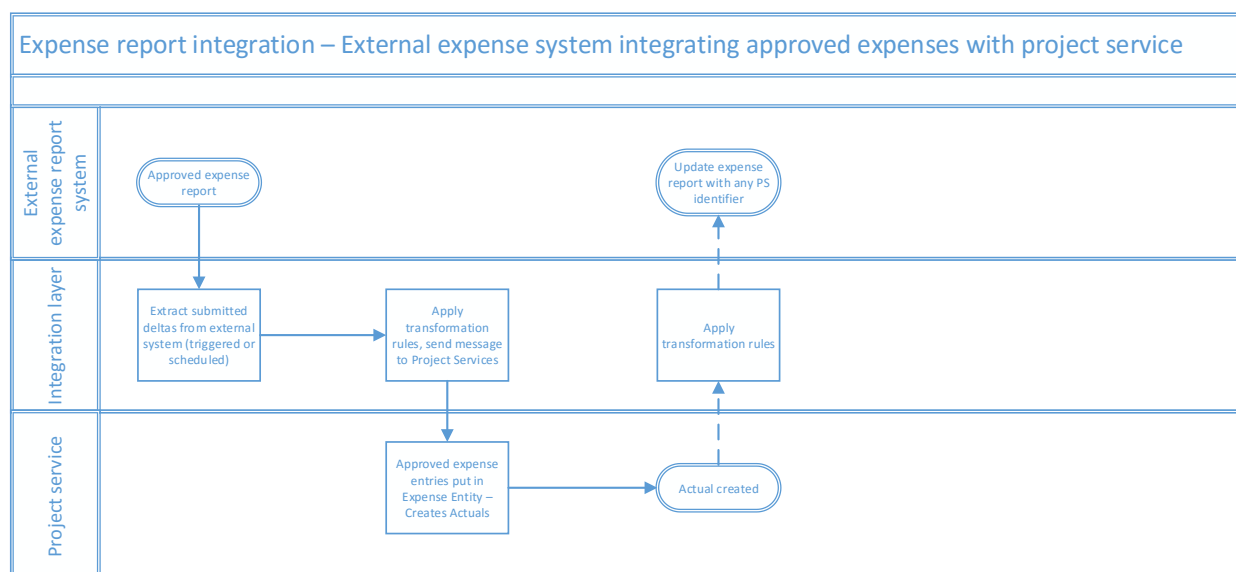


Figure 7—Expense report integration with submission and approval in external system

File-based integration

The project service automation solution can produce comma-separated files of transactions from the Actuals entity. This feature has delta extract capabilities, so it can send the transactions that have occurred since the last time the feature ran. Customers with a smaller number of transactions can use this feature instead of the service-oriented architecture.

Once the file is extracted, the same methods of mapping and integrating with the target system applies as in the service oriented architecture. Because the project service automation solution runs in Dynamics CRM Online, there are various limitations in place to maintain system performance in a multi-tenant architecture. We recommend this approach only to customers who process a small number of transactions.

Dynamics AX services industries solution and project management and accounting module

We don't recommend integrating with Microsoft Dynamics AX at the Project Management and Accounting Module level, but some customers might have the AX Project Module implemented and don't wish to integrate at our recommended level via general ledger journals or Free Text Invoices. The integration at the Project Module level is very complex and requires the integration and synchronization of reference and master data objects, such as Project ID, Worker ID, Line Properties, and Categories. The integration requires the AX Project Hour Journal for time entries, the AX Project Expense Journal for expense entries, and the AX Project Fee Journal for fees.

You will need to create an AX Project for each project service automation contract line and make sure the AX Project Group for the AX Project is appropriate for the project service automation contract line. For example, a time and materials project service automation contract line requires an AX Project that uses a time and materials AX Project Group.

Another key consideration is that there will need to be a map in the integration layer that maps the project service automation contract line to the AX project. If there is no map in the integration layer, you will need to

customize one of the two systems to include a field in which the external system ID is mapped. You will also have to keep those two IDs in sync.

You can create a sample AX Project Hour Journal to record time against an AX Project. If you use a time entry as an example, the entry in the Actuals entity in the project service automation solution looks like this:

Document date	Transaction type	Transaction class	Customer	Contract	Contract org	Resource	Resource org	Resource role	Billing type	Quantity	Unit price	Amount
12/3/15	Cost	Time	Alpine ski house	Alpine CRM	Contoso – US	Ashley Chinn	Contoso – US	Project Mgr	Chargeable	8.0	50.00	400.00
12/3/15	Unbilled sales	Time	Alpine ski house	Alpine CRM	Contoso – US	Ashley Chinn	Contoso – US	Project Mgr	Chargeable	8.0	100.00	800.00

The integration must have logic that determines the type of AX Journal that should be used based on the project service transaction class. For example, transaction class Time uses an AX Project Hour Journal, transaction class Expense uses an AX Project Expense Journal, and so on.

The time entry in the project service automation becomes two records in the Actuals entity; one for the cost side, and one for the (unbilled) sales side. In the AX Project Hour Journal, both the cost and sales records are represented as one line in the journal with cost, cost price, sales, and sale price amounts. The integration must combine the two project service automation solution records into one for the AX Project Hour Journal. Additionally, both the cost and sales prices will need to be set up in both systems and kept in sync, or the integration will have to write the project service prices to the AX Journal. We recommend that the integration write the prices in because this creates fewer setup and synchronization issues.

We have mentioned that the project service contract line will need to map to an AX Project. Additionally, the Project Service resource will need to map to an AX Worker, and the Billing Type (chargeable, non-chargeable) in project service automation will need to map to an AX Line Property. For a time-transaction project, the service resource role should map to an AX Project Category. In pseudocode, the integration will need to do the following:

IF Transaction class = Time

THEN use the AX Project Hour Journal

Find corresponding Unbilled Sales transaction type:

Create a union of the two transactions in a temporary table in the integration layer so the sales and cost amounts are now one record that can be mapped into the AX Hour Journal line:

Project service Actuals records for one-time entry

Document date	Transaction type	Transaction class	Customer	Contract	Contract org	Resource	Resource org	Resource role	Billing type	Quantity	Unit price	Amount
12/3/15	Cost	Time	Alpine ski house	Alpine CRM	Contoso – US	Ashley Chinn	Contoso – US	Project Mgr	Chargeable	8.0	50.00	400.00
12/3/15	Unbilled sales	Time	Alpine ski house	Alpine CRM	Contoso – US	Ashley Chinn	Contoso – US	Project Mgr	Chargeable	8.0	100.00	800.00

Merged record of time entry actuals for integration into AX Hour Journal

Document date	Transaction class	Customer	Project	Project org	Resource	Resource org	Resource role	Billing type	Quantity	Cost price	Cost Amount	Sale price	Sales Amount
12/3/15	Time	Alpine ski house	Alpine CRM	Contoso – US	Ashley Chinn	Contoso – US	Project Mgr	Chargeable	8.0	50.00	400.00	100.00	800.00

With this merged record, the integration layer will need to perform the following:

- Map Contract line for the transaction to AX Project ID
- Map Resource to AX Worker ID
- Map Resource Role to AX Project Category
- Map Billing Type to AX Line Property
- Map the quantity to Hour Quantity in the AX Project Hour Journal
- Map the cost price to the cost price on the AX Project Hour Journal
- Map the cost amount to the cost amount on the AX Project Hour Journal
- Map the sales price to the cost price on the AX Project Hour Journal
- Map the sales amount to the sales amount on the AX Project Hour Journal

After the integration layer completes the mapping, your AX Project Hour Journal will look like this:

Project date	Project ID	Category	Resource	Resource role	Hours	Line property	Quantity	Cost price	Sale price
12/3/15	Alpine CRM	PM	Ashley Chinn	Project Mgr	8.0	Billable	8.0	50.00	100.00

You will need to address numerous assumptions in order for the mapping to produce a viable AX Hour Journal.

The following table shows project service automation roles set up as AX Project Categories for the AX Hour Journal, including a map between the two. Note that we are using project service automation roles to map to AX project categories because they are the closest match. Project service automation categories are used for expenses and do not line up with AX categories that are used for driving general ledger account posting.

Project service role	AX Project Category
Project Manager	PM
Developer	AppDev
...	...

This sample table shows project service automation roles set up as AX Project resource roles for the AX Hour Journal, and a map between the two has been created.

Project service role	AX Project Resource Role
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Project manager	Maps to	Project manager
Developer	Maps to	Software developer
...		...

The following table shows project service Billing Types set up in AX as Line Properties, and a map between the two has been created.

Project service Billing Type		AX Project Line Property
Chargeable	Maps to	Billable
Non-chargeable	Maps to	Non-billable
...		...

Other Dynamics AX project module considerations

Invoicing

Project service automation includes a robust and flexible invoice feature. The AX Project Module also includes a project-invoicing capability closely coupled with the AX Accounts Receivable Module.

The main invoicing challenge with integrating project service automation with the AX Project Module is that AX assumes that all invoicing will happen within AX. With that notion by AX, you will need to decide amongst three alternatives when integrating at the invoice level. The first alternative is to invoice in the project service automation solution and in AX, send the project service automation invoice to the customer, and ignore sending the AX invoice to the customer. The second alternative is to invoice in the project service automation solution and then invoice in AX as well, considering the project service invoice as a pro-forma or draft invoice and the final customer invoice as the AX invoice. The third alternative is to not invoice in the project service automation solution, sending just the unbilled transactions to AX and leaving all the unbilled sales transactions as unbilled in the project service automation solution.

Work breakdown structures

Both the project service automation solution and the AX Project Module support project planning via a Work Breakdown Structure (WBS). We don't recommend integrating the WBS tasks for both systems because issues with mapping and synchronization between the two systems would outweigh the limited benefits.

Special topic two: fixed-price revenue recognition

Revenue recognition for fixed-price contracts is a complicated and often contentious area of project accounting. As the project service automation solution is a front-office system for efficiently managing a professional services organization, accounting topics such as revenue recognition are left to back-office financial systems.

Project service automation contains the elements necessary to inform the revenue recognition calculations for fixed-price contracts. You can download the project service automation sample report pack, which contains the

Fixed price contract completion report that will give you the following information, by contract and contract line, for any fixed price contract line.

- The contracted value of the line
- The total estimated effort to complete (in hours)
- Total estimated cost to complete
- Actual hours consumed to date
- Actual cost consumed to date
- Calculations of actual effort to date
- Total estimated effort to complete
- Actual cost to date
- Total estimated cost to complete

Additionally, you can create a view on the sales contract line and project entities that will give you much the same information for fixed price contract lines. You can then run this view using Advanced Find and download it to Excel for further analysis and processing.

To invoice milestones and entries to Work in Process and A/R receivables, use the Actuals entity much as you would with time and materials contract lines. The difference would be looking for actuals with transaction type Billed Sales and transaction class Milestone. The accounting entries you would have to generate would be debits to the customer accounts receivable account and credit to your WIP account.

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