

# Proposal Manager & Dynamics 365 for Sales

## Integration Architectural Overview

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## Introduction

This document describes the architecture of the integration between Proposal Manager and Dynamics 365 for Sales.

For details about Dynamics 365 for Sales, visit <https://dynamics.microsoft.com/en-us/sales/overview/>.

For details about Proposal Manager, visit <https://github.com/OfficeDev/ProposalManager/>.

*Note that, for the time being, the integration is one-way, with Dynamics 365 for Sales information flowing towards Proposal Manager. Changes in Proposal Manager will not be reflected in Dynamics 365 for Sales, with the only exception of documents, which are stored in the drive of a common SharePoint site, shared between the two products.*

## Architectural Overview

In this section, we will explore the applications, associations and technologies employed by the integration.

### Applications

There are two main applications involved in the integration:

1. The Proposal Manager application
2. Dynamics 365 for Sales



Figure 1 Main applications

The Proposal Manager application has an integration engine that drives the integration. It enables Proposal Manager and Dynamics 365 for Sales users to access the same information and leverage the same functionality from the frontends of both products.

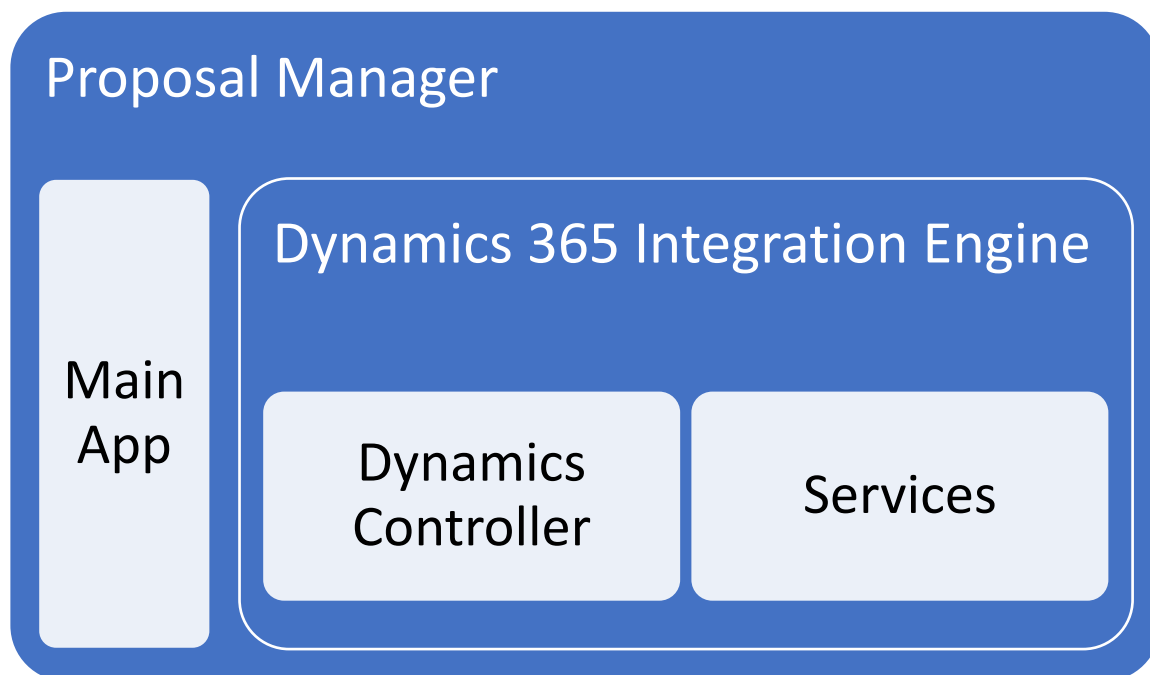


Figure 2 Proposal Manager Dynamics Integration Engine

All incoming integration-related interactions enter the application through the Dynamics Controller.

Other applications involved in the integration are:

3. Office 365 Groups
4. OneDrive for Business
5. SharePoint
6. Microsoft Teams

These last 4 applications are resources of the Microsoft 365 ecosystem; unless otherwise specified, they are accessed through the Microsoft Graph API.

### Dynamics 365 for Sales Customization

For the integration to work correctly for every use case, the Dynamics 365 instance needs be customized with the Proposal Manager solution, which is included as part of the Proposal Manager repository. Every time in this document where Dynamics 365 for Sales is referenced, it is presumed that the solution has been installed on the system. For more information on solutions and how to install them, go to <https://docs.microsoft.com/en-us/dynamics365/customer-engagement/customize/import-update-export-solutions>.

### Associations

In this integration, the user interacts directly only with the Proposal Manager application and Dynamics 365 for Sales. Other interaction cases (such as uploading a Formal Proposal document directly to OneDrive) may work as well, but they are not explicitly supported.

The applications listed in the previous section interact between them and the user as displayed in Figure 3.

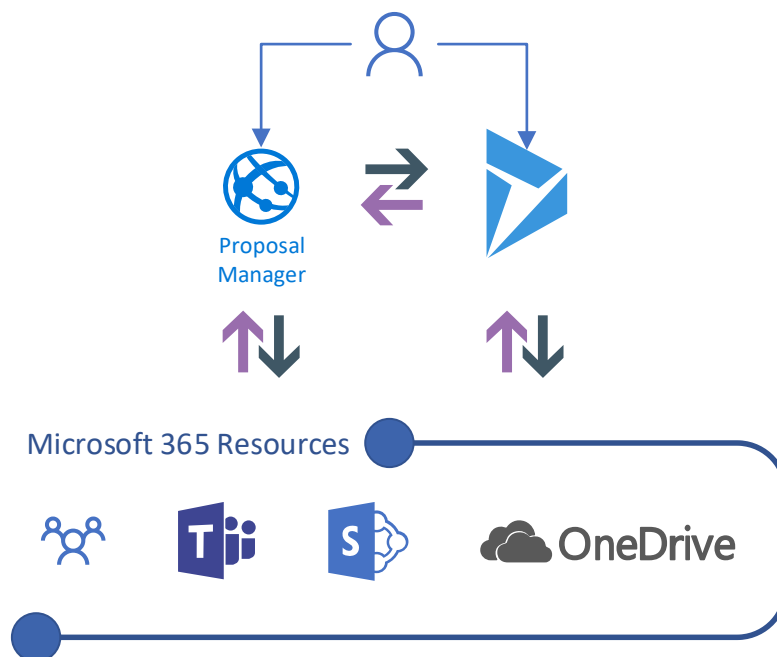


Figure 3 Integration Associations

Most of the interactions between the applications occur over ordinary REST API calls. However, for Proposal Manager to be able to capture all relevant events from the different applications, some of its associations are set up as webhooks.

In the context of this integration, webhooks account for the following scenarios:

- Something changed in Dynamics (for example, an opportunity has been added) and the change needs to be reflected in Proposal Manager.
- Something changed in OneDrive (for example, a formal proposal has been uploaded) and the change needs to trigger a processing of the uploaded file.



Figure 4  
Webhooks symbol

In this document, whenever a call is a webhook call, it will be signaled with a triangular blue symbol (Figure 4).

Webhooks' configuration

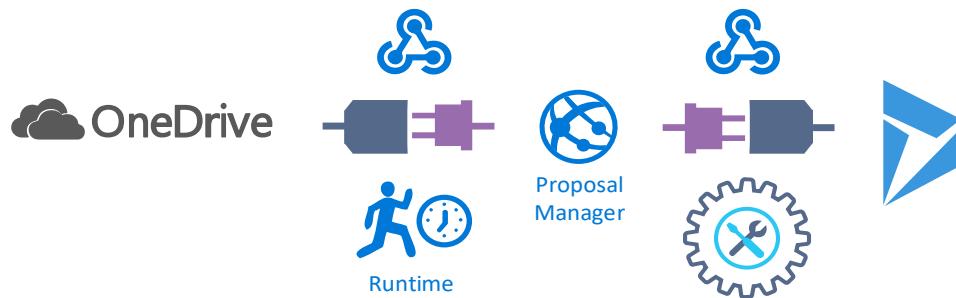


Figure 5 Integration Webhooks

OneDrive webhooks are set up dynamically at runtime, using Graph API subscriptions. For more information on subscriptions and how they are set up dynamically, visit <https://developer.microsoft.com/en-us/graph/docs/api-reference/v1.0/resources/subscription>.

Dynamics 365 webhooks are set up statically at configuration time, using the Plugin Registration Tool, available at <https://www.nuget.org/packages/Microsoft.CrmSdk.XrmTooling.PluginRegistrationTool>.

## Interactions

In this section, we will explore how the different applications involved in the integration collaborate with each other and the different kinds of users.

There are 4 possible interactions that cause a collaboration:

1. Creating an opportunity
2. Attaching a document to an opportunity
3. Creating the team for an opportunity
4. Adding a member to an opportunity team
5. Uploading a Formal Proposal template to an opportunity

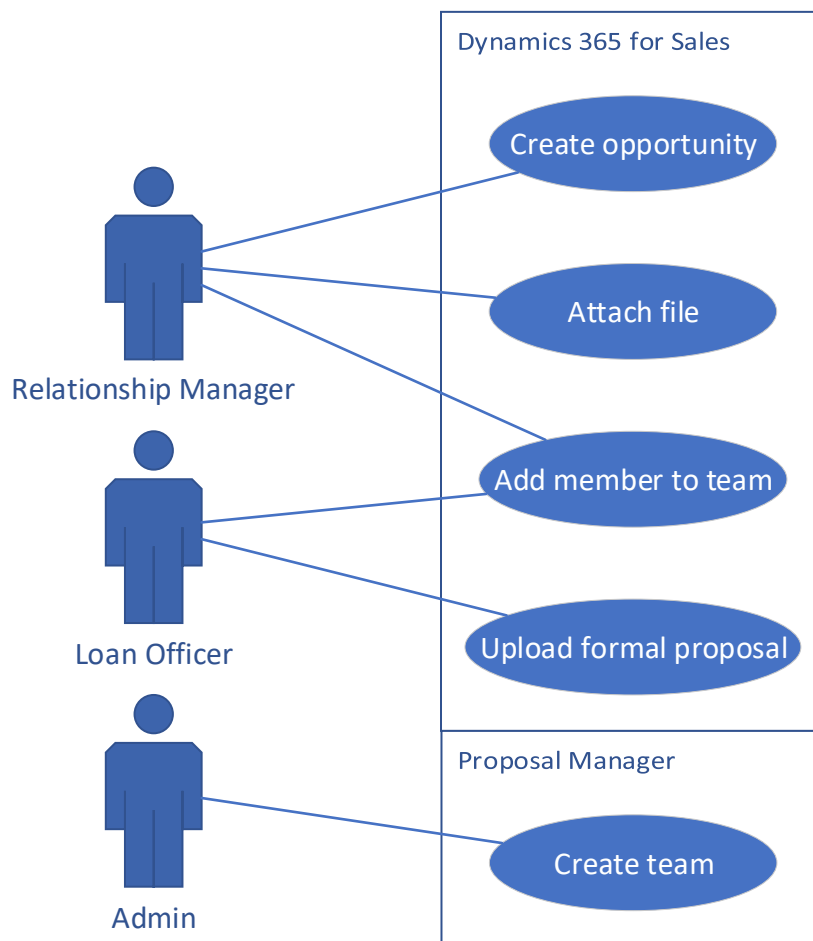


Figure 6 Integration use cases

It is important to note that, although webhooks may intervene in the collaborations, making them asynchronous by sometimes possibly deferring the event notification for a non-deterministic period, all sequences are initially triggered by a user of the solution.

## Opportunity Creation

This collaboration starts when a Relationship Manager creates an opportunity in Dynamics 365 for Sales.

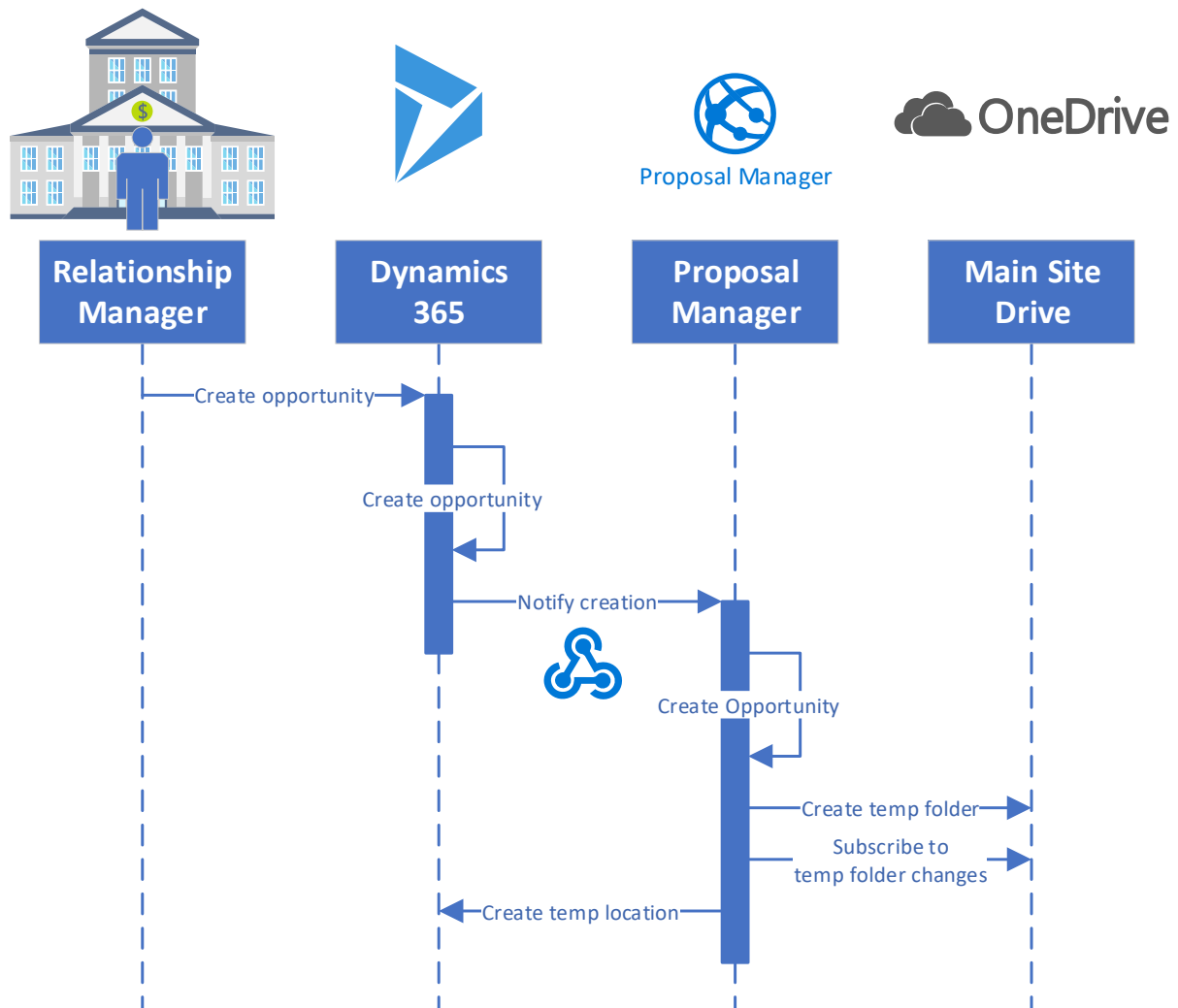


Figure 7 Opportunity Creation Sequence

## Integration Tasks

The responsibilities of the Proposal Manager integration engine in this collaboration are:

- Reflecting the opportunity creation in Proposal Manager
- Mapping the attachments folder of the opportunity to the Dynamics 365 for Sales opportunity, to enable the user to upload attachments through Dynamics 365.
- Setting up a webhook to be able to later notify Proposal Manager when an attachment is added to the opportunity's temporary folder (see Attachment Addition)

## Attachment Addition

This collaboration starts when a Relationship Manager uploads an attachment to an opportunity in Dynamics 365 for Sales.

*Note that attachments are different than other documents in that they are attached to the opportunity before the administrator creates the team, and they are then stored in the General channel when they are moved over to their new location.*

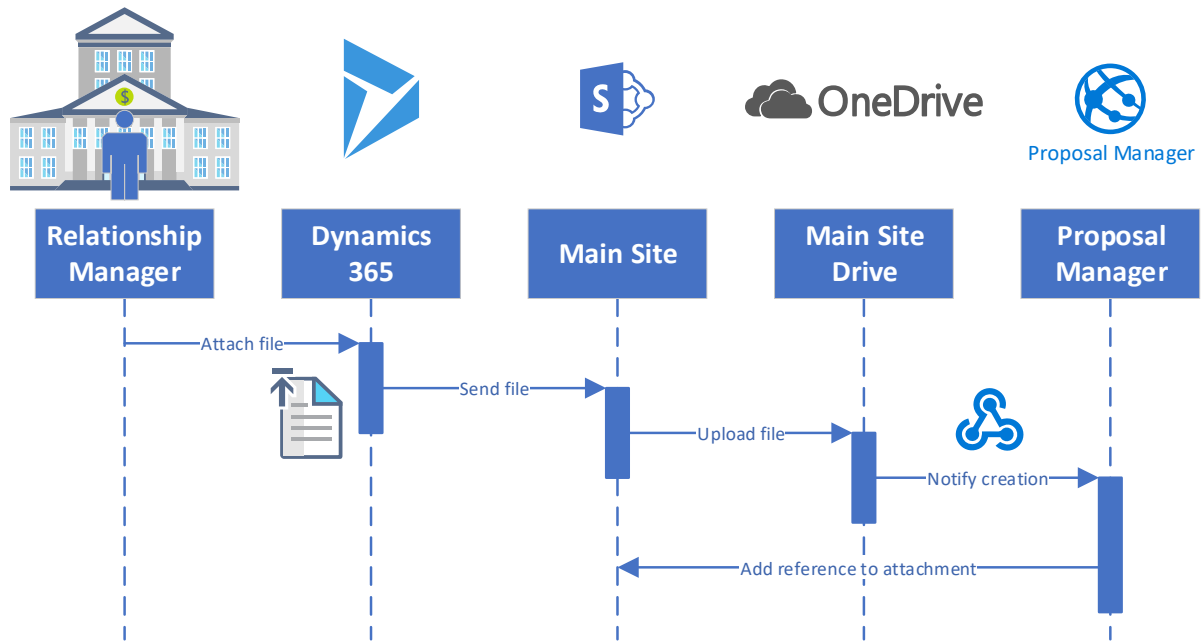


Figure 8 Attachment Addition Sequence

## Integration Tasks

The responsibilities of the Proposal Manager integration engine in this collaboration are:

- Notifying Proposal Manager that the attachment has been added to the opportunity's temporary folder, so that Proposal Manager can track it correctly

## Team Creation

This collaboration starts when an admin creates the team for an opportunity in Proposal Manager.

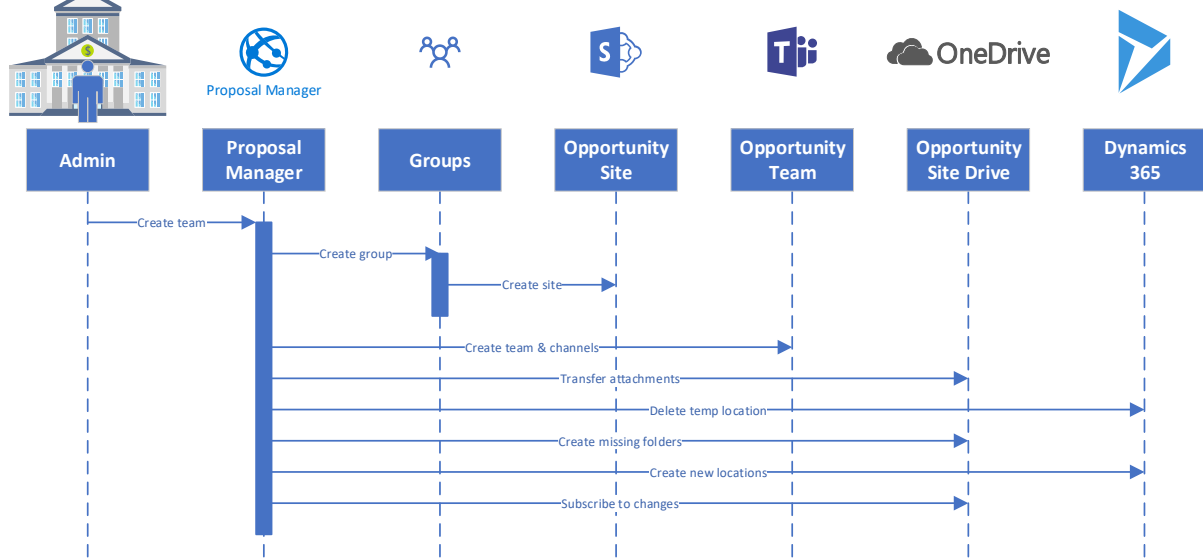


Figure 9 Team Creation Sequence

## Integration Tasks

The responsibilities of the Proposal Manager integration engine in this collaboration are:

- Deleting the obsolete reference to the opportunity's temporary location in Dynamics 365 for sales (see Opportunity Creation)
- Making sure all channels of the team have their folders created<sup>1</sup>
- Mapping every channel's folder of the opportunity to the Dynamics 365 for Sales opportunity, to enable the user to upload documents to the channels through Dynamics 365
- Setting up a webhook to be able to later notify Proposal Manager when a Formal Proposal template is uploaded to the opportunity (see Formal Proposal Upload)

<sup>1</sup> In Microsoft Teams, folders for the different channels are created lazily. For this reason, sometimes the occasion arises when not all folders have been created before a user needs to upload a document from Dynamics 365 for Sales.



## Team Member Addition

This collaboration starts when a Relationship Manager or Loan Officer adds a member to the Proposal Management Team of the opportunity in Dynamics 365 for Sales.

For more information on how the proposal management team related to the opportunity is set up in Dynamics 365 for Sales, see Annex A: Proposal Management Team Model in Dynamics 365 for Sales.

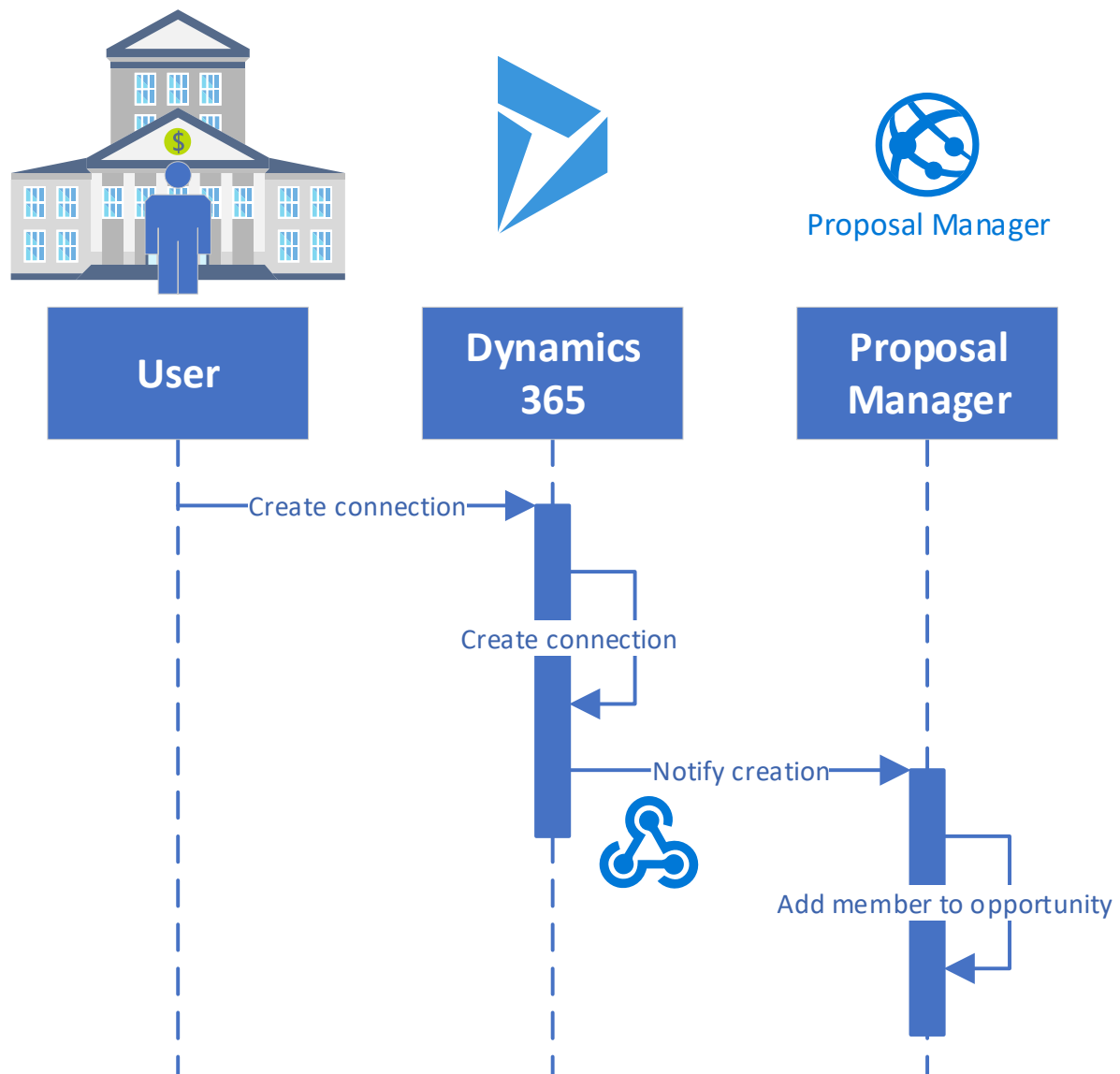


Figure 10 Team Member Addition Sequence

## Integration Tasks

The responsibilities of the Proposal Manager integration engine in this collaboration are:

- Adding to the Proposal Manager opportunity the member referenced by the connection created by the user from Dynamics 365 for Sales.

## Formal Proposal Upload

This collaboration starts when a Loan Officer uploads a Formal Proposal template to the opportunity in Dynamics 365 for Sales.

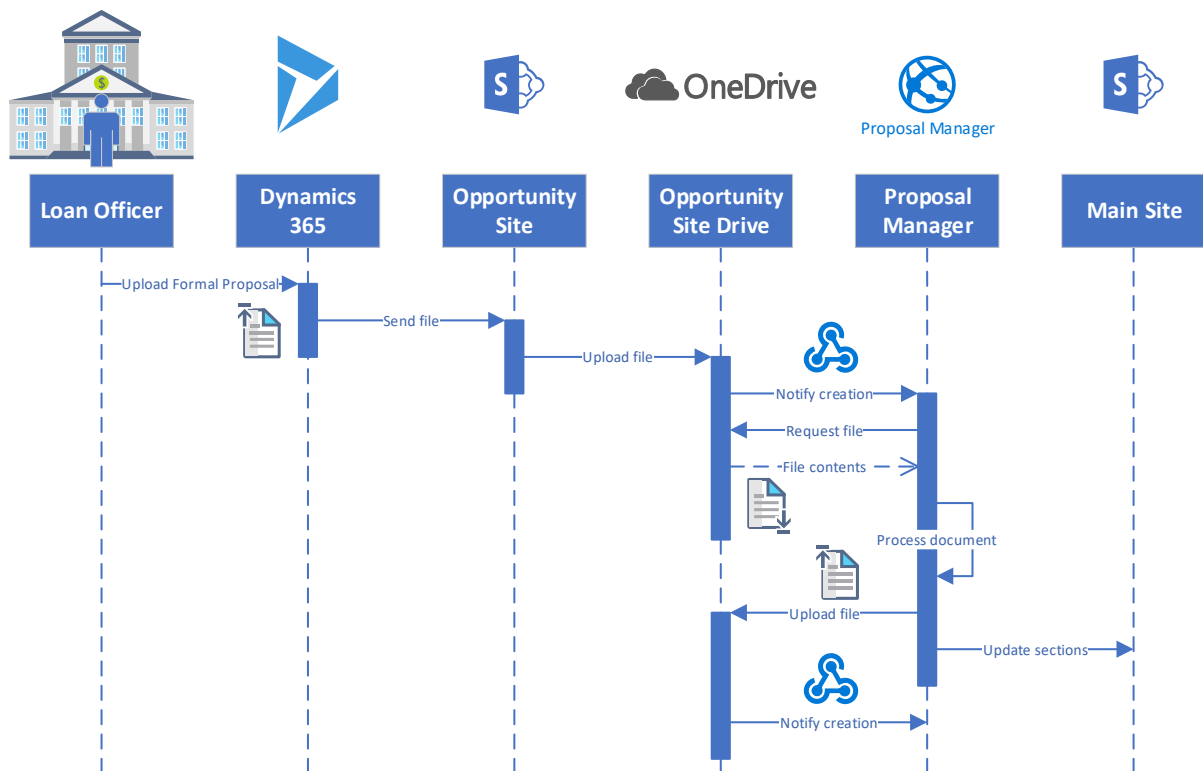


Figure 11 Formal Proposal Upload Sequence

## Integration Tasks

The responsibilities of the Proposal Manager integration engine in this collaboration are:

- Sending the uploaded file to the internal proposal manager document service for it to be able to process the document and update its sections.

## Additional Information

The Proposal Manager integration engine ignores the second webhook call in a row for a specific opportunity, given that it will be caused by Proposal Manager uploading the same document a second time. This is due to a current limitation in the Proposal Manager internal document service, which updates the document sections and uploads the given file contents, all in the same operation.

## Security

As this is an integration between several applications, security techniques are heterogeneous in nature. Following are descriptions of the different security models employed by the collaborating components.

### Applications involved

As already discussed, the integration enables the communication between the following applications:

1. Proposal Manager
2. Dynamics 365 for Sales
3. Several Microsoft 365 applications:
  - a. Office 365 Groups
  - b. OneDrive for Business
  - c. SharePoint
  - d. Microsoft Teams

Unless otherwise specified, all Microsoft 365 applications are accessed through the Microsoft Graph API, so for the purpose of this section, we will group these apps as “Graph API”.

### Authentication

#### Between Dynamics and Proposal Manager

Communication between Dynamics and the Proposal Manager app is made using Webhooks. These webhooks are secured with a common secret (a string), known by the sender (Dynamics 365) and the receiver (the Proposal Manager application). The same secret needs to be configured in both applications; otherwise, the integration won't work correctly.

When Proposal Manager needs access to Dynamics data, the Organization's API is used, with authentication made through the Azure AD v2 endpoint, using the Proposal Manager App registration.

#### Between Proposal Manager and Graph API

All access to Microsoft 365 Resources is secured via the Azure AD v2 authentication endpoint. When no user context is available, Proposal Manager authenticates by means of the Client Credentials flow, working as a daemon application. For more details on this flow, please visit <https://docs.microsoft.com/en-us/graph/auth-v2-service>.

#### Between OneDrive and Proposal Manager

A special communication case occurs when a document is uploaded to an opportunity from Dynamics 365. For the Proposal Manager app to be able to process this document on time, a separate Webhook is configured to notify any changes on the Site Drive to Proposal Manager. These webhooks are set up dynamically at runtime, using Graph API subscriptions. For more information on subscriptions and how they are set up dynamically, visit <https://developer.microsoft.com/en-us/graph/docs/api-reference/v1.0/resources/subscription>.

Like Dynamics 365 webhooks, webhook calls from OneDrive are secured with a common secret. However, as OneDrive webhooks are configured dynamically, the secret only needs to be set up in the Proposal Manager's configuration. This configuration is then automatically sent to OneDrive when the webhook subscription is set up.

## Authorization

### Between Dynamics and Proposal Manager

A user is created in Dynamics 365 for Sales, representing the Proposal Manager application. This application user has the Proposal Manager App id from its app registration in Azure AD and needs the following global permissions to allow Proposal Manager to access Dynamics entities:

- prvReadAccount
- prvReadContact
- prvReadConnectionRole
- prvCreateSharePointDocumentLocation
- prvReadSharePointDocumentLocation
- prvAppendSharePointDocumentLocation
- prvAppendToSharePointDocumentLocation
- prvWriteSharePointDocumentLocation
- prvDeleteSharePointDocumentLocation
- prvCreateSharePointSite
- prvReadSharePointSite
- prvAppendSharePointSite
- prvAppendToSharePointSite
- prvWriteSharePointSite
- prvDeleteSharePointSite
- prvReadUser

Additionally, a user needs to be created in Proposal Manager to give the Integration Engine permission to access the Proposal Manager API. This user needs to have the appropriate permissions (detailed in the Setup Guide) for the integration to work.

### Between Proposal Manager and Graph API

The Proposal Manager app is given admin consent during the initial setup process for all the permissions it needs.

### Between OneDrive and Proposal Manager

Permissions are required during the Graph API subscription, and as such, the Proposal Manager app needs to have the Files.ReadWrite.All permission enabled. This is also given during the initial setup process.

## Annex A: Proposal Management Team Model in Dynamics 365 for Sales

Sales Teams for Opportunities in Dynamics 365 for sales are modeled out of the box following the structure shown in Figure 12.

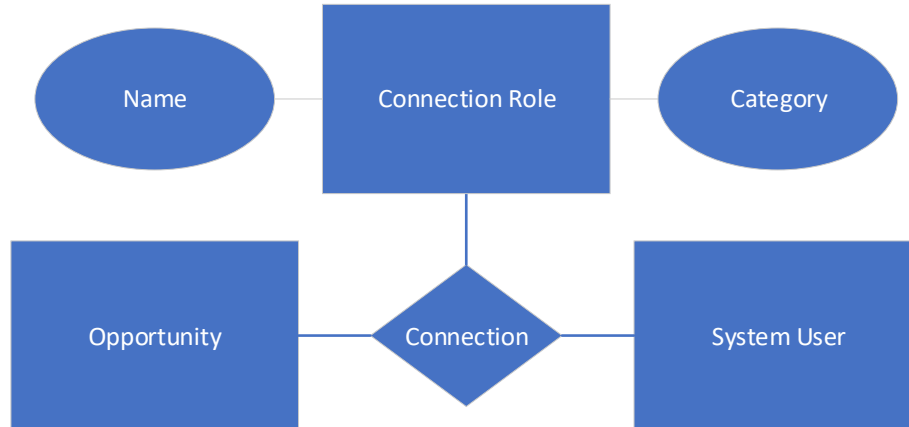


Figure 12 Sales Team Model in Dynamics 365 for Sales

Using this model, the Sales Team of an opportunity is the set of system users that are related to that opportunity through a connection, which, in turn, is related to a connection role that has a category of “Sales Team”. The name of the connection role is what indicates what role that specific system user plays in the sales team for that opportunity.

*Note: The “Sales Team” of an opportunity must not be confused with the concept of a “Team” in Dynamics 365, which is a security concept and not a business concept.*

In this integration, this model was mimicked by adding a special connection role category, called “Proposal Manager”, which groups the connection roles related to Proposal Manager, such as Relationship Manager or Loan Officer. This way, the Proposal Management Team of an opportunity is the set of system users that are related to that opportunity through a connection, which, in turn, is related to a connection role that has a category of “Proposal Manager”.