

**THEOBALD**  
SOFTWARE

**SAP-integrated  
Travel Scenarios in  
SharePoint**

**built with  
ERPConnect Services and the  
Nintex Workflow Automation  
Platform**

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 **Microsoft** Partner  
Gold Independent Software Vendor (ISV)  
Silver Business Intelligence

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# 1

## About the Authors

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## 2 Introduction

SharePoint integration with SAP is important when looking at process automation scenarios more holistically. This whitepaper provides an overview of how to achieve this type of integration scenario through ERConnect Services and the Nintex workflow automation platform. The following pages describe how **Nintex Workflow** and **Nintex Forms** interact with **ERConnect Services**, Theobald Software's solution for seamless, straightforward integration of SharePoint and SAP. Theobald Software, together with Nintex, developed two specific business scenarios that demonstrate the possibilities of combining different software components with powerful web applications.

The first scenario shows a **Travel Request** solution. In this scenario, employees can request business trips, with estimated costs. After the responsible manager approves it, the travel request is posted to the SAP system, where it can be further processed or used for reporting purposes.

The second scenario covers a **Travel Expenses** solution. The entered expenses are posted to the SAP system after approval. It's also possible to create a completely new expense report without a prior travel request.

The screenshot displays a web-based form titled "Travel Request". The form is organized into several sections:

- Travel Destination:** Includes a text input field for the destination and a dropdown menu for "Destination Country" with the placeholder "Please select a value...".
- Billable to Customer:** A dropdown menu with the placeholder "Please select a value...".
- Trip Start:** A date/time picker and a dropdown menu for "Trip Start Time" with the placeholder "Please select a...".
- Trip End:** A date/time picker and a dropdown menu for "Trip End Time" with the placeholder "Please select a...".
- Purpose:** A large text input field.
- Alternative Cost Assignment:** A text input field, a "Percentage" input field, and a "%" symbol.
- Flights:** A table with four rows:
  - Row 1: "Origin" (text input), "Departure" (date/time picker showing "12 AM" and "00").
  - Row 2: "Destination" (text input), "Arrival" (date/time picker showing "12 AM" and "00").
  - Row 3: "Cost/Currency" (text input), "Please" (dropdown menu).
  - Row 4: An "Add new row" button.

Before going into the details of the Travel Management scenarios, here's a brief overview of the software components used in these solutions.

## 2.1 Nintex Workflow

With Nintex Workflow, you can tackle everything from basic business functions to company-wide processes with a few simple clicks – no coding required.

Quickly turn time-consuming, manual steps into automated, efficient workflows, so you and your team can give more complex projects the time they deserve.

You can automate everyday processes like requesting reviews and approvals, routing tasks and collaborating on documents. Build powerful, enterprise-wide workflow solutions that are mobile, social and cloud-enabled.

With access to a catalog of cloud services, Nintex Connectors bring your organization's technology investments together. You can extend the reach of your workflows to new platforms and cloud services.

Nintex Workflow for SharePoint helps you get the most out of your existing SharePoint investment, while avoiding additional infrastructure and client software costs. It's tightly integrated with SharePoint and is simple to deploy and manage.

## 2.2 Nintex Forms

Nintex Forms for SharePoint gives you the ability to build and customize forms without code, including adding branding and presentation logic, so that your forms work the way you work.

You can design SharePoint forms with sophisticated business logic and rich HTML formatting. You can customize predefined layouts for any device, form factor or screen size. You can preview forms before publishing them to make certain you're providing a great user experience.

The business users are empowered and developer productivity is increased by:

- Auto-generating forms to support your business applications
- Customizing forms quickly with an intuitive, browser-based designer
- Integrating with databases and business applications via SQL and standard Web Services as well as using third party components, e.g. from Theobald Software for SAP integration.

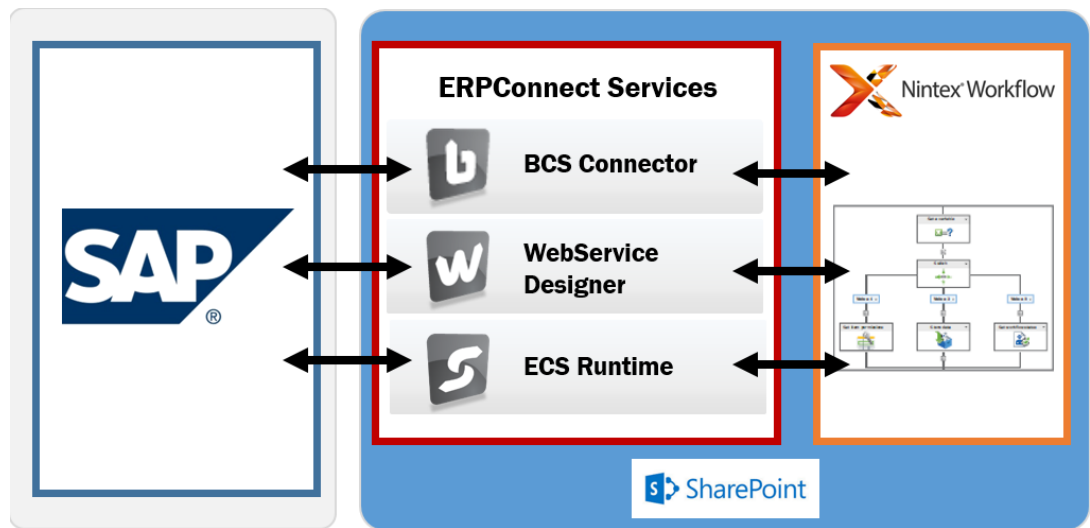
Nintex Forms tightly integrates with Nintex Workflow for SharePoint, which means your data gets to where it needs to go and your forms can be connected to other line-of-business systems and cloud services to create powerful workflow solutions.

Finally, Nintex Mobile apps for iOS, Android and the Windows platform provide offline access and enable the capture of location data, camera photos, video, audio and more using native device capabilities.

## 2.3 ERPConnect Services

Multiple methods exist to connect a SAP system to non-SAP environments. As a leading provider of SAP integration technology, **Theobald Software** offers a number of SAP connectors for different purposes and data destinations, such as Data Warehousing, BI tools and databases or business environments like SharePoint.

The software used to integrate SAP in Nintex Workflow is called **ERPConnect Services (ECS)**. ECS is the SAP/SharePoint integration platform in Theobald Software's product portfolio. With ECS, you can access SAP data in SharePoint by using different tools. It doesn't require any additional middleware – the integration takes place entirely within the SharePoint stack. We describe the tools for Nintex Workflow integration in more detail in the technical part of this whitepaper.



# 3

## General Part: SAP-integrated travel solutions

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The next pages give you a non-technical overview of the solution's general design and the benefits of integrating SharePoint with SAP.

### 3.1 Solution design

The **Travel Requests** and **Travel Expenses** scenarios are two ready-to-use SAP business integration solutions developed by Theobald Software and Nintex.

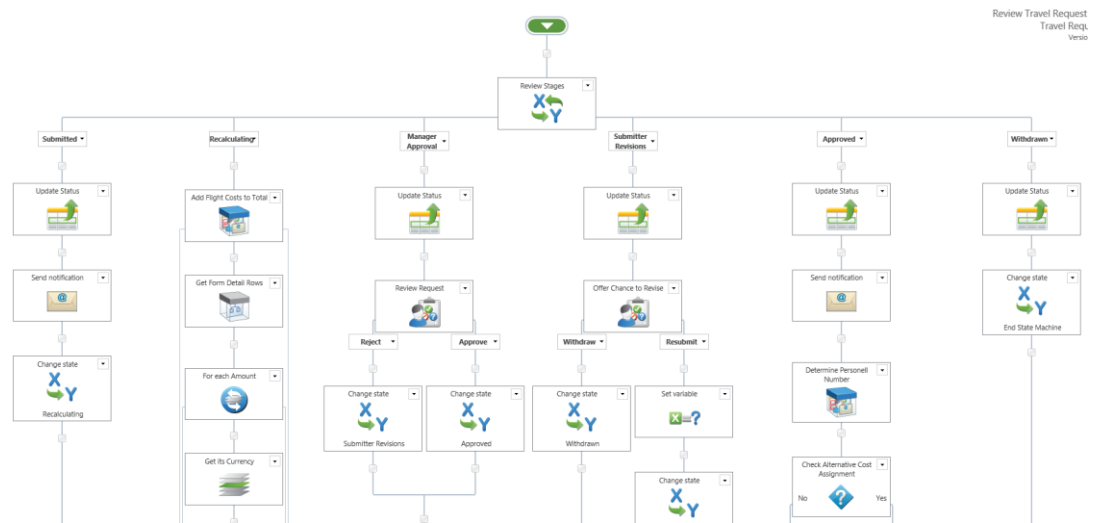
When employees want to submit a travel request or carry out a travel expense statement, they can do this in the familiar SharePoint environment or via Nintex Mobile app, though the actual Travel Management component is located in the more technical and more complex SAP system.

The overall structure of these solutions is relatively simple and consist of three components, which are interconnected and built on each other:

- A **SharePoint custom list**: This is the basis for both scenarios. A SharePoint list is used to store input data for newly created requests.
- An input form designed with **Nintex Forms**: Nintex Forms designer was used to create an easy-to-use input form, where employees enter their travel details. The input form can be configured for multiple devices, such as desktop PC, mobile phone and tablet, and employees can attach electronic receipts to the form.
- A **Nintex Workflow**: On the technical side, a Nintex Workflow is triggered when a new request has been entered and saved in Nintex Forms. The workflow goes through a multi-stage approval process that can be adjusted individually.

The SAP integration part takes place in Nintex Workflow. At first glance, both scenarios have a complex structure with different workflow stages and action sequences but in principle, they consist of three main parts:

1. **Initial request**: The employee enters the request details into Nintex Forms. It supplies the manager with information, such as travel date, travel destination and purpose of the trip. After saving the entries, the workflow starts automatically. In the Travel Expenses scenario, the expense report can be submitted by an employee or someone from the administration staff.
2. **Approval process**: An approval process is accomplished in several stages. Estimated costs for flights, hotel and other costs are calculated and submitted to the responsible manager. In the Travel Expenses scenario, an employee submits actual costs for expense types. Submitter and approver get notifications about the status of the request.
3. **Posting data to SAP**: After the responsible manager approves it, the travel request and expense report is posted to the SAP system. Theobald Software's Call SAP Function custom workflow action is used as the integration component.



As you may have noticed, the workflow's crucial parts, like determining an approver, calculating costs and sending messages, all take place within SharePoint and can therefore easily be adjusted to customer's individual requirements. That makes the solution very flexible and widely applicable.

Theobald Software and Nintex are not trying to copy the original SAP Employee Self-Service applications for travel requests and expenses. Rather, we take a more holistic approach to business process automation by connecting existing systems and processes. Whereas the ESS scenarios are located in the SAP landscape with regard to UI, usability and high technical expenditure for implementation, the present solutions get the best of both worlds. They combine the high usability of SharePoint and Nintex Workflow with the advantages of SAP functionality in processing business data (e.g. financial accounting).



## 3.2 Benefits of SAP integration in SharePoint and Nintex

Combining the strengths of SAP, SharePoint, ERPConnect Services and the Nintex Workflow automation platform leads to a number of benefits:

- With SAP integration to SharePoint, you can bring SAP-bound and sometimes rarely used actions into a well-known and heavily used platform. That means you can increase efficiency by bringing processes from several environments (e.g. SAP, CRM, etc.) into one portal. This eliminates manual and repetitive data entry.
- For the users, it means lower training costs: Business processes will be handled in a familiar and more intuitive way. This integration increases efficiency and usability compared to the standard SAP GUI experience.
- Furthermore, with SAP integration in SharePoint, you are using SharePoint as a flexible data hub in the mobile world. Existing SharePoint infrastructure can be used for mobile SharePoint applications, which leads to less development effort (Office 365).
- With the drag-and-drop Nintex Workflow designer, you can easily adjust or expand existing workflow scenarios according to your individual requirements. In SAP, only skilled ABAP developers can adjust workflows so it's expensive and time consuming.
- With Nintex Forms used as a data input cockpit, it's very simple to design templates for mobile devices like smartphones or tablet PCs. This enables users to process routine jobs while travelling (e.g. approvals).
- SAP integration with Nintex doesn't require any developer skills, which saves time and money. Take a look at "[5 Implementation and additional information](#)," where the implementation steps for the solutions are listed.

The following pages describe in more technical detail how SAP integration works within the Nintex workflow automation platform.

# 4

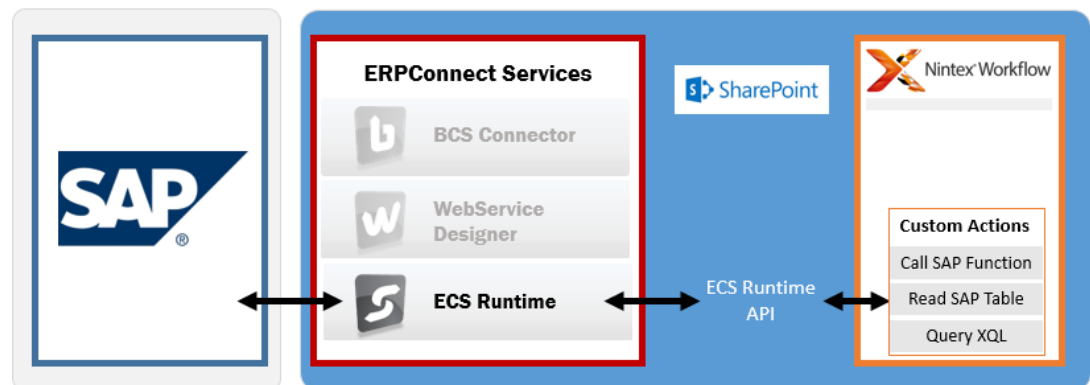
## Technical Part: How SAP integration works

This chapter provides a brief overview of how solutions establish SAP integration.

### 4.1 Theobald Software's custom actions

As mentioned previously, SAP integration for Nintex Workflows can be realized with **ERPConnect Services (ECS)** from Theobald Software. ECS delivers three software components:

- BCS Connector
- WebService Designer
- ECS Runtime



The **BCS Connector Designer** allows you to create external content types for SAP data without the need to write any code. The **WebService Designer** enables you to create SOAP or OData web services for direct access to SAP data and processes. In this paper, we want to focus on the possibilities of Nintex Workflow integration. **ECS Runtime**, the SAP/SharePoint integration platform for developers, provides the Nintex Workflow integration.

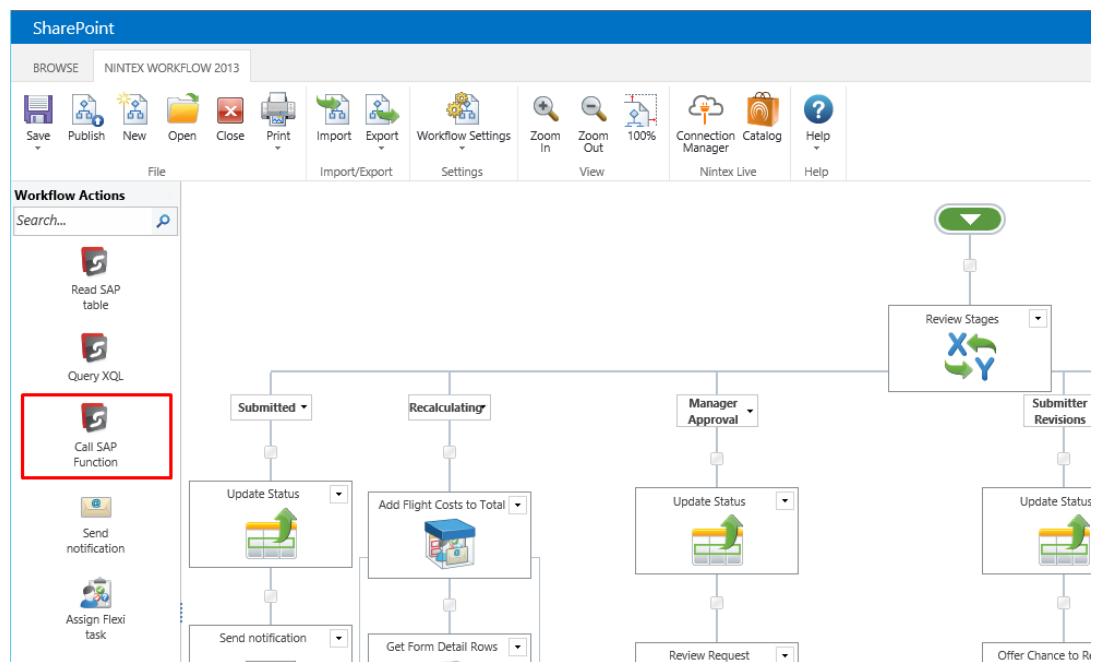
ECS Runtime provides so-called **Custom Actions** to enable direct access to SAP data within a Nintex Workflow. ESC delivers these Custom Actions, which can easily be implemented on your SharePoint server with an installer package.

The following Custom Actions are available:

- **Call SAP Function Action:** This custom action enables read/write access to your SAP data. You can use the custom action to call any remote-enabled SAP function module or BAPI to enable a business process integration scenario between SharePoint and SAP. You can easily configure the action without any programming or complex syntax.

- **Read SAP Table Action:** You can use this custom action to read data from any SAP table and use it in your workflow solution.
- **Query XQL Action:** This custom action provides the combined functionality of the other two custom actions outlined above. The Query XQL action offers a very flexible way of interacting with SAP, and you can use the XQL Explorer tool, which is provided with ERPConnect Services, to construct and verify your XQL statement. Further, the result of the Query XQL action is formatted as XML data and can be parsed using the standard Query XML action in Nintex Workflow.

In the business scenarios for Travel Requests and Travel Expenses discussed in this paper, SAP integration was mainly realized with the **Call SAP Function** Custom Action.



## 4.2 SAP integration in the travel solutions

The travel management solutions presented here are mainly configured and processed on the SharePoint side, only after successful approval of the requests data is posted to the SAP system.

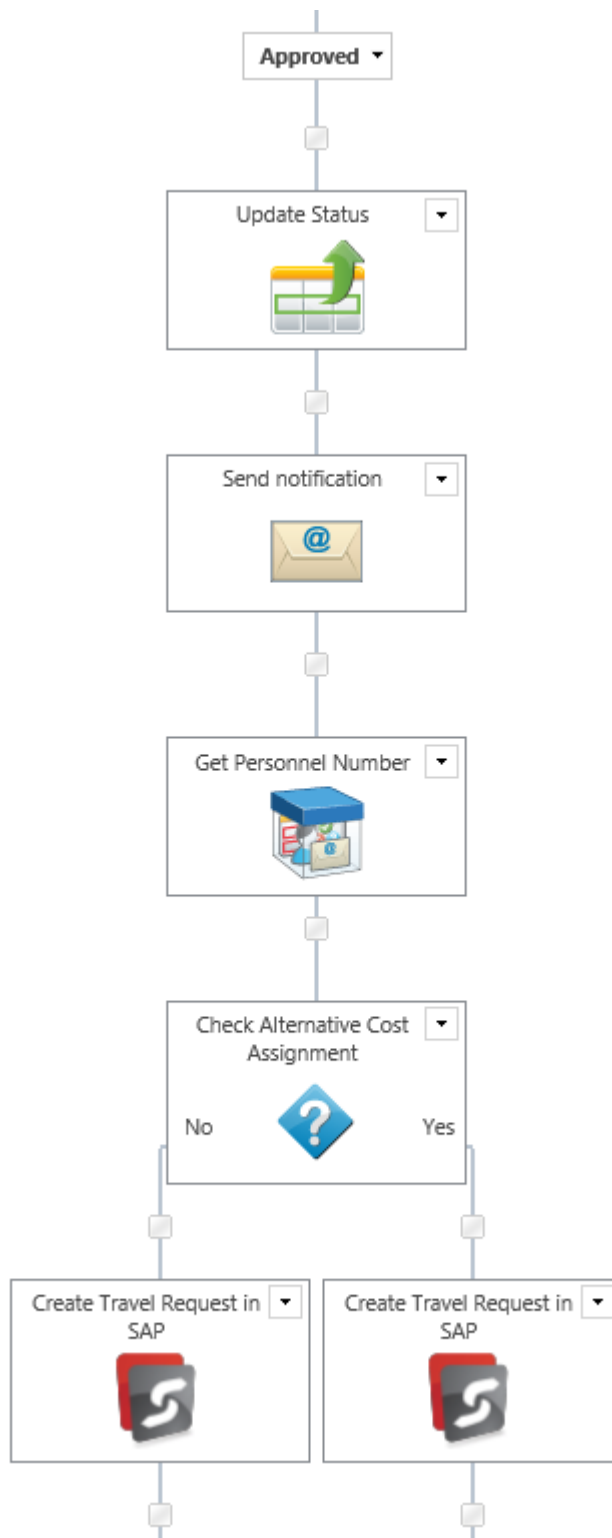
That means all travel details entered in Nintex Forms and stored in the SharePoint lists have to be somehow translated into the technical SAP structures and transferred to the SAP system. This is realized within the Nintex Workflow using Theobald Software's **Call SAP Function Custom Actions**.

The *Call SAP Function* Custom Action for Nintex Workflow gives you the capability to call any remote-enabled SAP function module or BAPI for read/write access to SAP. In Nintex Workflow, the output always occurs in XML format, which can be displayed, adjusted or processed as desired.

Every SAP functional component provides so-called function modules or BAPIs for reading or writing data. This includes the SAP travel management component. For posting or reading SAP data, the suitable standard SAP function modules are used in the solutions described here. To increase the functionality of the function modules, they were partly modified with ABAP code into custom function modules, which are delivered with the solution.

In the **Travel Request** workflow, the Call SAP function action is set up as follows: After the workflow actions for manager approval are processed, the Call SAP Function Custom Actions are triggered automatically after successful approval. Before calling the actions, a condition is checked to see if there is an entry for an alternative cost assignment. If an entry exists, the SAP function module has to be called with different input parameters.

The sequence of workflow actions in the *Approved* stage looks like this:



To get the Custom Actions working, you have to make some configurations. In the configuration screen of the actions, a lot of input boxes and parameters are available.

Configure Action - Call SAP Function

GENERAL

Save Cancel Action Labels Common Variables Help

Commit Settings Variables Help

ERPConnect Service Application ECS Service Application

SAP function \* Z\_FITP\_CREATE\_TRIP\_FROM\_REQUES Search

(Re-)Load parameters

+ Input

+ Changings

+ Tables

Output

Output parameters output.WA\_HEAD.MAND Add

output.WA\_HEAD.REINR \* TripNumber

+ Advanced options

Most important for connecting SharePoint and Nintex Workflow to SAP is the **ERPConnect Service Application** which has to be created in SharePoint Central Administration and contains all information and user credentials to connect to the SAP system. It's possible to select among different service applications if more than one exists. Simply select the desired one in the dropdown list or use the default service application.

In the **SAP function** box, you must enter the above mentioned SAP function module for posting travel requests or travel expenses. If you don't know the exact name, you can use a function to search for specific function modules directly in the SAP system.

The crucial part to "translate" the submitted travel request or travel expense details into SAP language is accomplished by using function modules **parameters**. Each SAP function module or BAPI usually contains input-, changing- or output-parameters to post data to or obtain data from the SAP system. In the present case, we want to post data to SAP. In the selected function module, we have to enter some mandatory input and changing parameters to successfully call up the function module. We recommend that that before configuring a function module in the Call SAP Function Custom Action, you test it on your SAP system. That makes life easier for setting up the configuration.

You can enter either fixed values there or you can enter **references** to workflow variables or – mainly used in these two scenarios – to a specific column in a SharePoint list. In the travel request workflow discussed here, we refer to several SharePoint list columns (e.g. Travel Destination, Country, etc.).

Because SAP sometimes requires a specific data format (e.g. leading zeros for some values or specific date format), it's possible to use so-called **inline functions** in Nintex Workflow to get the data in the right format.

Configure Action - Call SAP Function

GENERAL

Save Cancel Action Labels Common Variables Help

Commit Settings Variables Help

Input

Input parameters

I\_FM\_POSTING\_DATE

MOREI

01

Changings

Changings

WA\_REQ\_HEAD.MANDT

WA\_REQ\_HEAD.PERNR

PersonellNumber

WA\_REQ\_HEAD.REINR

WA\_REQ\_HEAD.REQUESTVRS

99

WA\_REQ\_HEAD.PLAN\_REQUEST

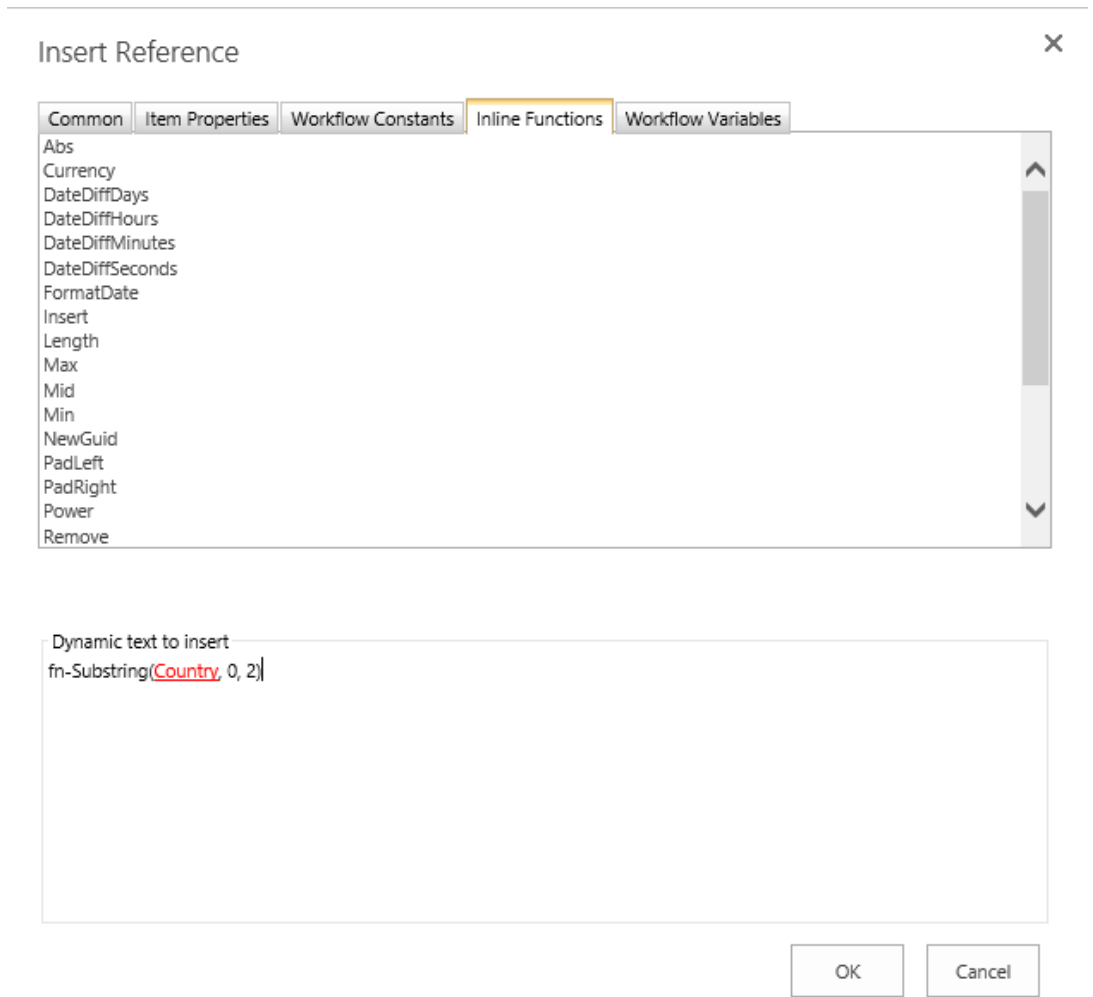
R

WA\_REQ\_HEAD.LOCATION\_END

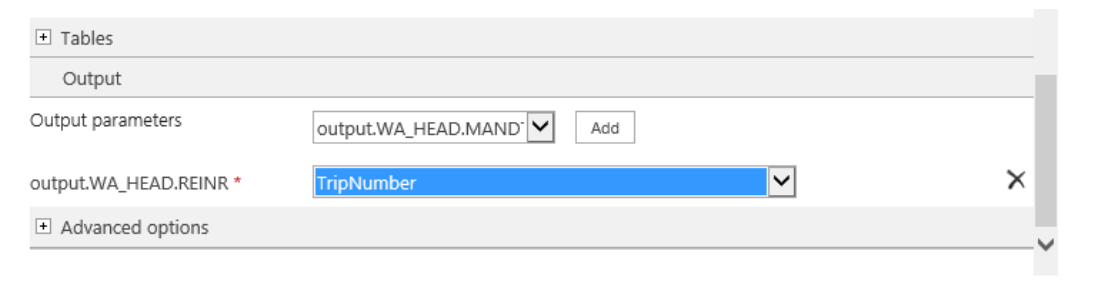
Travel Destination

WA\_REQ\_HEAD.COUNTRY\_END

fn-Substring(Country, 0, 2)



Some SAP function modules or BAPIs return data in **output parameters**, for example if data was successfully posted. In the case of the Travel Request workflow, a Trip Number is generated in SAP that's stored in a workflow variable and written to the SharePoint list.





TS Site Collection

## Travel Requests

[+ new item](#) or [edit this list](#)

All Items ...

✓	Travel Destination	Created By	Trip Start	Trip End	Approver	TotalUSD	Status	Trip Number	Review Travel Request SAP
✓	Shanghai	Workflowuser1	3/11/2016	3/12/2016	Manager2	1,752.992	Approved	0002000782	Completed

This way, several different SAP function modules are called in the solutions to create data in SAP or to write data back into SharePoint. The example described here is for the Travel Request workflow but in principle that's how it works with the **Travel Expenses** workflow as well.

Following this approach, it's possible to design many more SAP integrated solutions not only for HR but for other SAP modules as well.

# 5

## Implementation and additional information

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The implementation of both solutions is simple compared to the effort of implementing SAP Employee Self-Service scenarios. There are ready-to-use templates for both solutions that you can easily install on your system. The basic settings of the scenario components are already maintained in the templates - you just have to configure the solutions to your individual needs.

The following steps are required to get the solutions running:

- Import or manual creation of several SharePoint lists
- Import of some User Defined Actions (e.g. a Currency Converter Action)
- Import of Nintex Forms files
- Import of Nintex list workflows
- Import of SAP custom function modules
- Individual configuration (e.g. Active directory, Email Notifications)

All import files are available for download at Theobald Software's website. For more details about system requirements and solution implementation, please visit Theobald Software's OnlineHelp:

<http://help.theobald-software.com/ERPConnect-Services-EN/default.aspx?pageid=travel request and travel expense report>

Please contact us if you are interested the Travel Request and Travel Expenses solutions or other Nintex workflow templates containing SAP integration parts.

The Nintex workflow automation platform makes it easy to automate business processes, empowering SharePoint professionals to create and deploy powerful workflow automation scenarios within SharePoint and Office 365. With simple and easy to use graphical user interfaces and intuitive drag-and-drop designers, the platform helps you easily connect and integrate processes and content.

For more information about the Nintex workflow automation platform, visit Nintex's website (<http://www.nintex.com>) or contact us directly via email ([sales@nintex.com](mailto:sales@nintex.com)).

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