



I300 Data Retrieval with OData

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Timing and Agenda

April 12, 2022 -10 AM -11 AM

Day 1

Lesson 1.1: Signing In to Acumatica ERP

Lesson 2.1: Retrieving the List of Customers with Contacts

Lesson 2.2: Retrieving the Quantities of Stock Items

April 13, 2022 -10 AM -11 AM

Day 2

Lesson 3.1: Retrieving the List of Modified Stock Items

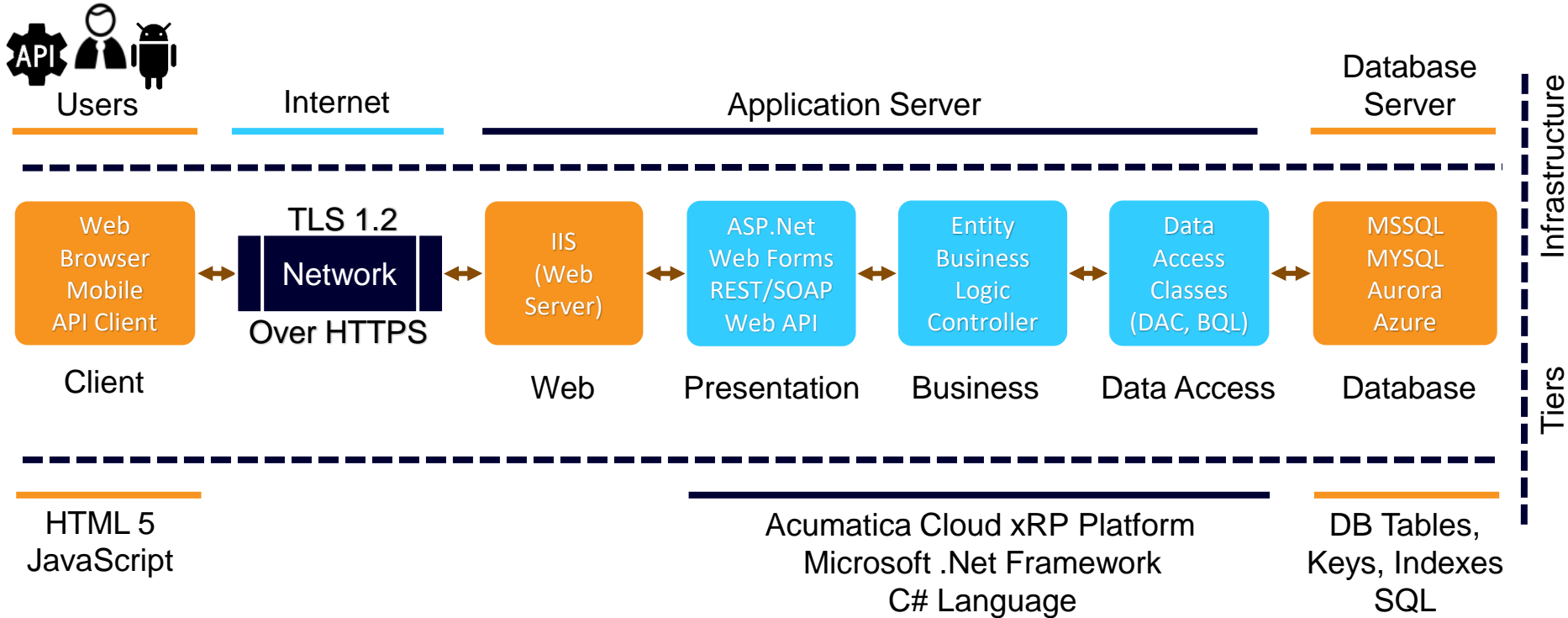
Lesson 3.2: Monitoring Item Availability with Push Notifications

Lesson 4.1: Configuring a Customization Project and Exporting It

Day 1

Acumatica Basics and API Overview

Acumatica Six-Tier Web Architecture



Downloading and Installing Acumatica

SaaS Instance



Local Installation

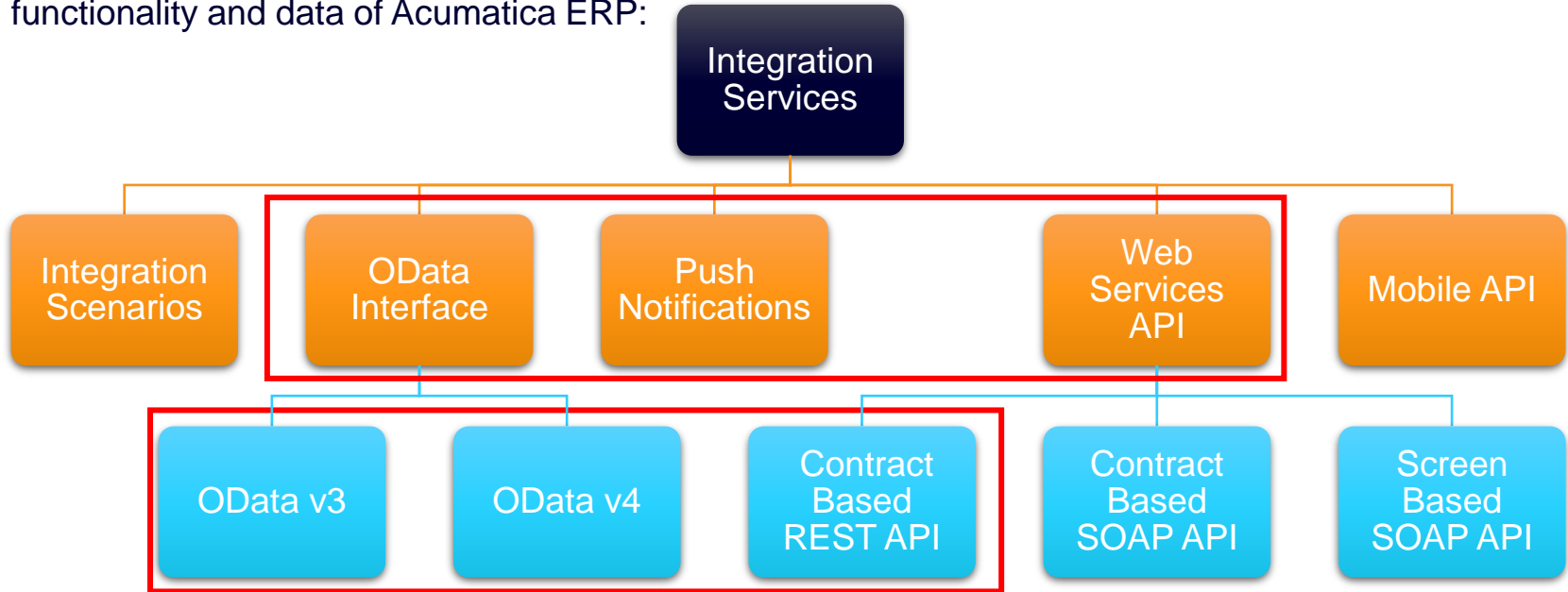


Local application
Server
and Database
Server

- Download:
 - Community Portal: <https://community.Acumatica.com>
 - Builds website: <http://builds.Acumatica.com>

Introduction and Overview

External systems can use the following Acumatica ERP integration interfaces to access business functionality and data of Acumatica ERP:



Acumatica APIs

OData:

- Read only
- Best suited for data retrieval for further analysis and visualization
- Based on Generic Inquiries (v3)

Contract Based REST API:

- Read and Write
- Best suited for bidirectional synchronizations
- Based on Endpoints

Push Notifications & Web Hooks:

- Real time push notifications (e.g. Webhooks) to external systems based on Generic Inquiries
- Incoming Webhooks

Generic Inquiry

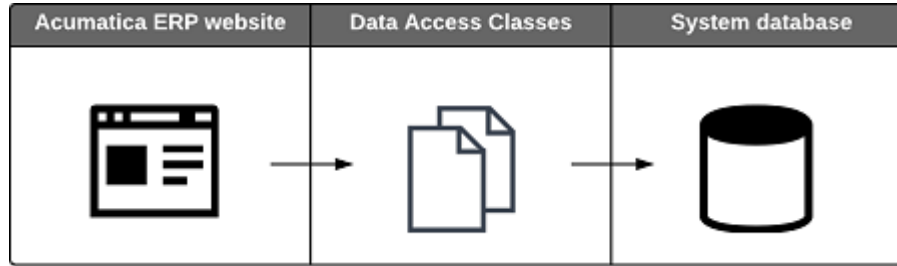
Generic Inquiry

A generic inquiry is a web-based tool that gives you the ability to pull data from the Acumatica ERP database and display it on a customizable form.

- You can view how it looks on-the-fly
- Test by supplying parameters and viewing the result
- It can be used as a source for dashboard widgets and pivot tables
- It can be added to a workspace and function as an entry point of a data entry form.

Data Access Classes

Acumatica ERP does not access the database directly but accesses it via DACs, as shown in the illustration below.



Generic inquiries work with Data Access Classes rather than with the database tables directly.

The data fields that you select to retrieve data from will be the columns of your inquiry

To work with an inquiry, you need to find the underlying data access classes and data fields

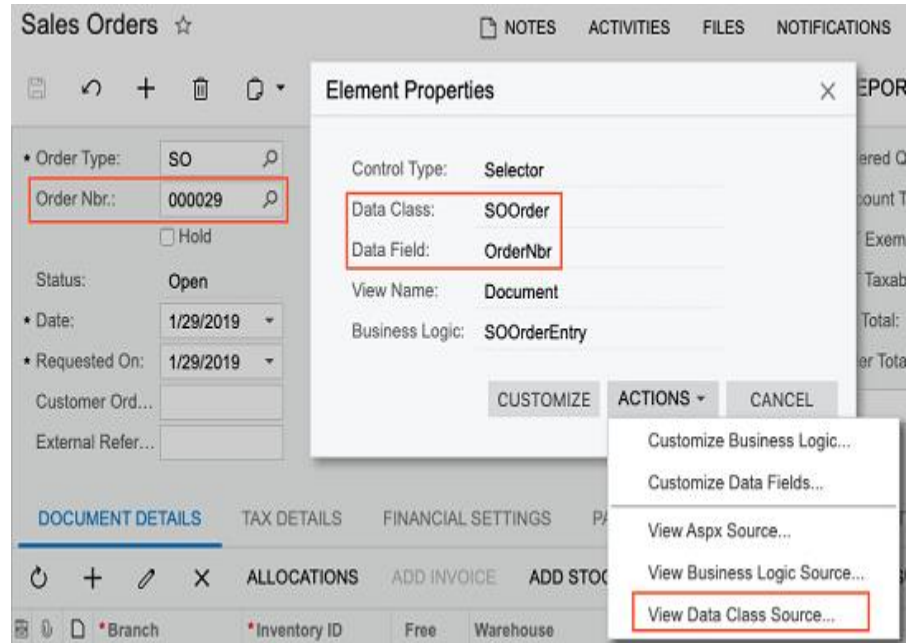
Creating Generic Inquiry

The business requirement is to create a simple Generic Inquiry that should display the list of open Sales Orders, Sales Order lines and the related customer.

UI Element Inspection

We need to explore the related forms to find the underlying data access classes and fields.

- Navigate to the Sales Order (SO301000) form
- To find the **Order Nbr.** field and the DAC containing it, on the Sales Orders (SO301000) form, press CTRL+ALT and click Order Nbr. Otherwise, you can use the Customization → Inspect Element option.
- The Element Properties dialog box opens. You are interested in two elements:
 - Data Class
 - Data Field



Creating Generic Inquiry

- Specify the Title of the GI
- Select the required Tables (DACs)

Generic Inquiry

VIEW INQUIRY ACTIONS

* Inquiry Title: SO-SOLine GI

Site Map Title:

Workspace:

Category:

Screen ID:

Make Visible on the UI

Show Deleted Records

Expose via OData

Expose to the Mobile Application

Arrange Parameters in:

Select Top:

Records per Page:

Export Top:

Attach Notes To:

TABLES RELATIONS PARAMETERS CONDITIONS GROUPING SORT ORDER RESULTS GRID ENT

ADD RELATED TABLE

* Table Name	Description	* Alias
PX.Objects.SO.SOLine		SOLine
PX.Objects.SO.SOOrder		SOOrder

Creating Generic Inquiry

- Choose the Parent Table
- Define the relations between Tables

Generic Inquiry

* Inquiry Title:
 Make Visible on the UI
 Arrange Parameters in:

Site Map Title:
 Show Deleted Records
 Select Top:

[TABLES](#)
[RELATIONS](#)
[PARAMETERS](#)
[CONDITIONS](#)
[GROUPING](#)
[SORT ORDER](#)
[RESULTS GRID](#)
[ENTRY POINT](#)
[NAV](#)

Table Relations

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Active	Parent Table	Join Type	Child Table
>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SOOrder	Inner	SOLine

Data Field Links For Active Relation

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Brackets	Parent Field	Condition	Child Field
>	<input type="checkbox"/>	<input type="checkbox"/>		SOOrder.OrderNbr	Equals	SOLine.OrderNbr
	<input type="checkbox"/>	<input type="checkbox"/>		SOOrder.OrderType	Equals	SOLine.OrderType

Creating Generic Inquiry

- On the Results Grid tab, specify the DAC fields to be shown in the results
 - SOOrder.OrderType
 - SOOrder.OrderNbr
 - SOOrder.CustomerID
 - SOLine.InventoryID
 - SOLine.InventoryID_desc.
 - SOLine.TotalCost
 - SOOrder.Status
- Save and View the Inquiry

Generic Inquiry NOTES FILES

* Inquiry Title:
 Make Visible on the UI
 Arrange Parameters in: columns

Site Map Title:
 Show Deleted Records
 Select Top: records

TABLES RELATIONS PARAMETERS CONDITIONS GROUPING SORT ORDER **RESULTS GRID** ENTRY POINT NAVIGATION

Row Style:

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Active	Object	Data Field	Schema Field	Width (px)	Style	Visible	Default Navigation
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		SOOrder	OrderType				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		SOOrder	OrderNbr				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		SOOrder	CustomerID				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		SOLine	InventoryID				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		SOLine	InventoryID_Description				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		SOLine	TotalCost				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		SOOrder	Status				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Creating Generic Inquiry

- On the Conditions tab, specify that SOOrder Status should be equal to Open. Select the **From Schema** check box to enable the dropdown.
- Save and View enquiry to verify that the condition works.
- In the header, find the **Expose via OData** checkbox

Generic Inquiry

VIEW INQUIRY ACTIONS

* Inquiry Title: SO-SOLine GI Make Visible on the UI Arrange Parameters in:
Site Map Title: Show Deleted Records Select Top:

TABLES RELATIONS PARAMETERS **CONDITIONS** GROUPING SORT ORDER RESULTS GRID ENTRY POINT

Active	Brackets	Data Field	Condition	From Schema	Value 1
<input checked="" type="checkbox"/>		SOOrder.Status	Equals	<input checked="" type="checkbox"/>	Open

Data Retrieval Through OData: Basics

OData

Open Data Protocol (OData) is an open protocol that allows the creation and consumption of queryable APIs in a simple and standard way.

Web clients can use OData to access resources by using simple HTTP messages

In Acumatica ERP, OData interface is used only to retrieve the data.

OData v3 vs OData v4

OData v3

- Requires GI
- Flat lists only

OData v4

- Access DACs directly
- Supports nested objects

HTTP messages

HTTP messages are used to exchange data between a server and a client

HTTP Request

- **Start Line:**
 - HTTP Method (GET, PUT)
 - Request target
 - URL
 - *Query String (? + Parameters)*
 - HTTP Version
- **Headers**
- **Body**

HTTP Response

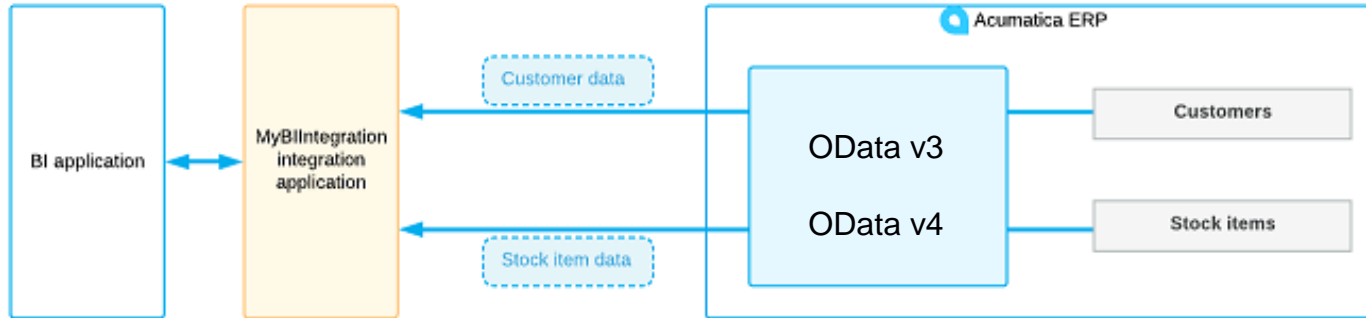
- **Status Line:**
 - Protocol Version
 - Status Code
 - Status Text
- **Headers**
- **Body**

Story

BI application will be used by marketing managers and warehouse managers to analyze the existing customers and review item availability in warehouses.

We are implementing the integration part between the BI application and Acumatica ERP supporting the following scenarios:

- ✓ Retrieval of the list of customers with contact and address details of each customer
- ✓ Retrieval of the information about availability of stock items in warehouses



Lesson 1: Signing In to Acumatica ERP by using OData

Learning Objectives

In this lesson, you will learn how to sign in to Acumatica ERP to use the OData interfaces v3 AND v4 by

- Configuring Basic Authentication
- Testing the Sign-in by requesting available GIs / DACs

Lesson 1: Signing In to Acumatica ERP by using OData

Basic Authorization

Each request will contain a header field in the form of

Authorization: Basic
<credentials>

where *credentials* is the Base64 encoding of the ID/username and password joined by a single colon (:)

The screenshot shows the Acumatica API client interface. At the top, there are tabs for 'Overview' and 'Summit2021'. Below the tabs, there are buttons for 'Watch', 'Fork', and 'Run'. The 'Authorization' tab is selected, showing a green dot. Below the tabs, there are tabs for 'Pre-request Script', 'Tests', and 'Variables'. The main content area shows the configuration for the 'Summit2021' collection. The 'Type' is set to 'Basic Auth'. Below this, there is a note: 'The authorization header will be automatically generated when you send the request. [Learn more about authorization](#)'. A warning message is displayed: 'Heads up! These parameters hold sensitive data. To keep this data secure while working in a collaborative environment, we recommend using variables. [Learn more about variables](#)'. Below the warning, there are input fields for 'Username' (containing 'admin') and 'Password' (containing '...'). There is also a checkbox labeled 'Show Password' which is currently unchecked.

Lesson 1: Signing In to Acumatica ERP by using OData

Testing Sign In

OData v3

Method **GET**

URL `http://localhost/MyStoreInstance/OData`

OData v4

Method **GET**

URL `http://localhost/MyStoreInstance/ODataV4/$metadata`

Lesson 1: Signing In to Acumatica ERP by using OData

Additional Information

- **OAuth 2.0 Authorization**

Acumatica ERP supports the OAuth 2.0 mechanism of authorization for applications that are integrated with Acumatica ERP through the application programming interface (API) and OData.

- **CORS Support for OData**

Acumatica ERP supports cross-origin resource sharing (CORS), meaning that requests for resources can come from a different domain than that of the resource making the request.

To enforce limitations on CORS requests, CORS settings can be changes in Web config

```
<odata enableCompression="true" compressionThreshold="860">  
  <cors enabled="true" origins="*" methods="*" headers="*" exposedHeaders="DataServiceVersion,MaxDataServiceVersion,odata-Version,odata-MaxVersion" />  
</odata>
```

Lesson 1: Signing In to Acumatica ERP by using OData

Summary

In this lesson, you have learned how an application can sign in to Acumatica ERP by using OData v3/v4 interface and to review the exposed entities.

Lesson 2: Initial Data Retrieval by using OData

Learning Objectives

In this lesson, you will learn how to retrieve the data from an Acumatica ERP data entry form, and retrieve a list of records from a generic inquiry form.

Lesson 2: Initial Data Retrieval by using OData

Retrieving the List of Customers with Contacts

Addressing the required fields

- Customer ID
- Customer name
- Customer class
- Details of the main contact of the customer
 - Email address
 - Primary phone number
- Customer address
 - City
 - State
 - Postal code
 - Address line

Customers NOTES FILES CUSTOMIZATION TOOLS ▾

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* Customer ID: * Status: Balance: 730.00
* Customer Name: Prepayment Balance: 0.00

GENERAL INFO BILLING SETTINGS DELIVERY SETTINGS PAYMENT METHODS CONTACTS SALESPERSONS ATTRIBUTES >>

MAIN CONTACT

Company Name:
Attention:
Email:
Web:
Phone 1:
Phone 2:
Fax:
Account Ref #:

MAIN ADDRESS

Address Line 1:
Address Line 2:
City:
* Country:
State:
Postal Code:

FINANCIAL SETTINGS

* Customer Class:
Terms:
* Statement Cycle ID:
 Auto-Apply Payments
 Apply Overdue Charges
 Enable Write-Offs
Write-Off Limit: 0.00

CREDIT VERIFICATION RULES

Credit Verification:
Credit Limit: 0.00
Credit Days Past Due: 0
Unreleased Balance: 0.00
Open Orders Balance: 75.00
Remaining Credit Limit: 0.00
First Due Date:

PERSONAL DATA PRIVACY

Consented to the Processing of Personal Data

Lesson 2: Initial Data Retrieval by using OData

Retrieve the list of customers with contacts

OData v3

Method	GET
URL	http://localhost/MyStoreInstance/OData/Customer%20Contacts
Parameters	<code>\$format</code> json

OData v4

Method	GET
URL	http://localhost/MyStoreInstance/ODatav4/PX_Objects_AR_Customer
Parameters	<code>\$select</code> AcctCD,AcctName,CustomerClassID <code>\$expand</code> ContactByDefBillContactID(\$select=Email,Phone1), AddressByDefAddressID(\$select=AddressLine1, AddressLine2,City,State,PostalCode)

Lesson 2: Initial Data Retrieval by using OData

Retrieving the Quantities of Stock Items

Item Availability Data (INGI0002) form

Item Availability Data ☆

CUSTOMIZATION ▾ TOOLS ▾

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Inventory ID:

Drag column header here to configure filter

Warehouse	Inventory ID	Description	Qty. On Hand	Qty. Available
> MAIN	AACOMPUT01	Acer Laptop Computer	150.00	150.00
MAIN	AALEGO500	Lego 500 piece set	1,999.00	1,977.00
MAIN	AAMACHINE1	Injection molding machine	130.00	127.00
MAIN	CONGRILL	Char-Broil Classic 480	200.00	193.00
MAIN	CONTABLE1	Folding Picnic Table 6 Foot	200.00	195.00
MAIN	HEADSET	Headset	40.00	40.00
MAIN	KEYBOARD	Computer keyboard	40.00	40.00
MAIN	LAPTOP12	Laptop 12"	20.00	20.00
MAIN	LAPTOP14	Laptop 14"	20.00	20.00
MAIN	LEATHCASE	Leather case for laptops 12"-15"	40.00	40.00
MAIN	MONITOR26	Monitor 26"	40.00	40.00
MAIN	MOUSE	Computer mouse	40.00	40.00
YOGI	SIMCARD	SIM card & contract	1,000.00	1,000.00

1-13 of 13 records

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Lesson 2: Initial Data Retrieval by using OData

Retrieving the Quantities of Stock Items

OData v3

Method	GET
URL	http://localhost/MyStoreInstance/OData/Item%20Availability%20Data
Parameters	<code>\$format</code> json

OData v4

Method	GET
URL	http://localhost/MyStoreInstance/ODatav4/PX_Objects_IN_INSiteStatus
Parameters	<code>\$select</code> QtyOnHand,QtyAvail
	<code>\$expand</code> InventoryItemByInventoryID(\$select=InventoryCD,Descr), INSiteBySiteID(\$select=SiteCD)

Lesson 2: Initial Data Retrieval by using OData

Summary

In this lesson, you have learned how to retrieve the list of records that is exposed in Acumatica ERP on a data entry form and generic inquiry form by using different integration interfaces.

Day 2

Retrieval of the Delta of Records

Lesson 3.1: Retrieval of the Delta of Records

Learning Objectives

In this lesson, you will learn how to retrieve the list of records that have been modified within a period.

Story

The BI application of the MyStore company should display to each user the information about the items that are sold in the store. These items are entered and updated on the Stock Items (IN202500) form in Acumatica ERP. When you already have the list of items with the necessary information, you need to retrieve only the changes to the items that have been made during the last day.

Lesson 3.1: Retrieval of the Delta of Records

How it works?

Making use of the ***LastModifiedDateTime** audit field:

- The name of the DAC field may vary.
- The field has the PXDBLastModifiedDateTime attribute
- This fields exists in most DACs of native Acumatica ERP and in Certified ISV solutions.

Lesson 3.1: Retrieval of the Delta of Records

Prerequisites

On the *Stock Items* (IN202500) form, modify the *AACOMPUT01* and *AALEGO500* inventory items as follows:

- Change the status of the *AACOMPUT01* inventory item to *Inactive* and save the record.
- Change the description of the *AALEGO500* inventory item to *Lego, 500 piece set*, and save the record.

Lesson 3.1: Retrieval of the Delta of Records

Retrieving the Names of the Fields by using OData v3

Method

GET

URL

`http://localhost/MyStoreInstance/OData/$metadata`

(checking for Modified Stock Items entity in response)

Retrieving the List of Modified Stock Items by using OData v3

Method

GET

URL

`http://localhost/MyStoreInstance/OData/Modified%20Stock%20Items`

Parameters

`$format`

json

`$filter`

`ItemStatus eq 'Active' and LastModifiedOn gt datetime'2021-07-21T00:00:00.000'`

Lesson 3.1: Retrieval of the Delta of Records

Retrieving the List of Modified Stock Items by using OData v4

Method	GET
URL	<code>http://localhost/MyStoreInstance/ODataV4/PX_Objects_IN_InventoryItem</code>
Parameters	<code>\$select</code> InventoryCD,Descr,ItemStatus,LastModifiedDateTime,BaseUnit <code>\$expand</code> INSiteByDfltSiteID(\$select=SiteCD), INItemClassByItemClassID(\$select=ItemClassCD), INSiteStatusCollection(\$select=QtyOnHand) <code>\$filter</code> StkItem eq true and ItemStatus eq 'AC' and LastModifiedDateTime gt 2021-07-21T00:00:00-08:00

Lesson 3.1: Retrieval of the Delta of Records

Summary

In this lesson, you have learned how to export from Acumatica ERP the list of stock item records that have been modified within a particular period.

Supported Parameters
\$select
\$filter
\$orderby
\$top
\$skip
\$format

Monitoring Item Availability

Lesson 3.2: Monitoring Item Availability

Learning Objectives

In this lesson, you will learn how to configure Acumatica ERP to send push notifications to an HTTP address.

Prerequisites

1. Open <http://webhookinbox.com/>.
2. Click **create an inbox**.
3. Copy the HTTP address that the site has generated.
4. Do not close the webpage.

Lesson 3.2 : Monitoring Item Availability

Configuring Push Notifications

1. In the Summary area of the *Push Notifications* (SM302000) form, specify the following settings:

- **Destination Name:** MyBIIntegration
- **Destination Type:** *Webhook*
- **Address:** **Copied Address from Webhook Inbox**

2. Add *Item Availability Data* generic inquiry

3. On the form toolbar, click **Save**.

Push Notifications ★

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* Destination Name:	<input type="text" value="MyBIIntegration"/>	Header Name:
* Destination Type:	<input type="text" value="Webhook"/>	Header Value:
* Address:	<input type="text" value="http://api.webhookinbox.com/i/F"/>	

GENERIC INQUIRIES BUILT-IN DEFINITIONS

🔄 + ✕ VIEW INQUIRY ⏪ ⏩

Active	Inquiry Title
> <input checked="" type="checkbox"/>	Item Availability Data

Lesson 3.2 : Monitoring Item Availability

Testing Push Notifications

On the Sales Orders (SO301000) form, create a sales order as follows:

1. In the Customer box, select C000000001.
2. Clear the Hold check box.
3. On the table toolbar of the Document Details tab, add 1 x AALEGO500 Stock Item
4. Save your changes

Check the notification generated on the webhook inbox webpage.

Lesson 3.2 : Monitoring Item Availability

Summary

In this lesson, you have configured Acumatica ERP to send push notifications to an HTTP address. You have also reviewed the possible options for the configuration of push notifications.

Push Notification Type	Information
Webhook	HTTP address to which Acumatica ERP sends HTTP POST requests with notification information Failed notifications can be processed from the Process Push Notifications (SM502000) form within 2 days
Message Queue	The message queue is a local or remote private Microsoft message queue. Failed notifications can be processed from the Process Push Notifications (SM502000) form within 2 days
SignalR Hub	Uses the ASP.NET SignalR library. If the connection fails or there are no clients connected to the SignalR hub when a notification comes, this notification will not be sent, and it cannot be resent later.

Creation of a Customization Package

Lesson 4: Creation of a Customization Package

Learning Objectives

- Include in a customization project all necessary items that were created in Acumatica ERP for an integration application
- Export the customization project as a ZIP file

Lesson 4: Creation of a Customization Package

List of items required for customization package for the integration by using OData v3

- Generic inquiries:
 - Customer Contacts (ARGI0015)
 - Item Availability Data (INGI0002)
 - Modified Stock Items (INGI0016)
- Push notification definition:
 - MyBIIntegration

List of items required for customization package for the integration by using OData v4

- Generic inquiries:
 - Item Availability Data (INGI0002)
- Push notification definition:
 - MyBIIntegration

Lesson 4: Creation of a Customization Package

Summary

In this lesson, you have configured a customization project to include all necessary items that have been created in Acumatica ERP for the integration application. You have exported this customization project as a ZIP file.

Your feedback is appreciated

<https://www.surveymonkey.com/r/OnlineSessions2022>



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Thank you

Ruchika Sharma