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LEARNING acumatica

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#acumatica

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About

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Chapter 1: Getting started with acumatica

Remarks

This section provides an overview of what acumatica is, and why a developer might want to use it.

It should also mention any large subjects within acumatica, and link out to the related topics. Since the Documentation for acumatica is new, you may need to create initial versions of those related topics.

Examples

Installation or Setup

Detailed instructions on getting acumatica set up or installed.

Read Getting started with acumatica online: https://riptutorial.com/acumatica/topic/7152/getting-started-with-acumatica

Chapter 2: Acumatica BQL Reference

Examples

BQL Parse and Verify

Any Acumatica application developer spends a great deal of their time writing BQL code. At the same time, not everybody knows the underlying details of how BQL types work under the hood.

At the heart of BQL lay two key methods: `Parse()` and `Verify()`, declared by the `IBqlCreator` interface. Most of the commonly used BQL types, such as `Where<>`, `And<>`, `Or<>` etc., derive from this interface.

It should be admitted that the names these methods historically stuck with are not very descriptive. Arguably better alternative names for them would be `PrepareCommandText` and `Evaluate`.

Parse

```
public void Parse(
    PXGraph graph,
    List<IBqlParameter> pars,
    List<Type> tables,
    List<Type> fields,
    List<IBqlSortColumn> sortColumns,
    StringBuilder text,
    BqlCommand.Selection selection)
```

The only purpose of `Parse()` is to translate BQL into an SQL command to be sent into DBMS. Therefore, this method accepts a `StringBuilder` parameter representing the SQL command currently being constructed, to which the BQL creator appends the SQL text representation of itself.

For example, the `And<>` predicate's `Parse()` method will append `" AND "` to the command text, and recursively request translation of all nested BQL creators.

In particular, `And<ARRegister.docType, Equal<ARDocType.invoice>>` will translate into something like `"AND "ARRegister.DocType = 'AR'"`.

Verify

```
public void Verify(
    PXCache cache,
    object item,
    List<object> pars,
    ref bool? result,
    ref object value)
```

In contrast to `Parse()`, `Verify()` operates purely at the application level.

Given a record (e.g. an `ARRegister` object), it can be used to calculate expressions on it, including calculating formulas and evaluating conditions.

The `result` parameter is used to store the boolean condition evaluation result. It is mostly used by *predicate* BQL creators such as `Where<>`.

The `value` parameter is used to store the expression calculation result. For example, the `value` of a BQL `Constant<string>` is the string representation of that constant.

Most of the time, BQL creators will either affect the result or the value, but rarely both of them.

One notable usage of the `Verify()` method is in the static `BqlCommand.Meet()` method, used by `PXCache` to determine if a given item satisfies the BQL command:

```
public bool Meet(PXCache cache, object item, params object[] parameters)
{
    List<object> pars = new List<object>(parameters);
    bool? result = null;
    object value = null;
    try {
        Verify(cache, item, pars, ref result, ref value);
    }
    catch (SystemException ex) {
        throw new PXException(String.Format("BQL verification failed! {0}", this.ToString()),
ex);
    }
    return result == null || result == true;
}
```

Conclusion

The real power and beauty of BQL creators lies in that most of them can be used at both the database and application level, enabling Acumatica's cache merging mechanism and providing a great opportunity for code reusability.

For instance, when you select records from the database, the `Where<>` clause of the BQL command:

- Will provide `Parse()` to translate itself into SQL text during command preparation.
- Will provide `Verify()` during cache merging to determine which items already residing in the cache `Meet()` the `Where<>` clause conditions so as to include such cached items into the result set.

Read Acumatica BQL Reference online: https://riptutorial.com/acumatica/topic/9690/acumatica-bql-reference

Chapter 3: Acumatica Platform Attributes Reference

Examples

PXFormula Attribute

General Description

A formula in Acumatica is a DAC field that is calculated based on the values of other object fields.

To calculate a formula, Acumatica framework provides a set of various operations and functions (such as arithmetical, logical, and comparison operations and string processing functions; see *List of Built-In Common Formulas*). In addition to the field values, a formula can use various constants provided by both the core of Acumatica and the application solutions. Moreover, a formula can obtain values for the calculation not only from the current record but also from other sources (see *Formula Context and Its Modifiers*).

The beauty of the formulas is that they will automatically recalculate the value at the right time:

- On field defaulting (inserting a new row; `FieldDefaulting` event handler of formula field)
- On updating of dependent fields (`FieldUpdated` event handler of each dependent field)
- On database selection (only for unbound fields; `RowSelecting` event handler)
- On database persisting if needed (developer should specify it explicitly; `RowPersisted` event handler)

Recalculation of a formula field value on the update of a dependent field raises a `FieldUpdated` event for formula field. This allows you to make a chain of dependent formulas (see Direct and Mediated Circular References in Formulas).

Application developers can write their own application-side formulas.

Modes of Usage

A formula can be used in three main modes:

- Simply calculating the value and assigning it to formula field (see *Basic Usage*)
- Calculating the aggregate value from existing values of formula fields and assigning it to specified field in the parent object (see *Aggregate Usage*)
- Mixed mode: Calculating the formula value, assigning it to the formula field, calculating the aggregate value, and assigning it to the field in the parent object (see *Combined Usage*)

There is another auxiliary mode, unbound formulas, that is very similar to mixed mode, but the

calculated values of the formula are not assigned to the formula field. The aggregated value is calculated immediately and assigned to the field of the parent object. See *Usage of Unbound Formulas* for more information.

`PXFormulaAttribute` Properties and Constructor Parameters

The formula functionality is implemented by `PXFormulaAttribute`. The constructor of PXFormulaAttribute has the following signatures:

```
public PXFormulaAttribute(Type formulaType)
{
    // ...
}
```

The single parameter `formulaType` is a type of formula expression to calculate the field value from other fields of the same data record. This parameter must meet one of the following conditions:

- Must implement the IBqlField interface
- Must be a BQL constant
- Must implement the IBqlCreator interface (see *List of Built-In Common Formulas*)

```
public PXFormulaAttribute(Type formulaType, Type aggregateType)
{
    // ...
}
```

The first parameter, `formulaType`, is the same as in the first constructor. The second parameter, `aggregateType`, is a type of aggregation formula to calculate the parent data record field from the child data record fields. An aggregation function can be used, such as SumCalc, CountCalc, MinCalc, and MaxCalc. Application developers can create their own aggregation formulas.

An aggregate formula type must be a generic type and must implement `IBqlAggregateCalculator` interface. The first generic parameter of the aggregate formula type must implement the `IBqlField` interface and must have the field type of the parent object.

```
public virtual bool Persistent { get; set; }
```

The `PXFormulaAttribute.Persistent` property indicates whether the attribute recalculates the formula after changes are saved to the database. You may need recalculation if the fields the formula depends on are updated on the `RowPersisting` event. By default, the property equals `false`.

Usage

In most cases, formulas are used for direct calculation of the value of the formula field from other

fields of the same data record.

The simplest example of formula usage:

```
[PXDBDate]
[PXFormula(typeof(FADetails.receiptDate))]
[PXDefault]
[PXUIField(DisplayName = Messages.PlacedInServiceDate)]
public virtual DateTime? DepreciateFromDate { get; set; }
```

In this example, the value of the ReceiptDate field is assigned to the DepreciateFromDate field on the insertion of a new record and on the update of the ReceiptDate field.

A slightly more complex example:

```
[PXCurrency(typeof(APPayment.curyInfoID), typeof(APPayment.unappliedBal))]
[PXUIField(DisplayName = "Unapplied Balance", Visibility = PXUIVisibility.Visible, Enabled =
false)]
[PXFormula(typeof(Sub<APPayment.curyDocBal, APPayment.curyApplAmt>))]
public virtual Decimal? CuryUnappliedBal { get; set; }
```

Here, the unapplied balance of the document is calculated as the difference between the balance of the document and the applied amount.

Example of multiple choice with a default value:

```
[PXUIField(DisplayName = "Class Icon", IsReadOnly = true)]
[PXImage]
[PXFormula(typeof(Switch<
    Case<Where<EPActivity.classID, Equal<CRActivityClass.task>>, EPActivity.classIcon.task,
    Case<Where<EPActivity.classID, Equal<CRActivityClass.events>>,
EPActivity.classIcon.events,
    Case<Where<EPActivity.classID, Equal<CRActivityClass.email>,
        And<EPActivity.isIncome, NotEqual<True>>>, EPActivity.classIcon.email,
    Case<Where<EPActivity.classID, Equal<CRActivityClass.email>,
        And<EPActivity.isIncome, Equal<True>>>, EPActivity.classIcon.emailResponse,
    Case<Where<EPActivity.classID, Equal<CRActivityClass.history>>,
EPActivity.classIcon.history>>>>>,
    Selector<Current2<EPActivity.type>, EPActivityType.imageUrl>>))]
public virtual string ClassIcon { get; set; }
```

Order of Fields

The order of fields in the DAC is important to correct formula calculation. All source fields (from which the formula is calculated) including other formulas must be defined in the DAC before the formula field. Otherwise, the field can be calculated incorrectly or can cause a runtime error.

Formula Context and Its Modifiers

By default, the context of the formula calculation is restricted by the current object (record) of the

class containing the formula declaration. It is also allowed to use constants (descendants of the `Constant<>` class).

A formula that uses the fields of its object only:

```
public partial class Contract : IBqlTable, IAttributeSupport
{
    //...
    [PXDecimal(4)]
    [PXDefault(TypeCode.Decimal, "0.0", PersistingCheck = PXPersistingCheck.Nothing)]
    [PXFormula(typeof(Add<Contract.pendingRecurring, Add<Contract.pendingRenewal,
Contract.pendingSetup>>))]
    [PXUIField(DisplayName = "Total Pending", Enabled=false)]
    public virtual decimal? TotalPending { get; set; }
    //...
}
```

However, it is possible to obtain input values for the formula calculation from other sources:

- A current record of any cache in the BLC (if assigned).
- A foreign record specified by `PXSelectorAttribute`.
- A parent record specified by `PXParentAttribute`.

The formula supports the following context modifiers.

`Current<TRecord.field>` and `Current2<TRecord.field>`

Fetches the field value from the record stored in the `Current` property of the TRecord cache.

If the cache's `Current` property **or the field itself** contains null:

- Current<> forces field defaulting and returns the default field value.
- Current2<> returns null.

Example:

```
[PXFormula(typeof(Switch<
    Case<Where<
        ARAdjust.adjgDocType, Equal<Current<ARPayment.docType>>,
        And<ARAdjust.adjgRefNbr, Equal<Current<ARPayment.refNbr>>>>,
        ARAdjust.classIcon.outgoing>,
    ARAdjust.classIcon.incoming>))]
protected virtual void ARAdjust_ClassIcon_CacheAttached(PXCache sender)
```

`Parent<TParent.field>`

Fetches the field value from the parent data record as defined by PXParentAttribute residing on the current DAC.

```
public class INTran : IBqlTable
{
    [PXParent(typeof(Select<
        INRegister,
```

```
        Where<
            INRegister.docType, Equal<Current<INTran.docType>>,
            And<INRegister.refNbr,Equal<Current<INTran.refNbr>>>>>))]
    public virtual String RefNbr { ... }

    [PXFormula(typeof(Parent<INRegister.origModule>))]
    public virtual String OrigModule { ... }
}
```

`IsTableEmpty<TRecord>`

Returns `true` if the DB table corresponding to the specified DAC contains no records, `false` otherwise.

```
public class APRegister : IBqlTable
{
    [PXFormula(typeof(Switch<
        Case<Where<
            IsTableEmpty<APSetupApproval>, Equal<True>>,
            True,
        Case<Where<
            APRegister.requestApproval, Equal<True>>,
            False>>,
        True>))]
    public virtual bool? DontApprove { get; set; }
}
```

`Selector<KeyField, ForeignOperand>`

Fetches a PXSelectorAttribute defined on the foreign key field (KeyField) of the current DAC.

Fetches the foreign data record currently referenced by the selector.

Calculates and returns an expression on that data record as defined by ForeignOperand.

```
public class APVendorPrice : IBqlTable
{
    // Note: inventory attribute is an
    // aggregate containing a PXSelectorAttribute
    // inside, which is also valid for Selector<>.
```

```
    // -
    [Inventory(DisplayName = "Inventory ID")]
    public virtual int? InventoryID

    [PXFormula(typeof(Selector<
        APVendorPrice.inventoryID,
        InventoryItem.purchaseUnit>))]
    public virtual string UOM { get; set; }
}
```

Using Formulas on Unbound Fields

If the formula field is an unbound field marked with one of the `PXFieldAttribute` descendants (such as `PXIntAttribute` or `PXStringAttribute`), then its calculation is additionally triggered during `RowSelecting` event.

List of Built-In Common Formulas

TBD

Direct and Mediated Circular References in Formulas

TBD

Control Flow in Conditional Formulas

TBD

Using Multiple Formulas on One Field

TBD

PXRestrictor Attribute

Introduction

The PXSelectorAttribute attribute (also referred to as the selector), while vital and frequently used, has however two major drawbacks:

- It gives an uninformative message `"<object_name> cannot be found in the system"` if no items

are found to satisfy the selector condition.
- The produces the same error message if you update *other* fields of the record but the object referenced by the selector has already changed and no longer meets its condition. This behaviour is clearly wrong because the law must not be retroactive.

The `PXRestrictorAttribute` (also referred to as the restrictor) can be used to solve these problems.

Details

`PXRestrictorAttribute` does not work alone; it should always be paired with a `PXSelectorAttribute`. Using the restrictor without the selector will have no effect.

The restrictor finds the selector on the same field, injecting into it an additional condition and the corresponding error message. The restrictor condition is appended to the selector condition via a boolean AND, and an appropriate error message is generated if the referenced object violates the restrictor constraint. Also, if the referenced object has changed and no longer meets the restrictor condition, no error messages are produced when you change **any other** fields of the referencing object.

General usage:

```
[PXDBInt]
[PXSelector(typeof(Search<FAClass.assetID, Where<FAClass.recordType,
Equal<FARecordType.classType>>>),
    typeof(FAClass.assetCD), typeof(FAClass.assetTypeID), typeof(FAClass.description),
typeof(FAClass.usefulLife),
    SubstituteKey = typeof(FAClass.assetCD),
    DescriptionField = typeof(FAClass.description), CacheGlobal = true)]
[PXRestrictor(typeof(Where<FAClass.active, Equal<True>>), Messages.InactiveFAClass,
typeof(FAClass.assetCD))]
[PXUIField(DisplayName = "Asset Class", Visibility = PXUIVisibility.Visible)]
public virtual int? ClassID { get; set; }
```

Multiple restrictors can be used with one selector attribute. In this case, all additional restrictor conditions are applied in a non-determined order. Once any condition is violated, the appropriate error message is generated.

The `Where<>` condition of the selector itself is applied **after** all restrictor conditions.

```
[PXDefault]
//  An aggregate attribute containing the selector inside.
// -
[ContractTemplate(Required = true)]
[PXRestrictor(typeof(Where<ContractTemplate.status, Equal<Contract.status.active>>),
Messages.TemplateIsNotActivated, typeof(ContractTemplate.contractCD))]
[PXRestrictor(typeof(Where<ContractTemplate.effectiveFrom,
LessEqual<Current<AccessInfo.businessDate>>,
    Or<ContractTemplate.effectiveFrom, IsNull>>), Messages.TemplateIsNotStarted)]
[PXRestrictor(typeof(Where<ContractTemplate.discontinueAfter,
GreaterEqual<Current<AccessInfo.businessDate>>,
    Or<ContractTemplate.discontinueAfter, IsNull>>), Messages.TemplateIsExpired)]
public virtual int? TemplateID { get; set; }
```

Options

The constructor of PXRestrictorAttribute takes three parameters:

1. The restrictor's additional condition. This BQL type must implement the `IBqlWhere` interface.
2. The appropriate error message. The message can contain format elements (curly brackets) to show context. The message must be a string constant defined in a localizable static class (such as `PX.Objects.GL.Messages`).
3. An array of field types. These fields must belong to the current object and must implement the `IBqlField` interface. The values of the fields will be used for error message formatting.

Also, there are several options that specify the restrictor behavior.

Overriding Inherited Restrictors

The `ReplaceInherited` property indicates whether the current restrictor should override the inherited restrictors. If this property is set to true, then all inherited restrictors (placed on any aggregate attributes or base attribute) will be replaced.

Replacing inherited restrictors:

```
 [CustomerActive(Visibility = PXUIVisibility.SelectorVisible, Filterable = true, TabOrder =
2)]
 [PXRestrictor(typeof(Where<Customer.status, Equal<CR.BAccount.status.active>,
    Or<Customer.status, Equal<CR.BAccount.status.oneTime>,
    Or<Customer.status, Equal<CR.BAccount.status.hold>,
    Or<Customer.status, Equal<CR.BAccount.status.creditHold>>>>>),
Messages.CustomerIsInStatus, typeof(Customer.status),
    ReplaceInherited = true)] // Replaced all restrictors from CustomerActiveAttribute
[PXUIField(DisplayName = "Customer")]
[PXDefault()]
public override int? CustomerID { get; set; }
```

Please note that we do not advise that you use the `ReplaceInherited` property in application code when reasonable alternatives exist. This property is primarily intended to be used in customizations.

Global Caching

`CacheGlobal` supports global dictionary functionality in the same way as in `PXSelectorAttribute`.

Recommendations for Using

Use Restrictor Conditions Only

When restrictors and a selector are used together, the latter should not contain the `IBqlWhere`

clause. Ideally, all conditions should be moved into restrictors. This approach provides more user-friendly error messages and eliminates unnecessary retroactive errors.

An ideal example:

```
[PXDBString(5, IsFixed = true, IsUnicode = false)]
[PXUIField(DisplayName = "Type", Required = true)]
[PXSelector(typeof(EPActivityType.type), DescriptionField =
typeof(EPActivityType.description))]
[PXRestrictor(typeof(Where<EPActivityType.active, Equal<True>>),
Messages.InactiveActivityType, typeof(EPActivityType.type))]
[PXRestrictor(typeof(Where<EPActivityType.isInternal, Equal<True>>),
Messages.ExternalActivityType, typeof(EPActivityType.type))]
public virtual string Type { get; set; }
```

Possible retroactive errors:

```
[PXDBInt]
[PXUIField(DisplayName = "Contract")]
[PXSelector(typeof(Search2<Contract.contractID,
    LeftJoin<ContractBillingSchedule, On<Contract.contractID,
Equal<ContractBillingSchedule.contractID>>>,
    Where<Contract.isTemplate, NotEqual<True>,
        And<Contract.baseType, Equal<Contract.ContractBaseType>,
        And<Where<Current<CRCase.customerID>, IsNull,
            Or2<Where<Contract.customerID, Equal<Current<CRCase.customerID>>,
                And<Current<CRCase.locationID>, IsNull>>,
            Or2<Where<ContractBillingSchedule.accountID, Equal<Current<CRCase.customerID>>,
                And<Current<CRCase.locationID>, IsNull>>,
            Or2<Where<Contract.customerID, Equal<Current<CRCase.customerID>>,
                And<Contract.locationID, Equal<Current<CRCase.locationID>>>>,
            Or<Where<ContractBillingSchedule.accountID, Equal<Current<CRCase.customerID>>,
                And<ContractBillingSchedule.locationID,
Equal<Current<CRCase.locationID>>>>>>>>>>>>>,
    OrderBy<Desc<Contract.contractCD>>>),
    DescriptionField = typeof(Contract.description),
    SubstituteKey = typeof(Contract.contractCD), Filterable = true)]
[PXRestrictor(typeof(Where<Contract.status, Equal<Contract.status.active>>),
Messages.ContractIsNotActive)]
[PXRestrictor(typeof(Where<Current<AccessInfo.businessDate>, LessEqual<Contract.graceDate>,
Or<Contract.expireDate, IsNull>>), Messages.ContractExpired)]
[PXRestrictor(typeof(Where<Current<AccessInfo.businessDate>,
GreaterEqual<Contract.startDate>>), Messages.ContractActivationDateInFuture,
typeof(Contract.startDate))]
[PXFormula(typeof(Default<CRCase.customerID>))]
[PXDefault(PersistingCheck = PXPersistingCheck.Nothing)]
public virtual int? ContractID { get; set; }
```

Read Acumatica Platform Attributes Reference online:
https://riptutorial.com/acumatica/topic/8853/acumatica-platform-attributes-reference

Chapter 4: Adding Attribute Support to out-of-box Sales Order Entity

Introduction

Acumatica ERP lets you define attributes for flexible, meaningful classification of an Entity (Lead, Stock/Non-Stock Items Etc.) as required for your company's specific needs. An attribute is a property that enables you to specify additional information for objects in the system. Attributes are defined in the context of a class which is a grouping of the business accounts (including leads, opportunities, customers, and cases), Stock and Non-Stock items by one or more of their properties.

Remarks

This example is applicable to Acumatica 6.0 series

Examples

This article provides how-to guide to add Acumatica ERP Attribute support to out-of-box Sales Order Entity

At the very core, your entity main DAC must have GUID column (`NoteID`) to reference `CSAnswers` table and must have field that identify the class of the Entity.

We will make use of `Order Type` to define list of attributes to gather particular order type-specific information.

Create a Graph Extension for `SOOrderTypeMaint` Graph and declare data view to define list of attributes for a particular order type. We will be using out-of-box `CSAttributeGroupList<TEntityClass, TEntity>`

```
public class SOOrderTypeMaintPXExt : PXGraphExtension<SOOrderTypeMaint>
{
    [PXViewName(PX.Objects.CR.Messages.Attributes)]
    public CSAttributeGroupList<SOOrderType, SOOrder> Mapping;
}
```

Create a Graph Extension for `SOOrderEntry` Graph and declare data view for attributes specific to current order type.

```
public class SOOrderEntryPXExt : PXGraphExtension<SOOrderEntry>
{
    public CRAttributeList<SOOrder> Answers;
}
```

Create DAC Extension for `SOOrder` DAC and declare user defined field decorated with `CRAttributesField` attribute and specify the `ClassID` field – in our case it is `OrderType`.

```
public class SOOrderPXExt : PXCacheExtension<SOOrder>
{
    #region UsrAttributes

    public abstract class usrAttributes : IBqlField { }

    [CRAttributesField(typeof(SOOrder.orderType))]
    public virtual string[] UsrAttributes { get; set; }

    #endregion
}
```

Modify `Order Types` page (`SO201000`) as below using Customization Engine

```
<px:PXTabItem Text="Attributes">
  <Template>
    <px:PXGrid runat="server" BorderWidth="0px" Height="150px" SkinID="Details" Width="100%"
ID="AttributesGrid"
                MatrixMode="True" DataSourceID="ds">
        <AutoSize Enabled="True" Container="Window" MinHeight="150" />
        <Levels>
            <px:PXGridLevel DataMember="Mapping">
                <RowTemplate>
                    <px:PXSelector runat="server" DataField="AttributeID"
FilterByAllFields="True" AllowEdit="True"
                                   CommitChanges="True" ID="edAttributeID" /></RowTemplate>
                <Columns>
                    <px:PXGridColumn DataField="AttributeID" Width="81px" AutoCallBack="True"
LinkCommand="ShowDetails" />
                    <px:PXGridColumn DataField="Description" Width="351px" AllowNull="False"
/>
                    <px:PXGridColumn DataField="SortOrder" TextAlign="Right" Width="81px" />
                    <px:PXGridColumn DataField="Required" Type="CheckBox" TextAlign="Center"
AllowNull="False" />
                    <px:PXGridColumn DataField="CSAttribute__IsInternal" Type="CheckBox"
TextAlign="Center" AllowNull="True" />
                    <px:PXGridColumn DataField="ControlType" Type="DropDownList" Width="81px"
AllowNull="False" />
                    <px:PXGridColumn DataField="DefaultValue" RenderEditorText="False"
Width="100px" AllowNull="True" />
                </Columns>
            </px:PXGridLevel>
        </Levels>
    </px:PXGrid>
  </Template>
</px:PXTabItem>
```

Modify `Sales Orders` page (`SO301000`) as below using Customization Engine

```
<px:PXTabItem Text="Attributes">
  <Template>
    <px:PXGrid runat="server" ID="PXGridAnswers" Height="200px" SkinID="Inquire"
                Width="100%" MatrixMode="True" DataSourceID="ds">
        <AutoSize Enabled="True" MinHeight="200" />
        <ActionBar>
```

```
            <Actions>
                <Search Enabled="False" />
            </Actions>
        </ActionBar>
        <Mode AllowAddNew="False" AllowDelete="False" AllowColMoving="False" />
        <Levels>
            <px:PXGridLevel DataMember="Answers">
                <Columns>
                    <px:PXGridColumn TextAlign="Left" DataField="AttributeID"
TextField="AttributeID_description"
                                         Width="250px" AllowShowHide="False" />
                    <px:PXGridColumn Type="CheckBox" TextAlign="Center" DataField="isRequired"
Width="80px" />
                    <px:PXGridColumn DataField="Value" Width="300px" AllowSort="False"
AllowShowHide="False" />
                </Columns>
            </px:PXGridLevel>
        </Levels>
    </px:PXGrid>
  </Template>
</px:PXTabItem>
```

Download deployment package

Read Adding Attribute Support to out-of-box Sales Order Entity online: https://riptutorial.com/acumatica/topic/8666/adding-attribute-support-to-out-of-box-sales-order-entity

Chapter 5: Changing caption dynamically using readonly DAC fields.

Introduction

This example shows how to change dynamically the Caption/Label of Customer Name field on Customer ScreenID AR303000 on Acumatica ERP, depending on current Customer ID selected on the same form. We could:

Examples

How-To

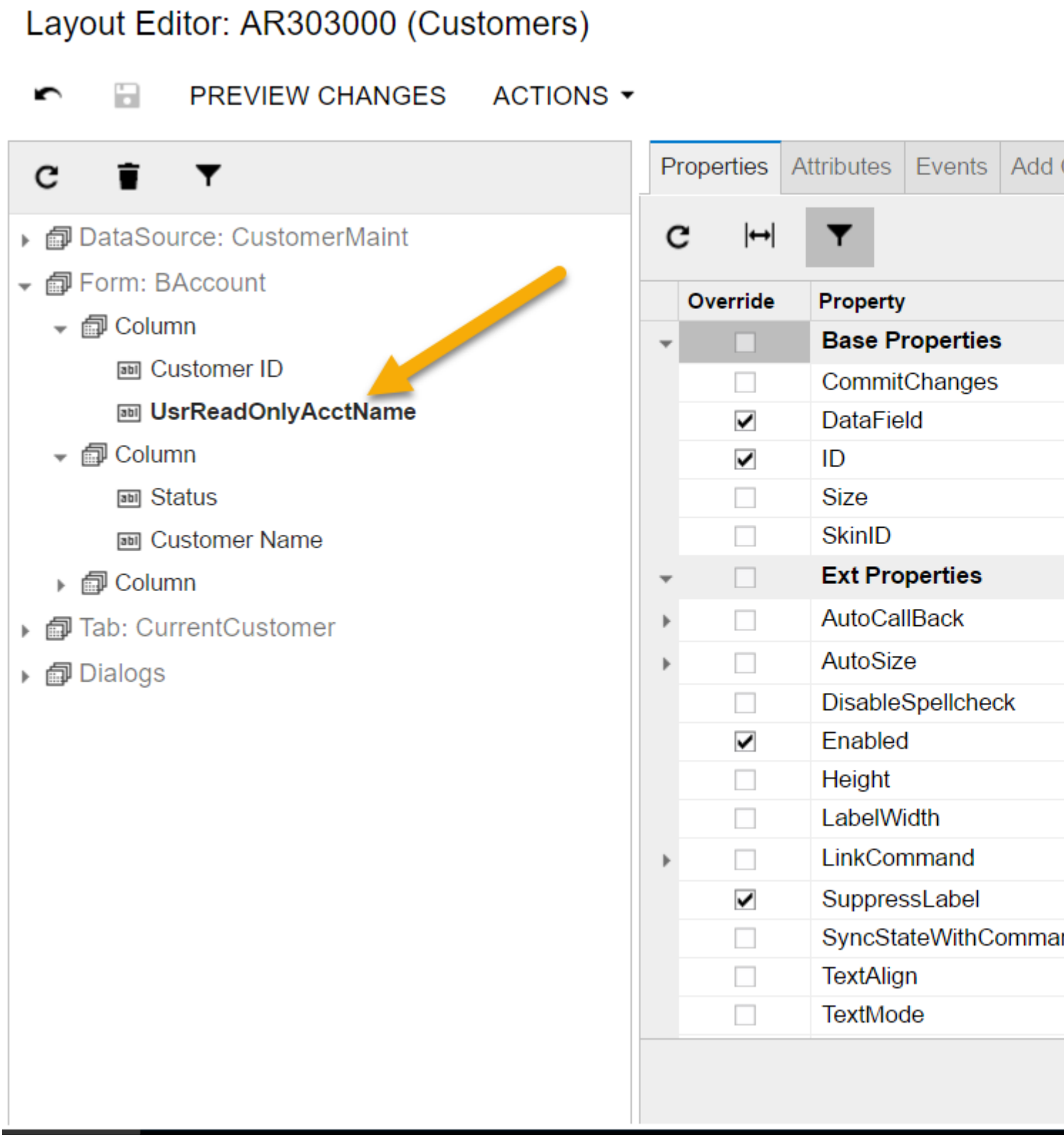
Add new unbound field to the DAC. (as readonly)

```
  [PXString(60, IsUnicode = true)]
  [PXUIField(Enabled = false, IsReadOnly = true)]
  public virtual string UsrReadOnlyAcctName{get;set;}
  public abstract class usrReadOnlyAcctName : IBqlField{}
```

Modify its value depending on conditions using handlers. (On Customer cycle ID Selected)

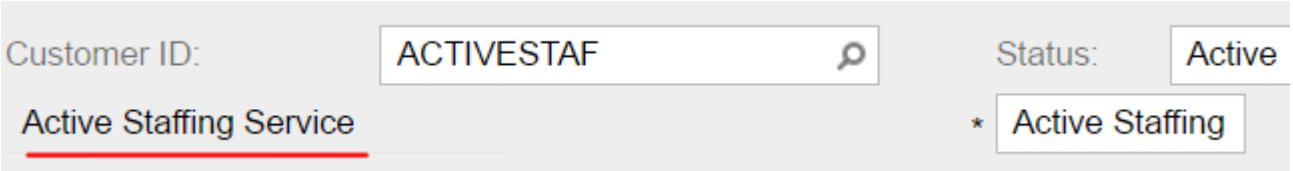
```
public class CustomerMaint_Extension:PXGraphExtension<CustomerMaint>
  {
    protected void Customer_RowSelected(PXCache sender, PXRowSelectedEventArgs e)
      {
          var customer = (BAccount)e.Row;
          var customerExt = customer.GetExtension<BAccountExt>();
          if (customerExt != null)
          {
              customerExt.UsrReadOnlyAcctName = customer.AcctName;
          }
      }
  }
```

SuppressLabel(true) for both new unbound fields and existing fields whose label will be replace.



Place the added unbound field before the existing field.

Results:



Read Changing caption dynamically using readonly DAC fields. online: https://riptutorial.com/acumatica/topic/8858/changing-caption-dynamically-using-readonly-dac-fields-

Chapter 6: Changing Size of Selector Drop-Down Window

Introduction

In this topic you will learn how to change size of the selector drop-down window. Each selector control in Acumatica has a button indicated with a magnifier icon. By clicking this button, users can open a drop-down window showing a list of objects available for selection.

Examples

Changing default size ranges for selector drop-down window

The following 4 properties are available for **PXSelector** and **PXSegmentMask** input controls to define size range for a drop-down window:

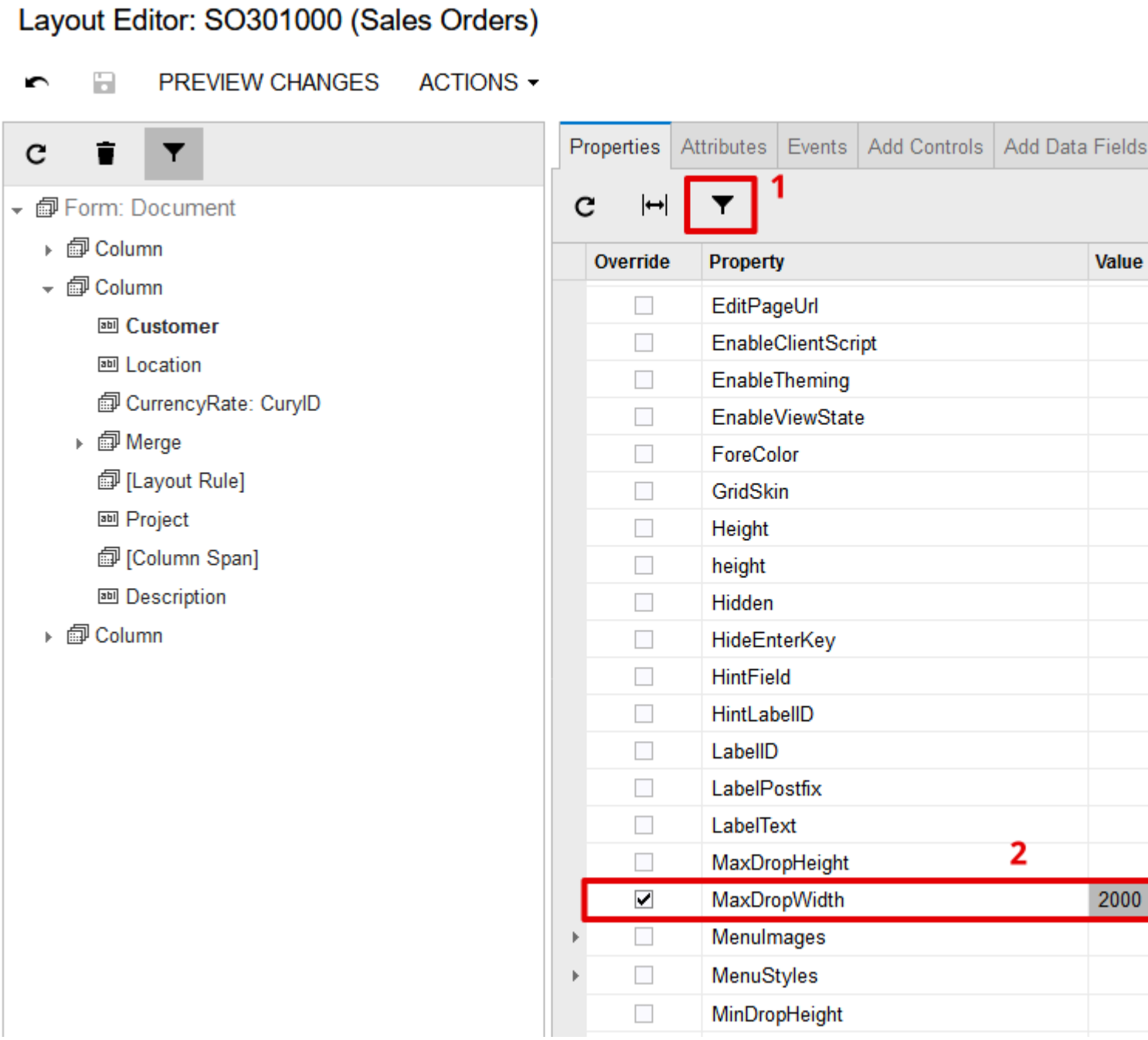
- **MinDropWidth**: gets or sets the minimum drop-down control width
- **MinDropHeight**: gets or sets the minimum drop-down control height
- **MaxDropWidth**: gets or sets the maximum drop-down control width
- **MaxDropHeight**: gets or sets the maximum drop-down control height

Please be advised, the 4 properties listed above are hidden from the Properties window and won't be suggested to you by IntelliSense while editing Aspx pages in Visual Studio.

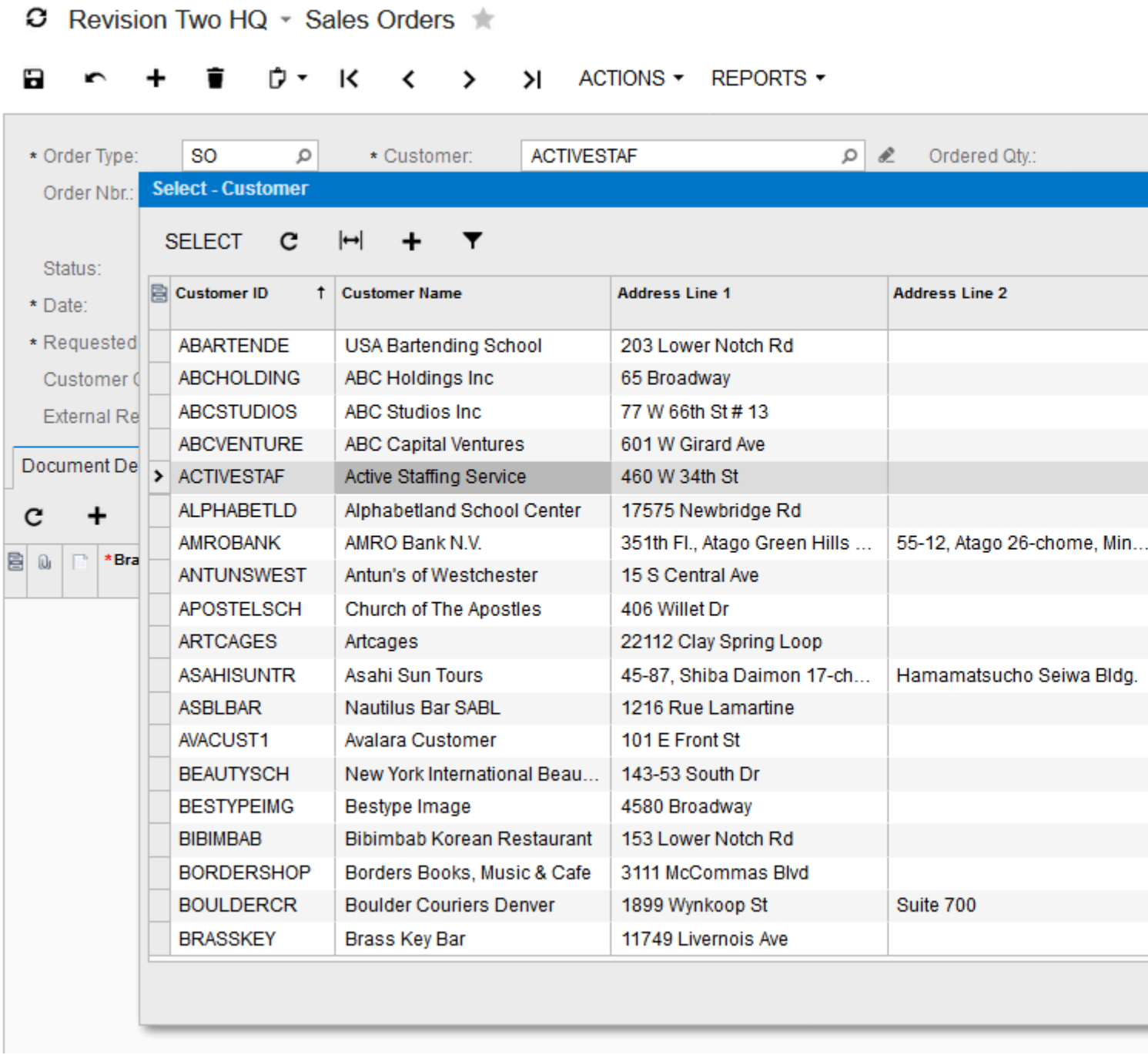
To expand drop-down window width of the Customer selector

Default 13-column layout defined for the **Customer** selector on the **Sales Orders** screen (SO.30.10.00) doesn't quite fit the default size range specified for selector drop-down window. To help users explore as much information as possible and save their time on scrolling horizontally to see all of the columns, you need to increase the maximum drop-down control width by assigning a bigger number to the **MaxDropWidth** property of for the **Customer** selector.

To set value for the **MaxDropWidth** property in Layout Editor, uncheck **Hide Advanced Properties** radio button as shown on the screenshot below:



After publishing the customization, users can enjoy the new layout of **Customer** selector, now expanded upon entire working frame:



Read Changing Size of Selector Drop-Down Window online:
https://riptutorial.com/acumatica/topic/9524/changing-size-of-selector-drop-down-window

Chapter 7: Conditionally Hiding Tabs

Introduction

In this topic you will explore two approaches to conditionally hiding tabs on data entry screens in Acumatica.

Examples

VisibleExp Property of the PXTab Control in Aspx

The **VisibleExp** property is a boolean expression, that determines if given tab is visible (when logical expression is TRUE) or hidden. You specify **VisibleExp** property for PXTab controls in Aspx page:

```
<px:PXTabItem Text="Credit Card Processing Info" BindingContext="form"
    VisibleExp="DataControls[&quot;chkIsCCPayment&quot;].Value = 1">
```

VisibleExp is composed of input controls placed within the container with ID specified in the **BindingContext** property of PXTab control. You are not allowed to use input controls from more than one container. Access to a specific input control is provided through the `DataControls` dictionary by its ID, not the name of a DAC field.

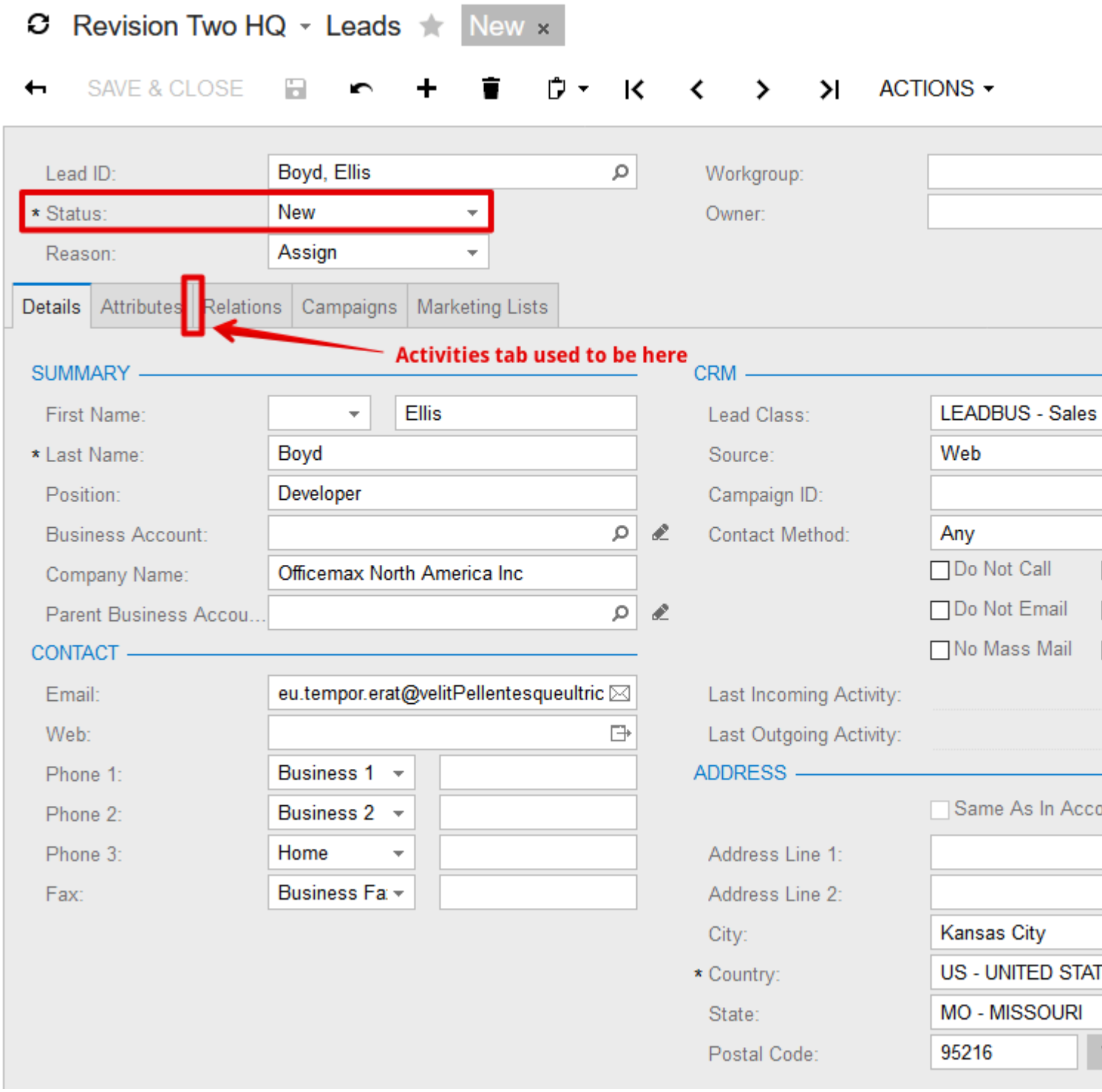
Usually **VisibleExp** property is used to compose fairly simple boolean expressions with hardcoded input control values, that are unlikely to change with time. For instance, the following expression is used on the **Sales Orders** screen (SO.30.10.00) to hide **Payment Setting** tab for orders of the ***Transfer*** type:

```
<px:PXTabItem Text="Payment Settings"
    VisibleExp="DataControls[&quot;edOrderType&quot;].Value!=TR" BindingContext="form">
```

To hide Activities tab for Leads with New status

To hide **Activities** tab from the **Leads** screen (CR.30.10.00), set ***BindingContext*** property to ***form*** (top-level *Lead Summary* form holds ***form*** ID) and define **VisibleExp** to return FALSE if lead status is Open (*Status* dropdown holds ***edStatus*** ID):

```
<px:PXTabItem Text="Activities" LoadOnDemand="True"
    BindingContext="form" VisibleExp="DataControls[&quot;edStatus&quot;].Value != H">
```



AllowSelect Property on Data Views

Unlike the **VisibleExp** property, defined in Aspx, you manipulate **AllowSelect** property of a data view though BLC or BLC extension code. The **AllowSelect** property makes it possible to use more complex boolean expressions (in comparison to the **VisibleExp** property) and, if necessary, retrieve additional information from database or other sources not available on a web page.

Below are 3 most common scenarios to work with the **AllowSelect** property:

- **RowSelected** event handler for top-level entity to hide **Applications** tab for invoices of ***Cash Sale*** and ***Cash Return*** types:

```
 public class SOInvoiceEntry : ARInvoiceEntry
 {
     ...
     protected override void ARInvoice_RowSelected(PXCache cache, PXRowSelectedEventArgs
e)
     {
         ...

         Adjustments.AllowSelect =
             doc.DocType != ARDocType.CashSale &&
             doc.DocType != ARDocType.CashReturn;
     }
     ...
 }
```

- BLC constructor to show **Subitem Replenishment Info** tab on the **Item warehouse Details** screen only when both *Inventory Replenishment* and *Inventory Subitems* features are activated:

```
 public class INItemSiteMaint : PXGraph<INItemSiteMaint, INItemSite>
 {
     ...
     public INItemSiteMaint()
     {
         ...

         bool enableSubItemReplenishment =
PXAccess.FeatureInstalled<FeaturesSet.replenishment>() &&
PXAccess.FeatureInstalled<FeaturesSet.subItem>();
         subitemrecords.AllowSelect = enableSubItemReplenishment;
     }
     ...
 }
```

- **RowSelected** handler for top-level entity to hide **Depreciation History** tab unless current asset is depreciable and **Depreciation History View** is set to ***Side by Side*** in the Fixed Assets Preferences:

```
 public class AssetMaint : PXGraph<AssetMaint, FixedAsset>
 {
     ...
     protected virtual void FixedAsset_RowSelected(PXCache sender, PXRowSelectedEventArgs
e)
     {
         ...

         AssetHistory.AllowSelect = asset.Depreciable == true &&
fasetup.Current.DeprHistoryView == FASetup.deprHistoryView.SideBySide;
     }
     ...
 }
```

Every time **AllowSelect** property is used to conditionally change tab visibility though BLC or BLC extension code, you must set **RepaintOnDemand** property to ***false*** in Aspx for the corresponding PXTab container:

```
<px:PXTabItem Text="Depreciation History" RepaintOnDemand="false">
```

The **RepaintOnDemand** property is ***true*** by default. This property controls the initialization of PXTab container: when set to ***true***, PXTab will not be initialized until it was selected by a user. Obviously you need **RepaintOnDemand** set to ***false*** to guarantee proper behavior of the given PXTab container despite whether it was selected or not.

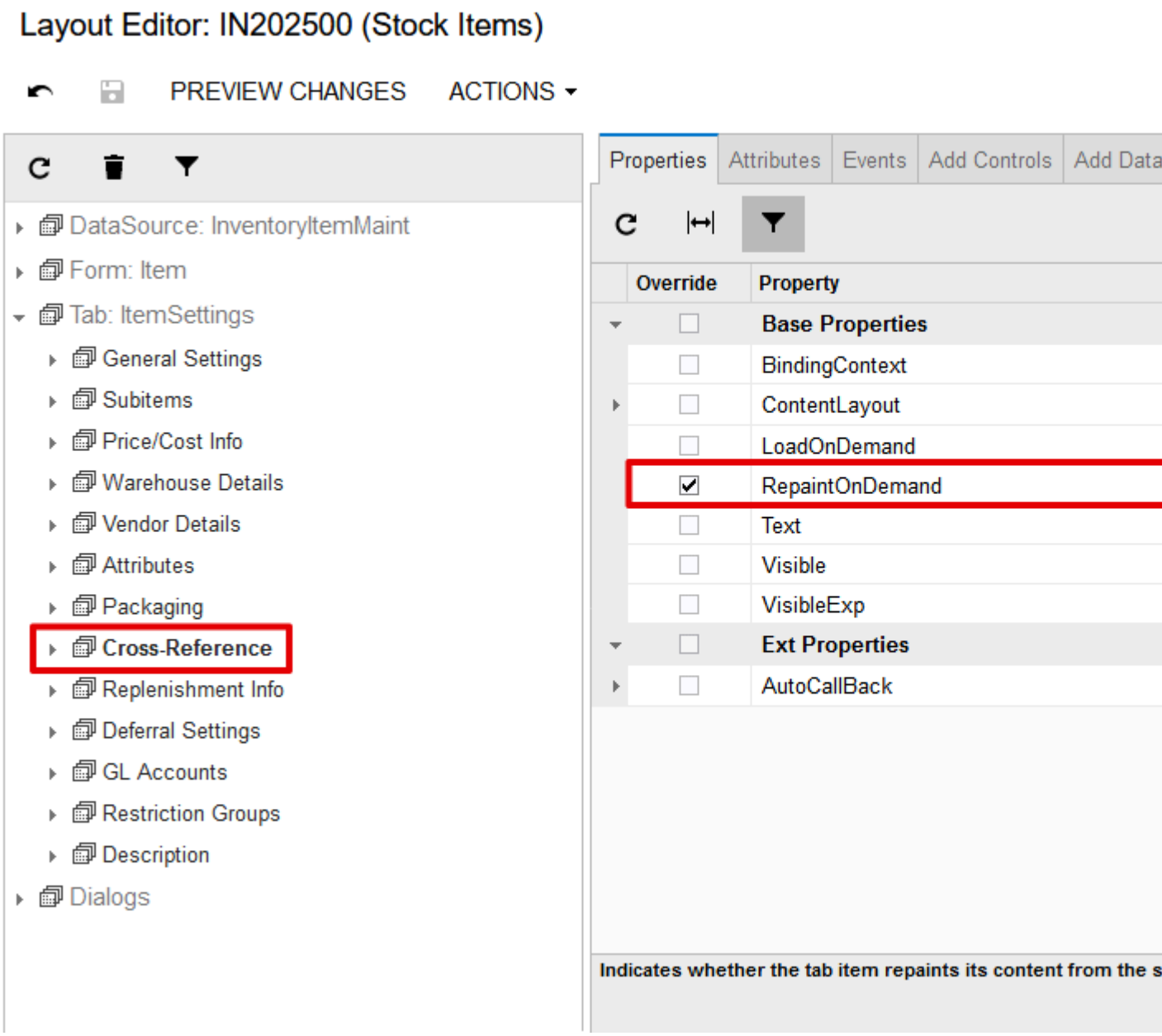
To hide Cross-Reference tab for Stock Items that can not be sold

To hide **Cross-Reference** tab from the **Stock Items** screen (IN.20.25.00) for items with ***No Sales*** status, proceed as follows:

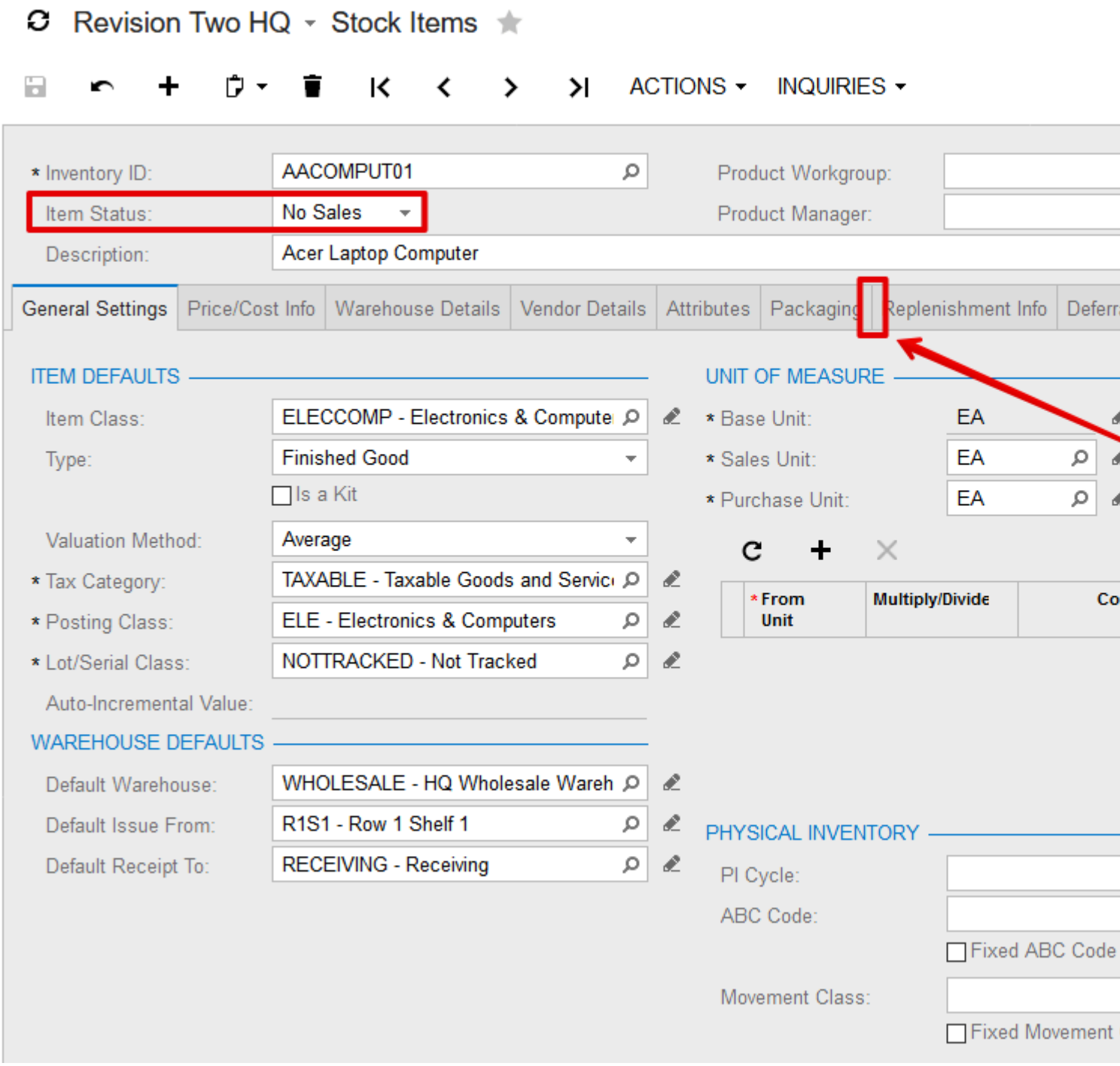
1. implement **InventoryItem_RowSelected** handler in the InventoryItemMaint BLC extension to set **AllowSelect** property to ***false*** for the `itemxrefrecords` data view if **Item Status** was set to ***No Sales***:

   ```
   public class InventoryItemMaintExt : PXGraphExtension<InventoryItemMaint>
   {
       protected void InventoryItem_RowSelected(PXCache sender, PXRowSelectedEventArgs e)
       {
           InventoryItem item = (InventoryItem)e.Row;
           if (item == null) return;

           Base.itemxrefrecords.AllowSelect = (item.ItemStatus !=
   InventoryItemStatus.NoSales);
       }
   }
   ```

2. in Customization manager, set **RepaintOnDemand** property to ***false*** for the **Cross-Reference** tab and publish customization:



After you completed 2 quite simple steps above, the **Cross-Reference** tab should not be accessible for Stock Items with ***No Sales*** status:



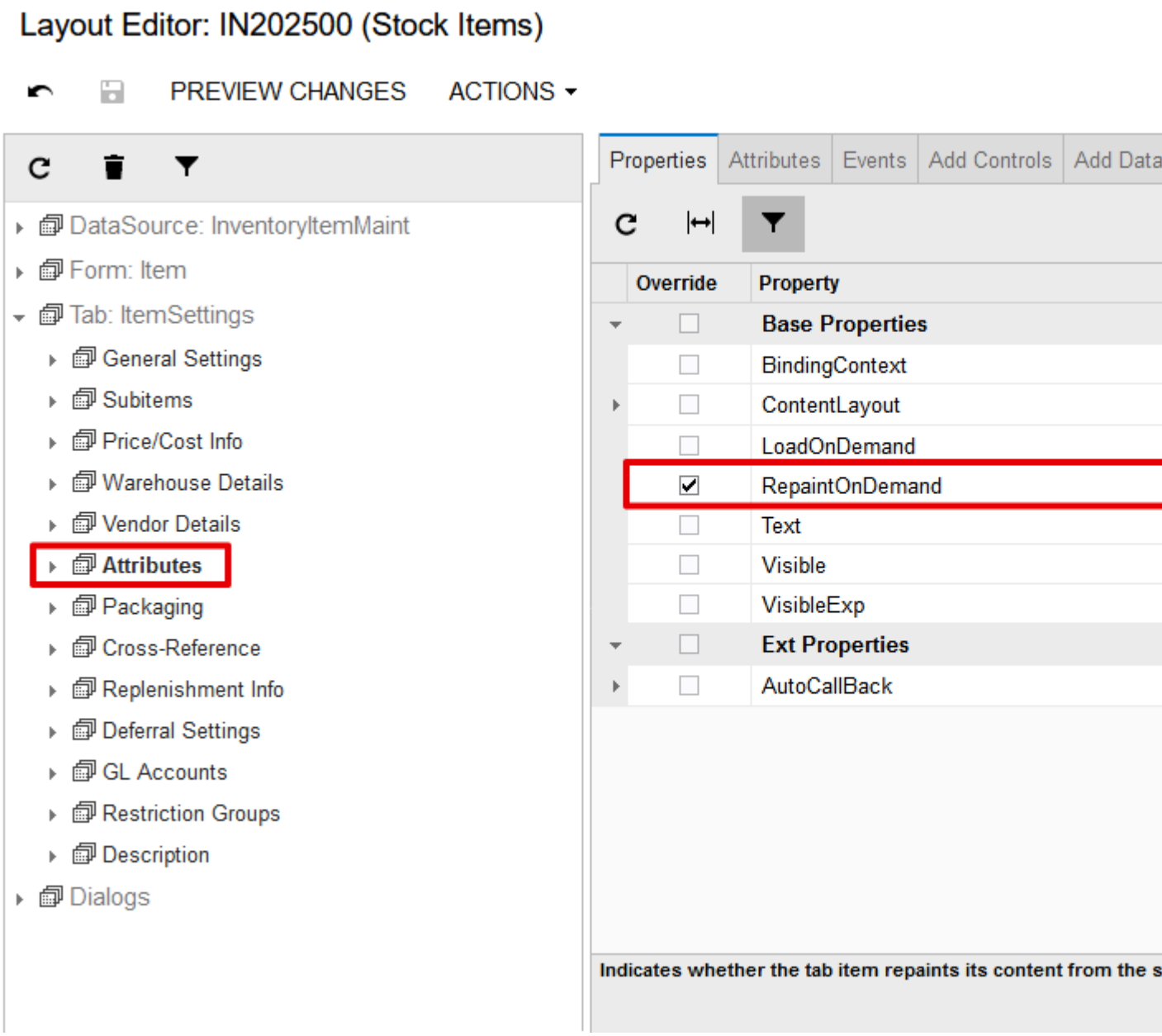
To hide Attributes tab for inactive Stock Items

To conditionally hide ** Attributes** tab from the **Stock Items** screen (IN.20.25.00), proceed as follows:

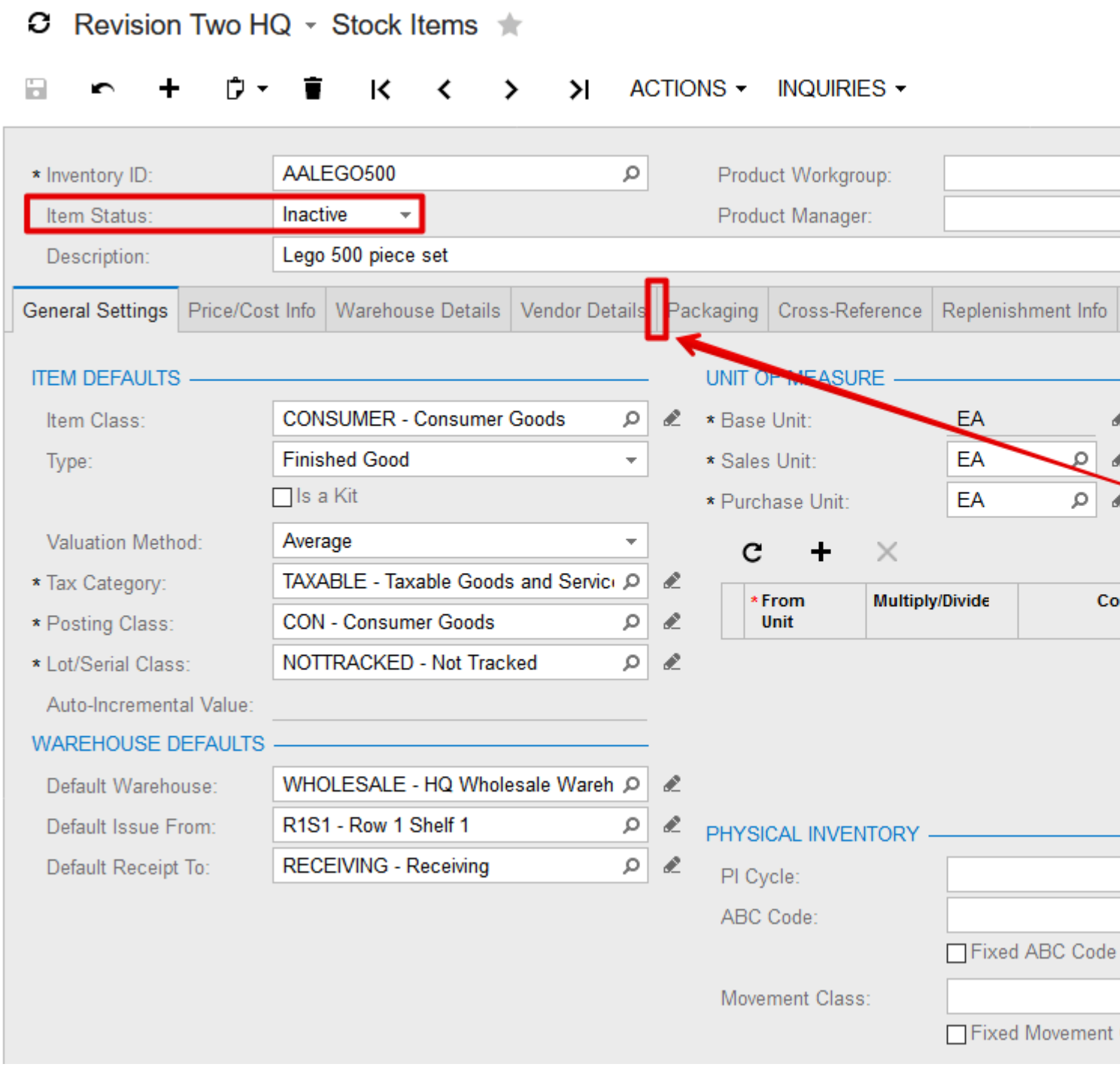
1. implement **InventoryItem_RowSelected** handler in the InventoryItemMaint BLC extension to set **AllowSelect** property to ***false*** for the `Answers` and `Category` data views if **Item Status** was set to ***Inactive***. Also notice **Visible** property set to ***false*** for `PXUIFieldAttribute` added on the `InventoryItem.ImageUrl` field by **CacheAttached** handler:

```
public class InventoryItemMaintExt : PXGraphExtension<InventoryItemMaint>
{
    protected void InventoryItem_RowSelected(PXCache sender, PXRowSelectedEventArgs e)
    {
        InventoryItem item = (InventoryItem)e.Row;
        if (item == null) return;

        bool showAttributesTab = item.ItemStatus != InventoryItemStatus.Inactive;
        Base.Answers.AllowSelect = Base.Category.AllowSelect = showAttributesTab;
        PXUIFieldAttribute.SetVisible<InventoryItem.imageUrl>(sender, item,
showAttributesTab);
    }

    [PXMergeAttributes(Method = MergeMethod.Append)]
    [PXUIField(DisplayName = "Image")]
    protected void InventoryItem_ImageURL_CacheAttached(PXCache sender)
    { }
}
```

2. in Customization manager, set **RepaintOnDemand** property to ***false*** for the **Attributes** tab and publish customization:



After you completed 2 steps above, the **Attributes** tab should not be accessible for Stock Items with ***Inactive*** status:



Read Conditionally Hiding Tabs online: https://riptutorial.com/acumatica/topic/9506/conditionally-hiding-tabs

Chapter 8: Creating Date and Time Fields in Acumatica

Introduction

This topic will walk you through different options available in the Acumatica Framework to create date and time fields in a data access class (DAC).

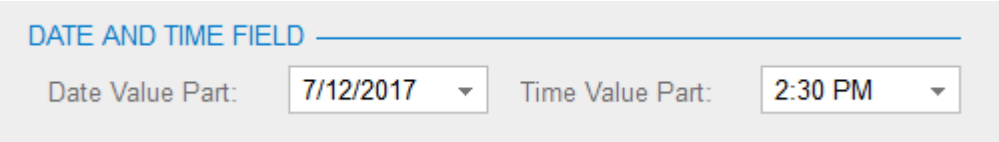
Examples

The PX(DB)DateAndTime Attribute

The **PXDBDateAndTime** attribute and the **PXDateAndTime** attribute are designed to work with a DAC field of the `Nullable<DateTime>` (`DateTime?`) type and store both date and time value parts inside a single field:

```
#region UsrDateAndTime
public abstract class usrDateAndTimeAttribute : IBqlField
{ }

[PXDBDateAndTime(
    DisplayNameDate = "Date Value Part",
    DisplayNameTime = "Time Value Part")]
public DateTime? UsrDateAndTime { get; set; }
#endregion
```

From the UI perspective, for a field decorated with **PXDBDateAndTimeAttribute** or **PXDateAndTimeAttribute**, one is expected to create either separate input controls for date and time value parts:




```
<px:PXDateTimeEdit runat="server" ID="edUsrDate" DataField="UsrDateAndTime_Date" />
<px:PXDateTimeEdit runat="server" ID="edUsrTime" DataField="UsrDateAndTime_Time"
TimeMode="True" />
```

or separate grid columns to enter and display date and time values:

Date Value Part	Time Value Part
7/14/2017	9:30 AM

```
<Columns>
    ...
    <px:PXGridColumn DataField="UsrDateAndTime_Date" Width="90px" />
```

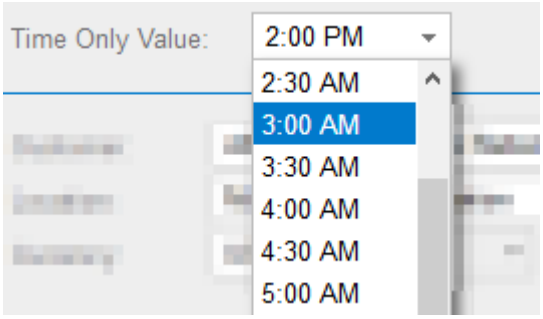
```
    <px:PXGridColumn DataField="UsrDateAndTime_Time" Width="90px" TimeMode="True" />
    ...
</Columns>
```

The PXDBTime Attribute

The **PXDBTime** attribute is designed to work with a DAC field of the `Nullable<DateTime>` (`DateTime?`) type and store only the time part without date inside a DAC field:

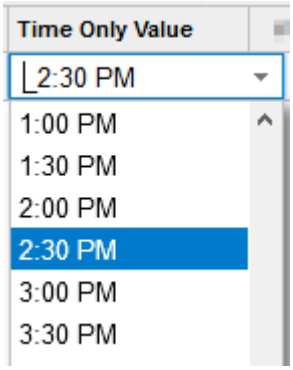
```
#region UsrTime
public abstract class usrTime : IBqlField
{ }

[PXDBTime(DisplayMask = "t", InputMask = "t")]
[PXUIField(DisplayName = "Time Only Value")]
public DateTime? UsrTime { get; set; }
#endregion
```

In the UI, for a field decorated with **PXDBTimeAttribute** the system creates an input control accepting only time values both on a form:




```
<px:PXDateTimeEdit runat="server" ID="edUsrTime" DataField="UsrTime" TimeMode="True" />
```

and within a grid cell:



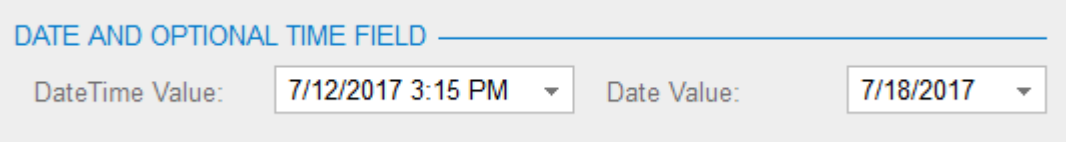

```
<Columns>
    ...
    <px:PXGridColumn DataField="UsrTime" Width="120px" TimeMode="True" />
    ...
</Columns>
```

The PX(DB)DateAttribute Attribute

The **PXDBDate** attribute and the **PXDate** attribute are designed to work with a DAC field of the `Nullable<DateTime>` (`DateTime?`) type and store date value with an optional time part inside a single field. Wheather **PX(DB)DateAttribute** should save time in addition to date in a DAC field is defined by the **PreserveTime** property: when **PreserveTime** is set to ***True***, the time part of a field value is preserved, otherwise only the date part is saved in a DAC field:

```
#region UsrDateTime
public abstract class usrDateTime : IBqlField
{ }

[PXDBDate(PreserveTime = true, InputMask = "g")]
[PXUIField(DisplayName = "DateTime Value")]
public DateTime? UsrDateTime { get; set; }
#endregion

#region UsrDate
public abstract class usrDate : IBqlField
{ }

[PXDBDate]
[PXUIField(DisplayName = "Date Value")]
public DateTime? UsrDate { get; set; }
#endregion
```

In the UI, for a field decorated with **PXDBDateAttribute** or **PXDateAttribute** the system creates an input control accepting either only date values or both date and time values depending on the value of **PreserveTime** property. This concept works exactly the same on a form:




```
<px:PXDateTimeEdit runat="server" ID="edUsrDateTime" DataField="UsrDateTime" Size="SM" />
<px:PXDateTimeEdit runat="server" ID="edUsrDate" DataField="UsrDate" />
```

and within a grid cell:

DateTime Value	Date Value
7/11/2017 2:45 PM	7/19/2017

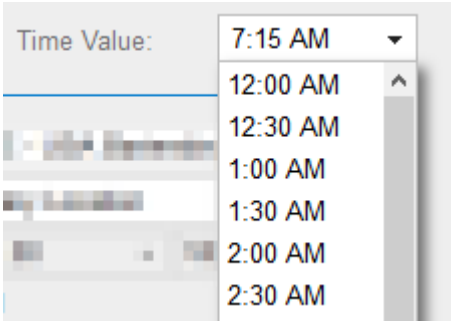
```
<Columns>
    ...
    <px:PXGridColumn DataField="UsrDateTime" Width="130px" />
    <px:PXGridColumn DataField="UsrDate" Width="90px" />
    ...
</Columns>
```

The PXDBTimeSpan Attribute

The **PXDBTimeSpan** attribute is designed to work with a DAC field of the `Nullable<int>` (`int?`) type and store time value inside a DAC field as the number of minutes passed since midnight:

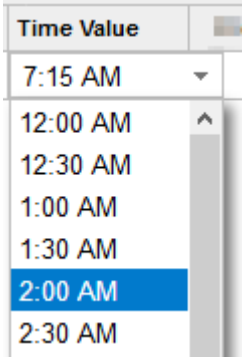
```
#region UsrTimeInt
public abstract class usrTimeInt : IBqlField
{ }

[PXDBTimeSpan(DisplayMask = "t", InputMask = "t")]
[PXUIField(DisplayName = "Time Value")]
public int? UsrTimeInt { get; set; }
#endregion
```

In the UI, for a field decorated with **PXDBTimeSpanAttribute** the system creates a drop-down with half hour interval values both on a form:



and within a grid cell:

```
<px:PXDateTimeEdit runat="server" ID="edUsrTimeInt" DataField="UsrTimeInt" TimeMode="true" />
```




```
<px:PXGridColumn DataField="UsrTimeInt" Width="90px" TimeMode="true" />
```

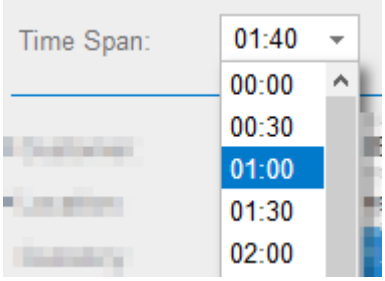
The PXTimeList Attribute

The **PXTimeList** attribute is designed to work with a DAC field of the `Nullable<int>` (`int?`) type and store time span value inside a DAC field as a number of minutes:

```
#region UsrTimeSpan
public abstract class usrTimeSpan : IBqlField
{ }

[PXDBInt]
[PXTimeList]
```

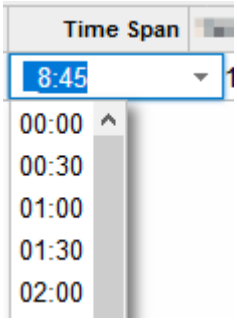
```
[PXUIField(DisplayName = "Time Span")]
public int? UsrTimeSpan { get; set; }
#endregion
```

In the UI, for a field decorated with **PXTimeListAttribute** the system creates a drop-down with 30-minute interval values both on a form:




```
<px:PXTimeSpan ID="edUsrTimeSpan" runat="server" DataField="UsrTimeSpan" InputMask="hh:mm" />
```

and within a grid cell:




```
<RowTemplate>
    ...
    <px:PXTimeSpan ID="edgUsrTimeSpan" runat="server" DataField="UsrTimeSpan"
InputMask="hh:mm" />
    ...
</RowTemplate>
<Columns>
...
    <px:PXGridColumn DataField="UsrTimeSpan" Width="90px" RenderEditorText="True" />
...
</Columns>
```

Read Creating Date and Time Fields in Acumatica online:
https://riptutorial.com/acumatica/topic/10783/creating-date-and-time-fields-in-acumatica

Chapter 9: Customization Mechanisms

Examples

Using CacheAttached to Override DAC Attributes in the Graph

Sometimes, you need to override one or more attributes of a particular Data Access Class (DAC) field just for a particular screen, without changing the existing behavior for other screens.

Replacing All Attributes

Suppose the original DAC field attributes are declared as shown below:

```
public class ARInvoice : IBqlTable
{
    [PXDBDecimal(4)]
    [PXDefault(TypeCode.Decimal, "0.0")]
    [PXUIField(DisplayName = "Commission Amount")]
    public virtual Decimal? CommnAmt
    {
        get;
        set;
    }
}
```

The basic way to override the field's attributes in the graph is to declare a `CacheAttached` event handler in the graph that follows the standard convention for naming graph events (note the absence of the EventArgs argument). The body of the event handler will not be executed, but any *attributes* that you place on the handler will replace the attributes on the corresponding DAC field:

```
[PXDBDecimal(4)]
[PXDefault(TypeCode.Decimal, "0.0")]
[PXUIField(DisplayName = "Commission Amount")]
[PXAdditionalAttribute(NecessaryProperty = true)]
protected virtual void ARInvoice_CommnAmt_CacheAttached(PXCache sender) { }
```

Appending a New Attribute to the DAC Field

The set of attributes placed on the CacheAttached handler will **redefine the whole set of the attributes** placed on the field in the DAC. This is almost always overkill; note how in the previous example, in order to add just a single attribute to the field, you had to copy all other attribute declarations from the DAC. This leads to undesired code duplication, as well as the possibility of DAC and the graph going out of sync. It is very easy to imagine a situation when someone changes the defaulting logic of, for instance, `PXDefaultAttribute` in the DAC, but forgets to update all the corresponding attributes placed on the `CacheAttached` handlers in various graphs.

To remedy this problem, the Acumatica Framework provides a special attribute called `PXMergeAttributesAttribute`. When this attribute is placed on a `CacheAttached` handler, you can reuse the existing attributes defined in the DAC.

Appending an attribute using `PXMergeAttributesAttribute`:

```
[PXMergeAttributes(Method = MergeMethod.Append)]
[PXAdditionalAttribute(NecessaryProperty = true)]
protected virtual void ARInvoice_CommnAmt_CacheAttached(PXCache sender) { }
```

In the above example, the whole set of attributes from the original DAC will be reused, appended by any attributes that you have declared on the `CacheAttached` event handler.

`PXMergeAttributesAttribute` has other merge behaviours, according to the following possible values for the Method property:

- `MergeMethod.Replace` replaces the DAC's attributes completely (equivalent to the absence of `PXMergeAttributesAttribute`).
- `MergeMethod.Append` appends the attributes from the `CacheAttached` handler to the original DAC attributes.
- `MergeMethod.Merge` is similar to `Append`; however, it also checks whether there are any conflicting attributes between the handler attributes and the DAC field attributes. If there is a conflict, the `CacheAttached` attribute takes precedence and the corresponding DAC attribute is discarded.

Overriding a Single Property of an Attribute

A very common application development scenario occurs when you have to redefine just a single property of a DAC's attribute for a particular screen; consider the situation when you have to define the `DisplayName` property of the PXUIFieldAttribute.

For that purpose, you can use yet another special attribute provided by the Acumatica Framework: `PXCustomizeBaseAttributeAttribute`. Its constructor accepts three values:

- The type of the DAC attribute whose property needs to be overridden
- The name of the attribute's property to override (use the `nameof` operator in C# 6.0 for code maintainability)
- The new value for the specified property.

Suppose that there is a requirement to change the UI display name from *Commission Amount* to *Base Currency Commission* for only one screen. The following code example demonstrates how to implement the desired behavior.

```
[PXMergeAttributes(Method = MergeMethod.Append)]
[PXCustomizeBaseAttribute(typeof(PXUIFieldAttribute), nameof(PXUIFieldAttribute.DisplayName),
"Base Currency Commission")]
protected virtual void ARInvoice_CommnAmt_CacheAttached(PXCache sender) { }
```

In this example, `PXMergeAttributes` ensures that the original DAC attributes are preserved, and `PXCustomizeBaseAttribute` allows the software engineer to override the UI field's display name for the graph in question.

Replacing an Attribute with Another Attribute

Suppose that there is a requirement to replace a DAC field's `PXDefaultAttribute` with `PXDBDefaultAttribute` for only one screen.

This can be achieved in the following manner:

```
[PXMergeAttributes(Method = MergeMethod.Append)]
[PXRemoveBaseAttribute(typeof(PXDefaultAttribute))]
[PXDBDefault(typeof(SOShipment.siteID), PersistingCheck = PXPersistingCheck.Nothing)]
protected void SOOrderShipment_SiteID_CacheAttached(PXCache sender) { }
```

Application Order of the Attribute-Customizing Attributes

1. `PXCustomizeBaseAttribute`
2. `PXRemoveBaseAttribute`
3. `PXMergeAttributes`

Read Customization Mechanisms online:
https://riptutorial.com/acumatica/topic/9751/customization-mechanisms

Chapter 10: Displaying an Error Requiring to Enter Entity Data

Examples

Displaying an Error Requiring the User to Enter Entity Data

Users often turn up in a situation when a business process cannot be finished because the user has not entered all the necessary information.

An example of this situation is when a user tries to create a drop-ship order with missing customer address.

According to UX best practices, the system should be friendly to the user and not only inform the user about the situation, but also guide him to the resolution of his issue. As we know, the system already has a similar mechanism activated by `PXSetup<TSetup>.Current` when there are no records in the `TSetup` table. It is internally implemented by throwing a `PXSetupNotEnteredException`.

Recently, a new functionality has been added to this exception, which allows an application developer to throw an error with a link to the entity which must be re-configured:

```
INSite erroneousSite = PXSelect<
    INSite,
    Where<
        INSite.siteID, Equal<Current<SOCreateFilter.siteID>>,
        And<INSite.active, Equal<True>,
        And<Where<INSite.addressID, IsNull, Or<INSite.contactID, IsNull>>>>>>
    .SelectSingleBound(this, new object[] { e.Row });

if (erroneousSite != null)
{
    throw new PXSetupNotEnteredException<INSite, INSite.siteCD>(
        Messages.WarehouseWithoutAddressAndContact,
        erroneousSite.SiteCDlnk,
        erroneousSite.SiteCDinf);
}
```

The result is displayed to the user like this:

Error #81

The requested resource is not available. The Multiple Warehouses feature and the Transfer orc

Next step:

Navigate to the Warehouse form and enter the required configuration data.

- As a first type parameter, `PXSetupNotEnteredException` accepts the type of the entity to which the default graph link will be generated.
- The second type parameter denotes the key field of the record to be used to generate the link. In the above example, navigation to the warehouse entity is made by the CD key.
- The first constructor argument is the format string for the error message. The numbering of its internal placeholders should start with 1: i.e. `The Multiple Warehouses feature and the Transfer order type are activated in the system, in this case an address and a contact must be configured for the '{1}' warehouse.`
- The second constructor argument is the value of the key field specified as the second generic parameter. In the example, the link that would be generated is `/IN204000.aspx?siteCD=erroneousSite.SiteCDlnk.`
- The third constructor argument is the human-readable value to be displayed in the error message: `...in this case an address and a contact must be configured for the 'erroneousSite.SiteCDinf' warehouse.`

Read Displaying an Error Requiring to Enter Entity Data online:
https://riptutorial.com/acumatica/topic/9274/displaying-an-error-requiring-to-enter-entity-data

Chapter 11: Downloading Files Attached to a Detail Entity Using Contract-Based API

Introduction

This topic will demonstrate how to download files attached to a detail entity inside Acumatica ERP by using the Contract-Based API.

Remarks

The code snippet above was created using the Json.NET framework (**Newtonsoft.Json.dll**).

To obtain HTTP cookie header from a SOAP response, add a reference to the .Net framework **System.ServiceModel** and **System.ServiceModel.Web** assemblies and the following 2 using directives in your code file:

```
using System.ServiceModel;
using System.ServiceModel.Web;
```

Examples

HTTP Cookie Header from a SOAP Response Shared by SOAP and REST Clients

There is a limitation in Acumatica's SOAP Contract-Based API allowing to download attachments only for a top-level entity. Any attempt to use the GetFiles() method to get the attachments of a detail entity will, unfortunately, result in the error "**Entity without screen binding cannot be used as top level entity.**" telling us it can only be used with a top-level entity defined in the web service endpoint.

Another limitation with the GetFiles() method is that it always returns the content of all files attached to an entity. There is no option to first retrieve only file names and then decide what particular file(s) to download from Acumatica.

Thankfully, there is a better and more controllable way to work with attachments provided with the Contract-Based REST API. The `files` array returned as part of every entity exported by the Contract-Based REST API contains only:

- file names (the **filename** property)
- file identifiers (the **id** property)
- hypertext references (the **href** property), which can be used later to download file content

For an example of obtaining a list of files attached to any entity from the web service endpoint and retrieving particular file content though the Contract-Based REST API, please check Acumatica

Product Help

How can one download the files attached to a detail entity if the entire integration project was developed with the SOAP Contract-Based API? As shown in the code snippet below, it is possible to pass HTTP cookie header from a SOAP response into the REST API client exclusively used to work with the attachments:

```
using (var soapClient = new DefaultSoapClient())
{
    var address = new Uri("http://localhost/AcumaticaERP/entity/Default/6.00.001/");
    CookieContainer cookieContainer;
    using (new OperationContextScope(soapClient.InnerChannel))
    {
        soapClient.Login(login, password, null, null, null);
        string sharedCookie = WebOperationContext.Current.IncomingResponse.Headers["Set-
Cookie"];
        cookieContainer = new CookieContainer();
        cookieContainer.SetCookies(address, sharedCookie);
    }
    try
    {
        var shipment = new Shipment()
        {
            ShipmentNbr = new StringSearch { Value = "001301" },
            ReturnBehavior = ReturnBehavior.OnlySpecified
        };
        shipment = soapClient.Get(shipment) as Shipment;

        var restClient = new HttpClient(
            new HttpClientHandler
            {
                UseCookies = true,
                CookieContainer = cookieContainer
            });
        restClient.BaseAddress = address;// new
Uri("http://localhost/059678/entity/Default/6.00.001/");

        var res = restClient.GetAsync("Shipment/" + shipment.ID + "?$expand=Packages")
            .Result.EnsureSuccessStatusCode();
        var shipmentWithPackages = res.Content.ReadAsStringAsync().Result;

        JObject jShipment = JObject.Parse(shipmentWithPackages);
        JArray jPackages = jShipment.Value<JArray>("Packages");
        foreach (var jPackage in jPackages)
        {
            JArray jFiles = jPackage.Value<JArray>("files");
            string outputDirectory = ".\\Output\\";
            if (!Directory.Exists(outputDirectory))
            {
                Directory.CreateDirectory(outputDirectory);
            }

            foreach (var jFile in jFiles)
            {
                string fullFileName = jFile.Value<string>("filename");
                string fileName = Path.GetFileName(fullFileName);
                string href = jFile.Value<string>("href");

                res = restClient.GetAsync(href).Result.EnsureSuccessStatusCode();
```

```
                byte[] file = res.Content.ReadAsByteArrayAsync().Result;
                System.IO.File.WriteAllBytes(outputDirectory + fileName, file);
            }
        }
    }
    finally
    {
        soapClient.Logout();
    }
}
```

Read Downloading Files Attached to a Detail Entity Using Contract-Based API online: https://riptutorial.com/acumatica/topic/10692/downloading-files-attached-to-a-detail-entity-using-contract-based-api

Chapter 12: Exporting Records via REST Contract-Based API

Introduction

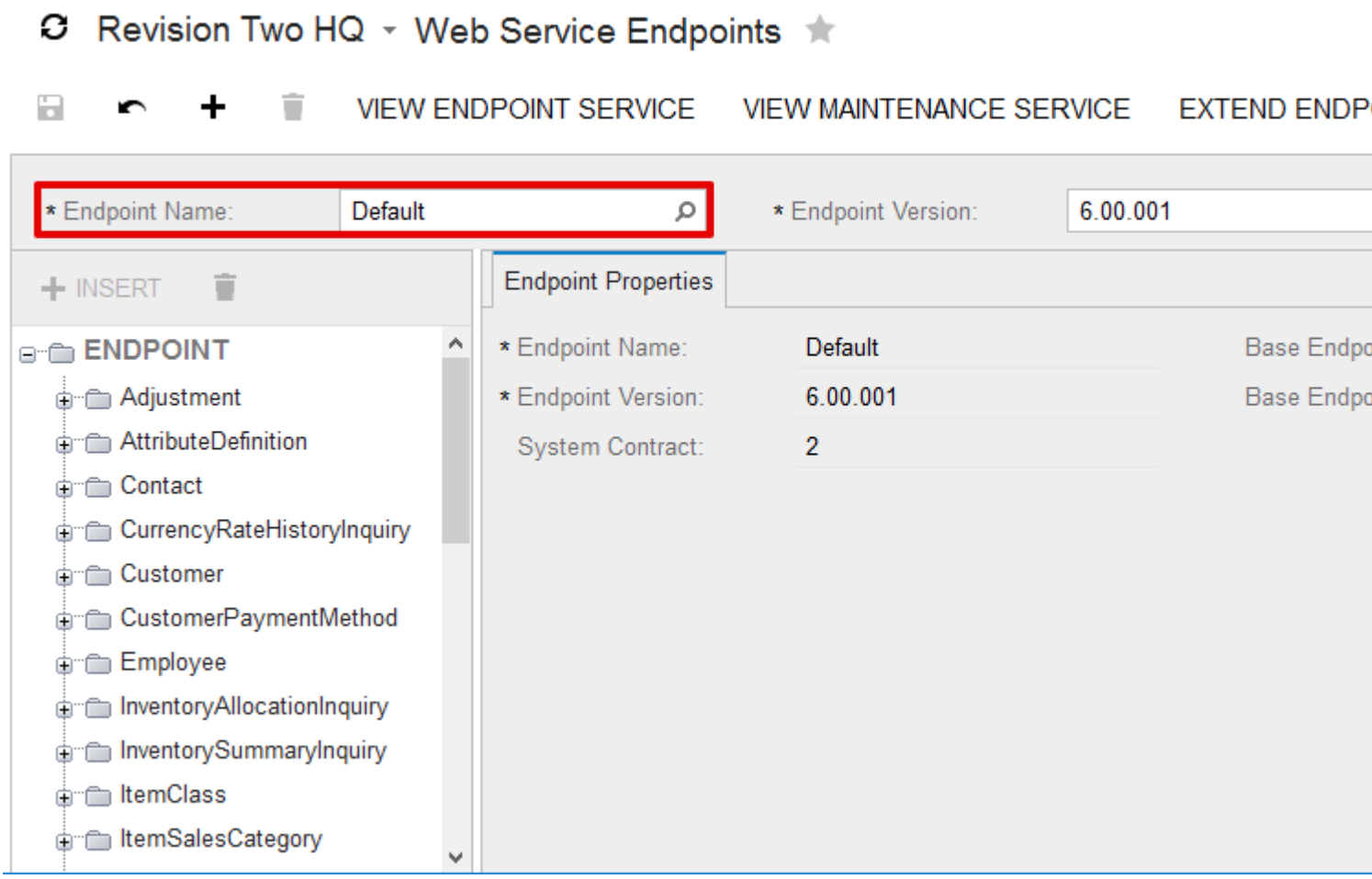
This topic will demonstrate how to export records from Acumatica ERP via the REST Contract-Based API. In contrast to the Screen-Based API of Acumatica ERP, the Contract-Based API provides both SOAP and REST interfaces. For more information on the Contract-Based API, see Acumatica ERP Documentation

Remarks

To communicate with the REST Contract-Based API of Acumatica ERP your client application must always perform the following 3 steps:

1. log into Acumatica ERP instance and get cookie with user session information
2. interact with one of Contract-Based API endpoints available on Acumatica ERP instance
3. log out from Acumatica ERP to close user session

All samples provided in this topic were built with the ***Default*** endpoint, always deployed as part of the standard Acumatica ERP installation process. On the **Web Service Endpoints** screen (SM.20.70.60) you can view the details of existing endpoints or configure your custom endpoints of the Acumatica ERP contract-based web services:



For your reference, below is implementation of the **RestService** class used in all samples above to interact with the Contract-Based web service of Acumatica ERP:

```
public class RestService : IDisposable
{
    private readonly HttpClient _httpClient;
    private readonly string _acumaticaBaseUrl;
    private readonly string _acumaticaEndpointUrl;

    public RestService(string acumaticaBaseUrl, string endpoint,
        string userName, string password,
        string company, string branch)
    {
        _acumaticaBaseUrl = acumaticaBaseUrl;
        _acumaticaEndpointUrl = _acumaticaBaseUrl + "/entity/" + endpoint + "/";
        _httpClient = new HttpClient(
            new HttpClientHandler
            {
                UseCookies = true,
                CookieContainer = new CookieContainer()
            })
        {
            BaseAddress = new Uri(_acumaticaEndpointUrl),
            DefaultRequestHeaders =
            {
                Accept = {MediaTypeWithQualityHeaderValue.Parse("text/json")}
            }
        };
```

```
        var str = new StringContent(
            new JavaScriptSerializer()
                .Serialize(
                    new
                    {
                        name = userName,
                        password = password,
                        company = company,
                        branch = branch
                    }),
                    Encoding.UTF8, "application/json");

        _httpClient.PostAsync(acumaticaBaseUrl + "/entity/auth/login", str)
            .Result.EnsureSuccessStatusCode();
    }

    void IDisposable.Dispose()
    {
        _httpClient.PostAsync(_acumaticaBaseUrl + "/entity/auth/logout",
            new ByteArrayContent(new byte[0])).Wait();
        _httpClient.Dispose();
    }

    public string GetList(string entityName)
    {
        var res = _httpClient.GetAsync(_acumaticaEndpointUrl + entityName)
            .Result.EnsureSuccessStatusCode();

        return res.Content.ReadAsStringAsync().Result;
    }

    public string GetList(string entityName, string parameters)
    {
        var res = _httpClient.GetAsync(_acumaticaEndpointUrl + entityName + "?" + parameters)
            .Result.EnsureSuccessStatusCode();

        return res.Content.ReadAsStringAsync().Result;
    }
}
```

Examples

Data Export in a Single REST Call

In this example you will explore how to export the following data from Acumatica ERP in a single call via the REST Contract-Based API:

- all stock items existing in the application
- all sales order of the IN type

If you need to export records from Acumatica ERP, use the following URL: `http://<Acumatica ERP instance URL>/entity/<Endpoint name>/<Endpoint version>/<Top-level entity>`

`<Top-level entity>` is the name of the entity which you are going to export

To export all stock items in a single REST call:

To export stock item records from a local `AcumaticaERP` instance by using the ***Default*** endpoint of version ***6.00.001***, you should use the following URL:
`http://localhost/AcumaticaERP/entity/Default/6.00.001/StockItem`

Below is the sample code written in C# to export all stock items by sending a single REST call to the ***Default*** endpoint of version ***6.00.001***:

```
using (RestService rs = new RestService(
    @"http://localhost/AcumaticaERP/", "Default/6.00.001",
    username, password, company, branch))
{
    string stockItems = rs.GetList("StockItem");
}
```

To export all sales order of the IN type in a single REST call:

To export sales orders of the ***IN*** type from a local `AcumaticaERP` instance by using the ***Default*** endpoint of version ***6.00.001***, you should use the following URL:
`http://localhost/AcumaticaERP/entity/Default/6.00.001/SalesOrder?$filter=OrderType eq 'IN'`

Below is the sample code written in C# to export all sales orders of the ***IN*** type by sending a single REST call to the ***Default*** endpoint of version ***6.00.001***:

```
using (RestService rs = new RestService(
    @"http://localhost/StackOverflow/", "Default/6.00.001",
    username, password, company, branch))
{
    var parameters = "$filter=OrderType eq 'IN'";
    string inSalesOrders = rs.GetList("SalesOrder", parameters);
}
```

Implementing Pagination on Multiple REST Requests

In this example you will explore how to export the following data from Acumatica ERP in batches via the REST Contract-Based API:

- stock items existing in the application in batches of 10 records
- all sales orders in batches of 100 records

To export stock items in batches of 10

records with multiple REST calls:

To export first 10 stock items from a local `AcumaticaERP` instance by using the ***Default*** endpoint of version ***6.00.001***, you should use the following URL:
`http://localhost/AcumaticaERP/entity/Default/6.00.001/StockItem?$top=10`

Accordingly, to request stock items from 10 to 20, you simply extend the URL above with ***filter*** parameter:
`http://localhost/AcumaticaERP/entity/Default/6.00.001/StockItem?$top=10&$filter=InventoryID gt '<InventoryID>'`

`<InventoryID>` is the ID of the last stock item exported with a previous REST call

Below is the sample code written in C# to export all stock items in batches of 10 records by sending multiple REST calls to the ***Default*** endpoint of version ***6.00.001***:

```
using (RestService rs = new RestService(
    @"http://localhost/StackOverflow/", "Default/6.00.001",
    username, password, company, branch))
{
    var json = new JavaScriptSerializer();
    string parameters = "$top=10";
    string items = rs.GetList("StockItem", parameters);
    var records = json.Deserialize<List<Dictionary<string, object>>>(items);

    while (records.Count == 10)
    {
        var inventoryID = records[records.Count - 1]["InventoryID"] as Dictionary<string,
object>;
        var inventoryIDValue = inventoryID.Values.First();
        string nextParameters = parameters + "&" +
            "$filter=" + string.Format("InventoryID gt '{0}'", inventoryIDValue);
        items = rs.GetList("StockItem", nextParameters);
        records = json.Deserialize<List<Dictionary<string, object>>>(items);
    }
}
```

To export all sales orders in batches of 100 records with multiple REST calls:

To export first 100 sales orders from a local `AcumaticaERP` instance by using the ***Default*** endpoint of version ***6.00.001***, you should use the following URL:
`http://localhost/AcumaticaERP/entity/Default/6.00.001/SalesOrder?$top=100`

Since the primary key of the **Sales Order** entity is composed by the ***Order Type*** and the ***Order Number***, in this example you will be using a combination of **filter** parameters for the ***Order Type*** and ***Order Number*** fields:

- to request sales orders from 100 to 200 of the ***SO*** type, you should use the following URL:
  `http://localhost/AcumaticaERP/entity/Default/6.00.001/SalesOrder?$top=100&$filter=OrderType eq 'SO' and OrderNbr gt '<OrderNbr>'`

`<OrderNbr>` is the number of the last sales order exported with a previous REST call

- accordingly, to request first 100 sales orders of the next to ***SO*** type, you should use the following URL:
  `http://localhost/AcumaticaERP/entity/Default/6.00.001/SalesOrder?$top=100&$filter=OrderType gt 'SO' and OrderNbr gt ''`

Below is the sample code written in C# to export all sales orders in batches of 100 records with multiple REST calls to the ***Default*** endpoint of version ***6.00.001***:

```
using (RestService rs = new RestService(
    @"http://localhost/StackOverflow/", "Default/6.00.001",
    username, password, company, branch))
{
    var json = new JavaScriptSerializer();
    string parameters = "$top=100";
    string items = rs.GetList("SalesOrder", parameters);
    var records = json.Deserialize<List<Dictionary<string, object>>>(items);

    bool sameOrderType = true;
    while (records.Count > 0 && (records.Count == 100 || !sameOrderType))
    {
        var orderType = records[records.Count - 1]["OrderType"] as Dictionary<string, object>;
        var orderTypeValue = orderType.Values.First();
        var orderNbr = records[records.Count - 1]["OrderNbr"] as Dictionary<string, object>;
        var orderNbrValue = orderNbr.Values.First();

        string nextParameters = parameters + "&" + "$filter=" +
            string.Format("OrderType {0} '{1}'", sameOrderType ? "eq" : "gt", orderTypeValue)
+ " and " +
            string.Format("OrderNbr gt '{0}'", sameOrderType ? orderNbrValue : "''" );
        items = rs.GetList("SalesOrder", nextParameters);
        records = json.Deserialize<List<Dictionary<string, object>>>(items);
        sameOrderType = records.Count == 100;
    }
}
```

Read Exporting Records via REST Contract-Based API online:
https://riptutorial.com/acumatica/topic/9298/exporting-records-via-rest-contract-based-api

Chapter 13: Exporting Records via Screen-Based API

Introduction

This topic will demonstrate how to export records from Acumatica ERP via the Screen-Based API. The Screen-Based API of Acumatica ERP provides only the SOAP interface. If your development platform has limited support for SOAP web services, consider the Contract-Based API providing both SOAP and REST interfaces. For more information on the Screen-Based API, see Acumatica ERP Documentation

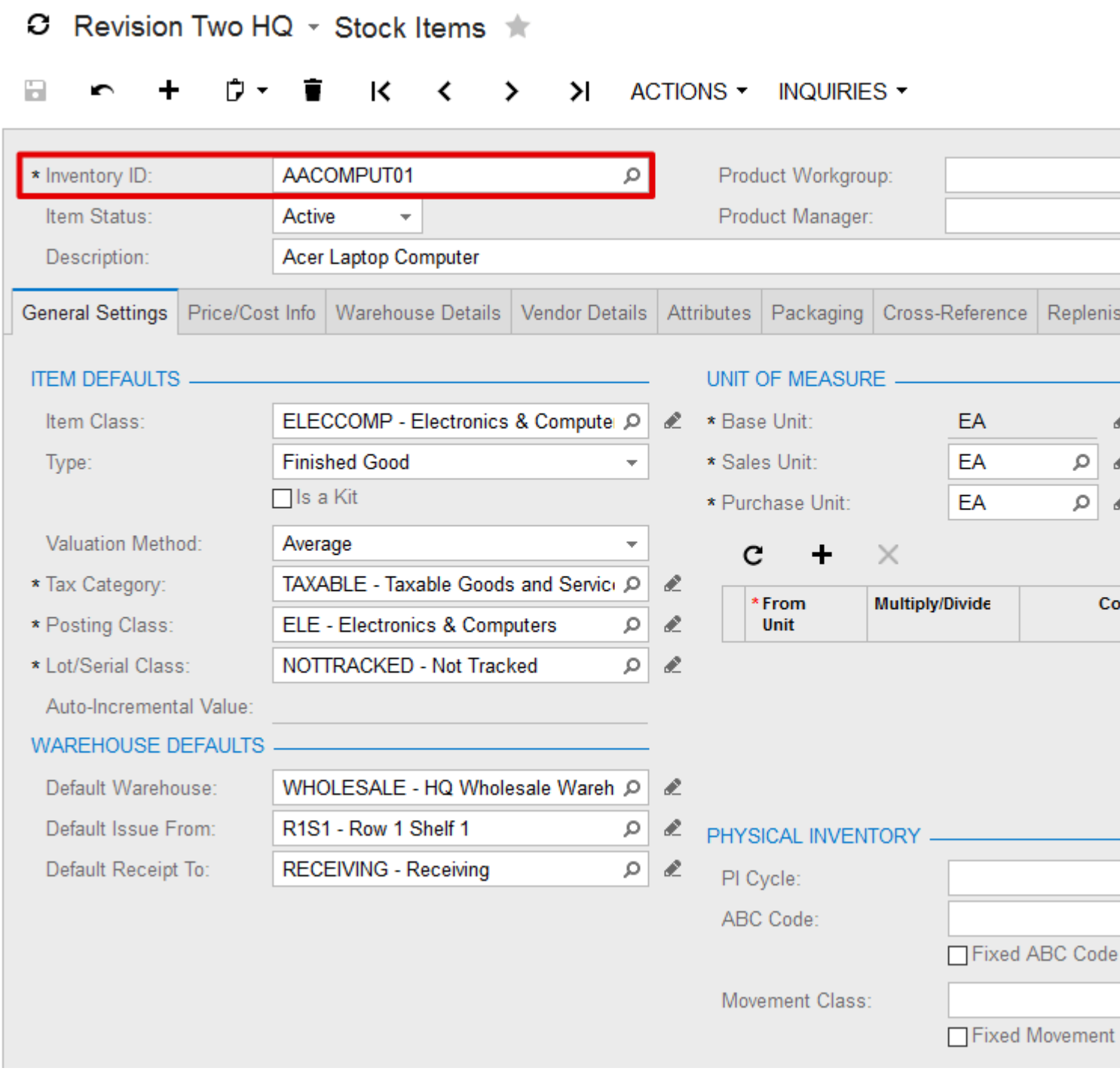
Remarks

All sample provided in this topic were created with the Screen-Based API Wrapper. If you want your client application to not depend on the UI changes in the Acumatica ERP application, you should use the screen-based API wrapper, which is described in Acumatica ERP Documentation

Examples

Data Export from an Entry Form with a Single Primary Key

The **Stock Items** screen (IN.20.25.00) is one of the most often used data entry forms of Acumatica ERP to export data. ***Inventory ID*** is the only primary key on the **Stock Items** screen:



To export records from a data entry form, your SOAP request must always begin with the `ServiceCommands.Every[Key]` command, where `[Key]` is to be replaced with primary key name.

To export all stock items in a single web service call:

```
Screen context = new Screen();
context.CookieContainer = new System.Net.CookieContainer();
context.Url = "http://localhost/AcumaticaERP/Soap/IN202500.asmx";
context.Login(username, password);
try
```

```
{
    Content stockItemsSchema = PX.Soap.Helper.GetSchema<Content>(context);
    Field lastModifiedField = new Field
    {
        ObjectName = stockItemsSchema.StockItemSummary.InventoryID.ObjectName,
        FieldName = "LastModifiedDateTime"
    };
    var commands = new Command[]
    {
        stockItemsSchema.StockItemSummary.ServiceCommands.EveryInventoryID,
        stockItemsSchema.StockItemSummary.InventoryID,
        stockItemsSchema.StockItemSummary.Description,
        stockItemsSchema.GeneralSettingsItemDefaults.ItemClass,
        stockItemsSchema.GeneralSettingsUnitOfMeasureBaseUnit.BaseUnit,
        lastModifiedField
    };
    var items = context.Export(commands, null, 0, false, false);
}
finally
{
    context.Logout();
}
```

With time amount of data in any ERP application tends to grow in size. If you will be exporting all records from your Acumatica ERP instance in a single web service call, very soon you might notice timeout errors. Increasing timeout is a possible one-time, but not very good long-term solution. Your best option to address this challenge is to export stock items in batches of several records.

To export stock items in batches of 10 records:

```
Screen context = new Screen();
context.CookieContainer = new System.Net.CookieContainer();
context.Url = "http://localhost/AcumaticaERP/Soap/IN202500.asmx";
context.Login(username, password);
try
{
    Content stockItemsSchema = PX.Soap.Helper.GetSchema<Content>(context);
    Field lastModifiedField = new Field
    {
        ObjectName = stockItemsSchema.StockItemSummary.InventoryID.ObjectName,
        FieldName = "LastModifiedDateTime"
    };
    var commands = new Command[]
    {
        stockItemsSchema.StockItemSummary.ServiceCommands.EveryInventoryID,
        stockItemsSchema.StockItemSummary.InventoryID,
        stockItemsSchema.StockItemSummary.Description,
        stockItemsSchema.GeneralSettingsItemDefaults.ItemClass,
        stockItemsSchema.GeneralSettingsUnitOfMeasureBaseUnit.BaseUnit,
        lastModifiedField
    };
    var items = context.Export(commands, null, 10, false, false);
```

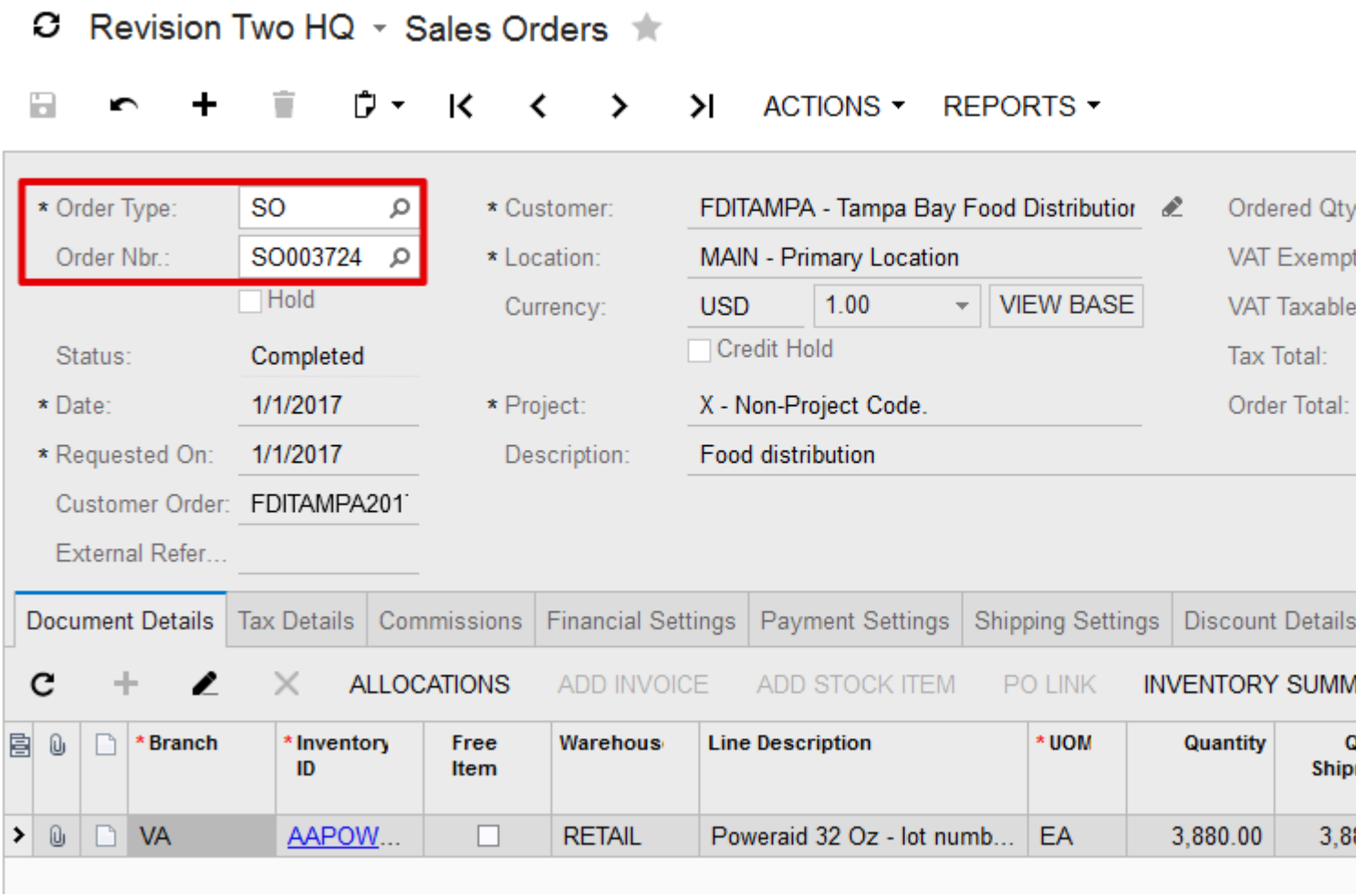
```
    while (items.Length == 10)
    {
        var filters = new Filter[]
        {
            new Filter
            {
                Field = stockItemsSchema.StockItemSummary.InventoryID,
                Condition = FilterCondition.Greater,
                Value = items[items.Length - 1][0]
            }
        };
        items = context.Export(commands, filters, 10, false, false);
    }
}
finally
{
    context.Logout();
}
```

There are 2 main differences between the single call approach and the export in batches:

- **topCount** parameter of the **Export** command was always set to `0` in the single call approach
- when exporting records in batches, size of a batch is configured though the **topCount** parameter supplemented by the **Filter** array to request the next result set

Data Export from an Entry Form with a Composite Primary Key

The **Sales Orders** screen (SO.30.10.00) is a perfect example of a data entry form with a composite primary key. The primary key on the **Sales Orders** screen is composed by the ***Order Type*** and the ***Order Number***:



The recommended 2-step strategy to export data from the **Sales Orders** screen or any other data entry form with a composite primary key via the Screen-Based API:

- on step 1 you request all types of orders previously created in your Acumatica ERP application
- 2nd step is to export orders of each type independently either in a single call or in batches

To request all types of existing orders:

```
Screen context = new Screen();
context.CookieContainer = new System.Net.CookieContainer();
context.Url = "http://localhost/AcumaticaERP/Soap/SO301000.asmx";
context.Login(username, password);
try
{
    Content orderSchema = PX.Soap.Helper.GetSchema<Content>(context);
    var commands = new Command[]
    {
        orderSchema.OrderSummary.ServiceCommands.EveryOrderType,
        orderSchema.OrderSummary.OrderType,
    };

    var types = context.Export(commands, null, 1, false, false);
}
```

```
finally
{
    context.Logout();
}
```

In the SOAP call above, notice **topCount** parameter of the **Export** command set to `1`. The purpose of this request is only to get all types of orders previously created in your Acumatica ERP application, not to export data.

To export records of each type independently in batches:

```
Screen context = new Screen();
context.CookieContainer = new System.Net.CookieContainer();
context.Url = "http://localhost/AcumaticaERP/Soap/SO301000.asmx";
context.Login(username, password);
try
{
    Content orderSchema = PX.Soap.Helper.GetSchema<Content>(context);
    var commands = new Command[]
    {
        orderSchema.OrderSummary.ServiceCommands.EveryOrderType,
        orderSchema.OrderSummary.OrderType,
    };
    var types = context.Export(commands, null, 1, false, false);

    for (int i = 0; i < types.Length; i++)
    {
        commands = new Command[]
        {
            new Value
            {
                LinkedCommand = orderSchema.OrderSummary.OrderType,
                Value = types[i][0]
            },
            orderSchema.OrderSummary.ServiceCommands.EveryOrderNbr,
            orderSchema.OrderSummary.OrderType,
            orderSchema.OrderSummary.OrderNbr,
            orderSchema.OrderSummary.Customer,
            orderSchema.OrderSummary.CustomerOrder,
            orderSchema.OrderSummary.Date,
            orderSchema.OrderSummary.OrderedQty,
            orderSchema.OrderSummary.OrderTotal
        };
        var orders = context.Export(commands, null, 100, false, false);
        while (orders.Length == 100)
        {
            var filters = new Filter[]
            {
                new Filter
                {
                    Field = orderSchema.OrderSummary.OrderNbr,
                    Condition = FilterCondition.Greater,
                    Value = orders[orders.Length - 1][1]
                }
```

```
            };
            orders = context.Export(commands, filters, 100, false, false);
        }
    }
}
finally
{
    context.Logout();
}
```

The sample above demonstrates how to export all sales orders from Acumatica ERP in batches of 100 records. To export sales order of each type independently, your SOAP request must always begin with the `Value` command, which determines the type of orders to be exported. After the Value command used to set first key value goes the `ServiceCommands.Every[Key]` command, where `[Key]` is to be replaced with name of the second key.

To export records of a specific type:

In case you need to export sales orders of a specific type, it's possible to explicitly define the type of orders with the `Value` command in the beginning of your SOAP request followed by the single call approach or the export in batches.

To export all sales order of the ***IN*** type in one call:

```
Screen context = new Screen();
context.CookieContainer = new System.Net.CookieContainer();
context.Url = "http://localhost/AcumaticaERP/Soap/SO301000.asmx";
context.Login(username, password);
try
{
    Content orderSchema = PX.Soap.Helper.GetSchema<Content>(context);
    var commands = new Command[]
    {
        new Value
        {
            LinkedCommand = orderSchema.OrderSummary.OrderType,
            Value = "IN"
        },
        orderSchema.OrderSummary.ServiceCommands.EveryOrderNbr,
        orderSchema.OrderSummary.OrderType,
        orderSchema.OrderSummary.OrderNbr,
        orderSchema.OrderSummary.Customer,
        orderSchema.OrderSummary.CustomerOrder,
        orderSchema.OrderSummary.Date,
        orderSchema.OrderSummary.OrderedQty,
        orderSchema.OrderSummary.OrderTotal
    };
    var orders = context.Export(commands, null, 0, false, false);
}
finally
{
    context.Logout();
}
```

Read Exporting Records via Screen-Based API online:
https://riptutorial.com/acumatica/topic/9288/exporting-records-via-screen-based-api

Chapter 14: Extending List of Entities Supported by Tasks, Events and Activities

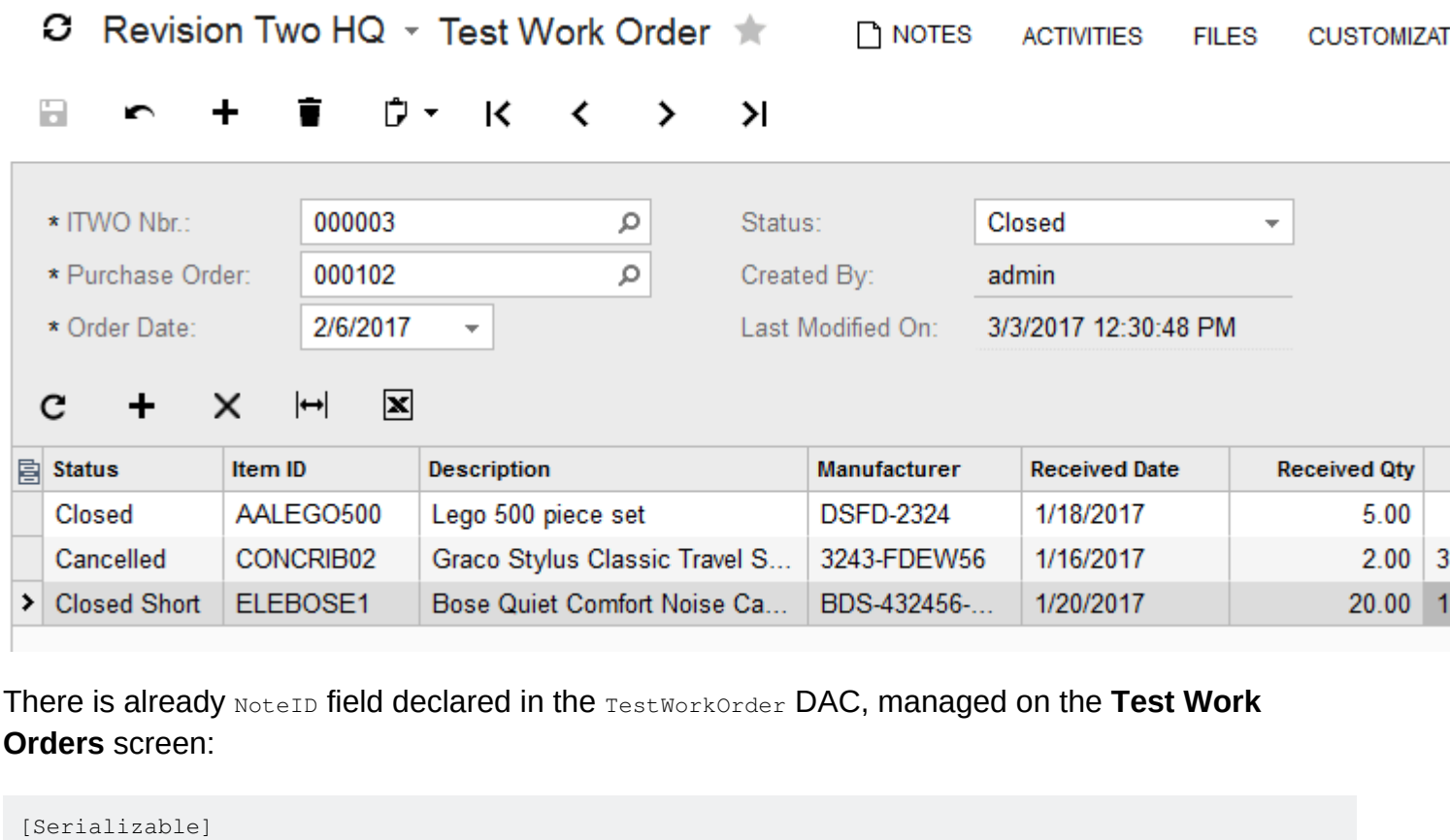
Introduction

In this topic you will learn how to extend the Related Entity Description field with a custom entity for Tasks, Events and Activities.

Examples

Adding Test Work Orders to the Related Entity Description Field

Let's say you have already created the custom **Test Work Orders** screen to manage test work orders in your Acumatica ERP application:



There is already `NoteID` field declared in the `TestWorkOrder` DAC, managed on the **Test Work Orders** screen:

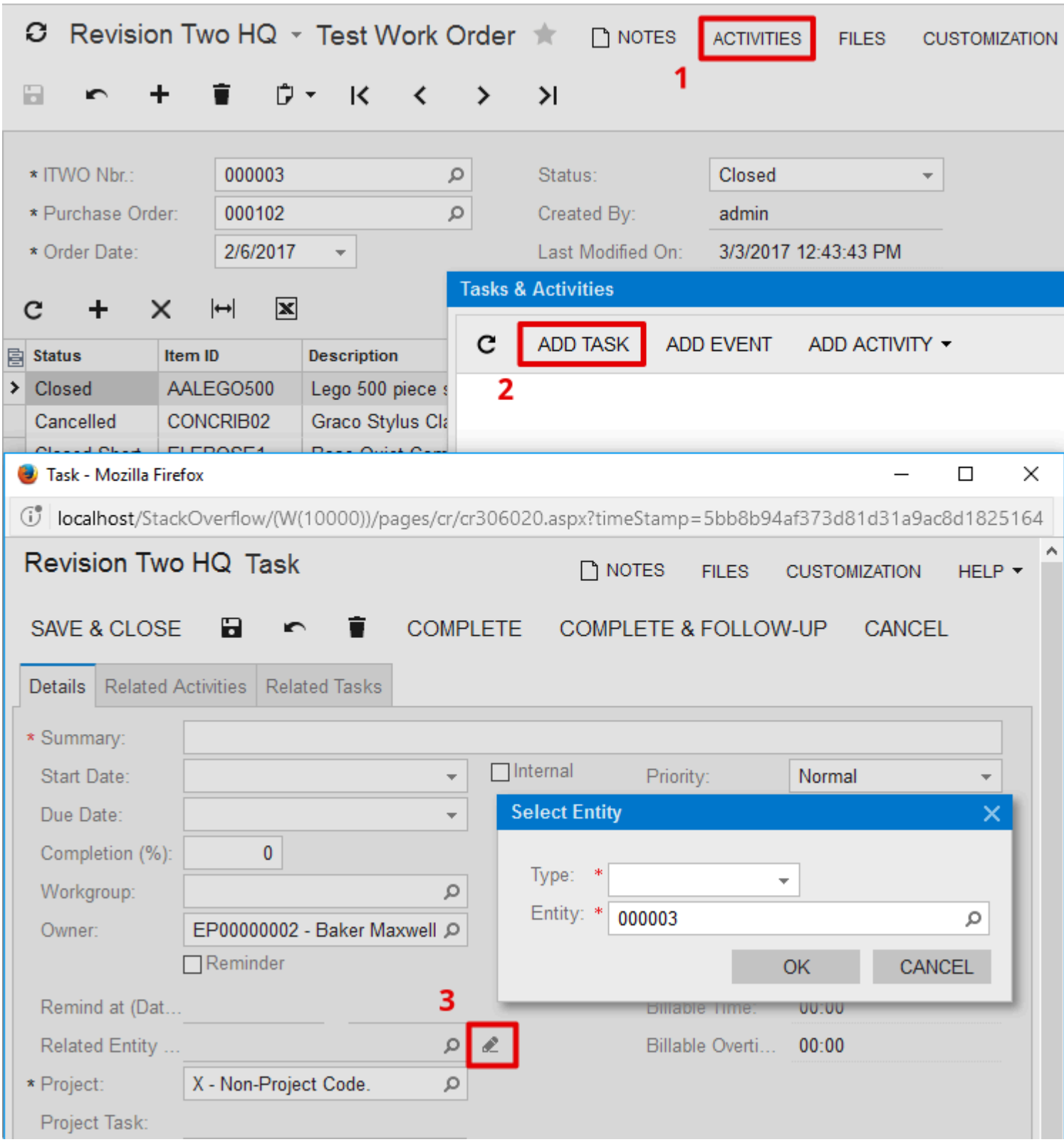
```
[Serializable]
public class TestWorkOrder : IBqlTable
{
    ...

    #region NoteID
    public abstract class noteID : IBqlField { }
    [PXNote]
    public virtual Guid? NoteID { get; set; }
    #endregion
```

```
    ...
}
```

and `ActivityIndicator` property is set to ***True*** for the top-level `PXForm` container:

```
<px:PXFormView ID="form" runat="server" ActivityIndicator="true" DataSourceID="ds" Style="z-
index: 100" DataMember="ITWO" Width="100%" >
```

However, when new task, event or activity is created for a test work order, the **Related Entity Description** control is always empty:



To add the **Test Work Order** entity to the **Related Entity Description** selector, you should complete the following steps:

1. For the `PXNoteAttribute` on **TestWorkOrder.NoteID** field, set `ShowInReferenceSelector` property to ***True*** and define BQL expression to select data records displayed in the **Entity** lookup:

```
[PXNote(
```

```
    ShowInReferenceSelector = true,
    Selector = typeof(Search<TestWorkOrder.orderNbr>))]
public virtual Guid? NoteID { get; set; }
```

2. Decorate the `TestWorkOrder` DAC with the `PXCacheNameAttribute` and the `PXPrimaryGraphAttribute`:

```
[PXLocalizable]
public static class Messages
{
    public const string Opportunity = "Test Work Order";
}

[Serializable]
[PXCacheName(Messages.Opportunity)]
[PXPrimaryGraph(typeof(TestWorkOrderEntry))]
public class TestWorkOrder : IBqlTable
{
    ...
}
```

   The `PXCacheName` attribute defines user-friendly name for the `TestWorkOrder` DAC (***Test Work Order*** in this case), which will be available in the **Type** dropdown. The `PXPrimaryGraph` attribute determines the entry page where a user is redirected for editing a test work order, which is the **Test Work Orders** screen in the given example.

3. Decorate some `TestWorkOrder` fields with the `PXFieldDescriptionAttribute`. Those field values will be concatenated into a single text label, representing the referenced test work order inside the **Related Entity Description** field:

```
...
[PXFieldDescription]
public virtual string OrderNbr { get; set; }

...
[PXFieldDescription]
public virtual String Status { get; set; }

...
[PXFieldDescription]
public virtual string POOrderNbr { get; set; }
```

4. Define the list of columns displayed in the **Entity** lookup by choosing one of the approaches below:

   a. Use the `PXNoteAttribute.FieldList` property (gets the highest priority):

```
public abstract class noteID : IBqlField { }
[PXNote(
    ShowInReferenceSelector = true,
    Selector = typeof(Search<TestWorkOrder.orderNbr>),
    FieldList = new Type[]
    {
        typeof(TestWorkOrder.orderNbr),
```

```
        typeof(TestWorkOrder.orderDate),
        typeof(TestWorkOrder.status),
        typeof(TestWorkOrder.poOrderNbr)
    })]
public virtual Guid? NoteID { get; set; }
```

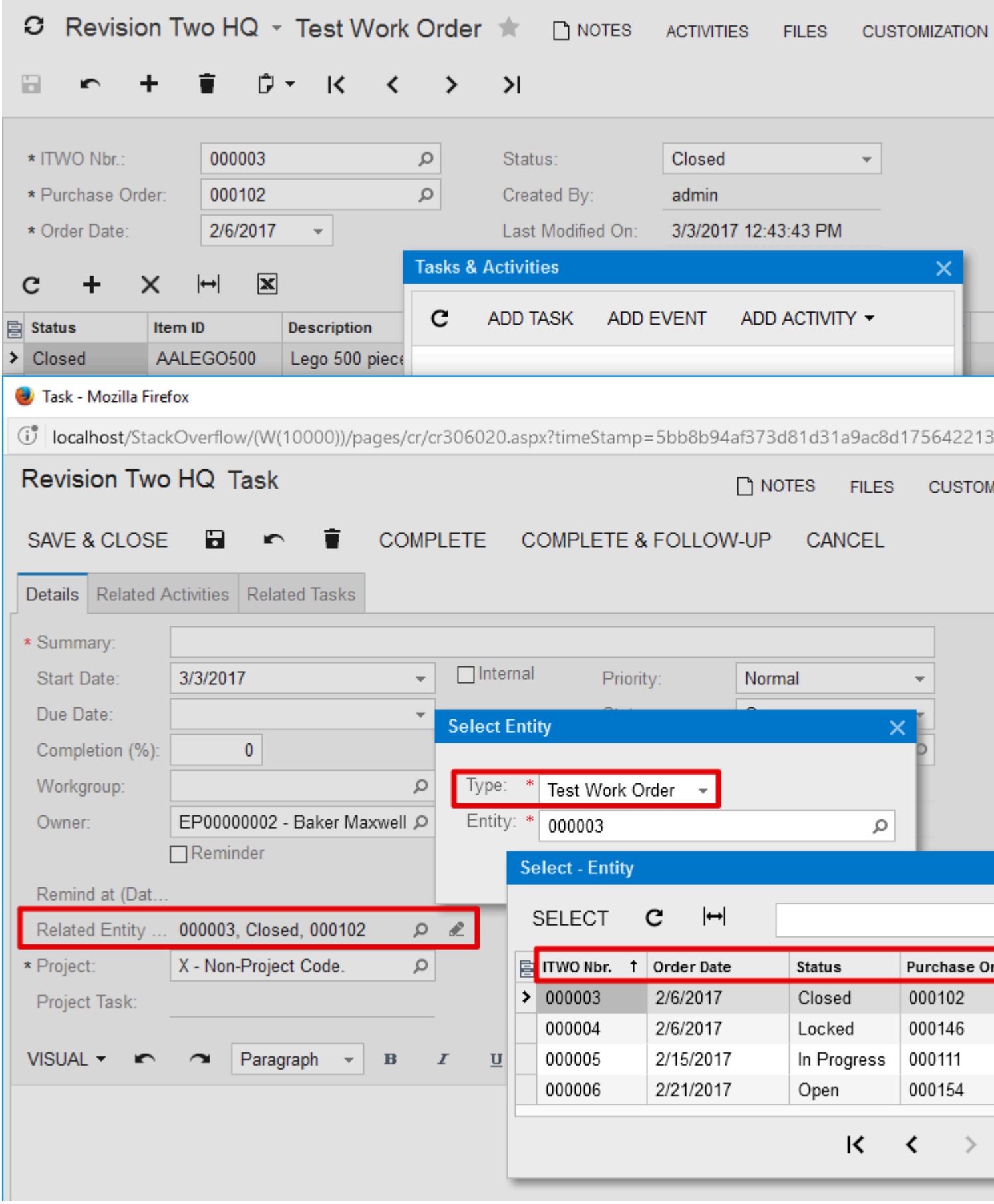
b. Borrow the list of columns defined for the **OrderNbr** lookup:

```
public abstract class orderNbr : IBqlField { }
[PXDBString(15, IsKey = true, IsUnicode = true, InputMask = ">CCCCCCCCCCCCCCC")]
[PXDefault()]
[PXUIField(DisplayName = "ITWO Nbr.", Visibility = PXUIVisibility.SelectorVisible)]
[PXSelector(typeof(Search<TestWorkOrder.orderNbr>),
    typeof(TestWorkOrder.orderNbr),
    typeof(TestWorkOrder.orderDate),
    typeof(TestWorkOrder.status),
    typeof(TestWorkOrder.poOrderNbr))]
[PXFieldDescription]
public virtual string OrderNbr { get; set; }
```

c. Show all `TestWorkOrder` fields with **Visibility** set to `PXUIVisibility.SelectorVisible`:

```
...
[PXUIField(DisplayName = "ITWO Nbr.", Visibility = PXUIVisibility.SelectorVisible)]
public virtual string OrderNbr { get; set; }

...
[PXUIField(DisplayName = "Order Date", Visibility = PXUIVisibility.SelectorVisible)]
public virtual DateTime? OrderDate { get; set; }

...
[PXUIField(DisplayName = "Status", Visibility = PXUIVisibility.SelectorVisible)]
public virtual String Status { get; set; }

...
[PXUIField(DisplayName = "Purchase Order", Visibility = PXUIVisibility.SelectorVisible)]
public virtual string POOrderNbr { get; set; }
```

After you completed the 4 steps above, **Test Work Orders** should be fully supported by the **Related Entity Description** field on Tasks, Events and Activities



Read Extending List of Entities Supported by Tasks, Events and Activities online: https://riptutorial.com/acumatica/topic/9342/extending-list-of-entities-supported-by-tasks--events-and-activities

Chapter 15: Filtering with multiple value with only one selector

Introduction

Here is a way of having multiple value inside of a selector in order to filter a grid.

Examples

Retrieving Sales Order for multilple customer

When trying to filter some record using multiple value in a selector. First you must use the px:PXMultiSelector in the aspx page instead of the normal px:PXSelector. Then after you must create yourself a graph containing at least three views and a view delegate. you will also need at least a basic unbound DAC.

Here is an sample page with the px:PXMultiSelector:

```
<%@ Page Language="C#" MasterPageFile="~/MasterPages/FormDetail.master" AutoEventWireup="true"
ValidateRequest="false" CodeFile="TT000000.aspx.cs" Inherits="Page_TT000000" Title="Untitled
Page" %>

<%@ MasterType VirtualPath="~/MasterPages/FormDetail.master" %>

<asp:Content ID="cont1" ContentPlaceHolderID="phDS" runat="Server">
<px:PXDataSource ID="ds" runat="server" Visible="True" Width="100%"
    TypeName="MultiSelector.MultiInquiry"
    PrimaryView="MasterView">
    <CallbackCommands>
    </CallbackCommands>
</px:PXDataSource>
</asp:Content>
<asp:Content ID="cont2" ContentPlaceHolderID="phF" runat="Server">
<px:PXFormView ID="form" runat="server" DataSourceID="ds" DataMember="MasterView" Width="100%"
Height="100px" AllowAutoHide="false">
    <Template>
        <px:PXMultiSelector ID="edInventoryID" runat="server" Width="100%" DataSourceID="ds"
DataField="Customer" CommitChanges="True"></px:PXMultiSelector>
    </Template>
</px:PXFormView>
</asp:Content>
<asp:Content ID="cont3" ContentPlaceHolderID="phG" runat="Server">
<px:PXGrid ID="grid" runat="server" DataSourceID="ds" Width="100%" Height="150px"
SkinID="Details" AllowAutoHide="false">
    <Levels>
        <px:PXGridLevel DataMember="DetailsView">
            <Columns>
                <px:PXGridColumn DataField="OrderType" Width="70"></px:PXGridColumn>
                <px:PXGridColumn DataField="OrderNbr" Width="200"></px:PXGridColumn>
                <px:PXGridColumn DataField="OrderDesc" Width="100"></px:PXGridColumn>
                <px:PXGridColumn DataField="CustomerOrderNbr" Width="100"></px:PXGridColumn>
```

```
                <px:PXGridColumn DataField="Status" Width="100"></px:PXGridColumn>
                <px:PXGridColumn DataField="RequestDate" Width="100"></px:PXGridColumn>
                <px:PXGridColumn DataField="ShipDate" Width="100"></px:PXGridColumn>
                <px:PXGridColumn DataField="CustomerID" Width="100"></px:PXGridColumn>
            </Columns>
        </px:PXGridLevel>
    </Levels>
    <AutoSize Container="Window" Enabled="True" MinHeight="150" />
    <ActionBar>
    </ActionBar>
</px:PXGrid>
</asp:Content>
```

Here is the sample graph with the views and the delegate.

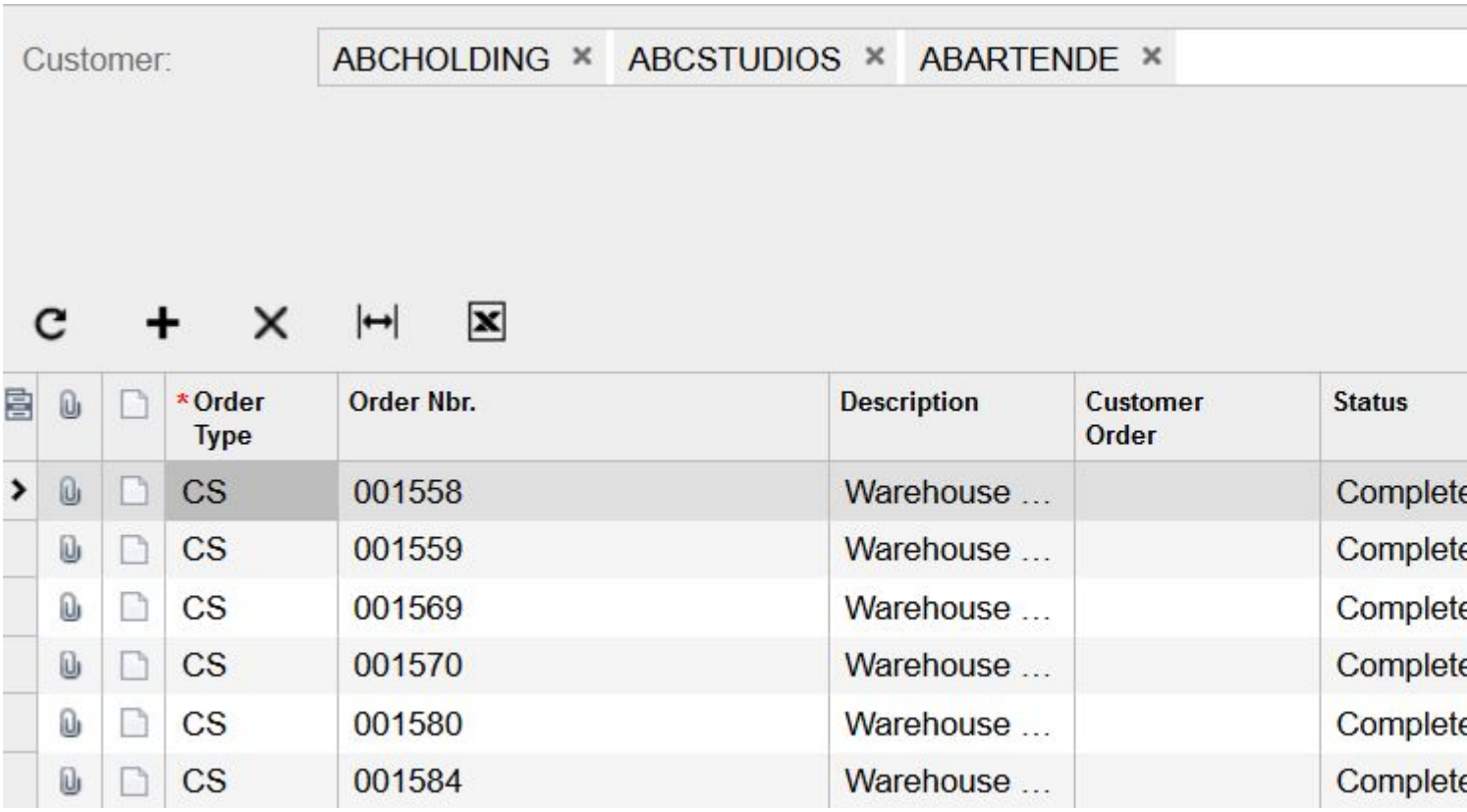
```
public class MultiInquiry : PXGraph<MultiInquiry>
{
    public PXCancel<MasterTable> Cancel;
    public PXFilter<MasterTable> MasterView;
    public PXSelect<SOOrder> DetailsView;

    public PXSelectJoin<SOOrder, LeftJoin<BAccount, On<SOOrder.customerID,
Equal<BAccount.bAccountID>>>, Where<BAccount.acctCD, In<Required<BAccount.acctCD>>>> Orders2;

    protected virtual IEnumerable detailsView()
    {
        var list = new List<SOOrder>();
        var customers = MasterView.Current.Customer;
        if (customers != null)
        {
            List<string> customerList = new List<string>();
            customerList.AddRange(customers.Split(new string[] { "; " },
StringSplitOptions.None));
            object[] val = new object[] { customerList.ToArray() };

            foreach (PXResult<SOOrder> res in Orders2.Select(val))
            {
                SOOrder order = res;
                list.Add(order);
            }
        }
        return list;
    }
}
```

To this we add the DAC containing the definition for the field used in the MultiSelector and the constant for only selecting customer accounts.

```
    [Serializable]
    public class MasterTable : IBqlTable
    {
        #region InventoryID
        public abstract class customer : IBqlField { }
        [PXString()]
        [PXUIField(DisplayName = "Customer")]
        [PXSelector(typeof(Search<BAccount.acctCD, Where<BAccount.type,
Equal<CustomerType>>>), ValidateValue = false)]
        public virtual string Customer { get; set; }
```

```
        #endregion

    }

    public class CustomerType : Constant<string> { public CustomerType() : base("CU") { } }
```

And the result for this example could be something like this :



Read Filtering with multiple value with only one selector online:
https://riptutorial.com/acumatica/topic/10707/filtering-with-multiple-value-with-only-one-selector

Chapter 16: Freight Calculation

Introduction

Acumatica ERP enables you to manage freight to better control any additional costs and revenues on sales transactions. The freight amount you charge your customers may include not only the freight your company is charged by carriers, but also insurance, handling and packaging fees defined by your shipping terms and premium freight.

Examples

Overriding Freight Amount in Shipment and Invoice

Out of the box Acumatica allows to create and maintain the list of shipping terms in the system. Shipping terms are used to define the shipping, packaging and handling costs, depending on the shipment amount.

In this example I will show how to calculate freight amount for a shipment based on sales order amount, which would allow users to create multiple shipments per sales order with same shipping terms automatically applied to all shipments.

FreightCalculator

The `FreightCalculator` class is responsible for calculation of Freight Cost and Freight Terms. For the purpose of this example, our interest will be only around the `GetFreightTerms` method:

```
public class FreightCalculator
{
    ...

    protected virtual ShipTermsDetail GetFreightTerms(string shipTermsID, decimal? lineTotal)
    {
        return PXSelect<ShipTermsDetail,
            Where<ShipTermsDetail.shipTermsID, Equal<Required<SOOrder.shipTermsID>>,
            And<ShipTermsDetail.breakAmount, LessEqual<Required<SOOrder.lineTotal>>>>,
            OrderBy<Desc<ShipTermsDetail.breakAmount>>>.Select(graph, shipTermsID, lineTotal);
    }

    ...
}
```

Both the **Sales Orders** and the **Shipments** screens utilize `FreightCalculator` class to calculate freight amount based on sales order's and shipment's amount respectively:

Sales Orders

```
public class SOOrderEntry : PXGraph<SOOrderEntry, SOOrder>, PXImportAttribute.IPXPrepareItems
{
    ...

    public virtual FreightCalculator CreateFreightCalculator()
    {
        return new FreightCalculator(this);
    }

    ...

    protected virtual void SOOrder_RowUpdated(PXCache sender, PXRowUpdatedEventArgs e)
    {
        ...

        PXResultset<SOLine> res = Transactions.Select();
        FreightCalculator fc = CreateFreightCalculator();
        fc.CalcFreight<SOOrder, SOOrder.curyFreightCost, SOOrder.curyFreightAmt>(sender,
(SOOrder)e.Row, res.Count);

        ...
    }

    ...
}
```

Shipments

```
public class SOShipmentEntry : PXGraph<SOShipmentEntry, SOShipment>
{
    ...

    protected virtual FreightCalculator CreateFreightCalculator()
    {
        return new FreightCalculator(this);
    }

    ...

    protected virtual void SOShipment_RowUpdated(PXCache sender, PXRowUpdatedEventArgs e)
    {
        ...

        PXResultset<SOShipLine> res = Transactions.Select();
        ...
        FreightCalculator fc = CreateFreightCalculator();
        fc.CalcFreight<SOShipment, SOShipment.curyFreightCost,
SOShipment.curyFreightAmt>(sender, (SOShipment)e.Row, res.Count);

        ...
    }

    ...
}
```

Overriding Freight Amount

To customize how Acumatica calculates freight amount on the **Shipments** screen I will declare `FreightCalculatorCst` class inherited from `FreightCalculator` and override `GetFreightTerms` method:

```
public class FreightCalculatorCst : FreightCalculator
{
    public FreightCalculatorCst(PXGraph graph)
        : base(graph)
    {
    }

    protected override ShipTermsDetail GetFreightTerms(string shipTermsID, decimal? lineTotal)
    {
        if (graph is SOShipmentEntry)
        {
            var shipmentEntry = graph as SOShipmentEntry;
            int orderCount = 0;
            decimal? lineTotalTemp = null;

            foreach (PXResult<SOOrderShipment, SOOrder, CurrencyInfo, SOAddress, SOContact,
SOOrderType> orderRec in
                shipmentEntry.OrderList.SelectWindowed(0, 2))
            {
                orderCount++;
                SOOrder order = (SOOrder)orderRec;
                if (orderCount == 1)
                    lineTotalTemp = order.LineTotal;
                else
                    break;
            }

            if (orderCount == 1)
            {
                lineTotal = lineTotalTemp;
            }
        }

        return base.GetFreightTerms(shipTermsID, lineTotal);
    }
}
```

After that I will implement an extension for the `SOShipmentEntry` BLC and override `CreateFreightCalculator` method to replace `FreightCalculator` with my custom `FreightCalculatorCst` class on the **Shipments** screen:

```
public class SOShipmentEntryExt : PXGraphExtension<SOShipmentEntry>
{
    [PXOverride]
    public FreightCalculator CreateFreightCalculator()
    {
        return new FreightCalculatorCst(Base);
    }
}
```

Understanding implementation of the

FreightCalculatorCst class in the sample above

In the overridden `GetFreightTerms` method I will use amount from sales order instead of shipment amount to invoke base `GetFreightTerms` method and receive shipping terms:

```
foreach (PXResult<SOOrderShipment, SOOrder, CurrencyInfo, SOAddress, SOContact, SOOrderType>
orderRec in
    shipmentEntry.OrderList.SelectWindowed(0, 2))
{
    orderCount++;
    SOOrder order = (SOOrder)orderRec;
    if (orderCount == 1)
        lineTotalTemp = order.LineTotal;
    else
        break;
}

if (orderCount == 1)
{
    lineTotal = lineTotalTemp;
}
```

Obviously, it's only possible to use sales order amount to calculate freight amount for shipments, which fulfill only 1 order. If one shipment fulfills several orders, we'd have to follow base product behavior and calculate freight amount based on shipment amount. To check the number of orders shipment fulfills, I used `SelectWindowed` method on the `OrderList` data view and requested first 2 orders fulfilled by the current shipment. I could have requested all orders fulfilled by the shipment, but this would take significantly more time to execute and return way to many records than needed to verify if sales order amount can be used instead of shipment amount to calculate freight.

Read Freight Calculation online: https://riptutorial.com/acumatica/topic/9044/freight-calculation

Chapter 17: Modifications to Base Data Views

Introduction

This topic is intended to demonstrate various patterns and practices available to modify base data views in Acumatica.

Examples

APInvoiceEntry BLC: add additional restriction to poReceiptLinesSelection data view

To add additional restriction to the **poReceiptLinesSelection** data view, you should invoke `Select` method on base view and inspect each item in returned `PXResultSet` independently to decide if it complies with additional restriction(s):

```
public class APInvoiceEntryExt : PXGraphExtension<APInvoiceEntry>
{
    [PXCopyPasteHiddenView]
    public PXSelect<APInvoiceEntry.POReceiptLineAdd> poReceiptLinesSelection;

    public virtual IEnumerable POReceiptLinesSelection()
    {
        foreach (var record in Base.poReceiptLinesSelection.Select())
        {
            // Additional restriction goes here
            if (true == true)
            {
                yield return record;
            }
        }
    }
}
```

This approach perfectly works with the **poReceiptLinesSelection** data view, due to lack of paging and aggregation in the implementation of base view. To compose result set, **poReceiptLinesSelection** view requests necessary data from database and performs all calculations on the application side.

```
public class APInvoiceEntry : APDataEntryGraph<APInvoiceEntry, APInvoice>,
PXImportAttribute.IPXPrepareItems
{
    ...

    [PXCopyPasteHiddenView]
    public PXSelect<POReceiptLineAdd> poReceiptLinesSelection;

    public virtual IEnumerable POReceiptLinesSelection()
    {
        APInvoice doc = this.Document.Current;
        if (doc == null || doc.VendorID == null || doc.VendorLocationID == null) yield break;
```

```
        if (doc.DocType != APDocType.Invoice && doc.DocType != APDocType.DebitAdj)
            yield break;

        string poReceiptType = (doc.DocType == APDocType.Invoice) ? POReceiptType.POReceipt :
POReceiptType.POReturn;

        HashSet<APTran> usedRecceiptLine = new HashSet<APTran>(new POReceiptLineComparer());
        HashSet<APTran> unusedReceiptLine = new HashSet<APTran>(new POReceiptLineComparer());

        foreach (APTran aPTran in Transactions.Cache.Inserted)
        {
            if (aPTran.ReceiptNbr != null && aPTran.ReceiptType != null &&
aPTran.ReceiptLineNbr != null)
                usedRecceiptLine.Add(aPTran);
        }

        foreach (APTran aPTran in Transactions.Cache.Deleted)
        {
            if (aPTran.ReceiptNbr != null && aPTran.ReceiptType != null &&
aPTran.ReceiptLineNbr != null && Transactions.Cache.GetStatus(aPTran) !=
PXEntryStatus.InsertedDeleted)
                if (!usedRecceiptLine.Remove(aPTran))
                    unusedReceiptLine.Add(aPTran);
        }

        foreach (APTran aPTran in Transactions.Cache.Updated)
        {
            APTran originAPTran = new APTran();
            originAPTran.ReceiptNbr =
(String)Transactions.Cache.GetValueOriginal<APTran.receiptNbr>(aPTran);
            originAPTran.ReceiptType =
(String)Transactions.Cache.GetValueOriginal<APTran.receiptType>(aPTran);
            originAPTran.ReceiptLineNbr =
(Int32?)Transactions.Cache.GetValueOriginal<APTran.receiptLineNbr>(aPTran);

            if (originAPTran.ReceiptNbr != null && originAPTran.ReceiptType != null &&
originAPTran.ReceiptLineNbr != null)
            {
                if (!usedRecceiptLine.Remove(originAPTran))
                    unusedReceiptLine.Add(originAPTran);
            }

            if (aPTran.ReceiptNbr != null && aPTran.ReceiptType != null &&
aPTran.ReceiptLineNbr != null)
            {
                if (!unusedReceiptLine.Remove(aPTran))
                    usedRecceiptLine.Add(aPTran);
            }
        }

        foreach (LinkLineReceipt item in PXSelect<LinkLineReceipt,
            Where<LinkLineReceipt.vendorID, Equal<Current<APInvoice.vendorID>>,
            And<LinkLineReceipt.vendorLocationID, Equal<Current<APInvoice.vendorLocationID>>,
            And<LinkLineReceipt.receiptCuryID, Equal<Current<APInvoice.curyID>>,
            And<LinkLineReceipt.receiptType, Equal<Required<POReceipt.receiptType>>,
            And<Where<LinkLineReceipt.orderNbr, Equal<Current<POReceiptFilter.orderNbr>>,
Or<Current<POReceiptFilter.orderNbr>, IsNull>>>
            >>>>>.SelectMultiBound(this, new object[] { doc }, poReceiptType))
        {
            APTran aPTran = new APTran();
            aPTran.ReceiptType = item.ReceiptType;
```

```
            aPTran.ReceiptNbr = item.ReceiptNbr;
            aPTran.ReceiptLineNbr = item.ReceiptLineNbr;
            if (!usedRecceiptLine.Contains(aPTran))
                yield return (PXResult<POReceiptLineAdd,
POReceipt>)ReceipLineAdd.Select(item.ReceiptNbr, item.ReceiptType, item.ReceiptLineNbr);
        }

        foreach (APTran item in unusedReceiptLine)
        {
            yield return (PXResult<POReceiptLineAdd,
POReceipt>)ReceipLineAdd.Select(item.ReceiptNbr, item.ReceiptType, item.ReceiptLineNbr);
        }

    }

    ...
}
```

Read Modifications to Base Data Views online:
https://riptutorial.com/acumatica/topic/9101/modifications-to-base-data-views

Chapter 18: Modifications to Contact and Address Info through Code

Introduction

In this topic, you will learn how to modify Contact and Address information through code on different screens inside Acumatica.

Examples

Specify Contact and Address information for a new Employee

To specify Contact and Address info for an Employee, you should always invoke `Select()` method on the **Contact** and **Address** data views prior to assigning any field values. It is also recommended to assign the result of `Select()` method to the **Contact** and **Address** data views' ***Current*** property to guarantee that your code modifies the current record in **Contact** and **Address** PXCache respectively.

```
EmployeeMaint employeeMaintGraph = PXGraph.CreateInstance<EmployeeMaint>();
EPEmployee epEmployeeRow = new EPEmployee();
epEmployeeRow.AcctCD = "EMPLOYEE1";
epEmployeeRow = employeeMaintGraph.Employee.Insert(epEmployeeRow);

Contact contactRow = employeeMaintGraph.Contact.Current = employeeMaintGraph.Contact.Select();
contactRow.FirstName = "John";
contactRow.LastName = "Green";
employeeMaintGraph.Contact.Update(contactRow);

Address addressRow = employeeMaintGraph.Address.Current = employeeMaintGraph.Address.Select();
addressRow.CountryID = "US";
addressRow = employeeMaintGraph.Address.Update(addressRow);
addressRow.State = "DC";
employeeMaintGraph.Address.Update(addressRow);

epEmployeeRow.VendorClassID = "EMPSTAND";
epEmployeeRow.DepartmentID = "FINANCE";
employeeMaintGraph.Employee.Update(epEmployeeRow);

employeeMaintGraph.Actions.PressSave();
```

When inserting a new Employee, `employeeMaintGraph.Contact.Current` will always return the main contact record as the contact record gets automatically inserted into the cache and therefore becomes available via the ***Current*** property of PXCache/Data View. The use of `Select()` method is a little more generic since it will work in all possible scenarios, whether you need to insert new Employee or update an existing one.

Override Bill-To Contact and Bill-To Address Info for a Customer

When you need to override Bill-To Contact and Bill-To Address info for a Customer, the very first step is to set correct values for the ***IsBillContSameAsMain*** and ***IsBillSameAsMain*** properties of the **Customer** DAC. Don't forget to invoke `Update()` method on the **Customer** cache right after you updated ***IsBillContSameAsMain*** or ***IsBillSameAsMain*** property to commit the current ***Same as Main*** field value into the cache.

Your next step is to invoke `Select()` method on the **BillContact** and **BillAddress** data views prior to assigning any field values. It is also recommended to assign the result of `Select()` method to the **BillContact** and **BillAddress** data views' ***Current*** property to guarantee that your code modifies the current record in **Contact** and **Address** PXCache respectively.

```
public class CustomerMaintExt : PXGraphExtension<CustomerMaint>
{
    public PXAction<Customer> UpdateBillingAddress;
    [PXButton(CommitChanges = true)]
    [PXUIField(DisplayName = "Update Bill-To Info")]
    protected void updateBillingAddress()
    {
        Customer currentCustomer = Base.BAccount.Current;

        if (currentCustomer.IsBillContSameAsMain != true)
        {
            currentCustomer.IsBillContSameAsMain = true;
            Base.BAccount.Update(currentCustomer);
        }
        else
        {
            currentCustomer.IsBillContSameAsMain = false;
            Base.BAccount.Update(currentCustomer);

            Contact billContact = Base.BillContact.Current = Base.BillContact.Select();
            billContact.FullName = "ABC Holdings Inc";
            billContact.Phone1 = "+1 (212) 532-9574";
            Base.BillContact.Update(billContact);
        }

        if (currentCustomer.IsBillSameAsMain != true)
        {
            currentCustomer.IsBillSameAsMain = true;
            Base.CurrentCustomer.Update(currentCustomer);
        }
        else
        {
            currentCustomer.IsBillSameAsMain = false;
            Base.CurrentCustomer.Update(currentCustomer);

            Address billAddress = Base.BillAddress.Current = Base.BillAddress.Select();
            billAddress.AddressLine1 = "65 Broadway";
            billAddress.AddressLine2 = "Office Suite 187";
            billAddress.City = "New York";
            billAddress.CountryID = "US";
            billAddress = Base.BillAddress.Update(billAddress);
            billAddress.State = "NY";
            billAddress.PostalCode = "10004";
            Base.BillAddress.Update(billAddress);
        }

        Base.Actions.PressSave();
```

```
    }
}
```

Override Bill-To Contact and Bill-To Address Info for a Sales Order

To specify Bill-To Contact and Bill-To Address info for a Sales Order, you should always first invoke `Select()` method on the **Billing_Contact** and **Billing_Address** data views prior to assigning any field values. It is also recommended to assign the result of `Select()` method to the **Billing_Contact** and **Billing_Address** data views' ***Current*** property to guarantee that your code modifies the current record in **SOBillingContact** and **SOBillingAddress** PXCache respectively.

When you need to override Bill-To Contact and Address info for a Sales Order, set correct values for the ***OverrideContact*** and ***OverrideAddress*** properties on the **SOBillingContact** DAC and the **SOBillingAddress** DAC. Don't forget to invoke `Update()` method on the **SOBillingContact** and **SOBillingAddress** caches right after you updated ***OverrideContact*** and ***OverrideAddress*** properties to commit the changes. Once that's done, you can go ahead and specify Bill-To Contact and Address info for a Sales Order.

```
public class SOOrderEntryExt : PXGraphExtension<SOOrderEntry>
{
    public PXAction<SOOrder> UpdateBillingAddress;
    [PXButton(CommitChanges = true)]
    [PXUIField(DisplayName = "Update Bill-To Info")]
    protected void updateBillingAddress()
    {
        SOBillingContact contact = Base.Billing_Contact.Current =
Base.Billing_Contact.Select();
        if (contact.OverrideContact == true)
        {
            contact.OverrideContact = false;
            Base.Billing_Contact.Update(contact);
        }
        else
        {
            contact.OverrideContact = true;
            contact = Base.Billing_Contact.Update(contact);
            if (contact == null)
            {
                contact = Base.Billing_Contact.Current;
            }

            contact.Phone1 = "+1 (908) 643-0281";
            contact.Email = "sales@usabartend.con";
            Base.Billing_Contact.Update(contact);
        }

        SOBillingAddress address = Base.Billing_Address.Current =
Base.Billing_Address.Select();
        if (address.OverrideAddress == true)
        {
            address.OverrideAddress = false;
            Base.Billing_Address.Update(address);
        }
        else
        {
            address.OverrideAddress = true;
```

```
            address = Base.Billing_Address.Update(address);
            if (address == null)
            {
                address = Base.Billing_Address.Current;
            }

            address.AddressLine1 = "201 Lower Notch Rd";
            address.AddressLine2 = "Office Suite 1936";
            address.City = "Little Falls";
            address.CountryID = "US";
            address = Base.Billing_Address.Update(address);
            address.State = "NJ";
            address.PostalCode = "07425";
            Base.Billing_Address.Update(address);
        }

        Base.Actions.PressSave();
    }
}
```

Read Modifications to Contact and Address Info through Code online: https://riptutorial.com/acumatica/topic/10617/modifications-to-contact-and-address-info-through-code

Chapter 19: Modifying Items in a Dropdown List

Introduction

In this topic you will learn how to modify field attributes inherited from the PXStringList or PXIntList attributes. The demonstrated approach will make sure to not break functionality of the base Acumatica ERP product and require minimal maintenance, if any, while upgrading your customizations to a newer version of Acumatica.

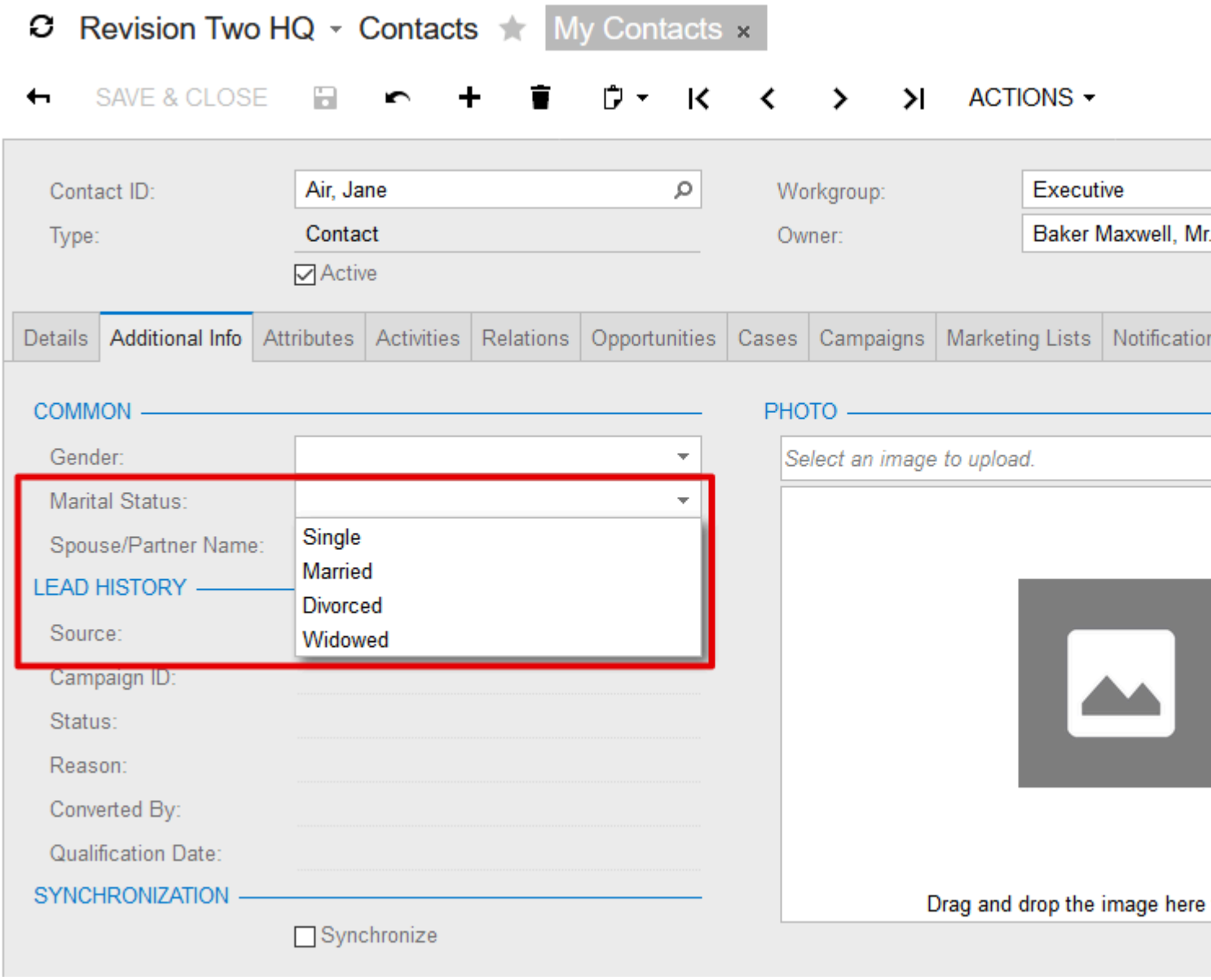
Remarks

In all samples above, you made changes to both the `_AllowedValues` and `_AllowedLabels` arrays. If your task is to modify only label (external value) of a drop-down item, consider using Translation Dictionaries. For more information on Translation Dictionaries see Acumatica ERP Documentation

Examples

Modifying Marital Statuses

In this example you will be modifying the **Marital Status** drop-down list found on the **Contacts** form (CR302000):



To add new items to the PXStringListAttribute successor

The best way to extend drop-down items hard-coded inside an attribute inherited from the PXStringList or PXIntList attribute is by increasing size of the `_AllowedValues` and `_AllowedLabels` arrays in the constructor of your custom field attribute:

```
[PXLocalizable(Messages.Prefix)]
public static class MaritalStatusesMessages
{
    public const string CommonLaw = "Living common law";
    public const string Separated = "Separated (not living common law)";
    public const string DivorcedNoCommonLaw = "Divorced (not living common law)";
    public const string NeverMarried = "Never Married";
}

public class MaritalStatusesCst1Attribute : MaritalStatusesAttribute
{
    public const string CommonLaw = "L";
    public const string Separated = "P";
    public const string NeverMarried = "N";
```

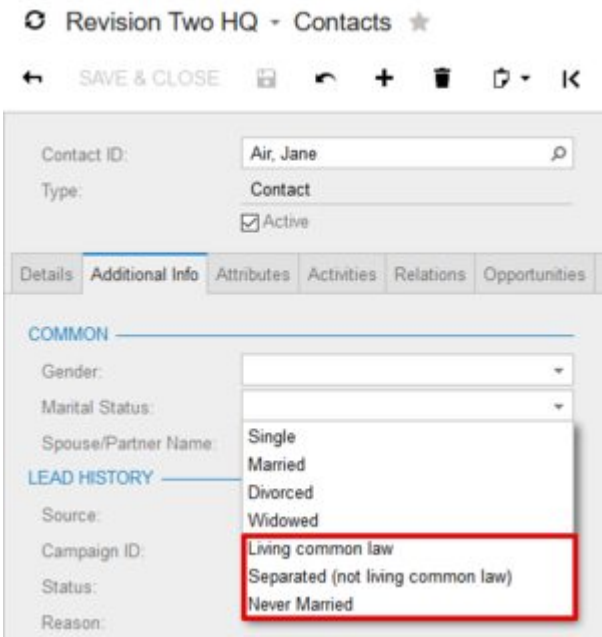
```
    public MaritalStatusesCst1Attribute()
    {
        Array.Resize(ref _AllowedValues, _AllowedValues.Length + 3);
        _AllowedValues[_AllowedValues.Length - 3] = CommonLaw;
        _AllowedValues[_AllowedValues.Length - 2] = Separated;
        _AllowedValues[_AllowedValues.Length - 1] = NeverMarried;
        Array.Resize(ref _AllowedLabels, _AllowedLabels.Length + 3);
        _AllowedLabels[_AllowedLabels.Length - 3] = MaritalStatusesMessages.CommonLaw;
        _AllowedLabels[_AllowedLabels.Length - 2] = MaritalStatusesMessages.Separated;
        _AllowedLabels[_AllowedLabels.Length - 1] = MaritalStatusesMessages.NeverMarried;
    }
}
```

In the sample above, you increased size of the `_AllowedValues` and `_AllowedLabels` arrays to add 3 additional items to the **Marital Status** drop-down list. Internal values, stored in the `_AllowedValues` array, will be assigned to DAC fields and saved in database, and external values from the `_AllowedValues` array represent internal values in the UI.

To test the results, in the Contact DAC extension, decorate **MaritalStatus** field with the `MaritalStatusesCst1Attribute`:

```
public class ContactExt : PXCacheExtension<Contact>
{
    [PXRemoveBaseAttribute(typeof(MaritalStatusesAttribute))]
    [PXMergeAttributes(Method = MergeMethod.Append)]
    [MaritalStatusesCst1]
    public string MaritalStatus { get; set; }
}
```

Now there are 7 items in the **Marital Status** drop-down list:



To remove items declared in the PXStringListAttribute successor

To remove specific drop-down item, that was hard-coded inside an attribute inherited from the PXStringList or PXIntList attribute, you need to decrease size of the `_AllowedValues` and `_AllowedLabels` arrays in the constructor of your custom field attribute:

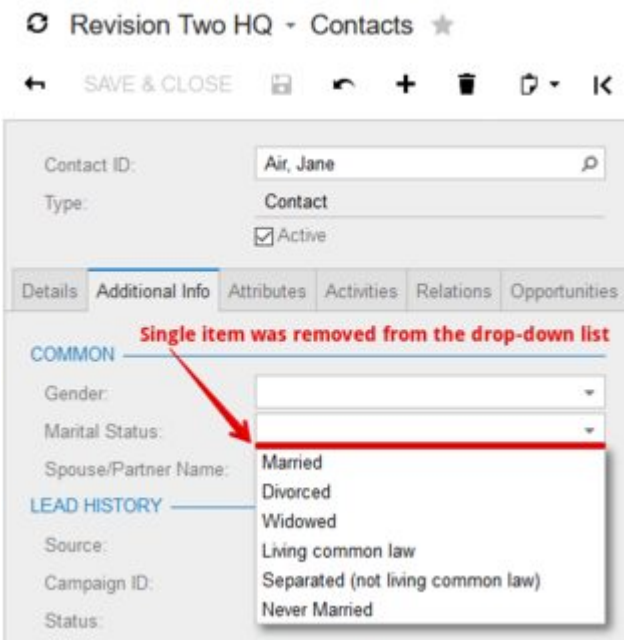
```
public class MaritalStatusesCst2Attribute : MaritalStatusesCst1Attribute
{
    public MaritalStatusesCst2Attribute()
    {
        string[] allowedValues = new string[_AllowedValues.Length - 1];
        string[] allowedLabels = new string[_AllowedLabels.Length - 1];
        Array.Copy(_AllowedValues, 1, allowedValues, 0, _AllowedValues.Length - 1);
        Array.Copy(_AllowedLabels, 1, allowedLabels, 0, _AllowedValues.Length - 1);
        _AllowedValues = allowedValues;
        _AllowedLabels = allowedLabels;
    }
}
```

In the sample above, you decreased size of the `_AllowedValues` and `_AllowedLabels` arrays to remove ***Single*** item from the **Marital Status** drop-down list.

To test the results, in the Contact DAC extension, decorate **MaritalStatus** field with the `MaritalStatusesCst2Attribute`:

```
public class ContactExt : PXCacheExtension<Contact>
{
    [PXRemoveBaseAttribute(typeof(MaritalStatusesAttribute))]
    [PXMergeAttributes(Method = MergeMethod.Append)]
    [MaritalStatusesCst2]
    public string MaritalStatus { get; set; }
}
```

Now there are only 6 items: 3 original and 3 custom - in the **Marital Status** drop-down list:



To replace items declared in the PXStringListAttribute

successor

To replace specific drop-down item, originally hard-coded inside an attribute inherited from the PXStringList or PXIntList attribute, you need to update appropriate value in the `_AllowedValues` and `_AllowedLabels` arrays in the constructor of your custom field attribute:

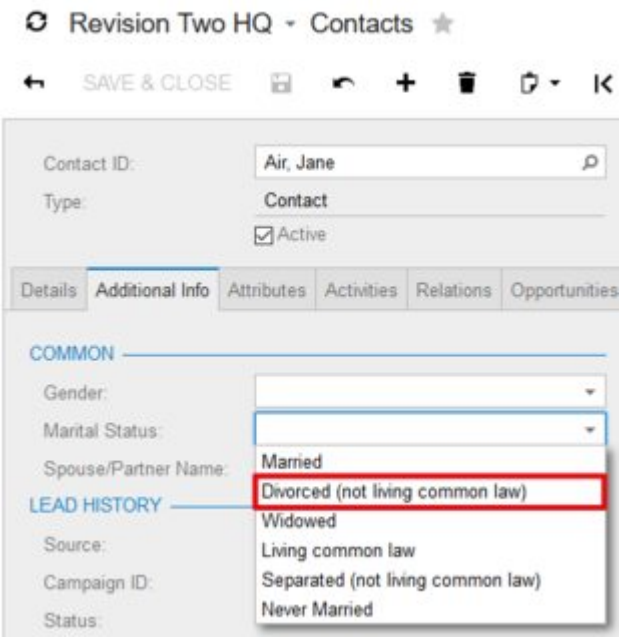
```
public class MaritalStatusesCst3Attribute : MaritalStatusesCst2Attribute
{
    public const string DivorcedNoCommonLaw = "V";

    public MaritalStatusesCst3Attribute()
    {
        _AllowedValues[Array.IndexOf(_AllowedValues, Divorced)] = DivorcedNoCommonLaw;
        _AllowedLabels[Array.IndexOf(_AllowedLabels, Messages.Divorced)] =
MaritalStatusesMessages.DivorcedNoCommonLaw;
    }
}
```

In the sample above, you replaced ***D*** - ***Divorced*** item with ***V*** - ***Divorced (not living common law)*** in the `_AllowedValues` and `_AllowedLabels` arrays respectively. By doing so, we replace both internal and external values of a drop-down item.

To test the results, in the Contact DAC extension, decorate **MaritalStatus** field with the `MaritalStatusesCst3Attribute`:

```
public class ContactExt : PXCacheExtension<Contact>
{
    [PXRemoveBaseAttribute(typeof(MaritalStatusesAttribute))]
    [PXMergeAttributes(Method = MergeMethod.Append)]
    [MaritalStatusesCst3]
    public string MaritalStatus { get; set; }
}
```

Now there are only 6 items: 2 original, 3 custom and 1 replaced - in the **Marital Status** drop-down list:



Read Modifying Items in a Dropdown List online:
https://riptutorial.com/acumatica/topic/9392/modifying-items-in-a-dropdown-list

Chapter 20: Populating report with data through code

Examples

This article covers example showing how to create report using memory records:

This example shows how to populate report with data returned by a data view delegate. During the exercise, we will develop an inquiry screen showing list of Sales Orders between two dates. Data view delegate will be used to populate Sales Order information.

Prerequisites:

1. We start with declaration of the SOOrderFilter DAC:

```
[Serializable]
public class SOOrderFilter : IBqlTable
{
    public abstract class dateFrom : IBqlField
    {
    }
    [PXDate()]
    [PXUIField(DisplayName = "Date From")]
    public DateTime? DateFrom { get; set; }

    public abstract class dateTo : IBqlField
    {
    }
    [PXDate()]
    [PXUIField(DisplayName = "Date To")]
    public DateTime? DateTo { get; set; }
}
```

2. Continue with declaration of the SOOrderData DAC:

```
[Serializable]
public class SOOrderData : IBqlTable
{
    #region OrderType
    public abstract class orderType : PX.Data.IBqlField
    {
    }
    [PXString(2, IsKey = true, IsFixed = true)]
    [PXUIField(DisplayName = "Type")]
    public virtual string OrderType { get; set; }
    #endregion
    #region OrderNbr
    public abstract class orderNbr : PX.Data.IBqlField
    {
    }
```

```
    [PXString(15, IsKey = true, IsUnicode = true, InputMask = ">CCCCCCCCCCCCCCC")]
    [PXUIField(DisplayName = "Order Nbr.")]
    public virtual string OrderNbr { get; set; }
    #endregion
    #region OrderDate
    public abstract class orderDate : PX.Data.IBqlField
    {
    }
    [PXDate]
    [PXUIField(DisplayName = "Date")]
    public virtual DateTime? OrderDate { get; set; }
    #endregion
    #region Status
    public abstract class status : PX.Data.IBqlField
    {
    }
    [PXString(1, IsFixed = true)]
    [PXUIField(DisplayName = "Status")]
    [SOOrderStatus.List()]
    public virtual string Status { get; set; }
    #endregion
    #region OrderDesc
    public abstract class orderDesc : PX.Data.IBqlField
    {
    }
    [PXString(60, IsUnicode = true)]
    [PXUIField(DisplayName = "Description", Visibility = PXUIVisibility.SelectorVisible)]
    public virtual string OrderDesc { get; set; }
    #endregion
    #region OrderTotal
    public abstract class orderTotal : PX.Data.IBqlField
    {
    }
    [PXDecimal(4)]
    [PXDefault(TypeCode.Decimal, "0.0")]
    public virtual decimal? OrderTotal { get; set; }
    #endregion
    #region DueDate
    public abstract class dueDate : PX.Data.IBqlField
    {
    }
    [PXDate]
    [PXUIField(DisplayName = "Due Date")]
    public virtual DateTime? DueDate { get; set; }
    #endregion
}
```

3. In PX.Documentation namespace create your SOOrderInq BLC using the code snippet below to declare Results data view delegate, which will later use to populate report with data:

```
public class SOOrderInq : PXGraph<SOOrderInq>
{
    public PXCancel<SOOrderFilter> Cancel;
    public PXFilter<SOOrderFilter> Filter;

    [PXFilterable]
    public PXSelectOrderBy<SOOrderData,
        OrderBy<Desc<SOOrderData.orderNbr>>> Result;
    protected virtual IEnumerable result()
```

```
    {
        BqlCommand cmd = PXSelect<SOOrder,
            Where<SOOrder.orderDate,
                Between<Current<SOOrderFilter.dateFrom>,
                    Current<SOOrderFilter.dateTo>>>>.GetCommand();
        PXView inView = new PXView(this, true, cmd);
        int startRow = PXView.StartRow;
        int totalRows = 0;
        foreach (SOOrder order in inView.Select(PXView.Currents, PXView.Parameters,
            PXView.Searches, PXView.SortColumns, PXView.Descendings, PXView.Filters,
            ref startRow, PXView.MaximumRows, ref totalRows))
        {
            yield return new SOOrderData
            {
                OrderType = order.OrderType,
                OrderNbr = order.OrderNbr,
                OrderDate = order.OrderDate,
                Status = order.Status,
                OrderDesc = order.OrderDesc,
                OrderTotal = order.OrderTotal,
                DueDate = order.DueDate,
            };
        }
        PXView.StartRow = 0;
    }

    public SOOrderInq()
    {
        Result.Cache.AllowInsert = false;
        Result.Cache.AllowUpdate = false;
        Result.Cache.AllowDelete = false;
    }

    public PXAction<SOOrderFilter> Report;
    [PXButton]
    [PXUIField(DisplayName = "View As Report", MapEnableRights = PXCacheRights.Select,
MapViewRights = PXCacheRights.Select)]
    protected virtual void report()
    {
        PXReportResultset reportData = new PXReportResultset(typeof(SOOrderData));
        foreach (SOOrderData row in Result.Select())
        {
            reportData.Add(row);
        }
        throw new PXReportRequiredException(reportData, "SO610501",
PXBaseRedirectException.WindowMode.NewWindow, "Report");
    }
}
```

4. Create SO401090.aspx page by selecting FormDetail template, and set the following properties for PXDataSource:

- PrimaryView: Filter
- TypeName: PX.Documentation.SOOrderInq

After that add input control on the Filter header form:

```
<px:PXFormView ID="form" runat="server" DataSourceID="ds" Style="z-index: 100"
    Width="100%" DataMember="Filter">
    <Template>
        <px:PXLayoutRule runat="server" StartRow="True" Merge="True" LabelsWidth="XS"
ControlSize="S" />
        <px:PXDateTimeEdit ID="edDateFrom" runat="server" CommitChanges="True"
DataField="DateFrom" />
        <px:PXDateTimeEdit ID="edDateTo" runat="server" CommitChanges="True"
DataField="DateTo" />
        <px:PXLayoutRule runat="server" />
    </Template>
</px:PXFormView>
```

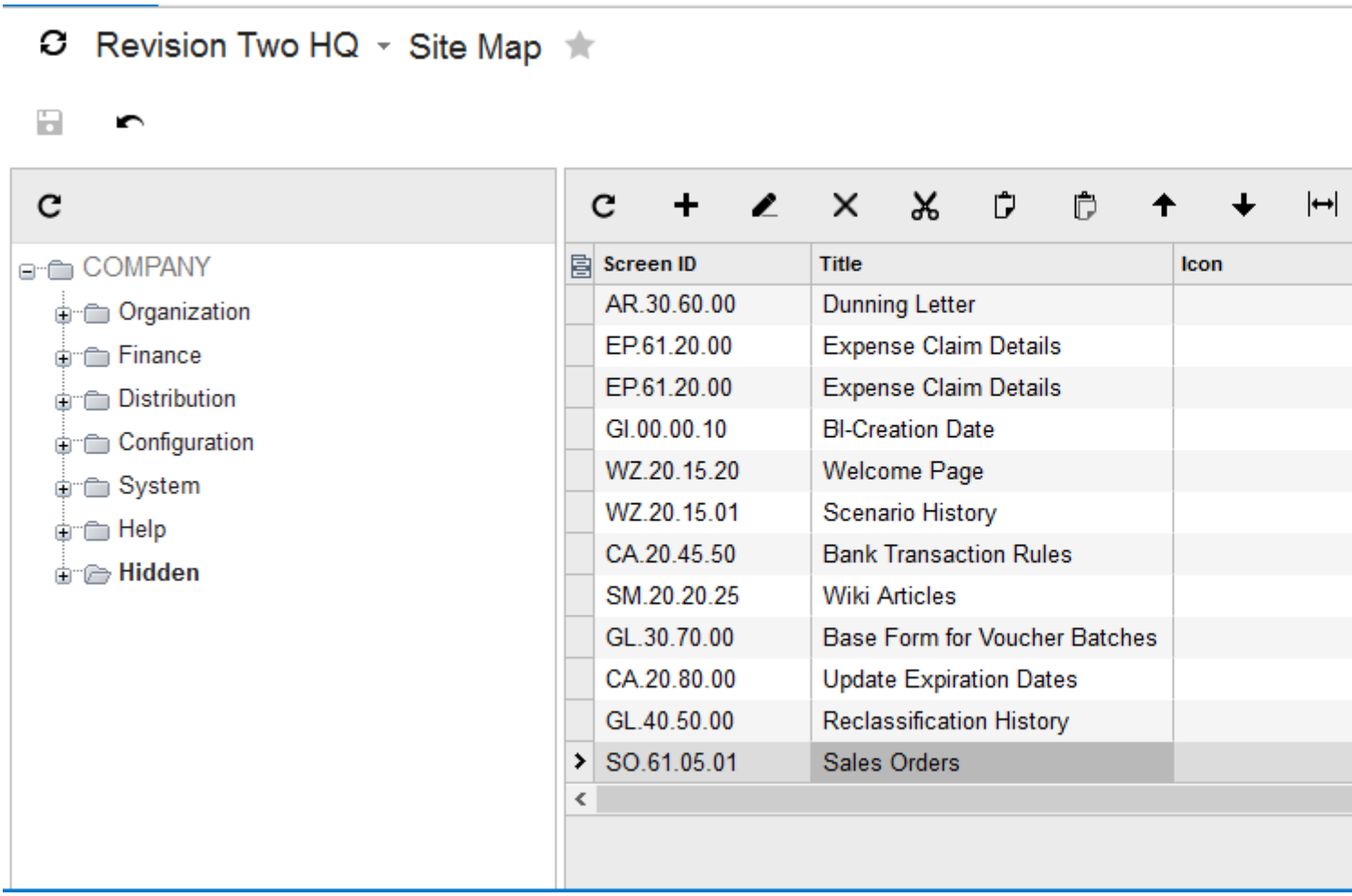
And create the following columns for the Detail grid:

```
<px:PXGrid ID="grid" runat="server" DataSourceID="ds" Style="z-index: 100"
    Width="100%" Height="150px" SkinID="Inquire" AllowPaging="True"
AdjustPageSize="Auto">
    <Levels>
        <px:PXGridLevel DataMember="Result">
            <Columns>
                <px:PXGridColumn DataField="OrderType" />
                <px:PXGridColumn DataField="OrderNbr" Width="90px" />
                <px:PXGridColumn DataField="OrderDate" Width="90px" />
                <px:PXGridColumn DataField="Status" />
                <px:PXGridColumn DataField="OrderDesc" Width="200px" />
                <px:PXGridColumn DataField="DueDate" Width="90px" />
            </Columns>
        </px:PXGridLevel>
    </Levels>
    <AutoSize Container="Window" Enabled="True" MinHeight="150" />
</px:PXGrid>
```

5. Add created screen to the Site Map

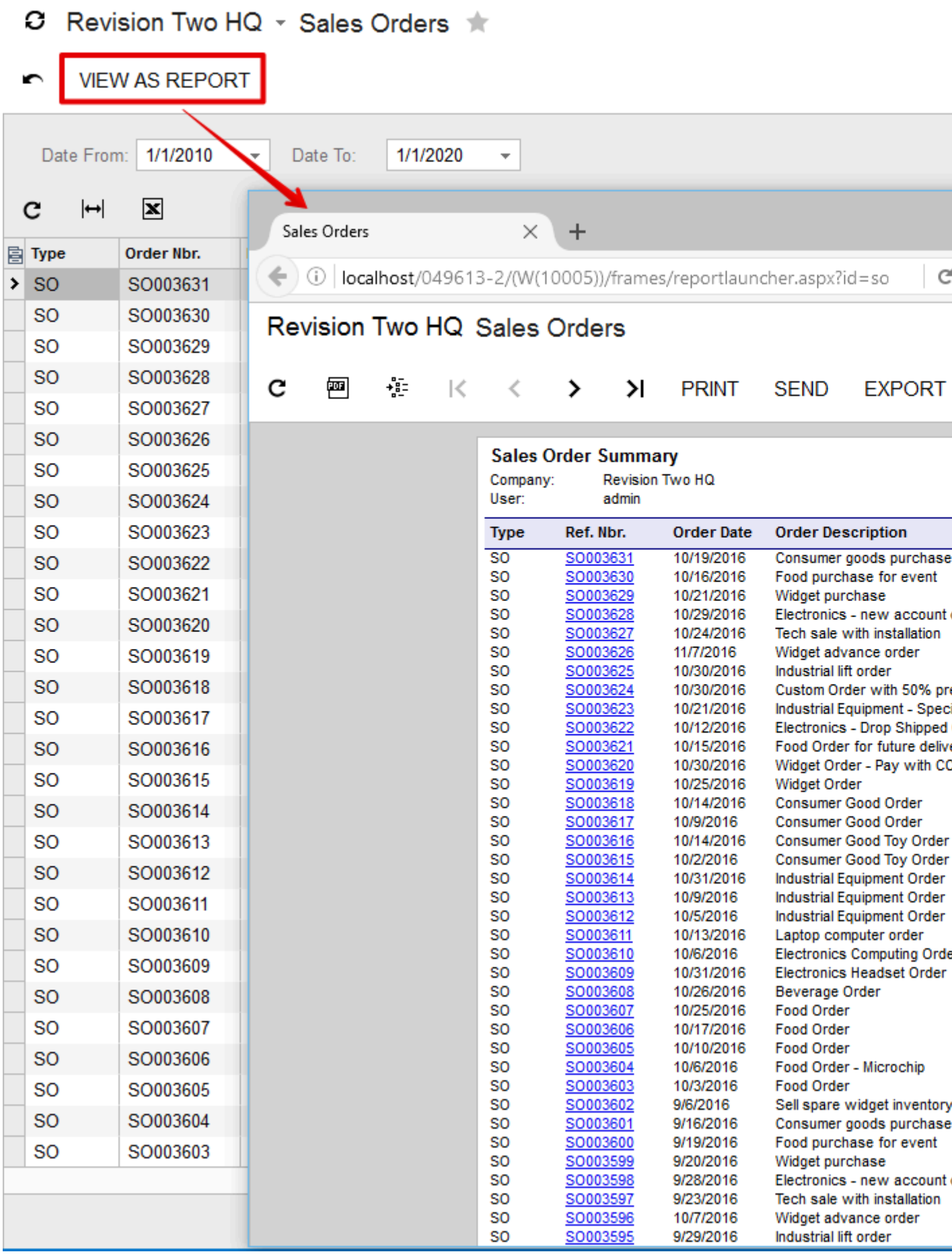
To populate report with data returned by a data view delegate:

1. Paste SO610501.rpx report file in ReportsCustomized folder of your Acumatica website, then add Sales Orders report in the Site Map **Hidden** folder



2. Declare **View as Report** action in the SOOrderInq BLC to generate and show Sales Orders report. The PXReportRequiredException accepts PXReportResultset prepared inside the action to populate report with data returned by **Result** data view delegate:

```
public class SOOrderInq : PXGraph<SOOrderInq>
{
    ...

    public PXAction<SOOrderFilter> Report;
    [PXButton]
    [PXUIField(DisplayName = "View as Report", MapEnableRights = PXCacheRights.Select,
MapViewRights = PXCacheRights.Select)]
    protected virtual void report()
    {
        PXReportResultset reportData = new PXReportResultset(typeof(SOOrderData));
        foreach (SOOrderData row in Result.Select())
        {
            reportData.Add(row);
        }
        throw new PXReportRequiredException(reportData, "SO610501",
PXBaseRedirectException.WindowMode.NewWindow, "Report");
    }
}
```



Read Populating report with data through code online:
https://riptutorial.com/acumatica/topic/7700/populating-report-with-data-through-code

Chapter 21: Publishing skipped already applied customization content

Introduction

When publishing a customization project, you might see some item being skipped for the reason of being already applied. Ex:

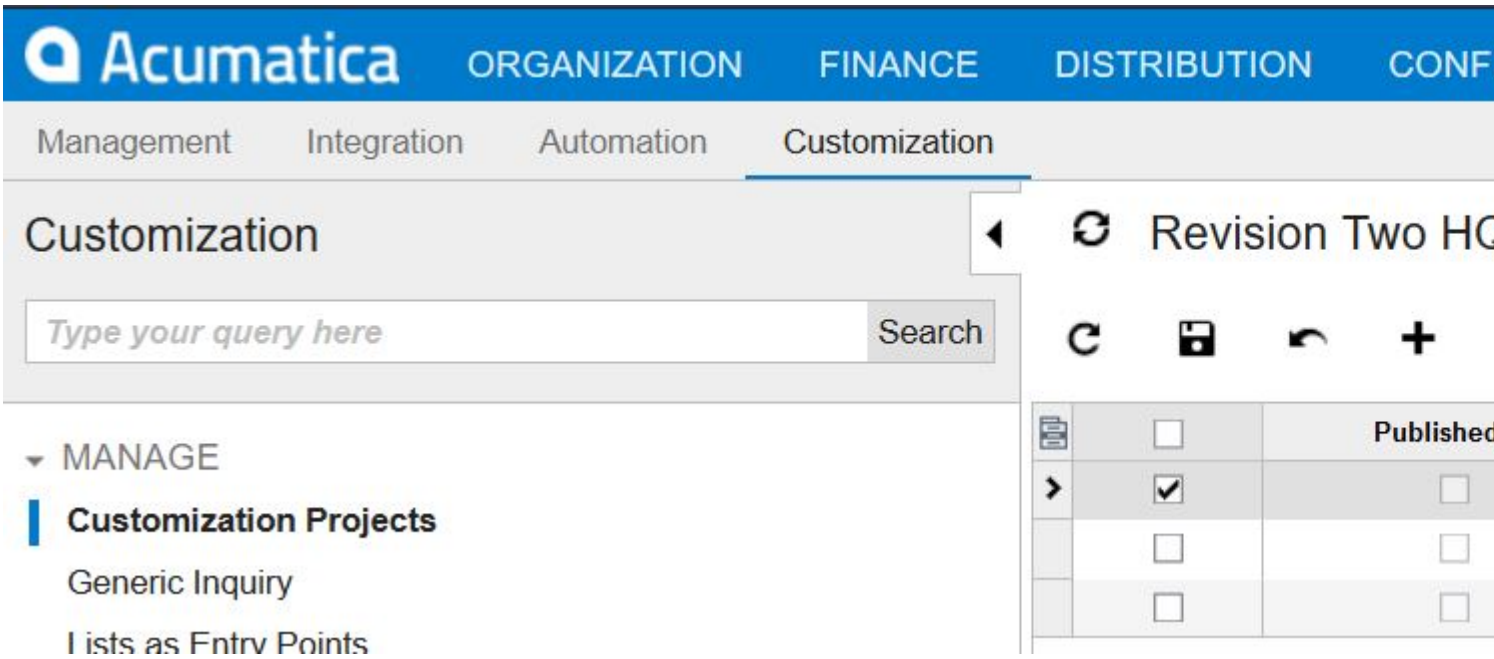
EntityEndpoint EntityEndpoint#6.00.001§DefaultPlus(skipped, already applied)

This can happen for any items contained saved in the database. Ex: Generic inquiries, reports, site map nodes, DB scripts, system locales, import/export scenarios, shared filters, access rights, wikis, web service endpoints and analytical reports.

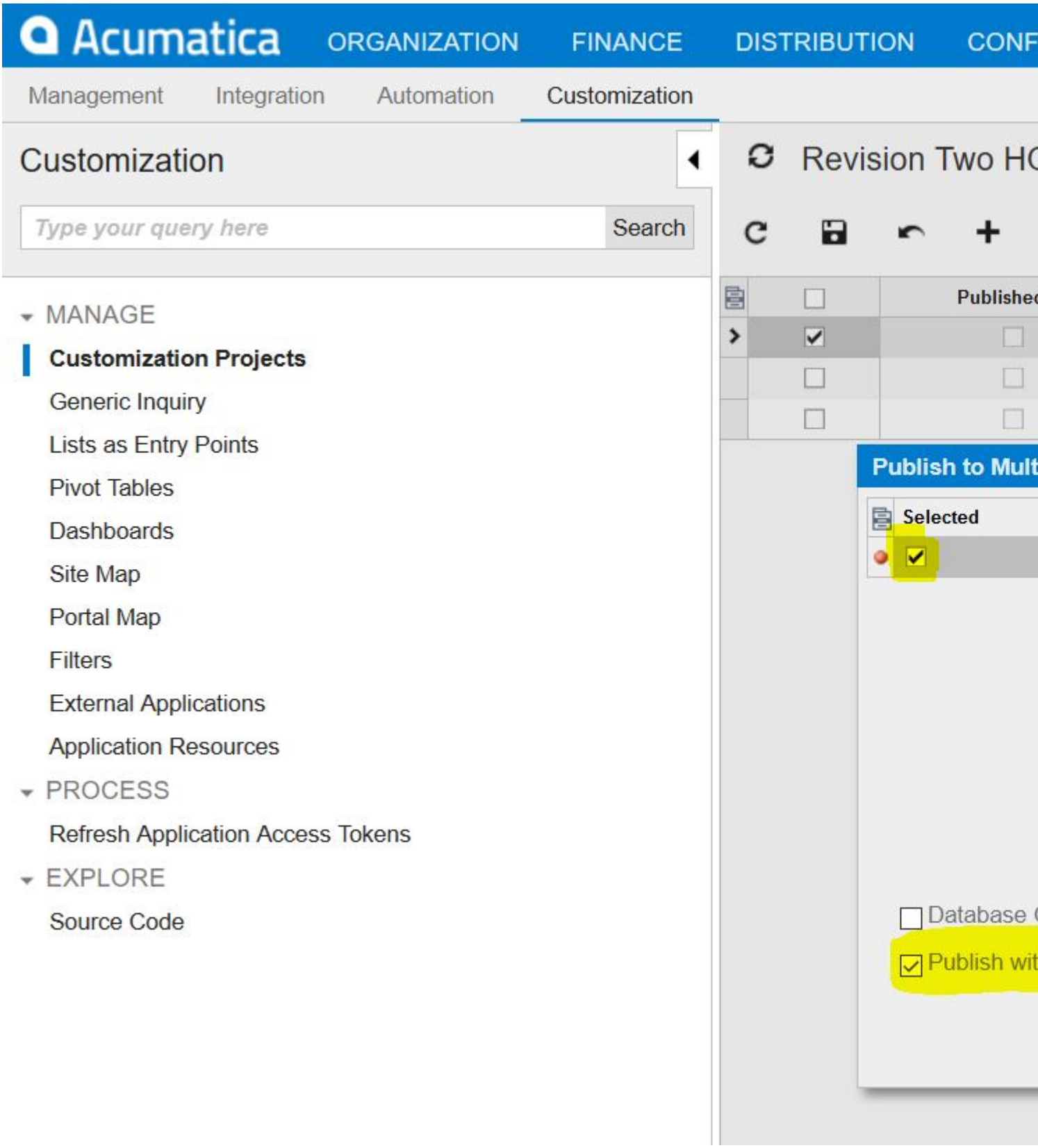
Examples

Publish with cleanup from the customization screen

1. You must obviously select the project that you want to publish.
2. You must click on the small arrow right next to the "Publish" button.
3. You must click on the "Publish to Multiple Companies" option.

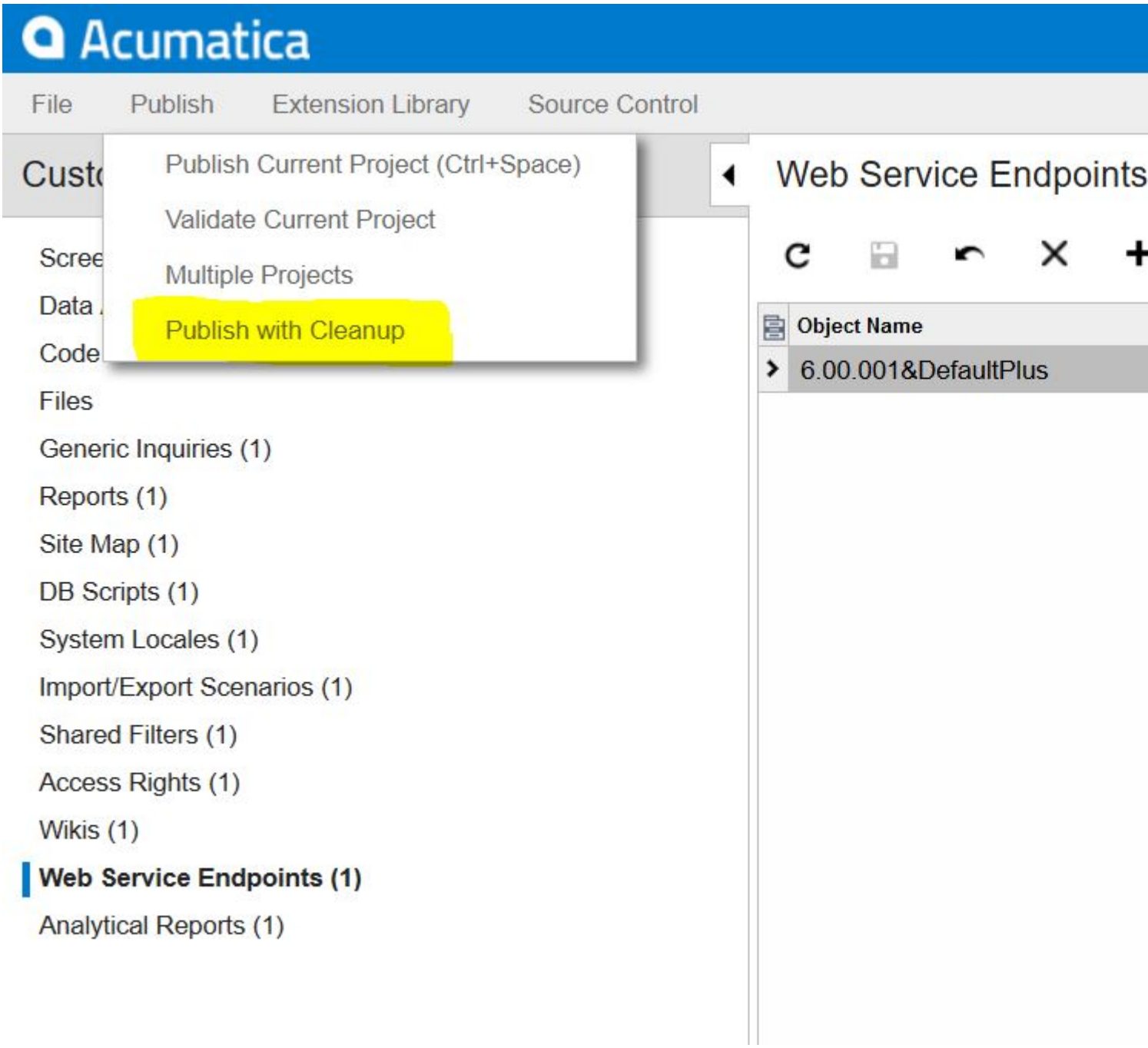


4. On the smart panel that will appear you must select the companies that you want to publish the project(s). Only one company is also a possibility.
5. Check the check box indicating "Publish with Cleanup", this will make sure to reapply all item present in the customization project replacing the already present one with their newer version.



Publish with clean up from inside a customization project

1. Open the customization project that you want to publish with this method.
2. Open the publish menu at the top and select the "Publish with Cleanup" option.



*Please take note that all customization project that are selected on the customization screen will be republish even if you are inside only a single project.

Read Publishing skipped already applied customization content online: https://riptutorial.com/acumatica/topic/10155/publishing-skipped-already-applied-customization-content

Chapter 22: Replacing Images on the Login Page

Introduction

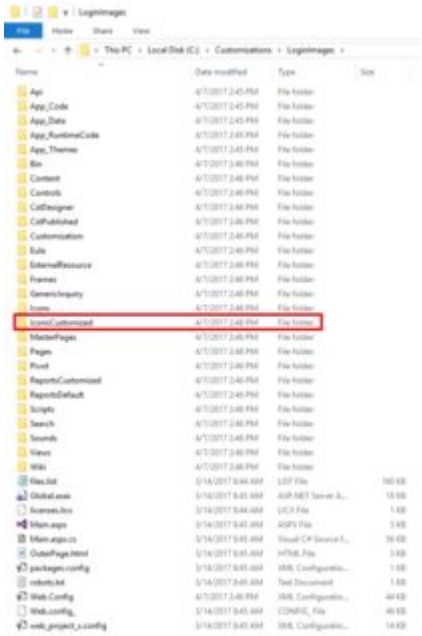
In this topic you will learn how to replacing standard Acumatica images on the login page. The demonstrated approach will make sure to keep your custom images on login page after the upgrade to a newer version and restore original images, provided by Acumatica, if at some point your customization appears unpublished.

Examples

Using customization to replace images on the login page

To create a customization package replacing images on the login page, follow the steps below on your **local Acumatica instance**:

1. Create a new folder in the Acumatica instance folder. For this example I added a folder called ***IconsCustomized*** in my local **LoginImages** instance:

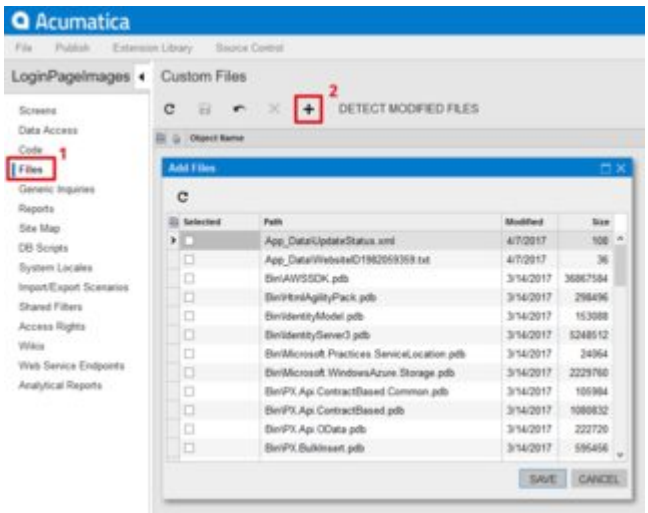


2. Add your custom images in this folder. For the sake of this example, I used images from Acumatica 4.2 login page:

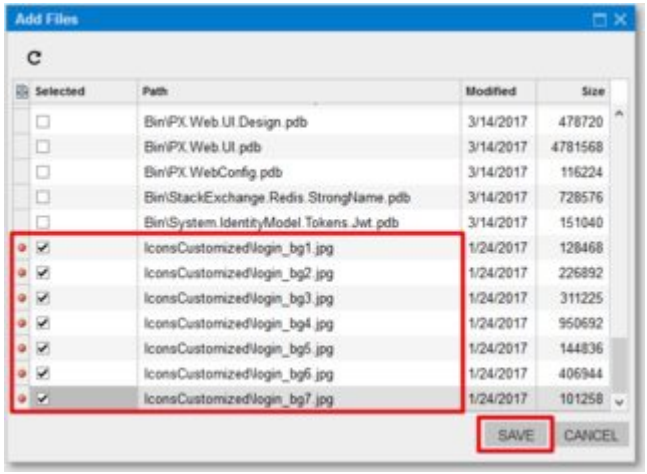
Keep in mind, ***to replace all images on the login page***, you have to add at least as many custom images in your **IconsCustomized** folder as the number of the `login_bg*.*` files originally present in the **Icons** folder of your Acumatica website. It's perfectly fine to use same image or images multiple times (by naming the files differently), if the number of your custom images is less then what was originally provided by Acumatica.

3. Now login to your Acumatica application, create new customization project called ***LoginPageImages*** and open it in Customization Manager.

4. In Customization Manager, navigate to the **Files** section and click the **Add New Record** button to open the **Add Files** dialog:

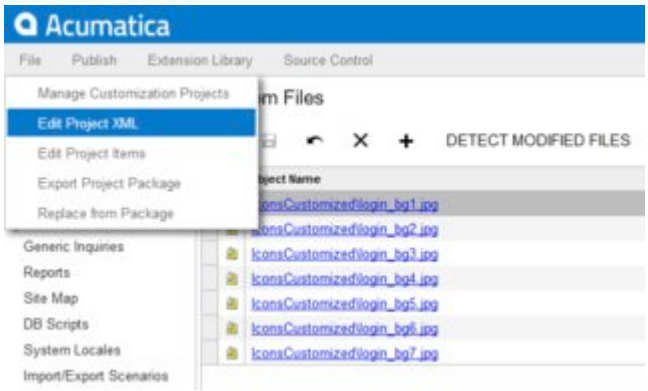


5. In the Add Files dialog, select all files from your **IconsCustomized** folder and click **Save**:

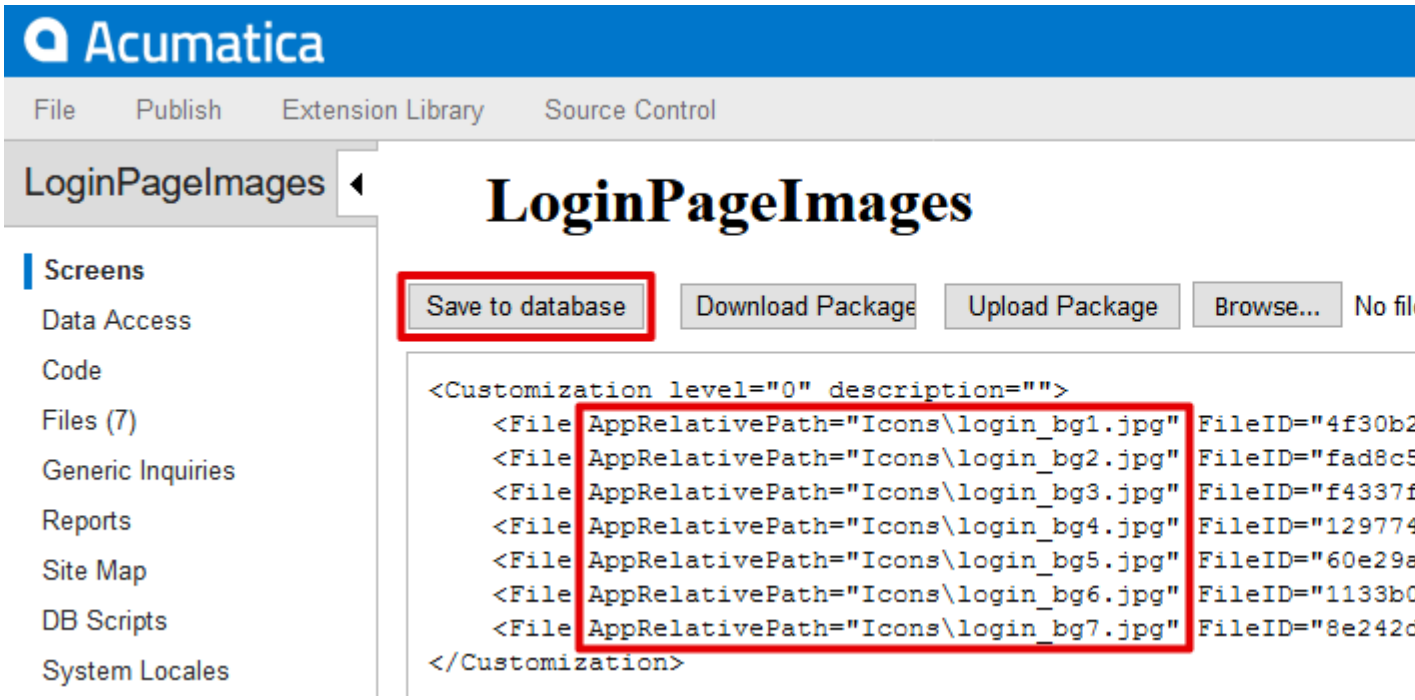


Now you have the custom login page images in the customization project, but you still need to edit the path so they correctly replace the standard images.

6. In Customization Manager, select **Edit Project XML** from the **File** menu:

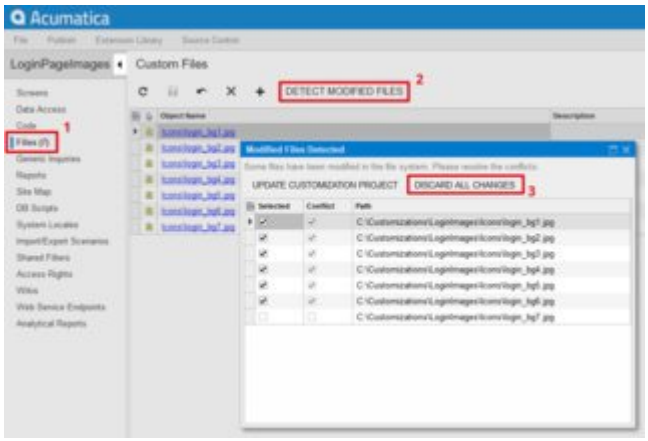


7. For all the **File** tags, generated for your custom images, charge the **AppRelativePath** attribute to ***AppRelativePath="Icons..."*** and set the **SystemFile** attribute to ***True*** for those images, that currently present in the **Icons** folder, then click the **Save to Database** button when done:



While publishing customization, Acumatica will automatically backup files currently present in the website folder, which are replaced by files from the customization with **SystemFile** attribute set ***True***.

8. If you now proceed with publishing the customization, it's very likely for **Some files have been modified in the file system.** error message to show up. To prevent this quite frightening message from appearing, open you project in Customization Manager, navigate to the **Files** section and click **Detect Modified Files** to open the **Modified Files Detected** dialog, then click the **Discard All Changes** button:



9. Now you can go ahead and publish the customization to enjoy your custom images on the login page:

Read Replacing Images on the Login Page online:
https://riptutorial.com/acumatica/topic/9657/replacing-images-on-the-login-page

Chapter 23: Significant API Changes Between Versions

Examples

PXSelectGroupBy and Bit Values in Acumatica 5.1 and 5.2+

The method of SQL generation from BQL `PXSelectGroupBy<>` data views has been changed in Acumatica Framework 5.2.

The sections below illustrate the differences using the example of `PXSelectGroupBy<FinYear, Aggregate<GroupBy<FinYear.finPeriods>>>.Select(graph)`:

Acumatica Framework 5.2 and Later

```
SELECT Max([finyear].[year]),
       Max([finyear].[startdate]),
       Max([finyear].[enddate]),
       [finyear].[finperiods],
       -- Attention!
       CONVERT (BIT, Max([finyear].[customperiods] + 0)),
       --
       Max([finyear].[begfinyearhist]),
       Max([finyear].[periodsstartdatehist]),
       Max([finyear].[noteid]),
       ( NULL ),
       ( NULL ),
       ( NULL ),
       Max([finyear].[tstamp]),
       Max([finyear].[createdbyid]),
       Max([finyear].[createdbyscreenid]),
       Max([finyear].[createddatetime]),
       Max([finyear].[lastmodifiedbyid]),
       Max([finyear].[lastmodifiedbyscreenid]),
       Max([finyear].[lastmodifieddatetime])
FROM   finyear FinYear
WHERE  ( finyear.companyid = 2 )
GROUP  BY [finyear].[finperiods]
ORDER  BY Max([finyear].[year])
```

Acumatica Framework 5.1 and Earlier

```
SELECT Max([finyear].[year]),
       Max([finyear].[startdate]),
       Max([finyear].[enddate]),
       [finyear].[finperiods],
       -- Attention!
       ( NULL ),
```

```
        --
        Max([finyear].[begfinyearhist]),
        Max([finyear].[periodsstartdatehist]),
        ( NULL ),
        ( NULL ),
        ( NULL ),
        Max([finyear].[tstamp]),
        ( NULL ),
        Max([finyear].[createdbyscreenid]),
        Max([finyear].[createddatetime]),
        ( NULL ),
        Max([finyear].[lastmodifiedbyscreenid]),
        Max([finyear].[lastmodifieddatetime])
FROM    finyear FinYear
WHERE   ( finyear.companyid = 2 )
GROUP   BY [finyear].[finperiods]
ORDER   BY Max([finyear].[year])
```

Explanation

By default, the `Max()` aggregate is applied to all fields not explicitly mentioned in a BQL statement.

However, in Acumatica 5.1 and earlier, it excludes the `CreatedByID`, `LastModifiedByID`, and `bool` fields. When translated into SQL, these fields will always be `null` unless you explicitly grouped by.

Starting from version 5.2, `Max()` will be applied by default for them, too.

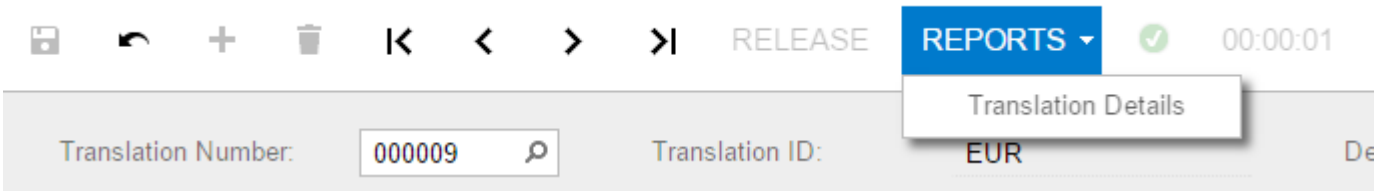
Read Significant API Changes Between Versions online:
https://riptutorial.com/acumatica/topic/9697/significant-api-changes-between-versions

Chapter 24: User Interface Techniques

Examples

Creating a Dropdown Menu for a Screen

Suppose that you need to define a dropdown menu for a particular Acumatica screen, such as the Reports menu on the following screenshot.



This can be achieved in three different ways:

- By adding a toolbar with a menu item to the screen's ASPX
- By declaring a special "folder" action to the graph and adding menu items in the code
- By using the Automation subsystem of the Acumatica Framework (not covered by this example)

Option 1: Creating a Dropdown Menu in ASPX

First of all, make sure that the ASPX page's PXDataSource element contains all the necessary commands corresponding to the graph actions that you would like to perform when clicking on a menu item.

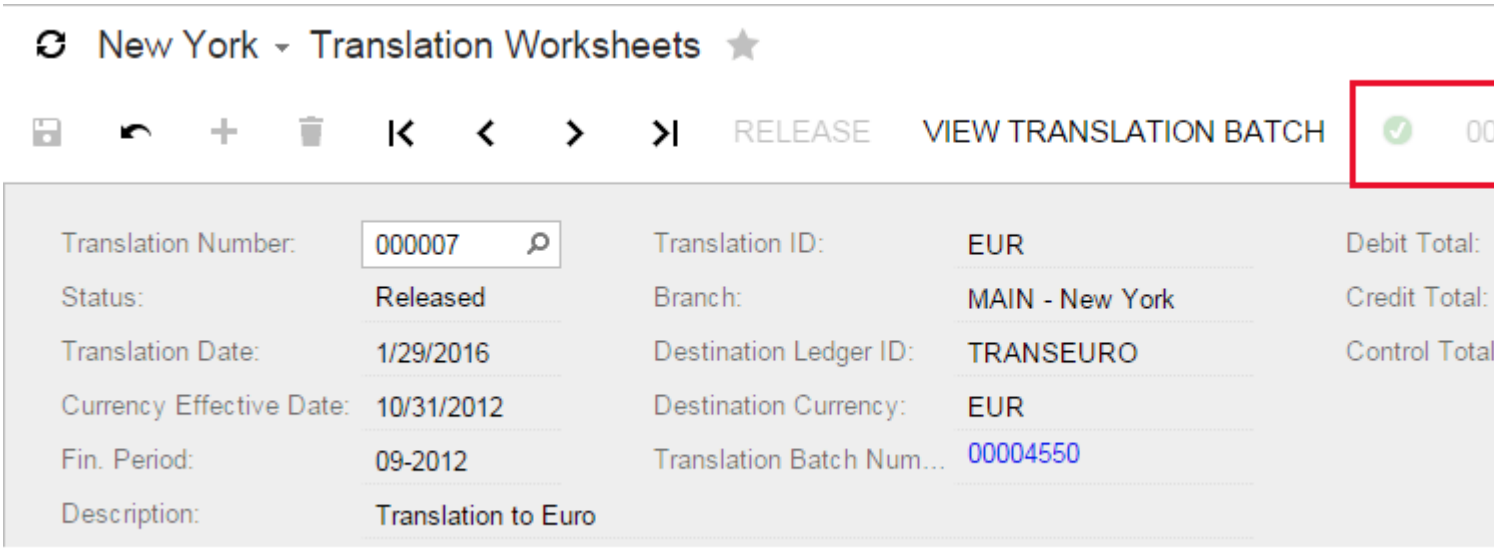
```
<px:PXDataSource
    ID="ds" runat="server" Visible="True" PrimaryView="TranslHistRecords"
TypeName="PX.Objects.CM.TranslationHistoryMaint">
    <CallbackCommands>
        ...
        <px:PXDSCallbackCommand Name="TranslationDetailsReport" Visible="False"/>
        ...
    </CallbackCommands>
</px:PXDataSource>
```

Next, add a custom toolbar element right after the PXDataSource element. Within it, define a PXToolbarButton with the desired dropdown menu items linking to the respective datasource commands, as shown in the following code.

```
<px:PXToolBar ID="toolbar1" runat="server" SkinID="Navigation" BackColor="Transparent"
CommandSourceID="ds">
```

```
    <Items>
        <px:PXToolBarButton Text="Reports">
            <MenuItems>
                <px:PXMenuItem Text="Translation Details" CommandSourceID="ds"
CommandName="TranslationDetailsReport"/>
            </MenuItems>
        </px:PXToolBarButton>
    </Items>
    <Layout ItemsAlign="Left" />
</px:PXToolBar>
```

This option might look tempting due to its simplicity; however, there is one **important drawback**. If you implement such a dropdown on a screen with a processing indicator (such as a document release screen or a mass-processing screen), the indicator will appear to the left of your dropdown menu, as shown below.



If this is not desirable, consider defining a dropdown menu in the code as described in the Option 2 section below.

Option 2: Creating a Menu in the Graph

First, in the page's graph, declare a "folder" action that will correspond to the dropdown menu button.

```
public PXAction<TranslationHistory> reportsFolder;
[PXUIField(DisplayName = "Reports", MapEnableRights = PXCacheRights.Select)]
[PXButton(SpecialType = PXSpecialButtonType.Report)]
protected virtual IEnumerable Reportsfolder(PXAdapter adapter)
{
    return adapter.Get();
}
```

Next, in the graph's constructor, indicate that the action is indeed a dropdown menu and add all actions that need to be displayed as menu items, as shown below.

```
public TranslationHistoryMaint()
{
    this.reportsFolder.MenuAutoOpen = true;
    this.reportsFolder.AddMenuAction(this.translationDetailsReport);
}
```

If you select this approach, the processing indicator will always appear to the right of your menu, which is arguably better UX.

Read User Interface Techniques online: https://riptutorial.com/acumatica/topic/10150/user-interface-techniques

Chapter 25: Using Customization Plug-In to Make Changes in Multiple Companies

Introduction

With classes derived from **CustomizationPlug** you can utilize capabilities of the Acumatica Customization Platform and execute custom code after the customization project has been published. In this topic you will learn how customization plug-ins can be used to make changes in multiple companies.

More information on customization plug-ins is available in Acumatica Customization Guide

Examples

Implementation of a customization plug-in to update multiple companies

To create a customization plugin, you simply create a class derived from **CustomizationPlug** and package it into customization. While the system is publishing customization project, it will execute the **OnPublished** and **UpdateDatabase** methods implemented in your customization plugin ***only within the current company scope***.

With that said, customization plug-in will never make changes to any other than current company, unless it uses **PXLoginScope** to log into all companies, one after the other, available to the current user publishing customization.

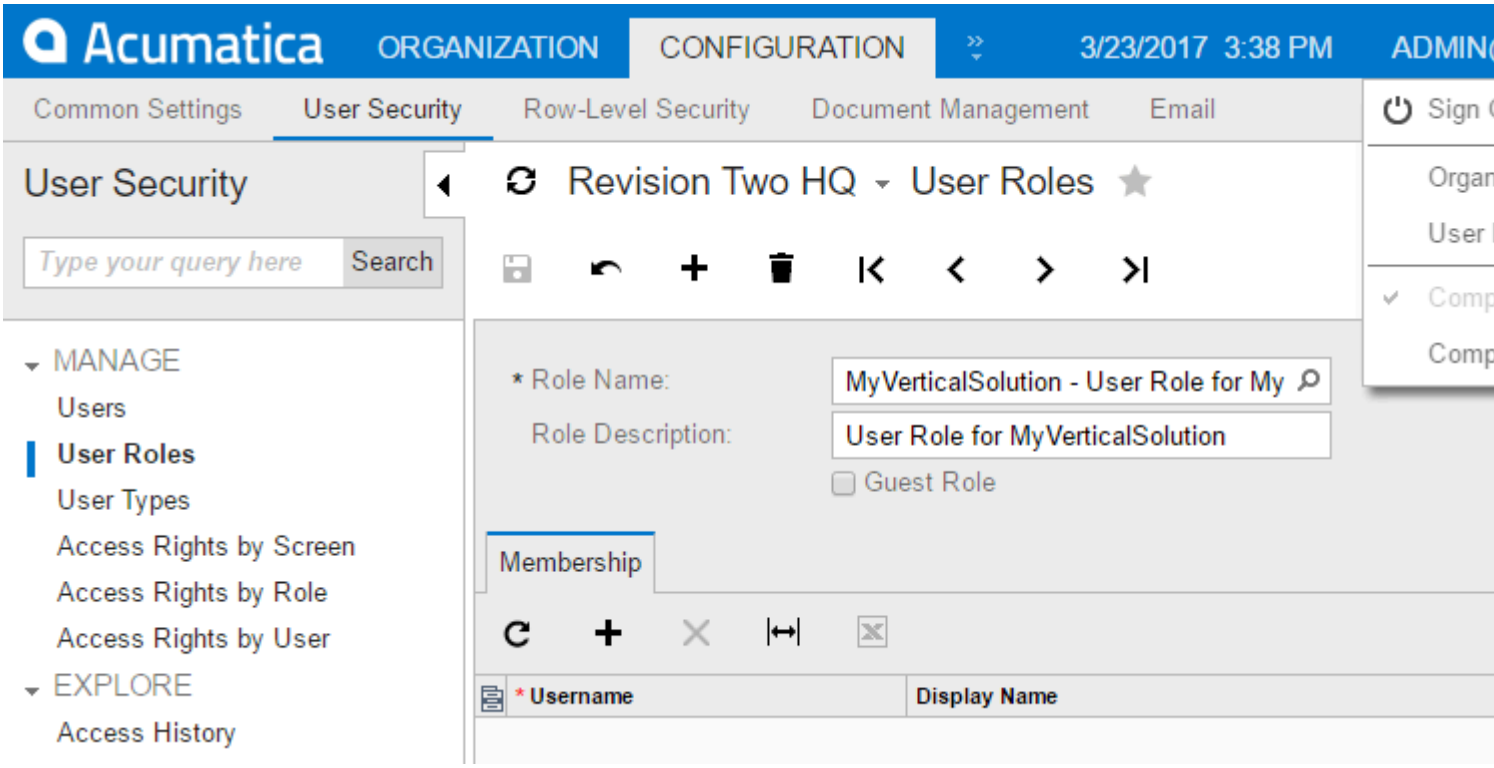
Below is an example of customization plugin creating ***MyVerticalSolution*** user role in all companies available to the current user:

```
public class MyVerticalSolutionInit : CustomizationPlugin
{
    public override void UpdateDatabase()
    {
        var companies = PXAccess.GetCompanies();

        foreach (var company in companies)
        {
            using (var loginScope = new PXLoginScope(string.Format("{0}@{1}",
                PXAccess.GetUserLogin(), company)))
            {
                string roleName = "MyVerticalSolution";
                RoleAccess graph = PXGraph.CreateInstance<RoleAccess>();

                Roles existingRole = graph.Roles.Search<Roles.rolename>(roleName);
                if (existingRole != null)
                {
                    WriteLog(string.Format("{0} already exists in company '{1}' - skipped",
roleName, company));
                    continue;
                }
```

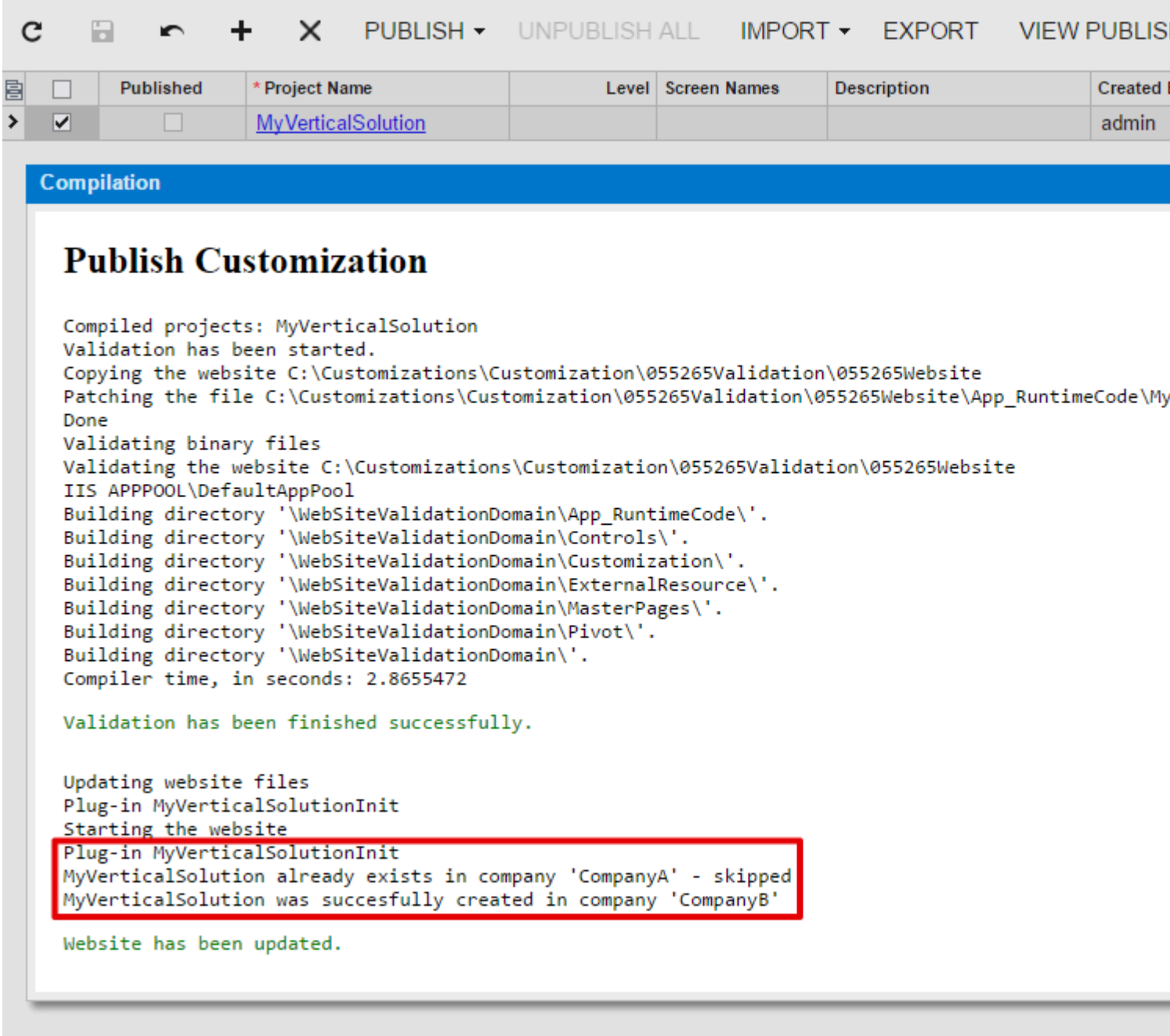
```
                var wmsRole = new Roles();
                wmsRole.Rolename = roleName;
                wmsRole.Descr = "User Role for MyVerticalSolution";

                graph.Roles.Insert(wmsRole);
                graph.Save.Press();

                WriteLog(string.Format("{0} was succesfully created in company '{1}'",
roleName, company));
            }
        }
    }
}
```

To obtain a list of companies available to the current user, you simply invoke static `PXAccess.GetCompanies()` method. Then **PXLoginScope** is used to log into each of the available companies to create ***MyVerticalSolution*** user role. Notice instance of the **RoleAccess** BLC re-initialized for each company - this is an absolutely mandatory step to making changes to multiple companies at a time.

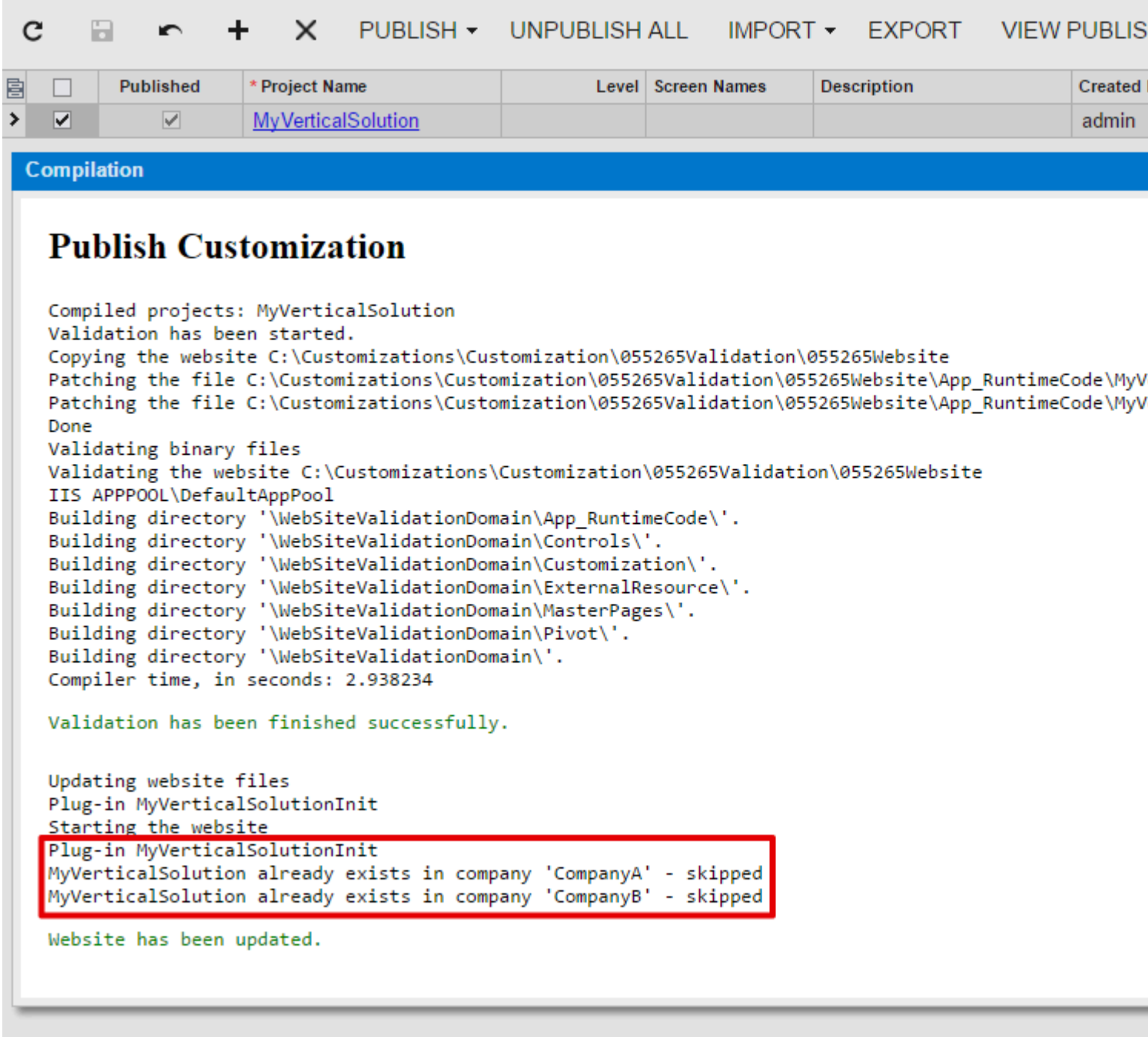
Let's assume there are 2 companies on your Acumatica instance: CompanyA and CompanyB. The **admin** user, that you are going to use to publish customization, has access to both companies and ***MyVerticalSolution*** role, created by customization plug-in, already exist in CompanyA:



After you published customization (while logged into CompanyA or CompanyB) with earlier developed customization plug-in to create ***MyVerticalSolution*** role in all companies available to the current user, notice ***MyVerticalSolution*** role skipped for CompanyA and successfully created for CompanyB.



Next time you publish this customization, ***MyVerticalSolution*** role will be skipped for both companies in your Acumatica application:



Read Using Customization Plug-In to Make Changes in Multiple Companies online: https://riptutorial.com/acumatica/topic/9522/using-customization-plug-in-to-make-changes-in-multiple-companies

Credits

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