Microsoft Dynamics® AX 2012

Report programming model for Microsoft Dynamics AX 2012

White Paper

Microsoft SQL Server Reporting Services is the primary reporting platform for Microsoft Dynamics AX. This document describes the programming model to use with the Microsoft Dynamics AX reporting framework.

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Overview

Microsoft® SQL Server® Reporting Services (SSRS) is the primary reporting platform for Microsoft Dynamics® AX. The new report programming model is built on the SysOperation framework. The SysOperation framework replaces the RunBase model.

Overview of concepts

The following table describes the concepts for the report programming model.

Concept	Class	Description	When to override
Report data provider (RDP) contract	**Object**	A contract used to specify parameters in an RDP class.	Every RDP class that requires input parameters is associated with a contract. Nested contracts are supported by RDP contracts.
Report definition language (RDL) contract	**SrsReportRdlDataContract**	A framework contract used for query-based, data method–based, and OLAP-based reports, and for reports that contain static parameters created in a report. This contract provides a weakly typed representation of parameters. It contains methods that can be used to get or set values. It also contains a map of parameter names and the **SrsReportParameter** class.	Override when you must do the following: • Add custom validation to parameters. Call **super()** before you validate. • Add custom initialization to your parameters. • Add your own UI builder for the parameters. Use the **SrsReportNameAttribute** attribute on the overridden class to specify which report uses this contract, and to bind the contract to the report. Use this attribute for reports that bind to a query or data method to tie the contract to the report.
Print contract	**SrsPrintDestinationSettings**	A contract that contains all the relevant contracts after a report RDL is parsed. This contract contains an instance of the RDP contract, RDL contract, print contract, and query contract.	Do not override.
Query contract	No direct class. A map that contains the parameter name and query object.	A contract that provides the query contracts that are used in the report.	Do not override.
Report contract	**SrsReportDataContract**	A contract that contains all the relevant contracts after a report RDL is parsed. This contract contains an instance of the RDP contract, RDL contract, print contract, and query contract.	Do not override.

Concept	Class	Description	When to override
Controller	**SrsReportRunController**	The controller of the Model View Controller (MVC) pattern. Given the report name, the controller does the following: • Call **SrsReportRunInterface** to parse RDL. • Get the report contracts. • Create the necessary UI builders and invoke them. • Call **validate** on contracts. Validation occurs on the server through a service call. • Save to the SysLastValue table. • After the form is displayed, and the user clicks **OK**, run the report.	Override when you must do the following: • Change the contract before you run it. For example, to change the query based on parameters in the form, override the **modifyReportContract** method. • React to form control events. In this case, override the method, and provide the override events. • Add basic validation that is not part of the contract, or not at the table level. In this case, override the **validate** method, and call the **super** method. • Change the name of the report that is being run based on a parameter. In this case, override the **modifyReportContract** method, and set **SrsReportDataContract.parmReportName**. • Modify the company or culture. In this case, override the **modifyReportContract** method, and set the company and culture on **SrsReportRdlDataContract**.
Group and order		You specify the group and order as follows: • If you are using an RDP class, specify them on the contract or in Visual Studio. • If you are using a query or data method, specify them by using report designer. • If you are using a mix of an RDP class, query, and data method, specify them by using Visual Studio.	In Visual Studio, you can create groups and orders, and preview them in Visual Studio and the Microsoft Dynamics AX client.
UI builders	**SrsReportDataContractUIBuilder** **SysOperationAutomaticUIBuilder**	UI builders do the following: • Lay out the fields on the contract. • Transfer data from a field to the contract, and bind fields to contract members. The group and order are specified in the contract in the Visual Studio designer. The **SrsReportDataContractUIBuilder** class provides the capability to show the date effective tab and valid values that are specified in the report. The **SysOperationAutomaticUIBuilder** class provided by the SysOperation framework renders the UI for a given data contract.	Override when you must do the following: • Provide additional grouping or ordering. For example, you can provide radio buttons for groups. • Change the layout from one column to multiple columns. For example, you can display three columns of parameters on the form. **Note:** To react to control events, you do not need to override the UI builder, because the control override methods need to be specified in the controller. Evaluate how much you need to override. For example, you can change the layout from one to three columns without an override. In the UI builder, override the **build** method, update the current form group property columns to 3, and then call **super()**. The base class lays out the fields.

Concept	Class	Description	When to override
Validation	RDP contract **SrsReportRdlDataContract** or its override		Contracts must implement the SysOperationValidatable interface that provides a **validate** method. For RDP contracts, implement the **validate** method, and return **True** or **False**. Use the **error** method, and write to the Infolog. The error messages in the Infolog are marshaled from the service to the client, and then rendered. Do not throw an error. For RDL contracts, the **SrsReportRdlDataContract** class implements default validation that performs basic parameter validation. It also validates the company and culture. When you override this class, first call **super()** to allow the base class to validate, and then implement your validation logic.
Initialization	RDP contract RDL contract override	Initialization provides support for overriding the contract and implementing your contract initialization.	

Use cases

The following table describes use cases when you develop reports.

Use case	Developer action	Unit testing artifact
A report is bound to a query, data method, or OLAP, and validation logic needs to be added on the parameters.	1. Extend the **SrsReportRdlDataContract** class, and override the **validate** method. 2. On the contract, add the **SrsReportNameAttribute('MyReportName')** attribute. Do not override the controller.	Test the validation logic on the data contract.
A report is bound to an RDP class, and validation logic needs to be added on the parameters.	The RDP data contract implements the SysOperationValidatable interface. Do not override the controller.	Test the RDP contract.
A report is bound to an RDP class and needs to change the UI dialog box for the report. The framework's support for grouping and ordering is not sufficient for the report's needs.	1. Extend the **SrsReportDataContractUIBuilder** class, and implement the UI customizations. 2. On the RDP contract, add a **SysOperationContractProcessingAttribute** attribute that specifies the name of the UI builder to use. Do not override the controller.	Test the UI builder by using the dialog API.
A report is bound to a query, data method, or OLAP, and needs to have grouping or ordering.	Use Visual Studio to group and order report parameters. Do not override the controller. A contract override is required.	
A report uses RDL and needs to change the UI dialog box for the report. The framework's support for grouping and ordering is not sufficient for the report's needs.	1. Extend the **SrsReportDataContractUIBuilder** class, and implement UI customizations. 2. Use the **SysOperationContractProcessingAttribute** attribute on the custom RDL contract. Do not override the controller.	Test the UI builder by using the dialog API.

Use case	Developer action	Unit testing artifact
A report needs to change the name of the report design used at run time.	Extend the **SrsReportRunController** class, override the **preRunModifyContract** method, and then provide a different name for the report in the **SrsReportDataContract** class.	Test the controller.

Patterns for converting reports

Report patterns emerged when Microsoft Dynamics AX reports were converted for the current release. The following table describes the report task, the programming model pattern, and a sample report that uses the pattern in Microsoft Dynamics AX.

Report task	Report programming model pattern	Sample report
An RDP report needs simple grouping and validation.	1. Create an RDP contract. 2. Implement the **SysOperationValidatable** class and validation. 3. Do parameter grouping on the contract.	AssetDepreciationLedger_IT InventABC
An RDP report needs complex grouping, such as horizontal, vertical, nested, or multiple groups.	Do parameter grouping by using Visual Studio tools for Microsoft Dynamics AX.	
A query-based, data method-based, or OLAP-based report needs grouping.	Do parameter grouping by using Visual Studio tools for Microsoft Dynamics AX.	
A custom field needs to be created in the dialog box, because, for example, the field is not a report parameter. The field is added based on certain conditions. The custom dialog box fields are added, and the report parameters are populated based on them.	Create a UI builder: 1. Move the code in the **addCustomCtrl** method to the **UIBuilder.build** method. 2. Move the **getFromDialog** method to the **UIBUilder.getFromDialog** method, and populate the contract. 3. Associate the UI builder class with the contract by using the attribute **SysOperationContractProcessingAttribute(classstr(UIBuilderName), SysOperationDataContractProcessingMode::CreateUIBuilderForRootContractOnly)**. 4. Optional: Create a controller, and if further modification of the contract is required before the report is run, add the logic to the **preRunModifyContract** method.	AgreementFollowup BOMPartOf
Code needs to react to dialog box field events, such as when a field is modified.	Create a UI builder: • In **postRun()**, register override methods for field events, and associate the fields events with methods.	BudgetFundsAvailableUIBuilder BudgetDetailsUIBuilder
A dialog box field needs to be changed to have a different button type than the default, or a field needs to turn on a flag on a grouping.	Create a UI builder: • In the **postBuild** method, get the dialog box field from the binding information, and change the field.	BudgetDetailsUIBuilder

Report task	Report programming model pattern	Sample report
A helper class needs to turn visibility of a report parameter on or off, so that new custom parameters can be added.	• Change the report parameter in the report design so that it is hidden. The framework takes care of not displaying the parameter in the Microsoft Dynamics AX form.	
A helper class needs to add a caption for the report.	This task should be avoided. The framework uses the label on the menu item that launches the report as a caption. For cases where the same report is used in multiple reports, override the **controller.prePromptModifyContract** method, and set **parmDialogCaption**.	AgreementFollowUpController
A dialog box field needs to be enabled or disabled based on certain conditions.	Create the UI builder class: 1. Override the **getFromDialog** method if you want to get the custom field value from the dialog box. 2. Override the **postBuild** method to enable or disable fields.	CustAccountStatementInt
A query is modified based on the caller args before the UI is rendered.	Create a controller: • Override the **prePromptModifyContract** method.	AgreementFollowUpController
A query is modified before the report is run.	Create a controller: • Override the **preRunModifyContract** method.	AgreementFollowUpController
The report name needs to be changed based on the caller args or a UI parameter.	Create a controller: • Override the **preRunModifyContract** method.	
The helper class needs to use print management.	Create a controller: 1. Override the **run** method. 2. Override the **preRunModifyContract** method, and also override the **prePromptModifyContract** method as needed.	CustInterestNoteHelper
The report parameter UI should not be displayed.	Create a controller: • In the main method, before the **controller.startOperation** method, call **controller.parmShowDialog(false)**.	
The report needs to use a temp table from a caller.	Create a controller: 1. Get the temp table from the caller, and use the **SRSTmpTblMarshaller** class to save the data. 2. Develop an RDP class to extract this data and perform business logic processing.	Cheque_US
The report needs to use print management.	See the "Print management" section.	SalesConfirm PurchPackingSlip ProjectInvoice

Using a temp table marshaller

Use of a temp table marshaller needs to be very limited. The following are the use cases for a temp table marshaller.

Use case 1: The report caller has a temporary table that is needed as part of business logic processing to render the report

- Use an RDP class to write the business logic.

- Use a controller class.
- Use a marshaller inside the controller class to pass the temp table that is used in the RDP class.
- Use an RDP contract to pass any other necessary details.
- Use the **SrsTmpTblMarshallerContract** class as a nested contract in the RDP contract.
- Do not process business logic in the controller class.

Example: The Cheque_US report

The **Cheque_US** report is an example of a report that uses a temp table marshaller.

Best practices:

- In the controller class, use a marshaller to send a temp table that contains the data that must be processed.
- In an RDP class, get the temp table, perform business logic processing on it, and return the data.
- The advantage is that the RDP class is always called as a service on the Application Object Server (AOS) instance, so the report runs more efficiently.

Practices to avoid:

- Do not use a controller class to process all the business logic, and then use a marshaller to store the final data that needs to be shown.

In RDP, data is read from the marshaller, and the dataset is returned to SSRS.

- The problem is that the business logic processing in the controller is run on the client and creates many database calls.

Use case 2: The report caller context is a class that contains business logic that needs to be used to process the report

- If the caller class can be packed or unpacked, use the SRSTmpDataStore table to store the packed value.
- If the caller class cannot be packed or unpacked, check whether relevant parameters from the caller class can be captured to create the logic in an RDP class.
- If neither of the previous actions is possible, process the data in a controller class.
- Insert the processed data in a marshaller, and then use an RDP class to get the data out.

Pseudo-temp table

Many reports from the previous release use the following pseudo-temp pattern:

- The table contains a sessionId column.
- Business logic processing occurs on the client, and data is then written to the table together with the sessionId.
- The report uses a query that has the sessionId as a predicate.

Note: Do not use this approach for reports from the current release. This approach is not framework approved. Because the data is not cleaned up immediately, it is vulnerable to security attacks and information disclosure.

Best practices for reports

- Use an RDP class to write the business logic.
- Use a controller class.
- Use a marshaller inside the controller to pass the temp table that is used in the RDP class.
- Use an RDP contract to pass any other necessary details.
- Use the **SrsTmpTblMarshallerContract** class as a nested contract in your RDP contract.
- Do not process business logic in a controller class.
- When a Surrogate Foreign Key (SFK) control is in a Microsoft Dynamics AX client reporting dialog, the following are required:
    - A SFK field in the table must have an EDT.
    - The EDT must have the Reference table property set to the natural key table.

Practices to avoid for report development

The following list describes practices that you should avoid when you define reports:

- Do not specify a parameter if parameters are not used anywhere in the code or report.
- Do not use an RDP class if a query can provide the same result.
- Do not use a helper class that provides no value.
- Do not define a label or caption for parameters if the same value can come from an EDT.
- Do not use a UI builder to hide report parameter visibility.
- Do not use UI builder to specify a report caption, except when a menu item launches multiple reports.

Print management

The following list describes print management–based reports:

1. Data needs to be processed based on user selection in a form. For example, a user selects three sales orders that must be invoiced.
2. For each sales order, the relevant print management settings are loaded into code by using the print management framework.

3. One or more print management settings are produced.
4. For each print management setting for the same report, a report should be printed.

If a report requires that business logic be run to render the data, the business logic should run once, for all print management settings. Running the business logic each time that the same report is rendered for different print management settings has the following effects:

- Data can become inconsistent. For example, the sales order copy might have an extra line that the original did not have.
- Performance is reduced, because the same business logic is run repeatedly.

By using an RDP class to have business logic, you can materialize the data. Make sure that the RDP class is run once for each sales order that is selected in the form. To ensure that the RDP class is only run once, the framework provides the concept of a pre-processing RDP. As a best practice, use a pre-processing RDP to perform business logic.

Pre-processing RDP

The following steps describe how to develop a print management report that has a pre-processing RDP class.

1. Implement a pre-processing RDP:
    1. Extend the RDP class from the **SrsReportDataProviderPreProcess** class.
    2. The tables that store data that is used by the report should have the following properties set:
        - **Table Type** = **Regular**
        - **CreatedBy** = **Yes**
        - **CreatedTransactionId** = **Yes**
2. Explicitly set the User Connection object on the temp table(s) that are used in the RDP class to return data. You must set the User Connection before the tables can be used. It is a best practice to set it in the beginning of processReport() method. For example, the SalesInvoiceDP class uses the salesInvoiceTmp class variable of the SalesInvoiceTmp table. To set the User Connection, provide the parmUserConnection to the Data Provider class like the following:

    ```
    salesInvoiceTmp.setConnection(this.parmUserConnection());
    ```
3. Open the report in Visual Studio and refresh the data source to include the new CreatedTransactionId field. To do this, in Model Editor, right-click the dataset and then click **Refresh**.
4. In Solution Explorer, right-click the solution and click **Deploy Solution** to deploy the new report.
5. In Microsoft Dynamics AX development workspace, generate the Incremental CIL. To do this, right-click the **AOT**, point to **Add-ins**, and then click **Incremental CIL generation from X++**.
6. Implement the controller class:
    - When print management uses, for example, the **Form Letter** report:
        1. Extend the controller class from the **SrsPrintMgmtFormLetterController** class.
        2. Override the **initFormLetterReport** method to initialize the relevant form letter class based on input arguments. Use the **formLetterReport** member variable to store the input arguments. Call the **super** method before you exit the method.
        3. Override the **runPrintMgmt** method:
            1. Write a loop to go over data that was selected in the form, and that needs to be printed.
            2. Load the relevant print settings for the given business record.
            3. Call the **outputReports** base class.

4. Override the **preRunModifyContract** method to modify the RDP contract parameters before the report is run. This method is called as part of the **outputReports** method.
5. Override the **outputReport** method to set the footer text or any other special parameters before each copy of report is printed.
6. Create a static main method. In most of these reports, the report parameter dialog box is not displayed. You can suppress the dialog box by using **parmShowDialog(false)**.

- When print management uses direct print management classes:
  1. Extend the controller class from the **SrsPrintMgmtController** class.
  2. Override the **initPrintMgmt** method.
  3. Override the **runPrintMgmt** method:
     1. Write a loop to go over data that was selected in the form, and that needs to be printed.
     2. Load the relevant print settings for the given business record.
     3. Call the **outputReports** base class.
  4. Override the **preRunModifyContract** method to modify the RDP contract parameters before the report is run. This method is called as part of the **outputReports** method.
  5. Override the **outputReport** method to set the footer text or any other special parameters before each copy of report is printed.
  6. Create a static main method. In most of these reports, the report parameter dialog box is not displayed. You can suppress the dialog box by using **parmShowDialog(false)**.

  7. Set the UserConnection for each table that is returned from the RDP:

  In the RDP class for the tables being returned, you must set the UserConnection before it can be used. The following code example illustrates returning the SalesInvoiceTmp table:

```
[SRSReportDataSetAttribute(tableStr(SalesInvoiceTmp))]
public SalesInvoiceTmp getSalesInvoiceTmp()
{
    select salesInvoiceTmp;
    return salesInvoiceTmp;
}
```

The following code illustrates setting the user connection to use on the SalesInvoiceTmp table. This code is added to the processReport method in the RDP class. You must set the UserConnection before code is executed for each of the tables that are returned from the RDP:

```
    // Set the userconnection to use on table.
    // This is required to ensure that createdTransactionId of inserted record is
different than default transaction.
    salesInvoiceTmp.setConnection(this.parmUserConnection());
```

For a complete example, see the SalesInvoiceDP, and ProjInvoiceDP class.

Modifying Query

The reporting framework does not invoke init on query in the `SysIOperationFramework` class. Invoking `init` is specific to forms. You can override the controller and call the `init` in the PrePrompt or PreRunModifyContract class.

For the error you are getting: "Pre-Processed RecId parameter not found. Cannot process report. Indicates a development error"

After you have changed the RDP class, compile it and then go to Visual Studio, then open the report and do a refresh on the dataset (which refers to the RDP), the new parameter will get added. Now re-deploy the report and you should be ok.

Reporting Services Time-out Concepts

A report time-out can occur in various places when a report is rendered. It is recommended that you move long running reports to the pre-processed model. Consider the following to improve reports with large datasets:

1. Is the report a query based report or a RDP based report?
2. Investigate whether there is inefficiency in the way the data is accessed.
3. Can you add an index to table?
4. If RDP is being used, is the code working correctly and does not have unnecessary loops?
5. Can you improve the user performance by only showing the first 100K records?
6. Can you provide a parameter that the end user can filter the data on?

Long running reports

Long running reports are classified as reports that take more than 10 minutes to process the business data. If the Reporting Services to AOS communication takes longer than 10 minutes, a time-out will occur and the report will not render. Examples of long running reports can occur in the processReport method of RDP based reports. You must change the RDP based report to use the pre-processed format. The RDP business logic processing occurs before Reporting Services is called. RDP Example 9 illustrates an example of a pre-processed RDP class.

The following sections describe time-out concepts when connecting **to** or **from** Reporting Services.

Time-out concepts when connecting to Reporting Services

This section describes how time-outs can impact report viewing like viewing the report using print to screen, print to file, or print to email.

The following list describes scenarios when connecting to Reporting Services causes a time-out:

- **Execution session time-out**: Time-out occurs when using a URL in the report viewer. The time can be increased using a script.
- **Asp.NET time-out**: The Reporting Services built-in web server times-out. The web.config contains the execution time-out value. The default time-out value is 90 seconds as shown in the following web.config:
  ```
  <httpRuntime maxRequestLength="100000" executionTimeout="90000" />
  ```

- **Web services time-out:** Use web services to connect to Reporting Services and the web service proxy has a time-out property that can be set. Setting to -1 provides infinite time. In reporting, you can set the time-out value to -1 in code.

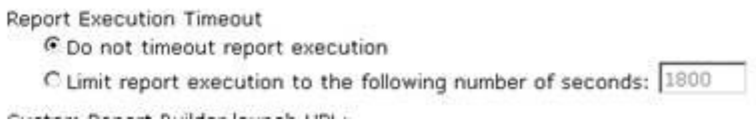
For more information, see Time-out Values for Report Processing.

Time-out concepts when connecting from Reporting Services to the AOS

This section describes how time-outs can impact reports when connecting from Reporting Services to the AOS.

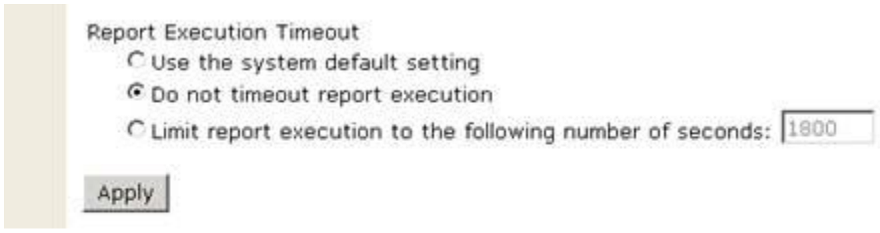
- **Data execution time-out**: Specifies the time-out for data processing to occur. This needs to be set in RDL for data extensions. If omitted, it defaults to infinite as set by the reporting framework.
- **Report processing time-out**: Specifies time taken to process the report, including data execution. This can be set per report or site level using Report Manager. The default is **Do not timeout report execution**.

  The following screenshot illustrates setting the site level settings:



Report Execution Timeout
[✓ Do not timeout report execution]
Limit report execution to the following number of seconds: 1800

  The following screenshot illustrates setting the report level settings:



Report Execution Timeout
Use the system default setting
[✓ Do not timeout report execution]
Limit report execution to the following number of seconds: 1800

- **WCF time-out**: The data extension in Reporting Services connects to the AOS using Windows Client Foundation (WCF). You can configure the binding to allow a large time-out.
  - On the client side (report extension configuration): Binding.SendTimeout
  - On server side (AOS configuration): Binding.ReceiveTimeout

Code examples

RDP class

The following code example illustrates how to define an RDP class, including the attributes and extension of the **SrsReportDataProviderPreProcess** class.

```
[
    SRSReportQueryAttribute(queryStr(ProjPrintInvoice)),
    SRSReportParameterAttribute(classStr(ProjInvoiceContract_New))
]
```

```
class ProjInvoiceDP_New extends SrsReportDataProviderPreProcess
{
```

The following screenshots illustrate the properties that are set on the temp table that is created for an RDP class.

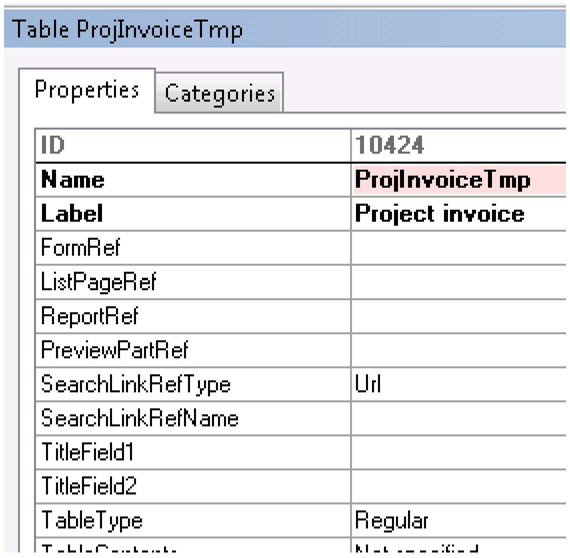
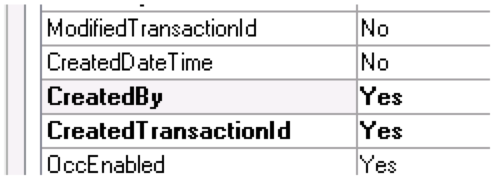


Table ProjInvoiceTmp

Properties | Categories

ID	10424
Name	ProjInvoiceTmp
Label	Project invoice
FormRef	
ListPageRef	
ReportRef	
PreviewPartRef	
SearchLinkRefType	Url
SearchLinkRefName	
TitleField1	
TitleField2	
TableType	Regular



ModifiedTransactionId	No
CreatedDateTime	No
CreatedBy	Yes
CreatedTransactionId	Yes
OccEnabled	Yes

The following code examples illustrate how to define a controller class. You can see the class and all the method code by clicking **AOT** > **Classes** > **ProjInvoiceController**. The following examples illustrate how to extend the **SrsPrintMgmtFormLetterController** class, main method, **initFormLetterReport** method, **runPrintManagement** method, **preRunModifyContract** method, and the **outputReport** method.

```
class ProjInvoiceController_New extends SrsPrintMgmtFormLetterController
{

public client static void main(Args _args)
{
    ProjInvoiceController_New controller = new ProjInvoiceController_New();
    controller.parmReportName(#ReportName);
    controller.parmArgs(_args);
    controller.parmShowDialog(false);
    controller.startOperation();

protected void initFormLetterReport()
{
    ProjPrintInvoice projPrintInvoice;
    printCopyOriginal = this.parmArgs().parmEnum();
    if (args && args.caller() )
    {
        if (classIdGet(args.caller()) == classNum(ProjFormLetter_Invoice))
        {
            projFormLetter       = args.caller();
        }
        if (classIdGet(args.caller()) == classNum(ProjPrintInvoice))
        {
            projPrintInvoice     = args.caller();
        }
    }
    if (args.record())
    {
        journalList = FormLetter::createJournalListCopy(args.record());
    }
    else
    {
        journalList = args.object();
    }

    this.filterReprintedOriginals_IS();



    formLetterReport = FormLetterReport::construct(PrintMgmtDocumentType::ProjectInvoice);
    formLetterReport.parmPrintType(printCopyOriginal);

    if (projFormLetter)
    {
        formLetterReport.parmDefaultCopyPrintJobSettings(new
SRSPrintDestinationSettings(projFormLetter.printerSettingsFormletter(PrintSetupOriginalCopy::Copy
)));
        formLetterReport.parmDefaultOriginalPrintJobSettings(new
SRSPrintDestinationSettings(projFormLetter.printerSettingsFormletter(PrintSetupOriginalCopy::Orig
inal)));
        formLetterReport.parmUsePrintMgmtDestinations(projFormLetter.usePrintManagement());

formLetterReport.parmUseUserDefinedDestinations(projFormLetter.parmUseUserDefinedDestinations());
    }
    else if (printCopyOriginal == PrintCopyOriginal::OriginalPrint)
    {
        // Always use the print mgmt destinations when reprinting for the OriginalPrint case.
        formLetterReport.parmUsePrintMgmtDestinations(true);
    }
    else if (projPrintInvoice)
    {
        formLetterReport.parmDefaultCopyPrintJobSettings(new
SRSPrintDestinationSettings(projPrintInvoice.printerSettingsPrintInvoice()));
        formLetterReport.parmDefaultOriginalPrintJobSettings(new
SRSPrintDestinationSettings(projPrintInvoice.printerSettingsPrintInvoice()));
        formLetterReport.parmUsePrintMgmtDestinations(false);
        formLetterReport.parmUseUserDefinedDestinations(true);
    }

    // Init projcredit invoice flag. Used to get invoicetext footer.
    projCreditInvoicing = CustParameters::find().CreditInvoicingReport;

    projInvoiceContract = this.parmReportContract().parmRdpContract() as ProjInvoiceContract;
    super();
}



protected void runPrintMgmt()
{
    if (this.parmArgs().menuItemName() == menuitemOutputStr(ProjPrintInvoice))
    {
        this.createJournalListFromQuery();
    }

    if (!journalList)
    {
        throw error("@SYS26348");
    }

    journalList.first(projInvoiceJour);

    if (!projInvoiceJour)
    {
        throw error("@SYS26348");
    }

    do
    {
        formLetterReport.loadPrintSettings(projInvoiceJour,
ProjInvoiceTable::find(projInvoiceJour.ProjInvoiceProjId), projInvoiceJour.LanguageId);
        this.outputReports();
    } while (journalList.next(projInvoiceJour));

}

public void preRunModifyContract()
{
    SRSTmpDataStore srsTmpDataStore;

    // set the current projinvoice jour recid
    projInvoiceContract.parmProjJourRecId(projInvoiceJour.RecId);

    projInvoiceContract.parmCountryRegionISOCode(SysCountryRegionCode::countryInfo());

    // set proforma and packed form letter. We dont need to do this in preRunModifyContract(),
since this needs to be set only once.
    if (projFormLetter && projFormLetter.proforma())
    {
        projInvoiceContract.parmProforma(true);

        // pack container and put into srstmptable.
        // Pack the class and insert into the temporary store.
        srsTmpDataStore.Value = projFormLetter.parmFormletterProformaPrintPacked();
        srsTmpDataStore.insert();
        // Set the rec id to contract parameter
        projInvoiceContract.parmFormLetterRecordId(srsTmpDataStore.RecId);
    }

    super();

}

protected void outputReport()
{
    SRSPrintDestinationSettings srsPrintDestinationSettings;
    SRSPrintMediumType          srsPrintMediumType;

    // For EVERY print mgmt setting
    // Set the invoice text.
    projInvoiceContract.parmInvoiceTxt(this.invoiceTxt());

    if (SysCountryRegionCode::isLegalEntityInCountryRegion([#isoIS]))
    {
        srsPrintDestinationSettings =
formLetterReport.getCurrentPrintSetting().parmPrintJobSettings();
        srsPrintMediumType          = srsPrintDestinationSettings.printMediumType();
        if ((printCopyOriginal == PrintCopyOriginal::Original || printCopyOriginal ==
PrintCopyOriginal::OriginalPrint)
            && srsPrintMediumType == SRSPrintMediumType::Printer)
        {
            ProjInvoiceJour::updatePrinted(projInvoiceJour,
srsPrintDestinationSettings.numberOfCopies());
        }
    }

    super();
}
```

Executing reports

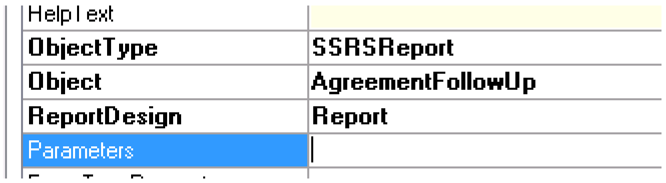
1. The RDL is stored in the Application Object Tree (AOT).
2. To deploy a Microsoft Dynamics AX reporting project in Microsoft Visual Studio®, you must start Visual Studio with administrative privileges, or you must start Microsoft Dynamics AX and the Developer Workspace with administrative privileges. Right-click the icon for Visual Studio or Microsoft Dynamics AX, and then click **Run as administrator**. The following table describes the options for deploying reports.

Deployment option	Description
Microsoft Dynamics AX	Reports can be deployed individually from the development workspace in Microsoft Dynamics AX. In the AOT, expand the **SSRS Reports** node, expand the **Reports** node, right-click the report, and then click **Deploy Element**. The reports are deployed for all the translated languages.

Deployment option	Description
Microsoft Visual Studio	Reports can be deployed individually from Visual Studio. In Solution Explorer, right-click the reporting project that contains the reports that you want to deploy, and then click **Deploy**. The reports are deployed only for the neutral, or invariant, language.
Windows PowerShell	The default reports that are provided with Microsoft Dynamics AX can be deployed by using Windows PowerShell. For more information, see Deploy the Default Reports.

3. Reports follow the naming convention of **ReportName.ReportDesign**. The Visual Studio project name is not included in the name.

4. When you add a report to a menu item, select the **SSRSReport** object type. You can then select a report and report design in the AOT by using a drop-down list of deployed reports. The following screenshot illustrates the menu item properties that you set when you create a menu item for a report.



HelpText	
ObjectType	SSRSReport
Object	AgreementFollowUp
ReportDesign	Report
Parameters	

Sample RDP-based reports

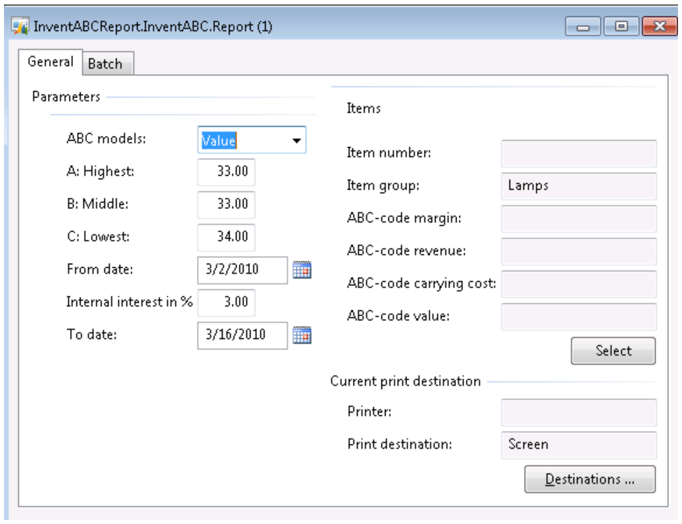
The following sections provide projects, code, and information about reports that had common scenarios when they were converted to use RDP and the current report programming model.

RDP example 1: Validation is performed on the contract, default ordering, and grouping

The following example provides information about how the **InventABC** report was converted to use the current report programming model. This report includes validation on the contract, default ordering, and grouping.

- The **InventABC** report was migrated to the current report programming model.
- Validation on the **InventABCHelper** class was moved to the contract.
- The helper class was removed.

The following screenshot illustrates the parameter form for the **InventABC** report that ships with Microsoft Dynamics AX.


InventABCReport.InventABC.Report (1)

General | Batch

Parameters

ABC models: Value

A: Highest: 33.00

B: Middle: 33.00

C: Lowest: 34.00

From date: 3/2/2010

Internal interest in %: 3.00

To date: 3/16/2010

Items

Item number:

Item group: Lamps

ABC-code margin:

ABC-code revenue:

ABC-code carrying cost:

ABC-code value:

Select

Current print destination

Printer:

Print destination: Screen

Destinations ...

The following code illustrates the InventABC contract.

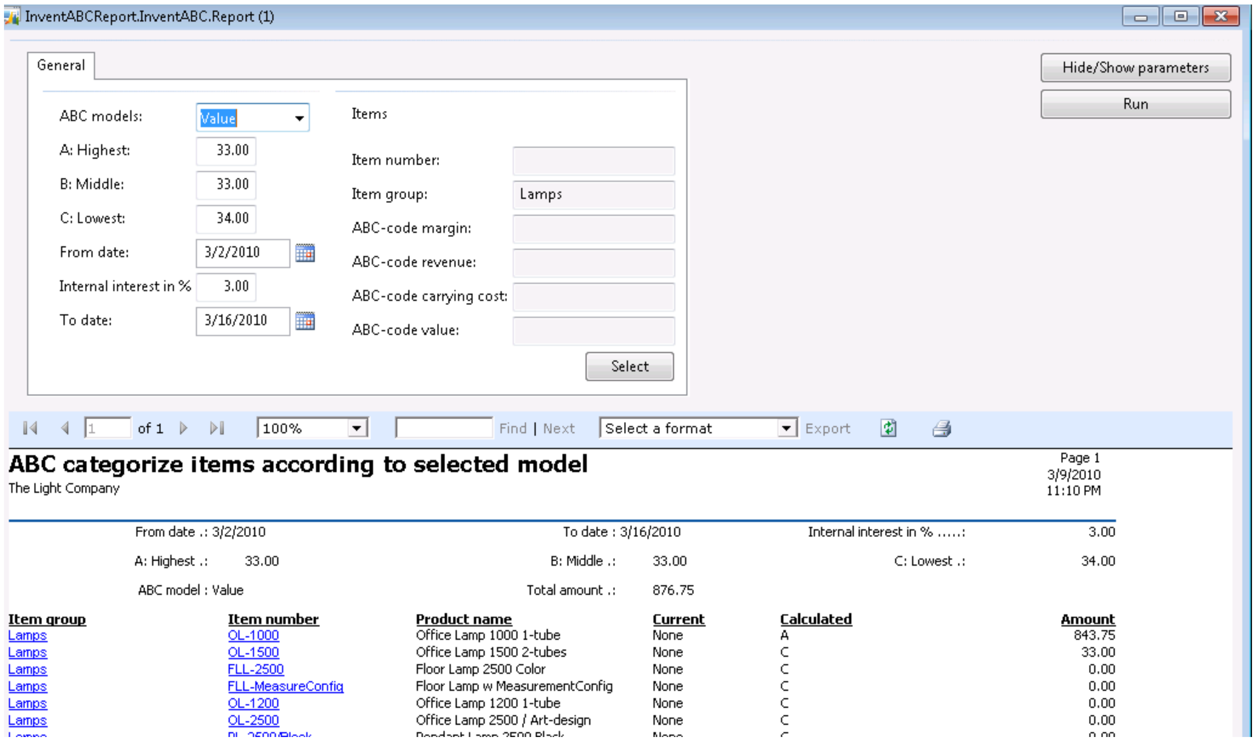
```
[DataContractAttribute]
public class InventABCContract implements SysOperationValidatable
{
    TransDate       fromDate;
    TransDate       toDate;
    InterestPct     interest;
    Percent         categoryA;
    Percent         categoryB;
    Percent         categoryC;
    ABCModel        abcModel;
}
```

The following code illustrates the **validate** method.

```
public boolean validate()
{
    boolean isValid = true;
    if (this.parmABCModel() == ABCModel::Link)
    {
        if (this.parmInterest() <= 0)
        {
            error("@SYS8377");
            isValid = false;
        }
        if (! this.parmToDate())
        {
            error("@SYS24515");
            isValid = false;
        }
    }
    if (this.parmInterest() < 0 )
    {
        error("@SYS118311");
        isValid = false;
    }
    if (this.parmCategoryA() < 0)
    {
        error("@SYS1724");
        isValid = false;
    }
    if (this.parmCategoryB() < 0)
    {
        error("@SYS10103");
        isValid = false;
    }
    if (this.parmCategoryC() < 0)
    {
        error("@SYS1723");
        isValid = false;
    }
    if ((this.parmCategoryA() + this.parmCategoryB() + this.parmCategoryC()) != 100)
    {
        error("@SYS17104");
        isValid = false;
    }
    if (this.parmFromDate() && this.parmToDate() && this.parmFromDate() > this.parmToDate())
    {
        error("@SYS91020");
        isValid = false;
    }

    return isValid;
}
```

The following screenshot illustrates how the **InventABC** report appears in the report viewer.



ABC models:	Value
A: Highest:	33.00
B: Middle:	33.00
C: Lowest:	34.00
From date:	3/2/2010
Internal interest in %	3.00
To date:	3/16/2010

Items

Item number:	
Item group:	Lamps
ABC-code margin:	
ABC-code revenue:	
ABC-code carrying cost:	
ABC-code value:	

1 of 1 100%

ABC categorize items according to selected model
The Light Company

Page 1
3/9/2010
11:10 PM

From date .: 3/2/2010 To date : 3/16/2010 Internal interest in % .....: 3.00
A: Highest .: 33.00 B: Middle .: 33.00 C: Lowest .: 34.00
ABC model : Value Total amount .: 876.75

Item group	Item number	Product name	Current	Calculated	Amount
Lamps	OL-1000	Office Lamp 1000 1-tube	None	A	843.75
Lamps	OL-1500	Office Lamp 1500 2-tubes	None	C	33.00
Lamps	FLL-2500	Floor Lamp 2500 Color	None	C	0.00
Lamps	FLL-MeasureConfig	Floor Lamp w MeasurementConfig	None	C	0.00
Lamps	OL-1200	Office Lamp 1200 1-tube	None	C	0.00
Lamps	OL-2500	Office Lamp 2500 / Art-design	None	C	0.00

RDP example 2: The UI requires grouping and ordering

The following example provides information about how the **AssetDepreciationLedger_IT** report was converted to use the current report programming model. This report provides an example of a report that requires grouping and ordering in the UI.

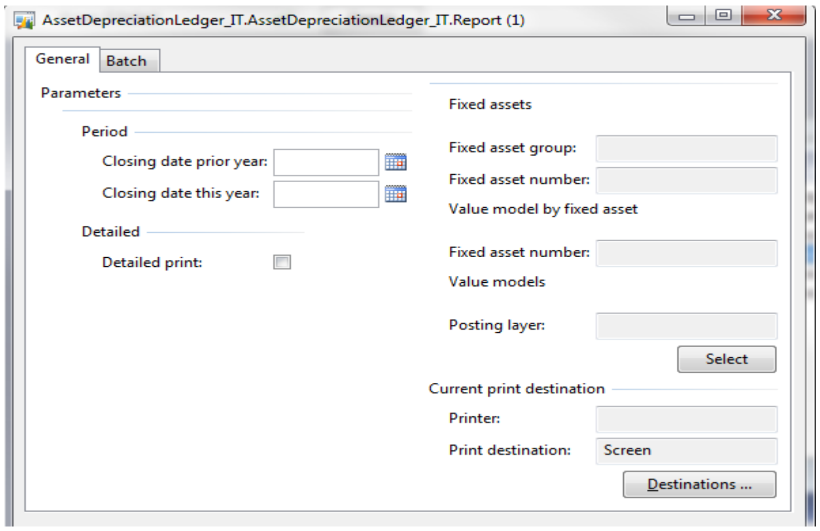
- The **AssetDepreciationLedger_IT** report was migrated to new model.
- Grouping and ordering were added to the contract to provide groups and the order of parameters.

The following steps explain how to do add groups and set the order of parameters:

1. Two groups are required for this contract, so define two group attributes on the class declaration. You can specify the order in which the groups are laid out.
2. Specify which group each data member is part of. Specify the order in which the data members appear in the group. For example, in the **Period** group, the **FromDate** data member should be first, followed by the **ToDate** data member.

If you do not specify a group for a data member, the dialog box includes the data member as part of the **Parameters** root group.

The following screenshot illustrates the parameter form for the **AssetDepreciationLedger_IT** report that ships with Microsoft Dynamics AX.


AssetDepreciationLedger_IT.AssetDepreciationLedger_IT.Report (1)

General | Batch

Parameters

Period

Closing date prior year:

Closing date this year:

Detailed

Detailed print:

Fixed assets

Fixed asset group:

Fixed asset number:

Value model by fixed asset

Fixed asset number:

Value models

Posting layer:

Current print destination

Printer:

Print destination: Screen

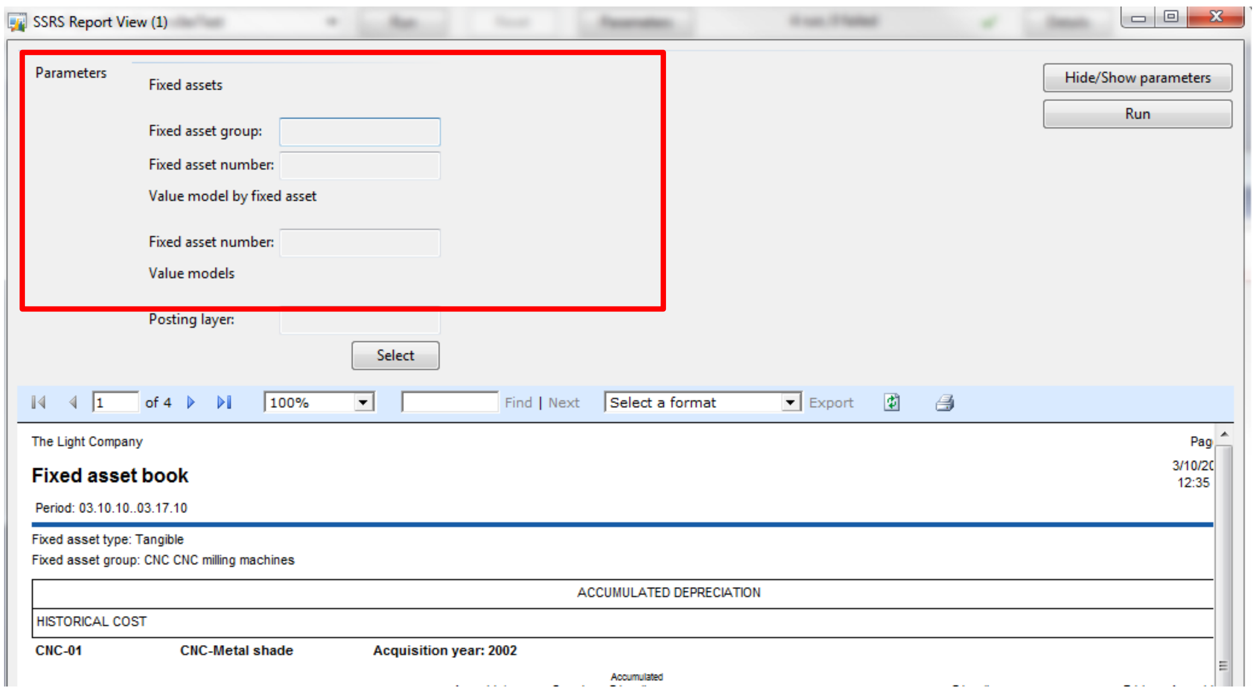
The following code illustrates the AssetDepreciationLedger contract that specifies the grouping and ordering.

```
[
    DataContractAttribute,
    SysOperationGroupAttribute('Period',"@SYS40",'1'),
    SysOperationGroupAttribute('Detailed',"@SYS95926",'2')
]
public class AssetDepreciationLedgerContract_IT
{
    FromDate     fromDate;
…
```

The following blocks of code illustrate how the parameters on the report are grouped and ordered by using the attributes.

```
SysOperationGroupMemberAttribute and SysOperationDisplayOrderAttribute:
[
    DataMemberAttribute('FromDate'),
    SysOperationLabelAttribute(literalstr("@SYS71135")),
    SysOperationHelpTextAttribute(literalstr("@SYS71135")),
    SysOperationGroupMemberAttribute('Period'),
    SysOperationDisplayOrderAttribute('1')
]
public FromDate parmFromDate(FromDate _fromDate = fromDate)
{
    fromDate = _fromDate;
    return fromDate;
}
[
    DataMemberAttribute('ToDate'),
    SysOperationLabelAttribute(literalstr("@SYS71136")),
    SysOperationHelpTextAttribute(literalstr("@SYS71136")),
    SysOperationGroupMemberAttribute('Period'),
    SysOperationDisplayOrderAttribute('2')
]
public ToDate parmToDate(ToDate _toDate = toDate)
{
    toDate = _toDate;
    return toDate;
}
[
    DataMemberAttribute('DetailedPrint'),
    SysOperationLabelAttribute(literalstr("@SYS95927")),
    SysOperationGroupMemberAttribute('Detailed'),
    SysOperationDisplayOrderAttribute('1')
]
public boolean parmDetailedPrint(boolean _detailedPrint = detailedPrint)
{
    detailedPrint = _detailedPrint;
    return detailedPrint;
}
```

The following screenshot illustrates how the **AssetDepreciationLedger_IT** report appeared in the report viewer before it was converted. Note that the parameters are empty, because a helper class was used.



Parameters

Fixed assets

Fixed asset group:

Fixed asset number:

Value model by fixed asset

Fixed asset number:

Value models

Posting layer:

The Light Company

Fixed asset book

Period: 03.10.10..03.17.10

Fixed asset type: Tangible

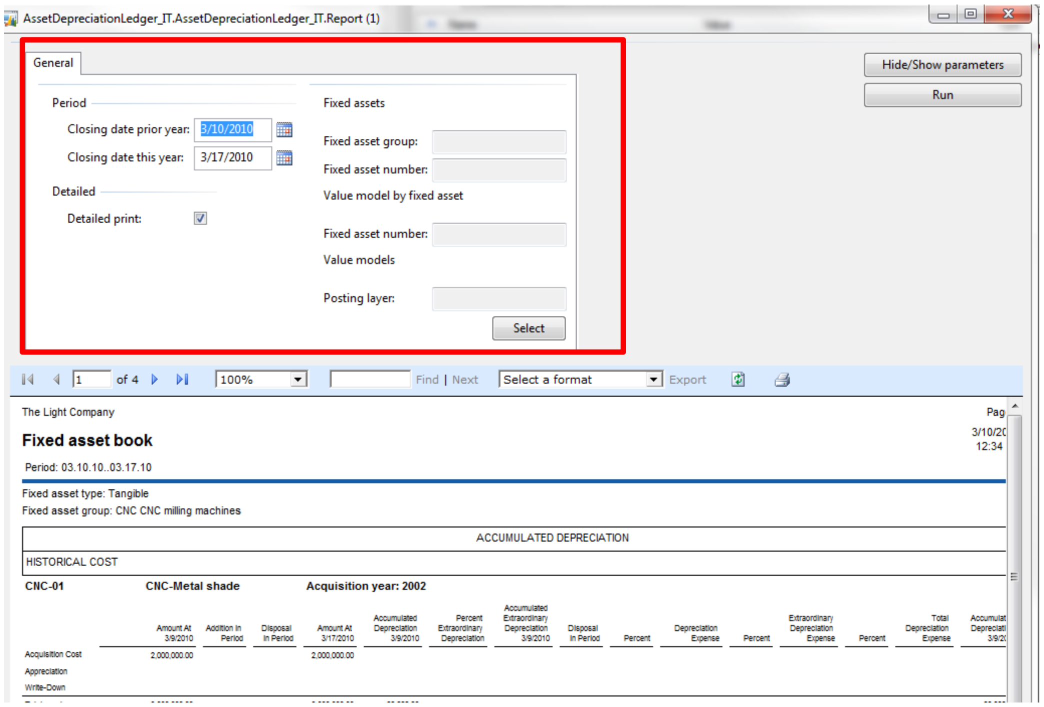
Fixed asset group: CNC CNC milling machines

ACCUMULATED DEPRECIATION

HISTORICAL COST

CNC-01 **CNC-Metal shade** **Acquisition year: 2002**

The following screenshot illustrates the **AssetDepreciationLedger_IT** report when it has two groups, **Period** and **Detailed**. The **Period** group reflects the specified order of the parameters.


AssetDepreciationLedger_IT.AssetDepreciationLedger_IT.Report (1)

General

Period

Closing date prior year: 3/10/2010

Closing date this year: 3/17/2010

Detailed

Detailed print: ✓

Fixed assets

Fixed asset group:

Fixed asset number:

Value model by fixed asset

Fixed asset number:

Value models

Posting layer:

The Light Company

Pag

3/10/2

12:34

Fixed asset book

Period: 03.10.10..03.17.10

Fixed asset type: Tangible

Fixed asset group: CNC CNC milling machines

ACCUMULATED DEPRECIATION

HISTORICAL COST

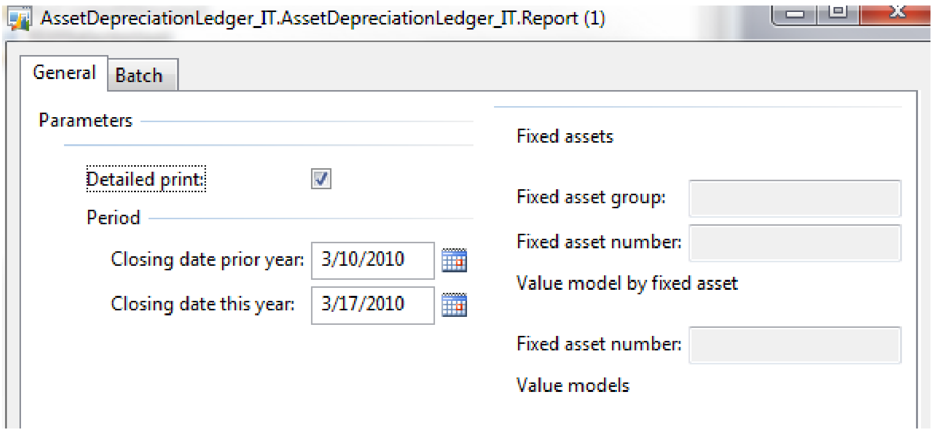
CNC-01 **CNC-Metal shade** **Acquisition year: 2002**

	Amount At 3/9/2010	Addition In Period	Disposal In Period	Amount At 3/17/2010	Accumulated Depreciation 3/9/2010	Percent Extraordinary Depreciation	Accumulated Extraordinary Depreciation 3/9/2010	Disposal In Period	Percent	Depreciation Expense	Percent	Extraordinary Depreciation Expense	Percent	Total Depreciation Expense	Accumulat Depreciati 3/9/2
Acquisition Cost	2,000,000.00			2,000,000.00											
Appreciation															
Write-Down															

The following code illustrates how you can change the **DetailedPrint** data member so that it is not part of a group.

```
[
    DataMemberAttribute('DetailedPrint'),
    SysOperationLabelAttribute(literalstr("@SYS95927")),
    // SysOperationGroupMemberAttribute('Detailed'),
    SysOperationDisplayOrderAttribute('1')
]
public boolean parmDetailedPrint(boolean _detailedPrint = detailedPrint)
{
    detailedPrint = _detailedPrint;
    return detailedPrint;
}
```

The following screenshot illustrates the **Detailed print** parameter when no group is specified for it. Notice that it is part of root **Parameters** group.


AssetDepreciationLedger_IT.AssetDepreciationLedger_IT.Report (1)

General | Batch

Parameters

Detailed print: ✓

Period

Closing date prior year: 3/10/2010

Closing date this year: 3/17/2010

Fixed assets

Fixed asset group:

Fixed asset number:

Value model by fixed asset

Fixed asset number:

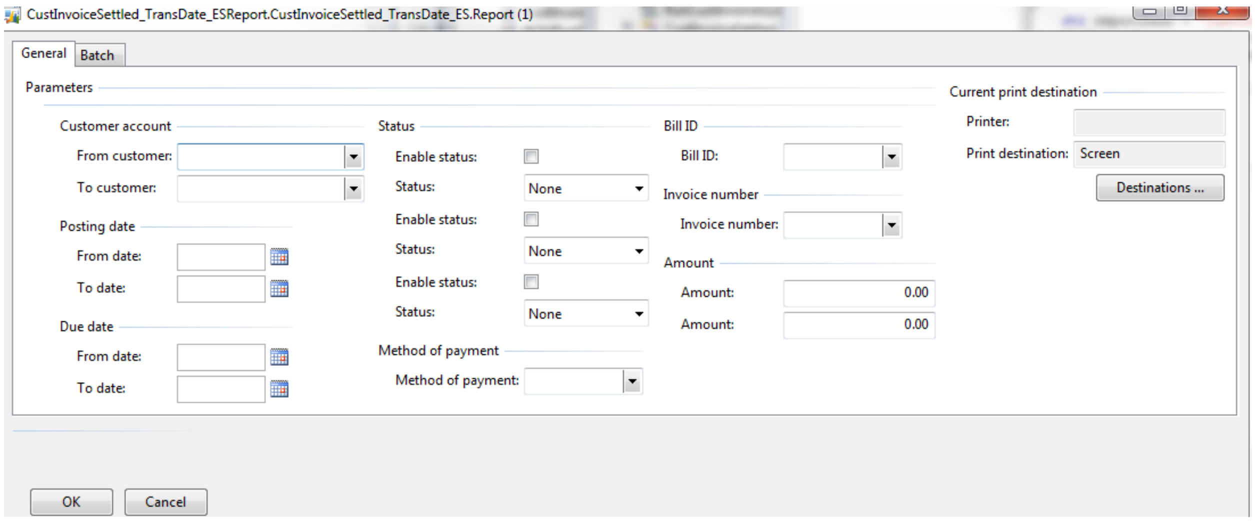
Value models

RDP example 3: The UI requires many groups and a three-column format

The following example provides information about how the **CustInvoiceSettled_TransDate** report was converted to use the current report programming model. This report provides an example of a report that requires three columns in the UI.

- The **CustInvoiceSettled_TransDate** report was migrated to the current report programming model.
- The grouping was moved from the helper class to the contract.
- The UI builder was used to override the group control so that three columns are shown in the UI.

The following screenshot illustrates the parameter form for the **CustInvoiceSettled_TransDate** report that ships with Microsoft Dynamics AX.



The following code illustrates the CustInvoiceSettled_TransDate contract when the **SysOperationContractProcessingAttribute** attribute is attached to specify the UI builder class.

```
[
    DataContractAttribute,
SysOperationContractProcessingAttribute(classstr(CustInvoiceSettled_TransDateUI_ES),
SysOperationDataContractProcessingMode::CreateUIBuilderForRootContractOnly),
    SysOperationGroupAttribute('CustAccount', "@SYS7149", '1'),
    SysOperationGroupAttribute('PostingDate', "@SYS14475", '2'),
    SysOperationGroupAttribute('DueDate', "@SYS14588", '3'),
    SysOperationGroupAttribute('Status', "@SYS25587", '4'),
    SysOperationGroupAttribute('MethodPaym',"@SYS21698", '5'),
    SysOperationGroupAttribute('BillId', "@SYS71453", '6'),
    SysOperationGroupAttribute('Invoice', "@SYS4726", '7'),
    SysOperationGroupAttribute('Amount', "@SYS53072", '8')
]
public class CustInvoiceSettled_TransDateCtrct_ES
{
...
```

The following code illustrates how to set the **Amount** parameter group for the fromAmount and toAmount parameters.

```
[
    DataMemberAttribute('FromAmount'),
    SysOperationLabelAttribute(literalstr("@SYS53072")),
    SysOperationGroupMemberAttribute('Amount'),
    SysOperationDisplayOrderAttribute('1')
]
public AmountMST parmFromAmount(AmountMST _fromAmount = fromAmount)
{
    fromAmount = _fromAmount;
    return fromAmount;
}

[
    DataMemberAttribute('ToAmount'),
    SysOperationLabelAttribute(literalstr("@SYS53072")),
    SysOperationGroupMemberAttribute('Amount'),
    SysOperationDisplayOrderAttribute('1')
]
public AmountMST parmToAmount(AmountMST _toAmount = toAmount)
{
    toAmount = _toAmount;
    return toAmount;
}
```

The following code illustrates how to override the UI builder to include three columns in the UI.

```
public class CustInvoiceSettled_TransDateUI_ES extends SrsReportDataContractUIBuilder
{
}

public void build()
{
    FormBuildGroupControl grp;
    // Get the form group used in template form and set it to use 3 columns.
    grp = this.dialog().curFormGroup();
    grp.frameType();
    grp.columns(3);
    // now let the framework draw the controls and take care of everything.
    super();
}
```

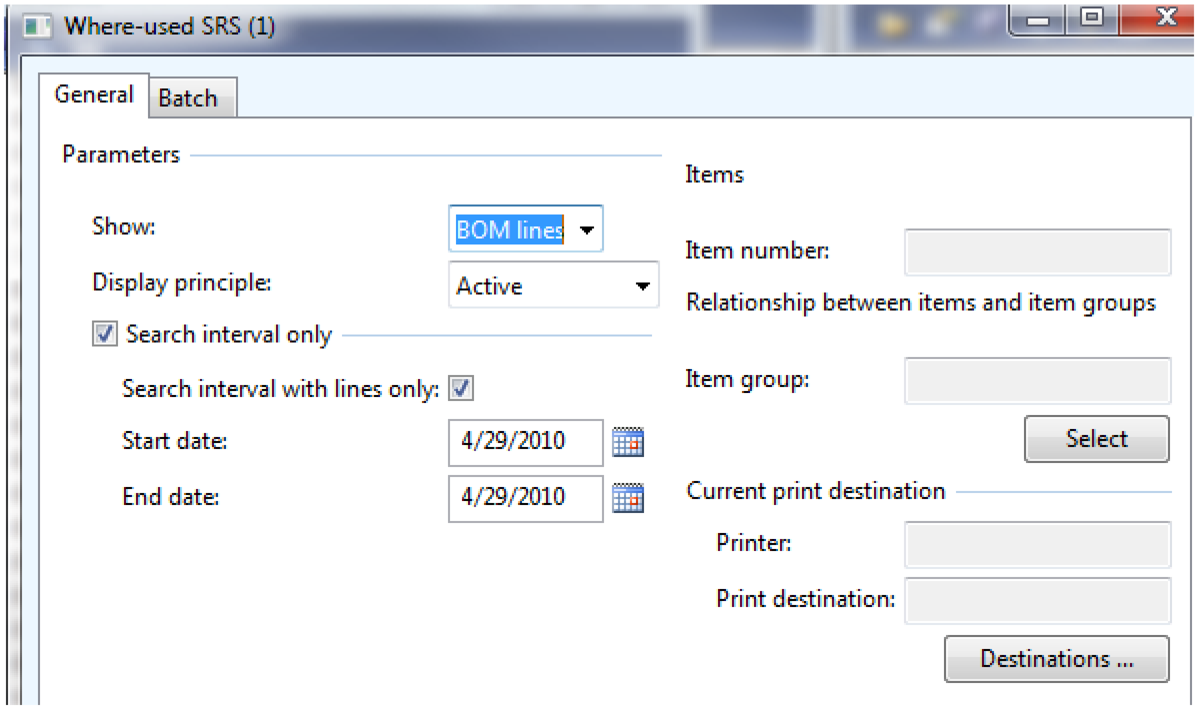
RDP example 4: The UI requires a group check box

The following example provides information about how the **BOMPartOf** report was converted to use the current report programming model. This report provides an example of a report that requires a group check box in the UI.

- The **BOMPartOf** report was migrated to the current report programming model.
- An RDP contract was created.
- The UI builder was used together with overrides so that the UI includes a group check box.
- Before the conversion, the helper class did the following:

- Add the fields to the dialog box.
- Get the fields from the dialog box.
- Set the report parameters.
- Provide the grouping.

The following screenshot illustrates a parameter form that includes the group check box.


Where-used SRS (1)

General | Batch

Parameters

Show: BOM lines

Display principle: Active

[✓] Search interval only

Search interval with lines only: [✓]

Start date: 4/29/2010

End date: 4/29/2010

Items

Item number:

Relationship between items and item groups

Item group:

Select

Current print destination

Printer:

Print destination:

Destinations ...

To see the full implementation, in the development workspace, click **AOT** > **Classes** > **BOMPartOfUIBuilder**. The following code illustrates how to create a form group control, and how to use the control in the **build** method, the **getFromDialog** method, and the **getSearchIntervalFromDialog** method.

```
public void build()
{
    FormBuildGroupControl formBuildGroupControl;
    super();
    formBuildGroupControl = this.dialog().curFormGroup();
    formBuildGroupControl.columns(2);
}

public void getFromDialog()
{
    super();
    this.getSearchIntervalFromDialog(this.dialog());
}

protected void getSearchIntervalFromDialog(Dialog  _dialog)
{
    BOMPartOfContract contract = this.dataContractObject();
    FormGroupControl  dialogSearchIntervalGroup =
_dialog.formRun().control(_dialog.formRun().controlId('Date'));

    contract.parmSearchInterval(dialogSearchIntervalGroup.optionValue());
}
```

The following code illustrates the contract for the **BOMPartOf** report.

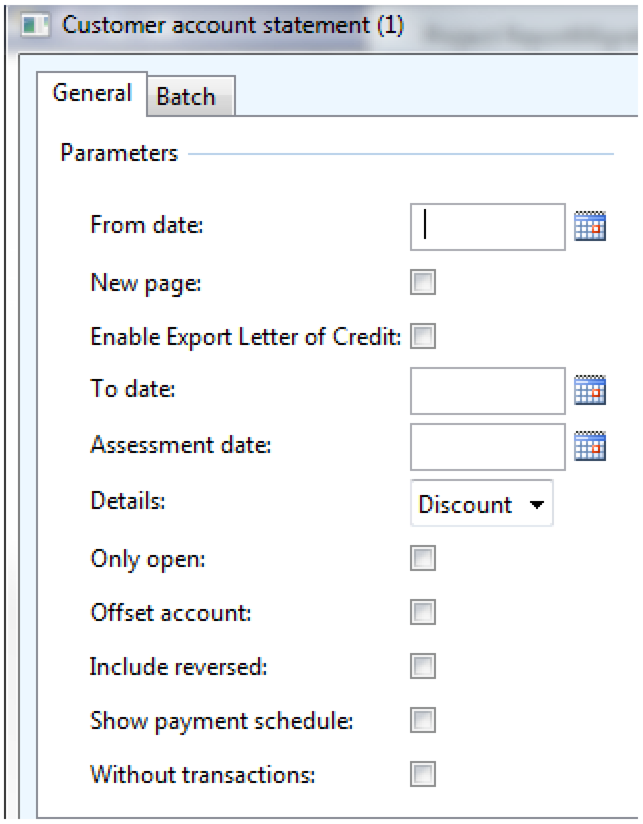
```
[
    DataContractAttribute,
    SysOperationContractProcessingAttribute(classstr(BOMPartOfUIBuilder),
SysOperationDataContractProcessingMode::CreateUIBuilderForRootContractOnly),
    SysOperationGroupAttribute('Date', "@SYS25853", '4'),
    SysOperationGroupAttribute('ViewGroup', "@SYS5252", '5')
]
public class BomPartOfContract
{
...
```

RDP example 5: Condition logic is used to enable UI fields

The following example provides information about how the **CustAccountStatementInt** report was converted to use the current report programming model. This report provides an example of a report that requires condition logic to determine whether a UI field should be enabled.

- The **CustAccountStatementInt** report was migrated to the current report programming model.
- A UI builder was created to do the following:
- Allow the report framework to create fields based on the contract.
- Override the **postBuild** method to disable the field based on a condition.
- The helper class was removed. Before the conversion, the helper class created the control and read from the dialog box.

The following screenshot illustrates the parameter form when the **BankDocumentType** field is disabled and is not displayed.

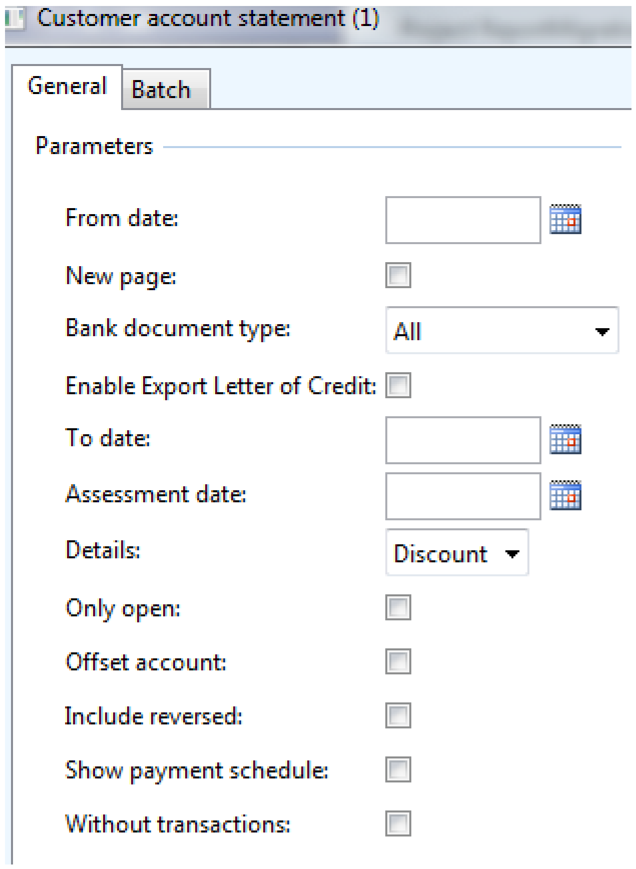

Customer account statement (1)

General | Batch

Parameters

From date:	
New page:	☐
Enable Export Letter of Credit:	☐
To date:	
Assessment date:	
Details:	Discount
Only open:	☐
Offset account:	☐
Include reversed:	☐
Show payment schedule:	☐
Without transactions:	☐

The following screenshot illustrates the parameter form when the **BankDocumentType** field is enabled and is displayed.



Customer account statement (1)

General | Batch

Parameters

From date:	
New page:	☐
Bank document type:	All
Enable Export Letter of Credit:	☐
To date:	
Assessment date:	
Details:	Discount
Only open:	☐
Offset account:	☐
Include reversed:	☐
Show payment schedule:	☐
Without transactions:	☐

The following code for the UI builder illustrates how to override the **postBuild** method to provide the condition logic to set the visibility of the field.

```
public void postBuild()
{
    DialogField dialogField;
    super();
    contract = this.dataContractObject();
    contract.parmBankLCExportEnable(BankLCExportFeatureChecker::checkBankLCExportEnabled());

    // after framework has built all fields, enable/disable the dialogfield for
BankLCBankDocumentType
    dialogField = this.bindInfo().getDialogField(contract,
methodstr(CustAccountStatementIntContract, parmBankLCBankDocumentType));

    if (dialogField && !contract.parmBankLCExportEnable())
    {
        dialogField.visible(false);
    }
}
```

RDP example 6: The report uses a temp table in the caller args

For an example of a report that uses a temp table in the caller args, see the classes that are defined for the **Cheque** report.

RDP example 7: The report uses print management

The following reports provide examples of reports that use print management:

- **PurchPackingSlip**
- **SalesConfirm**
- **ProjInvoice**

RDP example 8: The report uses a custom dialog box and UI event overrides

For an example of a report that uses a custom dialog box and UI event overrides, see the classes that are defined for the **BudgetDetails** report.

RDP example 9: The report uses a pre-processed RDP class

You must the set the user connection on the tables that are used in the report. For examples of reports that set **parmUserConnection**, see the report data provider classes that are defined in the **SalesInvoiceDP** and **SalesConfirmDP** classes.

Sample query-based reports

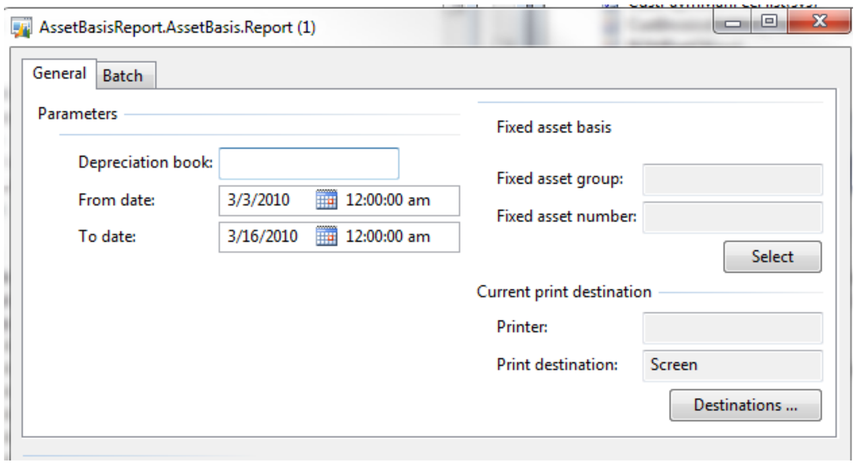
The following sections provide projects, code, and information about reports that had common scenarios when they were converted to use a query that is defined in the AOT and the current report programming model.

Query example 1: Modify the run-time query based on parameter values, without a custom dialog box

The following example provides information about how the **AssetBasis** report was converted to use the current report programming model. This report provides an example of a report that modifies the run-time query based on the values of the fromDate and toDate parameters, without using a custom dialog box.

- The **AssetBasis** report was migrated to the current report programming model.
- Code was moved from the helper class to the controller.
- Simple validation logic on the helper class was also moved to the controller. Most validation was performed automatically.

The following screenshot illustrates the parameter form that includes the from date and to date parameters for the AssetBasis report that ships with Microsoft Dynamics AX.


AssetBasisReport.AssetBasis.Report (1)

General | Batch

Parameters

Depreciation book:

From date: 3/3/2010 12:00:00 am

To date: 3/16/2010 12:00:00 am

Fixed asset basis

Fixed asset group:

Fixed asset number:

Current print destination

Printer:

Print destination: Screen

The following code illustrates how to modify the query contract based on the **fromDate** and **toDate** parameters in the **preRunModifyContract** method of the **AssetBasisController** class.

```
public class AssetBasisController extends SrsReportRunController
{
}

protected void preRunModifyContract()
{
    #define.parameterFromDate('FromDate')
    #define.parameterToDate('ToDate')
    #define.parameterDepreciationBookID('DepreciationBook')

    SrsReportRdlDataContract    contract            =
this.parmReportContract().parmRdlContract();

    date                        fromDate            =
contract.getParameter(#parameterFromDate).getValueTyped();
    date                        toDate              =
contract.getParameter(#parameterToDate).getValueTyped();
    AssetDepreciationBookId     depreciationBookId  =
contract.getParameter(#parameterDepreciationBookID).getValueTyped();

    Query                       query               = this.getFirstQuery();

    // Modify the query contract based on fromDate & toDate.
    SrsReportHelper::addFromAndToDateRangeToQuery(query,
                                                  fromDate,
                                                  toDate,
                                                  tableNum(AssetBasis),
                                                  fieldNum(AssetBasis, UsedFromDate));

    // Modify the query contract based on DepreciationBookId.
    SrsReportHelper::addParameterValueRangeToQuery(query,
                                                   tableNum(AssetBasis),
                                                   fieldNum(AssetBasis, DepreciationBookId),
                                                   depreciationBookId);
}
```

Query example 2: Override the query init method

The reporting framework does not invoke the **init** method on a query. You can override the controller and call the **init** method on the **PrePrompt** class or the **PreRunModifyContract** class.

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