MODULE 8: REPORTS

Module Overview

Reports print information, structure, and summarize information. Use reports to print documents such as invoices, and to process data without printing.

Creating reports includes designing both the business logic that covers the information the report contains, and the print layout of the report.

Objectives

The objectives are:

- Explain the concepts of reports and report components.
- Provide an overview of different report types and their characteristics.
- Describe the difference between the logical and the visual design of reports and introduce Report Designer.
- Describe the logical design of a report.
- Create the data model for a new report by defining data items in the Report Dataset Designer.
- Describe the visual design of a report and introduce Microsoft Visual Studio Report Designer.
- Design the report layout.
- Introduce Request Page Designer.
- Design the **Request Options** page.
- Explain the concepts of grouping and totaling in a report.
- Create a grouping and totaling for a report.
- Add advanced features to a report.

Reports Fundamentals

In Microsoft Dynamics NAV, reports have the following purposes:

- Structure and print information from a database. For example, report **108**, **Customer - Order Detail** lists all customers and all sales orders for each customer.
- Print and display documents in the application. For example, report **206**, **Sales - Invoice** prints an invoice together with its relevant information.
- Automate many recurring tasks, such as updating all prices in an item list. This can be performed by using C/AL code in a codeunit, but report makes it easier because of the powerful data modeling that is available for report design, such as report **794**, **Adjust Item Costs/Prices**.

A report consists of the report description that specifies how data is collected, presented on the screen, or printed on the paper when the report is run.

The report description is not directly visible to the user. When developers create reports, they perform the following task to establish the report description:

- Assign the report name and ID number.
- Specify data items.
- Design the layout of the report.

The report description contains the following:

- Properties
- Triggers
- Controls
- Data items
- Columns
- Request page labels
- Layout.

The "Report Description" figure shows components of a report and how they are related.
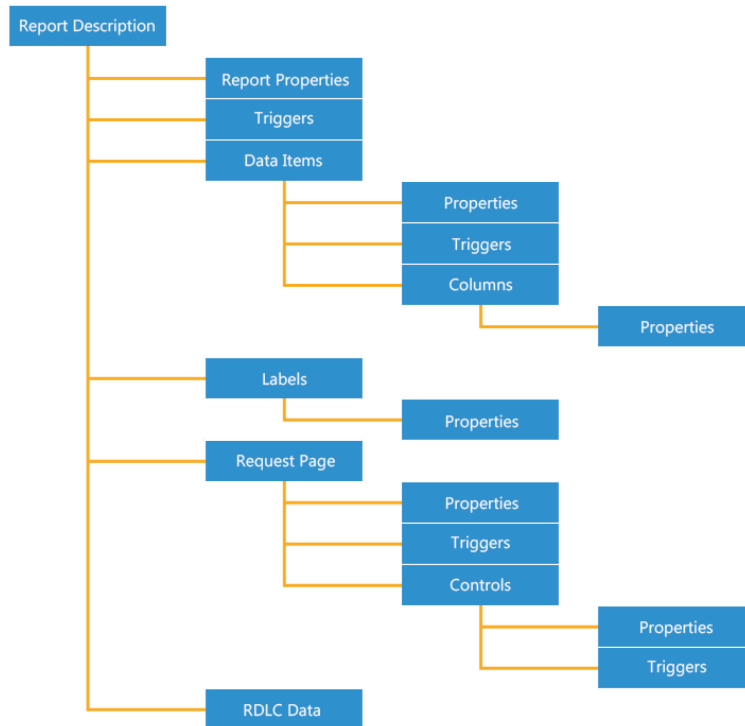
FIGURE 8.1: REPORT DESCRIPTION

Properties

The report description contains properties that are related to the report, and properties that are related to the other report components, such as data items, columns, and the **Request** page.

A property is an attribute of an object or its components that characterizes and specifies behavior of the parent, such as whether it is visible.

Triggers

Certain predefined events that occur in a report cause the system to execute a user-definable C/AL function. The event and the function together are called a *trigger*.

Triggers in a report can be divided into the following three categories:

- Report triggers
- Data item triggers
- Request page triggers

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Examples of report triggers include OnPreReport that contains statements that are executed right before the report is run, and OnPostReport that contains statements that are executed immediately before the report execution completes. Edit triggers in a report by using the C/AL Editor, which is accessed from Report Dataset Designer.

Data Items

You build the data model of a report from data items; data items correspond to a table. When the report runs, each data item is iterated for all records in the underlying table. When a report is based on more than one table, you establish a hierarchy of data items to control how the information is collected. You establish this hierarchy by indenting the data items.

For example, to create a report that prints a list of customers, and sales orders that are created by each customer, you define the following two data items:

- One that corresponds to the **Customer** table.
- One that corresponds to the Sales Order table. (This data item is indented.)

The report examines all customers in the **Customer** table, and all sales orders in the **Sales Order** table to find all sales orders that are related to this customer.

Columns

You use Report Dataset Designer in Microsoft Dynamics NAV Development Environment to define the dataset of a report. You build the report dataset from data items and columns.

A data item is a table. A column can be any of the following:

- A field in a table
- A variable
- An expression
- A caption that is not related to a specific table

Request Page

The **Request** page collects requests and options from users before the actual report begins execution. The request page runs at the same time that the report runs. Request pages enable end-users to specify options and filters for a report.

Labels

You can add labels to the dataset with **Report Dataset Designer**. Labels can be related to a data item, such as the caption for a table field. Labels can be unrelated to a data item, such as the title of the report.

When you create a report layout in Visual Studio, you add data items from the Visual Studio dataset to the layout. If you want to add a label to the report layout, such as a caption for a field, a title for a chart, or a title for the report, then you must have a label in the Visual Studio dataset.

To add a caption for a field, use the Include Caption property. To add labels to the report, use **Report Label Designer**.

Layout

Reports in Microsoft Dynamics NAV can be a printing or nonprinting report. Use a nonprinting report for processing a task that does not produce a displayed output. A printing report displays the result in the screen or generates print output. This display is controlled by the client report definition (Report Definition Language Client-side, or RDLC) layout of the reports.

You use Visual Studio Report Designer to design the RDLC layout. You display most of the data in the body of a report; you use the header to display information before any data item record is displayed. For example, you can display a report title, company, and user information in the header of a report.

With Visual Studio Report Designer, you can add useful features to your report layouts, such as the following:

- Links from a field on a report to either a page or another report
- Images and graphs
- The ability to toggle columns so that you can hide or display data
- The ability for users to interactively change the column on which data in the report is sorted

Report Design Process

The report design process is divided into two distinct phases that reflect different aspects of creating a report. They are as follows:

- Defining the logical structure (the data model)
- Designing the visual element

In addition, there are occasions when a user must input certain options before they run the report through the **Request** page. Therefore, the report design process also designs the request page.

Logical Design

Creating a logical design for a report means defining the data model. This means defining how the data for the report is collected. This includes defining the following:

- Tables that are used by the report by defining data items
- Relationships between data items if the report uses more than one table
- Key, sort order, and filters to use with the data items
- Elements that the user can change at run time
- Grouping of data
- Calculation of subtotals and totals

Visual Design

Designing a report's visual elements to create an RDL data for a report.

Demonstration: Report Dataset Designer

Define a logical report in the Report Dataset Designer.

The Report Dataset Designer contains the following designers:

- **The Request Options Page Designer**. An additional designer that you use to design request options pages.
- **Microsoft Visual Studio Report Designer**. An external designer that you use to create the RDL data for layout of reports.

Demonstration Steps

1. The following steps show how to open Report Dataset Designer:
   a. Click **Tools > Object Designer**.
   b. Click **Report** to open the **Report list**.
   c. Select any report, and then any of the following:
      - Click **Design** to open Report Designer to design the report.
      - Click **New** to open Report Designer to design a new report.

Design the Data Model

Define a data model in Report Dataset Designer by adding data items. In this window, specify the tables that the report reads. Any table that is listed in this window is read in its entirety when the report runs. Link and filter data items to limit the number of records that the report reads.

A report can read the same table multiple times if the table is listed multiple times in Report Dataset Designer. For example, you can set up a report to read customer records twice: first, the customers who are not blocked, and then the customers who are blocked.

The listed tables become data items in the report. Data items are record variables that enable the report to access table data. The "Report Dataset Designer" figure shows the **Customer List** report.
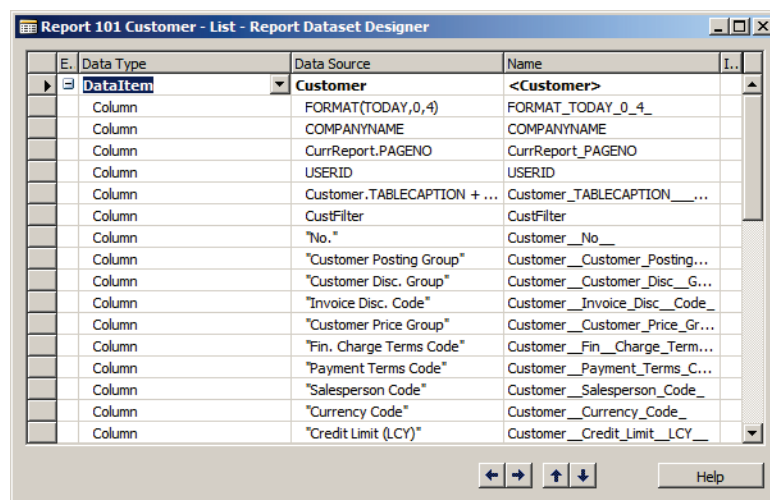

FIGURE 8.2: REPORT DATASET DESIGNER

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The **Customer** table is the data item for this report. The Name column in Report Dataset Designer displays the name that is used by the report for the data item. All variable names must be unique within the report.

Ordering and Indenting Data Items

The order in which the data items are listed is the order in which the report reads the data from the tables. At the bottom of the Report Dataset Designer window, there are four arrow buttons. Use the up and down arrow buttons to reorder the data items. Use the right and left arrow buttons to indent or remove the indentation of a data item.

If a data item is indented under another data item (the parent data item), the report reads every record from the parent data item and all records from the indented data item, including any filters or links.

This concept resembles a nested FOR loop. For example, if the **Sales Line** table is added as a data item under **Customer** table, and then it is indented, the report reads the customer, and then the relevant sales line information for that customer, before it moves to the next customer.

Linking a Data Item

Each data item has the DataItemLinkReference property and the DataItemLink property. These properties define a Master/Detail relationship between two tables.

In the DataItemLinkReference property of a data item, select the parent data item to link to (the data item must be indented under the parent data item).

In the DataItemLink property of the indented data item, specify a filter for this data item by matching fields in this data item with fields from the parent data item in the DataItemLinkReference property.

Adding columns

After you add a data item to a report, you add columns to the data item. A column can be a field in a table, a variable, or an expression. Columns correspond to fields in a table.

To add a column in Report Dataset Designer, do the following:

1. On the first blank line, in the Data Type column, select **Column** from the drop-down list.
2. Click **View > Field Menu**. The **Field Menu** window opens, and displays the list of available fields from the data item.

3. In the **Field Menu** window, select one or more fields that you want to add to the report dataset. Select multiple fields by holding down the SHIFT key or the CTRL key.

4. Click **OK** to add the selected fields to the dataset.

5. If you want to include the caption of a column in the dataset, then select **Include Caption** in Report Dataset Designer. The caption is included as a parameter in Visual Studio Report Designer.

6. If the Include Caption column is not visible in Report Dataset Designer, then click **View > Show Column** on the Toolbar. Select Include Caption, and then click **OK**.

7. In Report Dataset Designer, enter data items and columns until you have added all fields from the tables that you want to include in the report.

8. If you want to add a label to the report, such as a caption for a table header or a title for the report, then add a label to the dataset.

If you want to include a variable in the report dataset, then do the following:

1. In Report Dataset Designer, on a blank line in the Data Type column, select **Column** from the drop-down list.

2. In the Data Source column, enter the variable. You can use the up arrow to open the **C/AL Symbol Menu** dialog box and view the variables for the report.

3. In Report Dataset Designer, in the Name column, enter a CLS-compliant name for the variable. This name is used in the dataset in **Visual Studio**.

If you want to include a calculation or other source expression in the report dataset, then do the following:

1. In Report Dataset Designer, on a blank line in the Data Type column, select **Column** from the drop-down list.

2. In the Data Source column, enter the source expression.

3. In the Name column, enter a name for the variable. This name is used in the dataset in **Visual Studio**.

Creating a Data Model

The following demonstrations assist you in understanding the basic design principles of creating a report in Microsoft Dynamics NAV. The report that you create in these demonstrations shows a list of customers by salespersons.
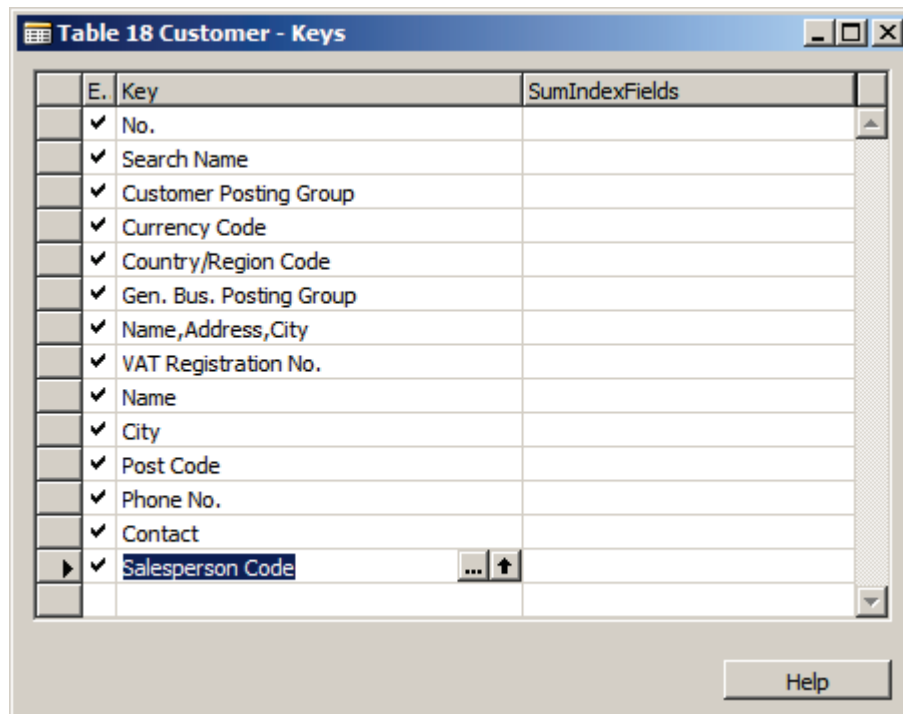
The following demonstration shows how to do the following:

- Create a data model by defining data items.
- Create linking between data items.
- Define appropriate sorting for the data item in the Report Dataset Designer.

Demonstration: Prepare the Customer Table

Demonstration Steps

1. Before you start the report, add a key to the **Customer** table.
   a. Select Design table **18**, **Customer**, from Object Designer.
   b. Click **View > Keys**, and add **Salesperson Code** to the list of keys. See "The Customer Table Keys" figure.

FIGURE 8.3: THE CUSTOMER TABLE KEYS

   c. Close the **Keys** window and compile, save, and then close the table.

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Demonstration: Create the Report Data Model

Demonstration Steps

1. The following steps show how to create the business logic for the report in the **Report Dataset Designer**:

   a. In **Object Designer Report List**, click **New**. The **Report Designer** opens.

   b. Click the first empty line in the **Report Dataset Designer**, and type or select the number or name of table **13**, **Salesperson/Purchaser** in the **DataItem** column. The Name column is set by default to the table name.

   c. Click the next line, and add table **18**, **Customer**.

2. The report must show customers by salesperson. Therefore, it must first read the **Salesperson/Purchaser** table, and for each salesperson record, it must read all customers for that salesperson. To do this, indent the **Customer** data item under the **Salesperson/Purchaser** data item, and link the two.

   a. With the **Customer** data item still selected, click the right arrow button at the bottom of the Report Designer to indent the **Customer** data item. See "The Customer Data Item Indented Under the Salesperson/Purchaser Data Item" figure.
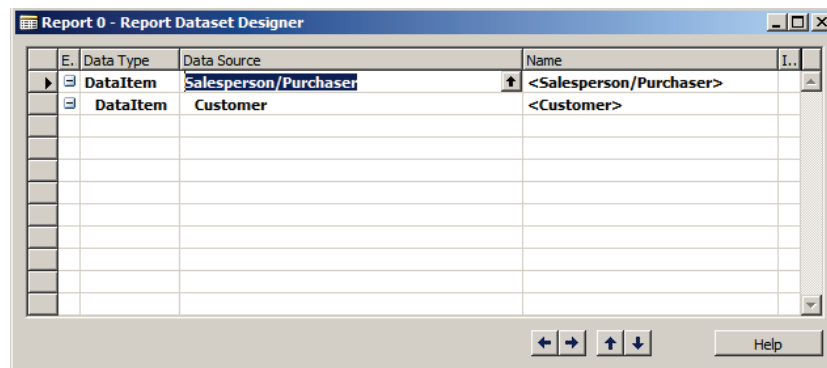
FIGURE 8.4: THE CUSTOMER DATA ITEM INDENTED UNDER THE SALESPERSON/PURCHASER DATA ITEM

   b. Open the **Properties** window for the Customer data item.

   c. Locate the DataItemLinkReference property, and verify that it is set to **Salesperson/Purchaser**.

   d. Locate the DataItemLink property, and then click **AssistEdit(...)** on the DataItemLink property.

   e. The **DataItem Link** window opens.

  f. Type the following in the **DataItem Link** window:

> Salesperson Code=FIELD(Code)

  g. This links the **Salesperson Code** field from the **Customer** table to the **Code** field from the **Salesperson/Purchaser** table.

  h. Click **OK** to close the **DataItem Link** window.

  i. Locate the DataItemTableView property, and then click **AssistEdit(…)** on the DataItemTableView property. The **Table View** window opens.

  j. In the **Key** field, select **Salesperson Code**, and then click **OK** to close the **Table View** window. This sorts the indented data item by the indicated field. This is best practice when linking two data items.

> Notice that the DataItemTableView property is set to the following:
>
> SORTING(Salesperson Code)

  k. Close the **Properties** window.

  l. Compile and save the report by clicking **File** > **Save As**. The **Save As** dialog box appears.

  m. Type "90000" in the **ID,** and **Customer by Salesperson** in the **Name**.

 n. Make sure that **Compiled** is selected, and then click **OK**. This compiles and saves the report.

The report data model is now complete. The next step is to design the visual element of the report.

Demonstration: Add columns and captions to the data model

Demonstration Steps

 1. Add columns to the Report Dataset Designer

  a. In **Report Dataset Designer**, select the first line that contains the **Salesperson/Purchaser** data item.

  b. Click the **Field Menu** button in the toolbar to open the **Field Menu** window.

  c. In the **Field Menu** window, select the first two lines.

  d. Click **OK** in the **Field Menu** window. A confirmation message appears.

e. Click **Yes**. Two columns are added to Report Dataset Designer, below the Salesperson/Purchaser data item as shown in the "Adding Columns" figure.
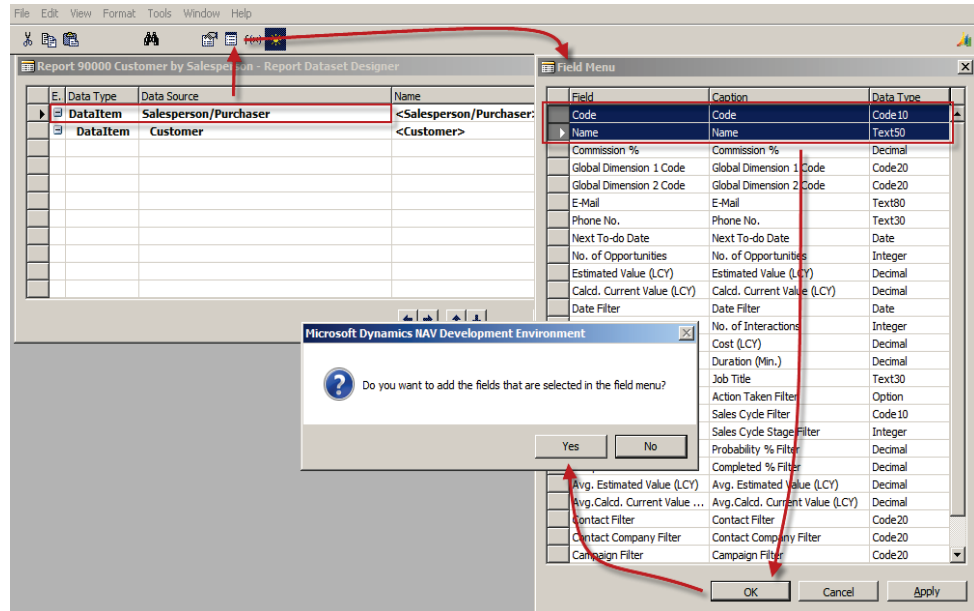
FIGURE 8.5: ADDING COLUMNS

f. Repeat this process for the **Customer** data item, and add the following fields to the **Customer** data item:

- No.
- Name
- City
- Phone No.

2. After the columns are added in the data items, include caption.

a. In the **Report Dataset Designer** for the **No.** field, select the Include Caption column. A toggle appears in the Include Caption column.

b. Repeat this for all fields of the **Salesperson/Purchaser** and **Customer** data items.

c. The **Report Dataset Designer** now looks like the "Include Columns in report Dataset Designer" figure.

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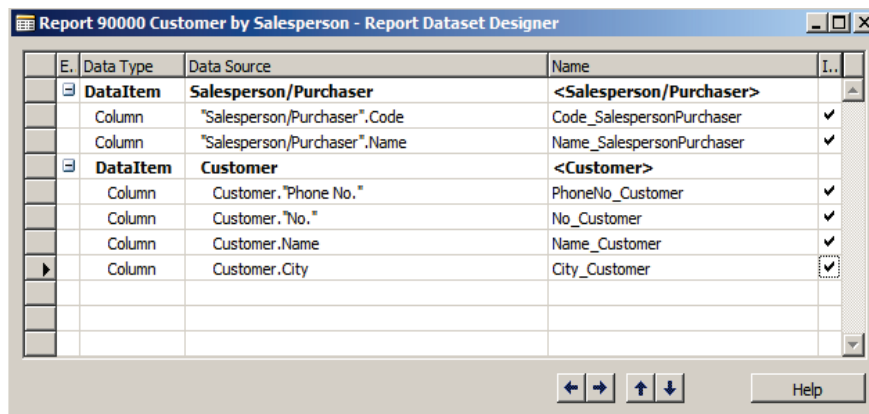
FIGURE 8.6: INCLUDE COLUMNS IN REPORT DATASET DESIGNER

Designing the Layout

The report's visual elements are the **Microsoft Visual Studio Report Designer**.

Microsoft Visual Studio Report Designer

The Report Definition Language (RDL) Data is a report component that is used by Microsoft Dynamics NAV to display the report in the RoleTailored client. **Microsoft Visual Studio Report Designer** is an external designer that is used to design the visual element (the RDL data) of a report. It is accessed from the **Report Dataset Designer**. The following steps show how to open the Microsoft Visual Studio Report Designer:

1. Open **Report Dataset Designer** from **Object Designer**.
2. In Report Designer, click **View**, **Layout**.

The **Report Designer** provides the following two options about layout creation:

- View Layout
- Delete Layout

You can access these two options on the **Tools** menu in the **Development Environment**.

The **View, Layout** option creates an (empty) report.rdlc file, and opens it in **Visual Studio Report Designer**.

The **Delete Layout** option deletes the current report layout.

Demonstration: Designing the Layout

The following demonstration shows how to design the report layout in **Microsoft Visual Studio Report Designer**.

Demonstration Steps

1. Prepare the Layout:
   The following steps show how to design the report layout in Microsoft Visual Studio Report Designer.

   a. Design report **90000**, **Customer by Salesperson**, from the **Object Designer**.

   b. Click **View**, **Layout**.
      Microsoft Visual Studio Report Designer opens with a **Dataset Result** from the report dataset designer.

   c. Drag a **Table** control from the toolbox to the report layout.

   d. Click one of the columns, right-click, and then click **Insert Column to the Right**. See "The Table with Four Columns" figure.
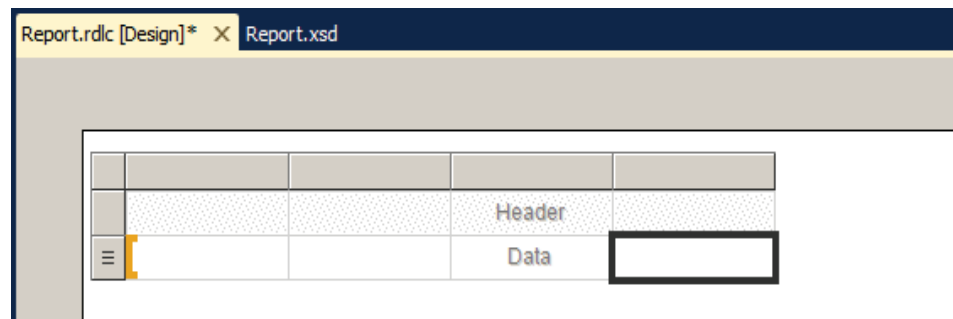
FIGURE 8.7: THE TABLE WITH FOUR COLUMNS

   The layout now has a table with four columns.

2. Add Column Headers

   a. Type [@No_CustomerCaption] in the first column of the first row of the table.

   b. Use the caption fields for column headings instead of hard-coded text, to support a multilanguage scenario.

   c. Repeat this for the following fields in the appropriate columns of the first row of the table:

      ▪ [@Name_CustomerCaption]

      ▪ [@City_CustomerCaption]

      ▪ [@PhoneNo_CustomerCaption]

   d. You can also complete these fields by going to the individual text box in the table and typing the Value property appropriately. See the "The Report Layout" figure.

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FIGURE 8.8: THE REPORT LAYOUT

3. Add a Grouping:

   A dataset result in **Visual Studio Report Designer** is flattened data. This means the **Salesperson/Purchaser** table and the **Customer** table are joined.

   In the **Visual Studio Report Designer**, the hierarchy is defined in each control, in this case, the table control. The following steps show how to add the grouping of customers by their salesperson.

   a. In the **Properties** window, select the Table properties and set the property DataSetName to DataSet_Result. This connects the table to the dataset. When you add a field from the dataset to the table, the table is automatically connected to the dataset. In this example, a group is created in a table that does not contain fields from the dataset.

   b. In the **Grouping** panel at the bottom of the page, click the **Row Group** arrow and click **Add Group > Parent Group**. See the "Add Parent Group to Table" figure.
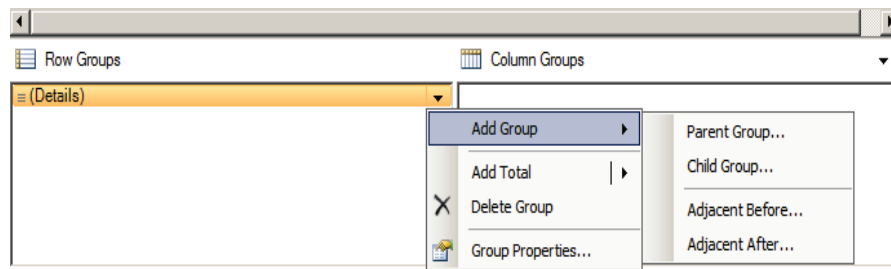

FIGURE 8.9: ADD PARENT GROUP TO TABLE

   c. The **Group Properties** window opens. Select **Group by**, and then select [Code_SalespersonPurchaser].

   d. Select **Add group header** and **Add group footer** as shown in Tablix Group. See the "Tablix Group" figure.
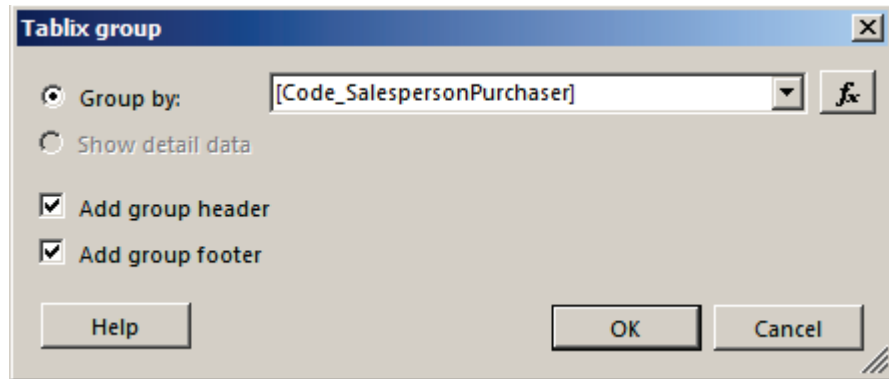
FIGURE 8.10: TABLIX GROUP WINDOW

    e.   Click **OK**.

    f.   In the first text box of the first row, change the expression for the value to the following: [@Name_SalespersonPurchaserCaption].

    g.   Right-click the column header of this text box header and select **Insert Column > Inside Group – Left** as shown in Add Column Inside.
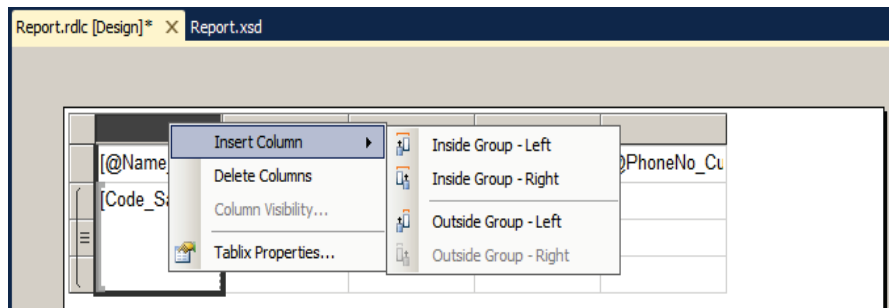
FIGURE 8.11: ADD COLUMN INSIDE

    h.   In the first text box of the first row, set the expression for the value to the following: [@Code_SalespersonPurchaserCaption].

    i.   In the first text box of the second row, set the expression for the value to the following: [Code_SalespersonPurchaser]. The "Report Layout" figure shows the layout.
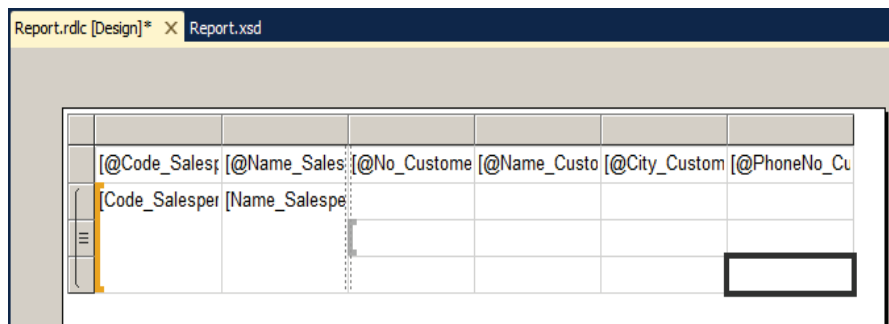
FIGURE 8.12: THE REPORT LAYOUT

4. Add fields:

The following steps show how to add fields to the report layout.

a. In the text box, on the third row of the third column, select **No_Customer** from the menu. The **[No_Customer]** field is added to the text box.

b. Repeat this step for the next three columns to add the fields:

- [Name_Customer]

- [City_Customer]

- [PhoneNo_Customer]

The "Report Layout" figure shows how the layout should look:

FIGURE 8.13: THE REPORT LAYOUT

c. Close Visual Studio and then click **Yes** when you are prompted to save the changes.

d. Click anywhere in the **Report Designer**, and then click **Yes** to load the saved changes from **Visual Studio**.

e. Compile, save, and then close the report.

5. Run the Report:

In the RoleTailored client, a report is run from a page. However, to test the changes, run the report from **Object Designer**.

a. In **Object Designer**, select the report **90000**, **Customer by Salesperson**.

b. Click **Run**.

c. The **Request** page opens. This page lets users enter filters for data items or change the sorting. Users can also choose to print or preview the report. See the "Request Page" figure.
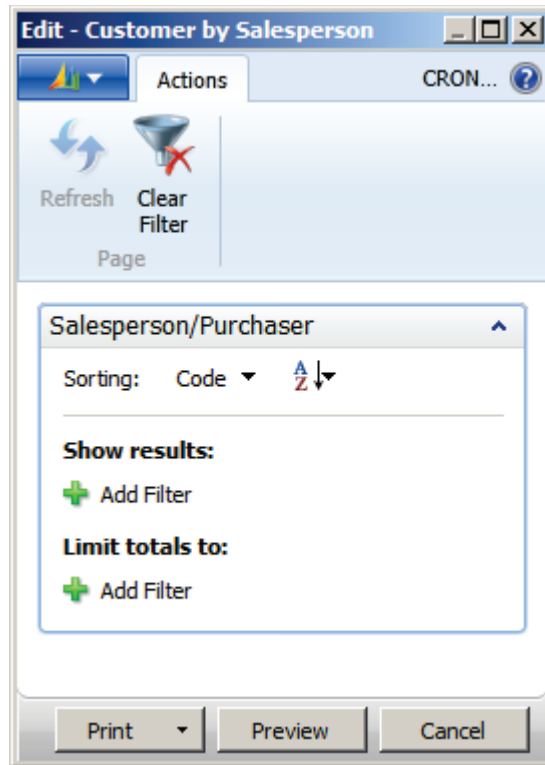
FIGURE 8.14: THE REQUEST PAGE

    d.   Click **Preview**. See the "Print Preview Window" figure.

FIGURE 8.15: THE PRINT PREVIEW WINDOW

6. Print Only If Details:

As you can see in the preview, the report prints **Salespersons** and **Customers** but there are salespersons that do not have customers. To improve the report only salespersons that have customers have to be displayed.

a. Open **Report Dataset Designer** for report **90000**, **Customer by Salesperson**.

b. Select the **Salesperson** data item

c. Click **View** > **Properties** to open the Properties window

d. Set the property **PrintOnlyIfDetails** to **Yes**.

e. Save and close the report.

f. Run it again from **Object Designer** to see the results. See "The Print Preview Window" figure for an example.

FIGURE 8.16: THE PRINT PREVIEW WINDOW

g. The report displays all salespersons, and displays the customers for each salesperson. Several fields, such as the **Name** field, are wide and require more space. These fields can grow to the second line. The CanGrow property defines this behavior.

7. Print Header on Every Page:
The customers for some salespersons extend to more than one page. However, on the second page, the report does not print any headings that indicate which salesperson that the customers are associated with. The following steps show how to achieve this.

a. Design report **90000**, **Customer by Salesperson**, from the **Object Designer**.

b. Click **View**, **Layout**.

c. Open the **Properties** window for the table control, and select **Repeat header rows on each page**. See the "Tablix Properties" figure.
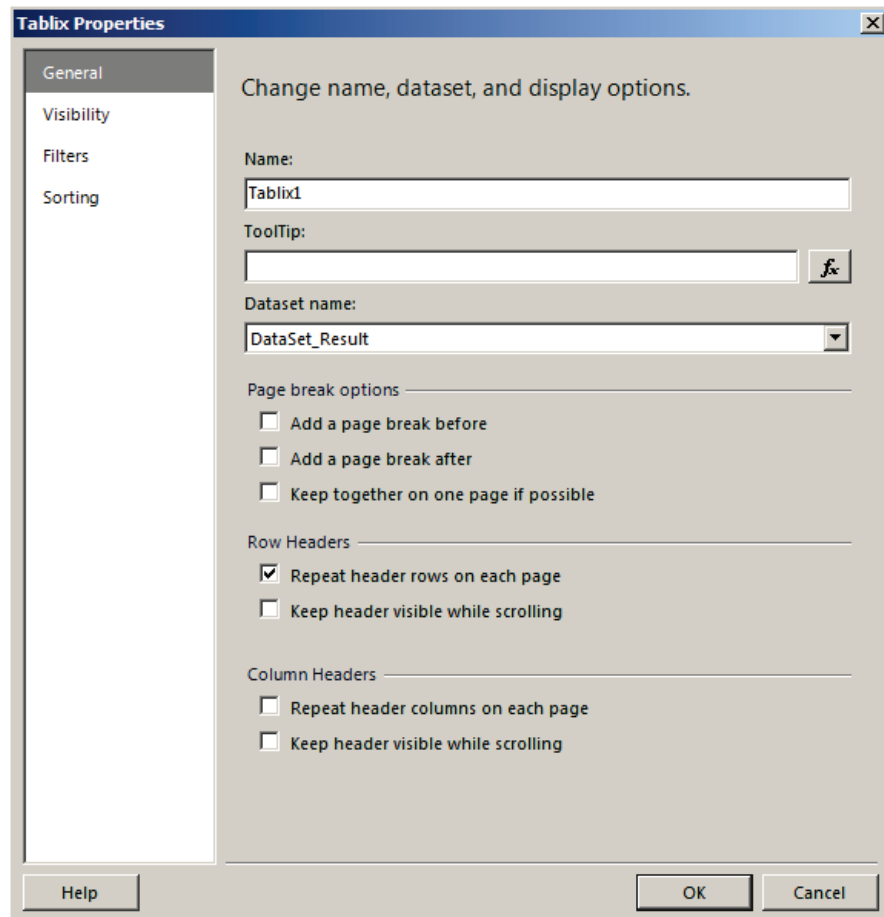
FIGURE 8.17: TABLIX PROPERTIES

d. Click **OK** to close the **Properties** window.

e. Close Visual Studio, and then click **Yes** when you are prompted to save the changes.

f. Click anywhere in Report Designer, and then click **Yes** to load the saved changes from Visual Studio.

g. Compile, save and close the report.

h. Run the report to view the changes.

8. Show New Record in a New Page:
    The following steps show how to start a new page for every Salesperson.

    a. Design report **90000**, **Customer by Salesperson**, from the **Object Designer**.

    b. Click **View**, **Layout**.

    c. Open the **Properties** window for the row group.

    d. Click the Page Breaks tab.

    e. Select **Between each instance of a group**.

    f. Click **OK** to close the **Group Properties** window.

    g. Close Visual Studio, and then click **Yes** when you are prompted to save the changes.

    h. Click anywhere in the Report Dataset Designer, and then click **Yes** to load the saved changes from Visual Studio.

    i. Compile, save, and then close the report.

    j. Run the report to view the changes.

The Request Page Designer

The request page is displayed when the report is run. The request page lets the user provide additional input before previewing or printing the report.

The Request Page Designer

The request page is displayed when the report runs. When you create a new report, a request page is created automatically for the report. In addition, you can create custom options in the **Request** page. You design these options by using the Request Options Page Designer which is accessed from the **Report Designer**. The following steps show how to open the **Request Options Page Designer**.

1. Open **Report Designer** from **Object Designer**.

2. In Report Designer, click **View**, **Request Page**.

The Request Options Page Designer resembles **Page Designer.** Here developers can add controls, such as FastTabs and fields to the request page. Controls that are created in the Request Options Page Designer always are displayed above the FastTabs that correspond to data items.

Design the Request Options Page

The following demonstration shows how to do the following tasks:

- Design the **Request Options** page.
- Add and remove FastTabs from the Request Options page.
- Add a control to the Options FastTab and use the control to affect the output of the report.

Demonstration: Add and Remove FastTabs on the Request Page

Every data item has a FastTab on the request page. It can be hidden or shown by the property UseRequestPage. If UseRequestPage is **No**, then a request page is not shown. The user cannot select a sort order or set filters.

Every data item has a FastTab on the **Request** page, although it can be hidden by setting certain properties. Currently the **Customer by Salesperson** report has two data items: the Salesperson/Purchaser data item, and the Customer data item.

When it runs, the request page for this report shows the Salesperson tab.

Demonstration Steps

1. The following steps show how to add and remove tabs on the **Request** page.
   a. Design report **90000**, **Customer by Salesperson** from the Object Designer.
   b. Open the **Properties** window for the Customer data item and clear the DataItemTableView property.
   c. Close the **Properties** window, and compile, save, and then run the report.

2. The **Request** page now shows two tabs: the Salesperson and the Customer tabs.
   a. Close the **Request** page.
   b. Open the **Properties** window for the Customer data item and set the DataItemTableView property to SORTING("No.").
   c. Close the **Properties** window, and compile, save, and then run the report.

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3. The **Request** page now shows only the Salesperson tab.

   a. Close the **Request** page.

   b. Open the **Properties** window for the Customer data item and set the ReqFilterFields property to "**No**.".

   c. Close the **Properties** window, and compile, save, and then run the report.

4. The **Request** page now shows two tabs: the Salesperson and the Customer tabs.

   a. Close the **Request** page and close the report.

Demonstration: Create Options FastTab and Add a Check Box

Demonstration Steps

1. The following steps show how to create a check box in the Options FastTab of the **Request** page.

   a. Design report **90000**, **Customer by Salesperson**, from **Object Designer**.

   b. Click **View > C/AL Globals**. The **C/AL Globals** window opens.

   c. Type the following in the Variables tab:

Name	DataType
ShowDetails	Boolean

   d. Close the **C/AL Globals** window.

   e. Click **View > Request Page** on the Toolbar. **The Request Options Page Designer** opens. It resembles Page Designer. See the "Request Options Page Designer" figure.

   f. Type the following on the first line of **Page Designer**:

Name	Caption	Type	SubType
Request Page	Request Page	Container	Content Area

   g. Go to the next blank line. The page elements automatically indent.
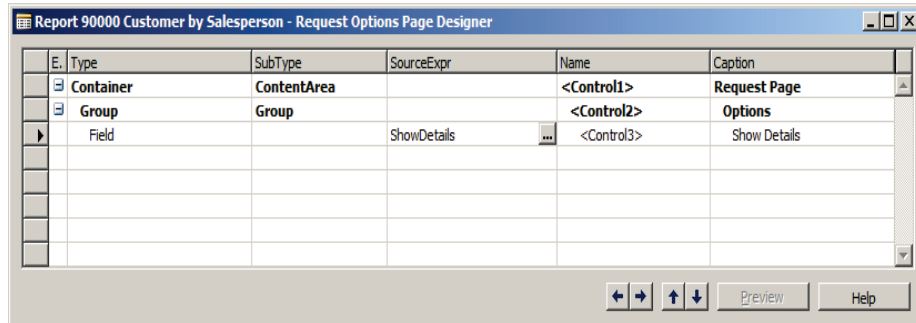
   h. Type the following:

| Name	Caption	Type	SubType
Options	Options	Group	Group

   i. This creates the Options FastTab.

j. Type the following on the next line, and make sure that it is indented under the Options FastTab:

Name	Caption	Type	SourceExpr
Show Details	Show Details	Field	ShowDetails

FIGURE 8.18: REQUEST OPTIONS PAGE DESIGNER

k. Close **Request Options Page Designer**.

l. Compile, save, and then close the report.

m. Run the report in the RoleTailored client.
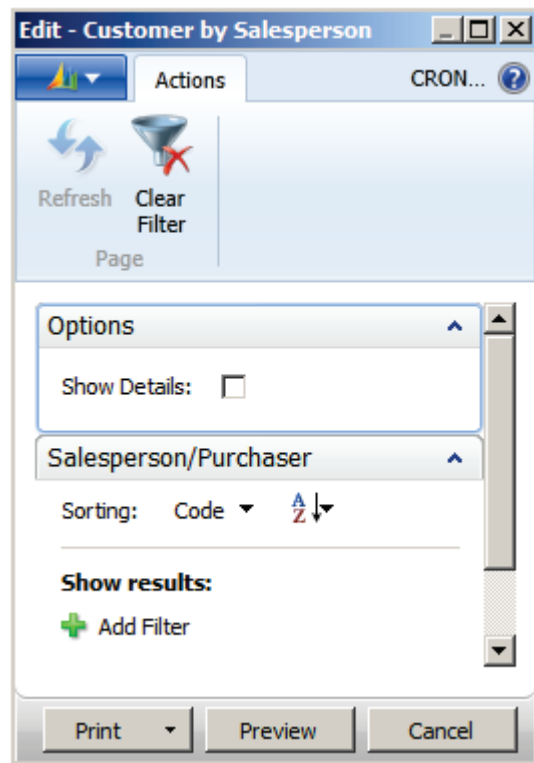
FIGURE 8.19: THE REQUEST PAGE

The **Request** page now shows the following three FastTabs:

- Options (displays **Show Details** check box)
- Salesperson
- Customer FastTabs

Demonstration: Skip Lines in a Report

Use the value of the check box in the **Request** page to either display or not display a section in the report.

Demonstration Steps

1. The following steps show how to conditionally show the detail of the **Customer**, depending on the value of the **Show Details** check box in the **Request** page.

   a. Design report **90000**, **Customer by Salesperson**, from Object Designer.

   b. Add a new line in **Report Dataset Designer** under the customer data item, and set the following properties:

Data Type	Data Source	Name
Column	ShowDetails	ShowDetails

   c. Click **View**, **Layout**.

   d. Select the third row (Detail) and set the following property:

Visibility, **Hidden**: =IIF(Fields!ShowDetails.Value,false,true)

   e. Close Visual Studio, and then click **Yes** when you are prompted to save the changes.

   f. Click anywhere in **Report Designer**, and then click **Yes** to load the saved changes from Visual Studio.

   g. Compile, save, and then close the report.

   h. Run the report, select **Show Details** in the Options FastTab of the request page, and then click **Preview**.

   i. Close the report preview, rerun the report, and clear **Show Details**.

   j. Click **Preview** and view the changes.

Grouping and Totaling

A report is usually designed to give the user summary information about what is in the database. This usually requires adding one or more fields that are displayed or read by the report, and then displaying the sum. This process is known as *totaling the report*.

Microsoft Dynamics NAV uses subtotals and grand totals. Subtotals are shown after a logical grouping of records. Grand totals are shown at the end of the report. Subtotals sum the group and grand totals sum the whole report. This means, grand totals sum all subtotals.

Demonstration: Grouping

The following demonstration shows how to create grouping in a report. For this demonstration, a new report is created.

Demonstration Steps

1. The following steps show how to create a new report that uses grouping.
   a. Create the **Report Data Model**.
   b. In **Object Designer**, click **New**. The **Report Dataset Designer** opens.
   c. Click the first empty line in **Report Dataset Designer**, and type or select the number or name of table **18**, **Customer** in the DataItem column. The Name column is set to the table name by default.
   d. Click the next line, and add the table **21**, **Cust. Ledger Entry**.
   e. Open the **Properties** window for the Customer Ledger Entry data item.
   f. Locate the **DataItemLinkReference** property, and verify that it is set to **Customer**.
   g. Locate the DataItemLink property, and then click the **AssistEdit** button on the DataItemLink property.
   h. The **DataItem Link** window opens.
   i. Type the following in the **DataItem Link** window:

   Customer No.=FIELD(No.)

   j. This links the **Customer No.** field from the **Customer Ledger Entry** table to the **No.** field from the **Customer** table.
   k. Click **OK** to close the **DataItem Link** window.
   l. Compile and save the report by clicking **File > Save As** on the Toolbar. The **Save As** dialog box opens.

    m. Type **90001** in the **ID**, and **Customer Details** in the **Name**.

    n. Make sure that **Compiled** is selected, and then click **OK**. This compiles and saves the report.

2. Add columns to the dataset.

    a. In **Report Dataset Designer**, select the first line that contains the Salesperson/Purchaser data item.

    b. Click **Field Menu** to open the **Field Menu** window.

    c. In the **Field Menu** window, select the following fields:

- No.
- Name
- City
- Phone No.

    d. Click **OK** in the **Field Menu** window.

    e. Click **Yes** when you receive a confirmation message. The selected fields are added as columns in **Report Dataset Designer**, under the Customer data item.

    f. Repeat step a through e for the **Customer Ledger Entry** data item. Add the following fields to the Customer Ledger Entry data item:

- Customer No.
- Posting Date
- Document Type
- Document No.
- Description
- Amount (LCY)

    g. In the Report Dataset Designer toggle the Include Caption column for all the columns. The Report Dataset Designer now looks the "Customer Details Report Dataset" figure.
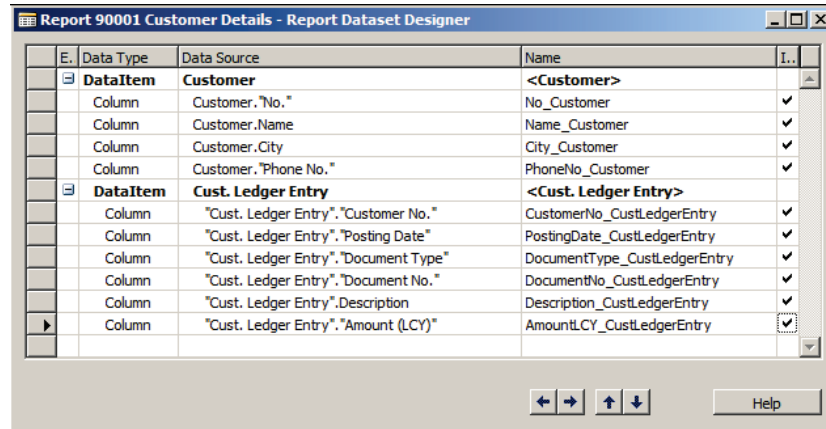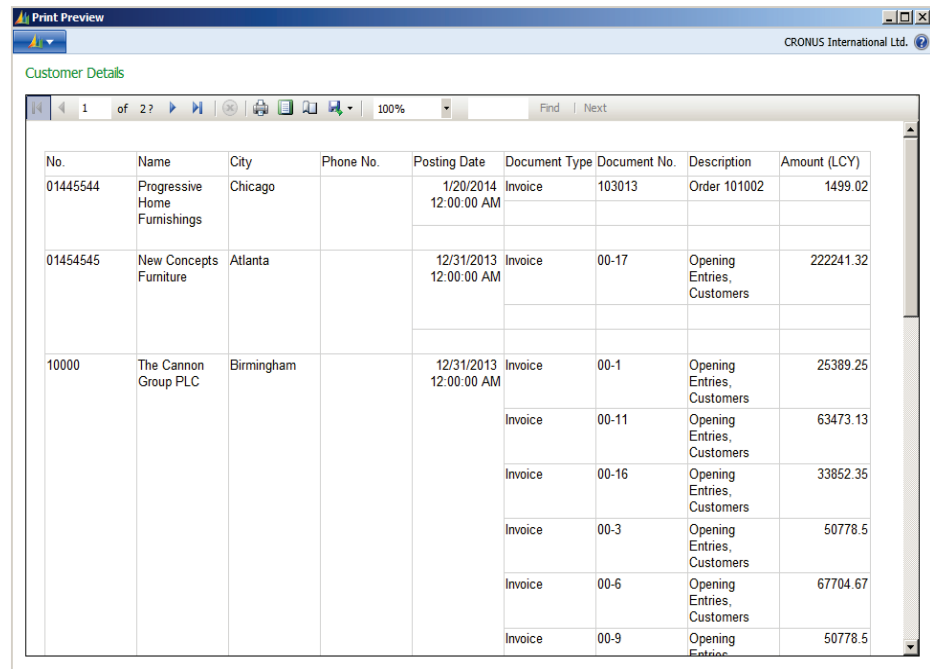
FIGURE 8.20: CUSTOMER DETAILS REPORT DATASET

3. Create a Group on Posting Date and a group on Customer No.

   a. Click **View**, **Layout**.

   b. Microsoft Visual Studio Report Designer opens with a Dataset Result from the Report Dataset Designer.

   c. Drag a **Table** control from the toolbox to the Report layout.

   d. Right-click one of the columns, and then continue to click **Insert Column to the Right**, until the layout has a table with four columns.

   e. Drag the [@DocumentType_CustLedgerEntryCaption] from Parameters to the first column of the first table row.

   f. Use the caption fields for column headings instead of hard-coded text, to support a multilanguage scenario.

   g. Repeat Step e through f for the following fields from the Parameters to the appropriate columns of the first row of the table. You also can go to each text box in the table and type the value property:

      - [@DocumentNo_CustLedgerEntryCaption]

      - [@Description_CustLedgerEntryCaption]

      - [@AmountLCY_CustLedgerEntryCaption]

   h. In the second row of the table, use the shortcut menu for each text box to add the following fields to the table:

      - [DocumentType_CustLedgerEntry]

      - [DocumentNo_CustLedgerEntry]

      - [Description_CustLedgerEntry]

      - [AmountLCY_CustLedgerEntry]

i.   In the **Grouping** panel at the bottom of the screen, click the **Row Group** arrow, and then select: **Add Group, Parent Group**.

j.   In the **Group By** drop-down list box, select [PostingDate_CustLedgerEntry].

k.   Select **Add** group Footer.

l.   Click **OK**.

m.   In the first field of the first row, change the value to the following: [@PostingDate_CustLedgerEntryCaption].

n.   In the **Row Groups** panel, select **Group 1 Properties**. The Group properties window opens.

o.   Change the **Name** of the group from **Group 1** to **PostingDate.**

p.   In the **Grouping** panel at the bottom of the screen, click the **Row Group** arrow of the **PostingDate** group, and then select **Add Group**, **Parent Group**.

q.   In the **Group By** field, select: [No_Customer].

r.   Select **Add group Footer**.

s.   Click **OK**.

t.   In the first field of the first row, change the value to the following: [@No_CustomerCaption].

u.   In the Row Groups panel, select **Group 1 Properties**. The Group Properties window opens.

v.   Change the **Name** of the group from **Group 1** to **Customer**.

w.   Right-click the column header of the first text box on the table header, and then select: **Insert Column**, **Inside Group – Right**.

x.   Repeat step w twice. See the "Tablix with Two Groups" figure.

y.   On the first (header) row, in the newly added columns, set the value to the following:

   ▪ [@Name_CustomerCaption]

   ▪ [@City_CustomerCaption]

   ▪ [@PhoneNo_CustomerCaption]

z.   On the second row, in the newly added columns, use the shortcut menu to set the values for the text boxes to the following:

   ▪ [Name_Customer]

   ▪ [City_Customer]

   ▪ [PhoneNo_Customer]
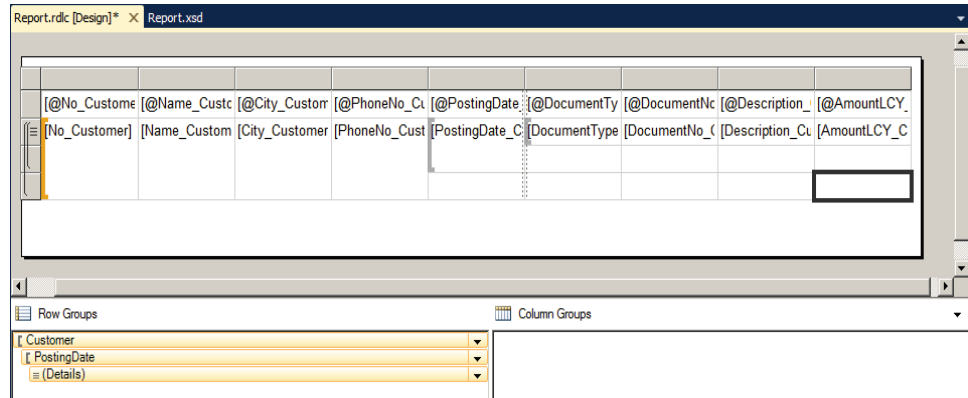
FIGURE 8.21: TABLIX WITH TWO GROUPS

4.   Run the report.

a.   When you run the report it now looks like the "Preview Report" figure.

FIGURE 8.22: PREVIEW REPORT

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Demonstration: Totaling

The following demonstration shows how to add totals to the report.

Demonstration Steps

1. Add Labels to the Report Dataset.

   a. In the Report Dataset Designer, select **View** > **Labels** from the Toolbar. The **Report Label Designer** window opens.

   b. Add the following three labels:

Name	Caption
TotalPostingDate	Total for Posting Date
TotalCustomer	Total for Customer
GrandTotal	Grand Total

2. Add Totals in the report.

   a. Click **View > Layout** to open Visual Studio Report Designer.

   b. In the Amount column, in the third and fourth row, enter the following expression for the value:

   ```
   =Sum(Fields!AmountLCY_CustLedgerEntry.Value)
   ```

3. Merge cells.

   a. In the seventh and eighth columns, on the third and fourth rows, merge the text boxes of the two columns by doing the following:

   - Select the text boxes that you want to merge.

   - Right-click and then select **Merge Cells**.
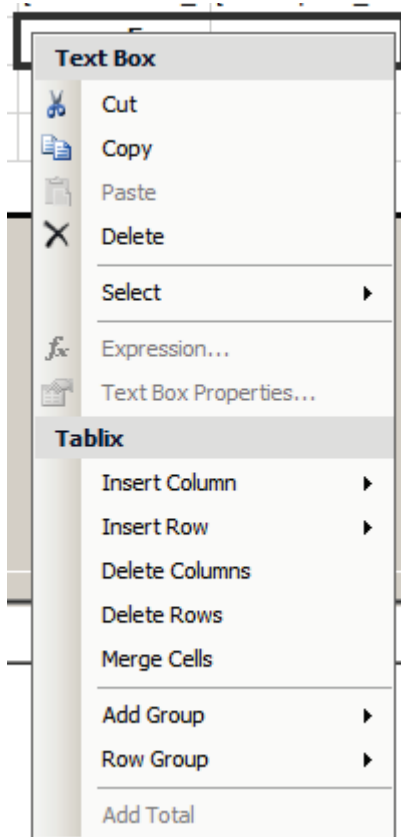
**FIGURE 8.23: MERGE CELLS OPTION**

    b. In the merged cell on the third row, type the following expression for the value:

```
=Parameters!TotalPostingDate.Value & " " &
Fields!PostingDate_CustLedgerEntry.Value
```

    c. In the merged cell on the fifth row, type the following expression for the value:

```
=Parameters!TotalCustomer.Value & " " & Fields!No_Customer.Value
```

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> d. In the **Row Groups** panel at the bottom of the screen, click
>   **Customer group**, and then select **Add Total, After**: A new row is
>   added to the bottom of the table. This row displays Grand Totals.
>   See the "Add Total After" figure.
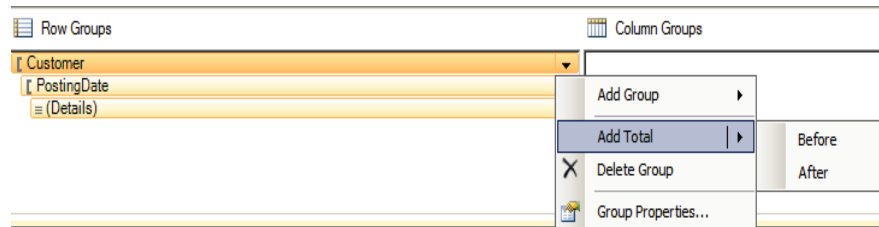
FIGURE 8.24: ADD TOTAL AFTER

> e. Merge the cells of the seventh and eight columns of the last row.
>
> f. In the merged text boxes, type the following expression in the
>   value of the text box:

=Parameters!GrandTotal.Value

4. Format the report.

   a. Select the last column of the table by clicking the column handle.

   b. In the **Property** list, for the Format property, enter the following
      expression:

=Fields!AmountLCY_CustLedgerEntryFormat.Value

   c. Select the text boxes that contain the totals and set **FontWeight**
      to **Bold**.

   d. Select the first row of the table and set **FontWeight** to **Bold**.

   e. Select the text box that contains the Posting Date, and then set
      the Format property to dd/MM/yyyy.

   f. Set the Width for the column that contains the Description to
      5,3cm**.**

   g. Select the last four columns and set **TextAlign** to **Right**.

   h. Select the table and set the **FontSize** to 9pt.

5. Run the report.

   a. Save the changes in Visual Studio and in the Report Dataset
      Designer.

   b. When you run the report, it should looks like the "Report
      Preview" figure.

FIGURE 8.25: REPORT PREVIEW

Add Advanced Features

The following demonstration shows how to add advanced features to the report, such as FlowFilters. The demonstration also features specific functionality in **Report Viewer**, such as interactive sorting, hide/collapse, and charts.

Demonstration: Using FlowFilters

The following steps show how to filter a report that uses the **Date Filter** field in the **Customer** table.

Demonstration Steps

1. Add a **Flowfilter** field.

   a. Design report **90001**, **Customer Detail**, from the **Object Designer**.

   b. Open the **Properties** window for the Customer data item, and set the ReqFilterFields property to include the **Date Filter** field. See the "REQFILTERFIELDS on the Customer Properties" figure.

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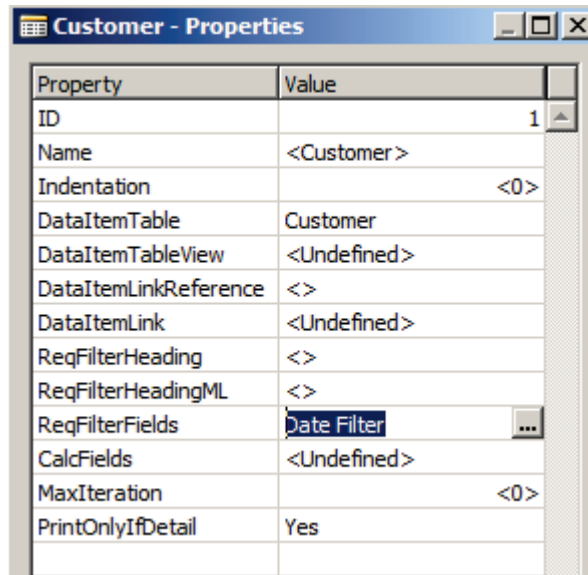
FIGURE 8.26: REQFILTERFIELDS ON THE CUSTOMER PROPERTIES

    c.   Open the **Properties** window for the Cust. Ledger Entry data item, and set the DataItemLink property to the following:

Customer No.=FIELD(No.),Posting Date=FIELD(Date Filter).

See the "DATAITEMLINK" figure.
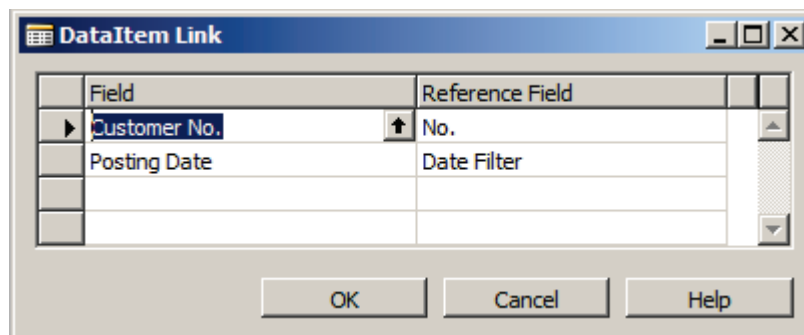
FIGURE 8.27: DATAITEMLINK

    d.   Close the **Properties** window and then compile, save, and close the report.

    e.   Run the report.

    f.   In the **Customer** tab of the request form, type the range 01/01/01..12/31/01 in the **Filter** column for the **Date Filter** field, and then click **Preview**.

    g.   Check whether there are any records outside the range that is set.

Demonstration: Adding Interactive Sorting

The following steps show how to add interactive sorting to the **Customer by Salesperson** report.

Demonstration Steps

1. Add Interactive Sorting.

   a. Design report **90000**, **Customer by Salesperson**, from Object Designer.

   b. Click **View > Layout** from the Toolbar.

   c. Select the text box in the first column of the table header row [@Code_SalespersonPurchaserCaption] and set the following properties:

   - **UserSort, SortExpression**: =Fields!Code_SalespersonPurchaser.Value

   - **UserSort, SortExpressionScope**: table1_Group1

See the "Usersort Properties" figure.

FIGURE 8.28: USERSORT PROPERTIES

   d. Repeat Step c for the remaining text boxes in the table header row with their respective **SortExpression**. Leave the **SortExpressionScope** property blank for text boxes that belong to **Customer** table.

   e. Close Visual Studio, and then click **Yes** when you are prompted to save the changes.

   f. Click anywhere in **Report Designer**, and then click **Yes** to load the saved changes from **Visual Studio**.

   g. Compile, save, and close the report.

   h. Run the report in the roletailored client to view the changes. See the "Report with Interactive Sorting" figure.

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FIGURE 8.29: THE REPORT WITH INTERACTIVE SORTING

Demonstration: Adding Hide/Collapse

The following demonstration shows how to add the hide/collapse feature to the **Customer by Salesperson** report.

Demonstration Steps

1. Add Hide/Collapse.
    a. Design report **90000**, **Customer by Salesperson**, from **Object Designer**.
    b. Click **View** > **Layout**.
    c. Select the first group detail row (third row), and then set the following property: **Visibility**, **ToggleItem**: Code_SalespersonPurchaser.
    d. Select the text box in the first column, second row (Salesperson_Purchaser_Code), and then set the following property: **InitialToggleState**: **True**.
    e. Close **Visual Studio**, and then click **Yes** when you are prompted to save the changes.
    f. Click anywhere in **Report Designer**, and then click **Yes** to load the saved changes from **Visual Studio**.
    g. Compile, save, and close the report.
    h. Run the report in the RoleTailored client to view the changes. See the "Report with Hide/Collapse" figure.

FIGURE 8.30: THE REPORT WITH HIDE/COLLAPSE

Demonstration: Adding a Chart

Charts are a graphical representation of data, and help present information in a summarized, yet concise manner. The following steps show how to add a chart to the **Customer by Salesperson** report to represent the number of customers that a salesperson has.

Demonstration Steps

1. Add a Chart.

   a. Design report **90000**, **Customer by Salesperson**, from **Object Designer**.

   b. Click **View > Layout** on the Toolbar.

   c. Drag a **Chart** control from the toolbox to the report layout.

   d. The **Select Chart Type** window opens.

   e. Select the shape that is indicated on Add a Pie Chart. See the "Select Chart Type" figure.

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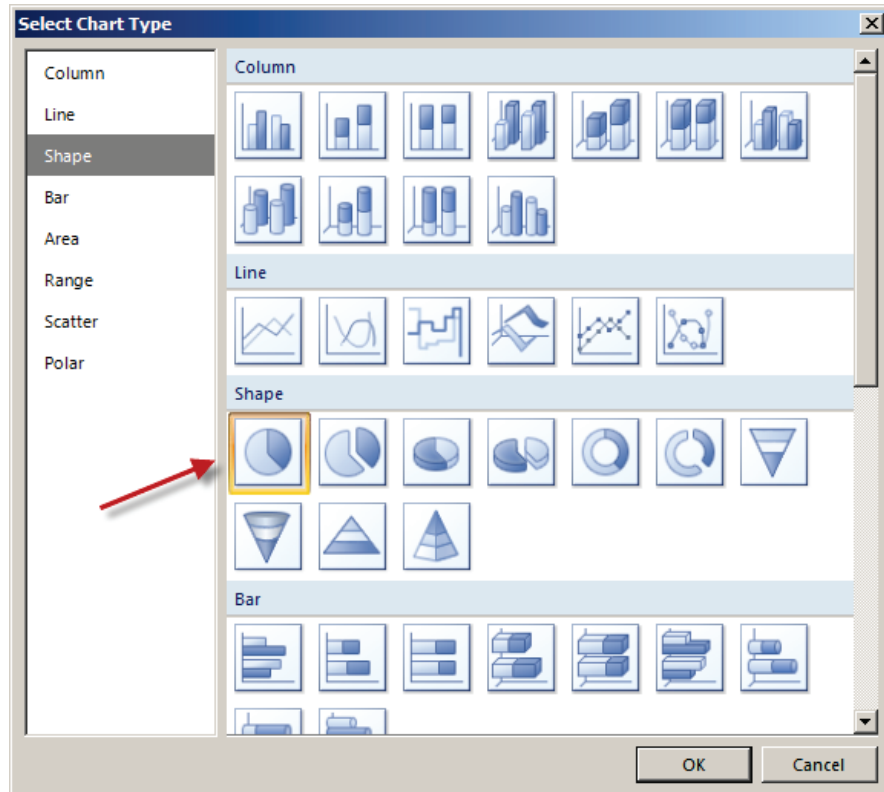
FIGURE 8.31: SELECT CHART TYPE WINDOW

        f.   Click **OK**.

        g.   Right-click the title of the chart, and then select **Title properties**. In the **Chart Title Properties** window that opens, in the **Title text** text box, type "Customer by Salesperson" as shown in the "Chart Title Properties" figure.
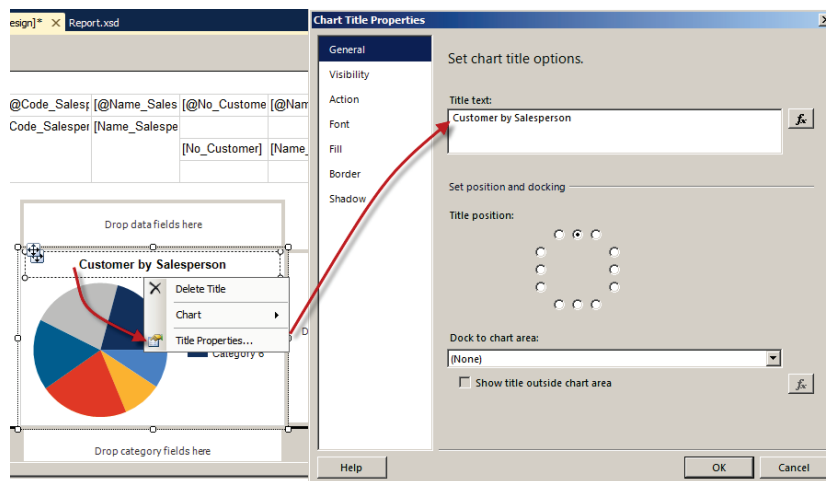
FIGURE 8.32: CHART TITLE PROPERTIES

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h. Click **OK**.

i. Drag the field **No_Customer** from the dataset to the **Drop data fields here** area.

j. Right-click the added field and select: **Series Properties**.

k. In the **Series Properties** window, set the **Value** field to the following: [Count(No_Customer)] as shown in the "Series Properties" figure.
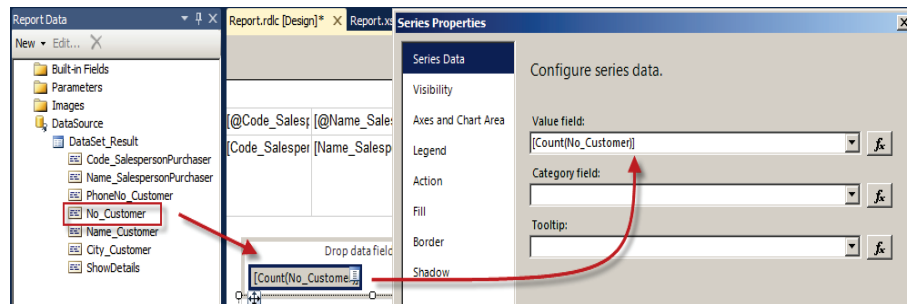
FIGURE 8.33: SERIES PROPERTIES

l. Click **OK**.

m. In the **Drop series fields here** area, select the **Code_SalespersonPurchaser** field as shown in the "Series Fields" figure.
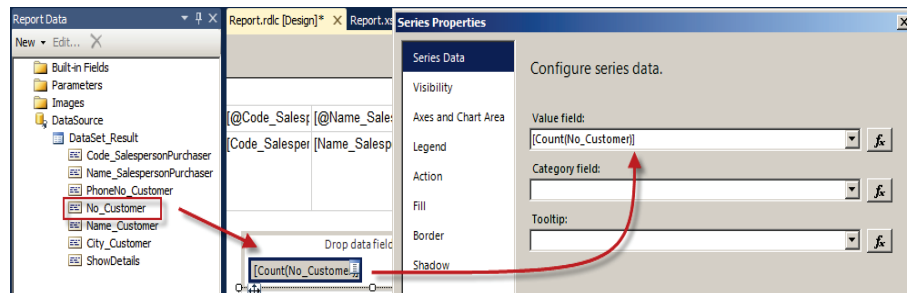
FIGURE 8.34: SERIES FIELDS

n. Close Visual Studio, and then click **Yes** when you are prompted to save the changes.

o. Click anywhere in **Report Designer**, and then click **Yes** to load the saved changes from Visual Studio.

p. Compile, save, and then close the report.

q. Run the report in the RoleTailored client to view the changes. See the "Report with a Chart" figure.

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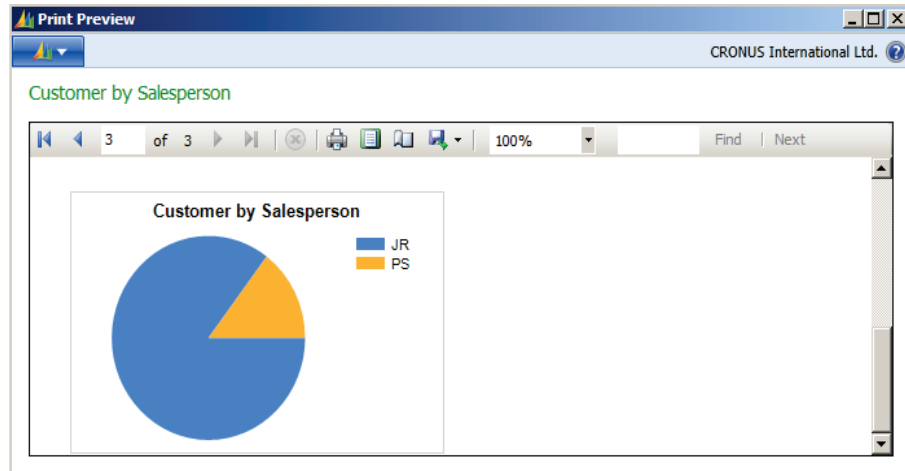
FIGURE 8.35: THE REPORT WITH A CHART

Lab 8.1: Creating a Basic Report

Scenario

Simon is a developer working for CRONUS International Ltd. CRONUS International has decided to sell Microsoft Dynamics NAV training courses as its business.

Simon has already created a **Course** table to record course information. Now, Simon must create a report to list all available courses.

Objectives

The following lab tests basic knowledge about how to create a report in Microsoft Dynamics NAV 2013.

Exercise 1: Build the report.

Exercise Scenario

1. Create a report that has the following requirements:
    a. Prints all course information.
    b. Filters by course type.

2. Create this report to run with the following advanced features:
    a. Interactive sorting.
    b. A bar chart that represents courses and the cost of investment (price) for each course.

Task 1: Create a new report.

High Level Steps

1. Create the dataset.

Detailed Steps

1. Create the dataset.
    a. In **Object Designer**, click **New**.
    b. In the **Report Dataset Designer**, set the **Course** table as a data item.
    c. Use the **Field Menu** to add all fields from the course table to the dataset as columns.
    d. Make sure that all fields have **Include Caption**.

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Task 2: Add a filter

High Level Steps

1. Add a filter to the report dataset.

Detailed Steps

1. Add a filter to the report dataset.
   a. Open the **Properties** window for the course data item.
   b. Set the ReqFilterFields property to Type.
   c. Close the **Properties** window.

Task 3: Create a Layout

High Level Steps

1. Create a layout for the report.

Detailed Steps

1. Create a layout for the report.
   a. Click **View** > **Layout**.
   b. Drag a **Table** control from the toolbox to the report layout.
   c. Click one of the columns, right-click, and then click **Insert Column to the Right**.
      - Repeat the step to add five columns.

   d. Type the following parameters in the appropriate columns of the **first** row of the table:
      - [@Code_CourseCaption]
      - [@Name_CourseCaption]
      - [@Description_CourseCaption]
      - [@Type_CourseCaption]
      - [@Duration_CourseCaption]
      - [@Price_CourseCaption]
      - [@Active_CourseCaption]
      - [@Difficulty_CourseCaption]
        [@PassingRate_CourseCaption]

   e. Set the following **DataSet Result** fields as the expression by typing them in the appropriate columns of the second row of the table:
      - Code_Course
      - Name_Course
      - Description_Course

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- Type_Course
- Duration_Course
- Price_Course
- Active_Course
- Difficulty_Course
- Passing_Rate_Course

Task 4: Adding Interactive Sorting

High Level Steps

1. Add interactive sorting to the table.

Detailed Steps

1. Add interactive sorting to the table.

   a. Select the [@Code_CourseCaption text box in the first column of the table header row], and set the following properties:

   UserSort, SortExpression:

   ```
   =Fields!Code_Course.Value
   ```

   - Repeat the step for the remaining text boxes in the table header row with their respective SortExpression.

Task 5: Add a Chart

High Level Steps

1. Add a Chart to the Report.

Detailed Steps

1. Add a Chart to the Report.

   a. Drag a **Chart** control from the toolbox to the **Report** layout.
   b. Select the chart control.
   c. Set the following:
      i. **Title**: Course Price
      ii. **Chart Type**: Bar

   d. In the **Drop data** fields, set the following:

   ```
   [Sum(Price_Course)]
   ```

   e. In the **Drop series** fields, set the following:

   ```
   [Code_Course]
   ```

  f. As a series **Label** use the following:

```
[Name_Course]
```

  g. Close Visual Studio, and then click **Yes** when you are prompted to save the changes.

  h. Click anywhere in Report Designer, and then click **Yes** to load the saved changes from Visual Studio.

  i. Compile and save the report as **90011**, **Course List** and then close the report.

Module Review

Module Review and Takeaways

An organization's ability to collect dependable, timely business intelligence is fundamental to its health. Reports are a way to obtain that intelligence. A C/SIDE developer must create robust reports on demand. This involves understanding not only the mechanics of report creation, but also business needs.

Reports can print information from a database, and structure and summarize information. Use reports to print documents such as invoices. You can also use reports to process data without printing.

Creating reports includes designing both the business logic that covers the kind of information that the report contains, and the layout that determines the look of the printed report.

Test Your Knowledge

Test your knowledge with the following questions.

1. How is the dataset defined in a report in Dynamics NAV 2013?

    (   ) You use Report DataItem Designer in Microsoft Dynamics NAV Development Environment to define the dataset of a report. You build the report dataset from data items and columns.

    (   ) You use Report Dataset Designer in Microsoft Dynamics NAV Development Environment to define the dataset of a report. You build the report dataset from data items and columns.

    (   ) You use Report Column Designer in Microsoft Dynamics NAV Development Environment to define the dataset of a report. You build the report dataset from data items and columns.

    (   ) You use Report Property DatasetFieldname in Microsoft Dynamics NAV Development Environment to define the dataset of a report. You build the report dataset from data items and columns.

2. Which of the following answers cannot be used as a Column in a Data Item?

    (   ) A field in a table.

    (   ) A variable

    (   ) A property of a table.

( ) An expression

( ) A caption that is not related to a specific table

3. How can you define a master/detail relationship between tables in the Report Dataset Designer?

( ) The indented data item has the DataItemLinkReference property and the DataItemLink property. These properties define a Master/Detail relationship between two tables.
In the DataItemLinkReference property of a data item, select the parent data item to link to (the data item must be indented under the parent data item).
In the DataItemLink property of the indented data item, specify a filter for this data item by matching fields in this data item with fields from the parent data item in the DataItemLinkReference property.

( ) Each data item has the DataItemLinkReference property and the DataItemLink property. These properties define a Master/Detail relationship between two tables.
In the DataItemLinkReference property of a data item, select the parent data item to link to (the data item must be indented under the parent data item).
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4. The Report Definition Language (RDL) Data is a report component that is used by Microsoft Dynamics NAV to display the report in the RoleTailored client. Microsoft Visual Studio Report Designer is an external designer that is used to design the visual element (the RDL data) of a report. It is accessed from the Report Dataset Designer.

( ) True

( ) False

5. How do you create a Request Page for a new report?

( ) When you create a new report, a request page is created automatically for the report. This request page cannot be edited, except by using a special license.

( ) When you create a new report, you need to create a separate page object and link it to the report object for it to become the request page. In addition, you can create custom options in the Request page. You design these options by using the Page Designer which is accessed from the Object Designer.

( ) When you create a new report, a request page is created automatically for the report. In addition, you can create custom options in the Request page. You design these options by using the Request Options Page Designer which is accessed from the Report Designer.

( ) When you create a new report, a request page is created automatically for the report. In addition, you can create custom query options in the Request page. You design these options by using the Query Designer which is accessed from the Object Designer.

6. Which properties in Visual Studio Report Designer are used to add a hide/collapse feature to a report?

( ) Visibility, ToggleItem

( ) Hidden, ToggleItem

( ) Visible, ToggleItem

( ) Visibility, ItemToggle

( ) Hidden, ItemToggle

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7. How can you add a flowfilter field to a report?

(   ) Flowfilter fields cannot be added to reports in Dynamics NAV 2013.

(   ) Flowfilter fields are added automatically to a report after you select a Data Item.

(   ) Open the Properties window for the Data Item, and set the ReqFilterFields property to include the FlowFilter field.

(   ) Open the Properties window for the Data Item, and set the FlowFilterFields property to include the FlowFilter field.

Test Your Knowledge Solutions

Module Review and Takeaways

1. How is the dataset defined in a report in Dynamics NAV 2013?

    ( ) You use Report DataItem Designer in Microsoft Dynamics NAV Development Environment to define the dataset of a report. You build the report dataset from data items and columns.

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    In the DataItemLink property of the indented data item, specify a filter for this data item by matching fields in this data item with fields from the parent data item in the DataItemLinkReference property.

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(√) Each data item has the DataItemLinkReference property and the DataItemLink property. These properties define a Master/Detail relationship between two tables.
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FlowFilterFields property to include the FlowFilter field.