## **前言**

最近接到一个需求：在给定的数据源中，某（些）列，可能需要单独统计，是否单独统计需要根据报表配置来决定。由于项目中一直使用RDLC来生成报表，临时为了一个需求换一种技术也不是很现实，所以自己捉摸了下。

## **认识RDLC**

RDLC的主要有三个部分：

（1）\*.rdlc文件，本质是一个XML文件，这里定义了报表样式；

（2）\*.xsd文件，也是一个XML文件，这里定义了数据源格式；

（3）\*.aspx文件，呈现报表的web页面。

注：RDLC是什么，可参考蜡人张的博客：[http://www.cnblogs.com/waxdoll/archive/2006/02/25/337713.html](http://www.cnblogs.com/waxdoll/archive/2006/02/25/337713.html%22%20%5Co%20%22http%3A//www.cnblogs.com/waxdoll/archive/2006/02/25/337713.html)

## **如何实现动态**

（1）LocalReport对象提供了方法LoadReportDefinition（Stream stream）和属性ReportPath保证了我们不仅可以从流中读取文件，也可以指定本地文件路径加载rdlc文件；

（2）.rdlc,.xsd都是xml文件，可使用XmlDocument进行读写操作。

## **实例**

下面实现一个学生成绩统计报表为例，介绍如何实现动态列。

#### **第一步 准备工作**

新建空web项目->添加xsd文件，创建一个table（文件名Students.xsd）->添加rdlc文件，与xsd的table关联，并绑定相关字段(文件名FirstRdlc.rdlc)。

Students.xsd设计器视图：



对应的xml文件：

 <?xml version="1.0" encoding="utf-8"?>
<xs:schema id="Students" targetNamespace="http://tempuri.org/Students.xsd" xmlns:mstns="http://tempuri.org/Students.xsd" xmlns="http://tempuri.org/Students.xsd" xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:msdata="urn:schemas-microsoft-com:xml-msdata" xmlns:msprop="urn:schemas-microsoft-com:xml-msprop" attributeFormDefault="qualified" elementFormDefault="qualified">
  <xs:annotation>
    <xs:appinfo source="urn:schemas-microsoft-com:xml-msdatasource">
      <DataSource DefaultConnectionIndex="0" FunctionsComponentName="QueriesTableAdapter" Modifier="AutoLayout, AnsiClass, Class, Public" SchemaSerializationMode="IncludeSchema" xmlns="urn:schemas-microsoft-com:xml-msdatasource">
        <Connections />
        <Tables />
        <Sources />
      </DataSource>
    </xs:appinfo>
  </xs:annotation>
  <xs:element name="Students" msdata:IsDataSet="true" msdata:UseCurrentLocale="true" msprop:EnableTableAdapterManager="true" msprop:Generator\_DataSetName="Students" msprop:Generator\_UserDSName="Students">
    <xs:complexType>
      <xs:choice minOccurs="0" maxOccurs="unbounded">
        <xs:element name="dtStudent" msprop:Generator\_TableClassName="dtStudentDataTable" msprop:Generator\_TableVarName="tabledtStudent" msprop:Generator\_TablePropName="dtStudent" msprop:Generator\_RowDeletingName="dtStudentRowDeleting" msprop:Generator\_UserTableName="dtStudent" msprop:Generator\_RowChangingName="dtStudentRowChanging" msprop:Generator\_RowEvHandlerName="dtStudentRowChangeEventHandler" msprop:Generator\_RowDeletedName="dtStudentRowDeleted" msprop:Generator\_RowEvArgName="dtStudentRowChangeEvent" msprop:Generator\_RowChangedName="dtStudentRowChanged" msprop:Generator\_RowClassName="dtStudentRow">
          <xs:complexType>
            <xs:sequence>
              <xs:element name="Name" msprop:Generator\_ColumnVarNameInTable="columnName" msprop:Generator\_ColumnPropNameInRow="Name" msprop:Generator\_ColumnPropNameInTable="NameColumn" msprop:Generator\_UserColumnName="Name" type="xs:string" minOccurs="0" />
              <xs:element name="Age" msprop:Generator\_ColumnVarNameInTable="columnAge" msprop:Generator\_ColumnPropNameInRow="Age" msprop:Generator\_ColumnPropNameInTable="AgeColumn" msprop:Generator\_UserColumnName="Age" type="xs:string" minOccurs="0" />
              <xs:element name="Scores" msprop:Generator\_ColumnVarNameInTable="columnScores" msprop:Generator\_ColumnPropNameInRow="Scores" msprop:Generator\_ColumnPropNameInTable="ScoresColumn" msprop:Generator\_UserColumnName="Scores" type="xs:string" minOccurs="0" />
              <xs:element name="RecId" msprop:Generator\_ColumnVarNameInTable="columnRecId" msprop:Generator\_ColumnPropNameInRow="RecId" msprop:Generator\_ColumnPropNameInTable="RecIdColumn" msprop:Generator\_UserColumnName="RecId" type="xs:string" />
              <xs:element name="Class" msprop:Generator\_ColumnVarNameInTable="columnClass" msprop:Generator\_ColumnPropNameInRow="Class" msprop:Generator\_ColumnPropNameInTable="ClassColumn" msprop:Generator\_UserColumnName="Class" type="xs:string" minOccurs="0" />
            </xs:sequence>
          </xs:complexType>
        </xs:element>
      </xs:choice>
    </xs:complexType>
    <xs:unique name="dtStudentKey1" msdata:PrimaryKey="true">
      <xs:selector xpath=".//mstns:dtStudent" />
      <xs:field xpath="mstns:RecId" />
    </xs:unique>
  </xs:element>
</xs:schema>

观察这段xml，会注意这段代码:

 <xs:element name="Class" msprop:Generator\_ColumnVarNameInTable="columnClass" msprop:Generator\_ColumnPropNameInRow="Class" msprop:Generator\_ColumnPropNameInTable="ClassColumn" msprop:Generator\_UserColumnName="Class" type="xs:string" minOccurs="0" />

这句代码定义了报表数据源的“Class”这列。可想而知，我们如果动态添加一列，这里势必应该要修改。

FirstRdlc.rdlc文件设计器视图：



对应的xml文件如下：

 <?xml version="1.0" encoding="utf-8"?>
<Report xmlns:rd="http://schemas.microsoft.com/SQLServer/reporting/reportdesigner" xmlns="http://schemas.microsoft.com/sqlserver/reporting/2008/01/reportdefinition">
  <DataSources>
    <DataSource Name="Students">
      <ConnectionProperties>
        <DataProvider>System.Data.DataSet</DataProvider>
        <ConnectString>/\* Local Connection \*/</ConnectString>
      </ConnectionProperties>
      <rd:DataSourceID>9a61684e-8669-405d-b9ef-dc43279c6ff0</rd:DataSourceID>
    </DataSource>
  </DataSources>
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        <rd:TableName>dtStudent</rd:TableName>
        <rd:TableAdapterFillMethod />
        <rd:TableAdapterGetDataMethod />
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      </rd:DataSetInfo>
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      <Style>
        <Border>
          <Style>None</Style>
        </Border>
      </Style>
    </PageFooter>
    <PageHeight>29.7cm</PageHeight>
    <PageWidth>21cm</PageWidth>
    <LeftMargin>2cm</LeftMargin>
    <RightMargin>2cm</RightMargin>
    <TopMargin>2cm</TopMargin>
    <BottomMargin>2cm</BottomMargin>
    <ColumnSpacing>0.13cm</ColumnSpacing>
    <Style />
  </Page>
  <rd:ReportID>7d9ab7b5-369c-4d46-86a6-b8723598c7cd</rd:ReportID>
  <rd:ReportUnitType>Cm</rd:ReportUnitType>
</Report>

仔细观察这段xml文件，不难看出有几部分代码是值得关注的：

（1）路径Report/DataSets/DataSet/Fields下得Field节点，这里定义的是同数据源相关的列；

         <Field Name="Name">
          <DataField>Name</DataField>
          <rd:TypeName>System.String</rd:TypeName>
        </Field>

（2）路径Report/DataSets/DataSet/rd:DataSetInfo节点，这里定义了rdlc关联的xsd文件的路径；

   <rd:DataSetInfo>
        <rd:DataSetName>Students</rd:DataSetName>
        <rd:SchemaPath>E:\Demo\HelloRDLC\HelloRDLC\Students.xsd</rd:SchemaPath>
        <rd:TableName>dtStudent</rd:TableName>
        <rd:TableAdapterFillMethod />
        <rd:TableAdapterGetDataMethod />
        <rd:TableAdapterName />
      </rd:DataSetInfo>

（3）路径Report/Body/ReportItems/Tablix/TablixBody/TablixColumns下的TablixColumn节点，这里应该定义了RDLC报表的列数

  <TablixColumn>
              <Width>0.98425in</Width>
            </TablixColumn>

（4）路径Report/Body/ReportItems/Tablix/TablixBody/TablixRows下的TablixRow。从名称可知是报表行相关内容，其中每个TablixRow，又定义了单元格信息（在TablixCells下的TablixCell节点）。这里默认情况下有两行，第一行定义了报表列头显示内容，如：姓名，性别等，第二行定义了报表数据的绑定项。如：姓名绑定到xsd的Name字段。这里便有：<Value>=Fields!Name.Value</Value>

 <TablixCell>
                  <CellContents>
                    <Textbox Name="Textbox27">
                      <CanGrow>true</CanGrow>
                      <KeepTogether>true</KeepTogether>
                      <Paragraphs>
                        <Paragraph>
                          <TextRuns>
                            <TextRun>
                              <Value>姓名</Value>
                              <Style />
                            </TextRun>
                          </TextRuns>
                          <Style />
                        </Paragraph>
                      </Paragraphs>
                      <rd:DefaultName>Textbox27</rd:DefaultName>
                      <Style>
                        <Border>
                          <Color>LightGrey</Color>
                          <Style>Solid</Style>
                        </Border>
                        <PaddingLeft>2pt</PaddingLeft>
                        <PaddingRight>2pt</PaddingRight>
                        <PaddingTop>2pt</PaddingTop>
                        <PaddingBottom>2pt</PaddingBottom>
                      </Style>
                    </Textbox>
                  </CellContents>
                </TablixCell>

所以，这以上几处在我们修改xml时，势必可能需要修改。其实，这里还有一处需要修改，路径：Report/Body/ReportItems/Tablix/TablixColumnHierarchy/TablixMembers下的TablixMember，该节点个数一定要和报表列数相同。否则编译便会报错。

#### **第二步：操作XML，动态添加列(GPA列)**

（1）操作XML文件使用XmlDocument类，需要添加节点时，可以使用XmlNode.CloneNode(bool)方法。

             //添加Field节点
            XmlNodeList fileds = xmlDoc.GetElementsByTagName("Fields");

            XmlNode filedNode = fileds.Item(0).FirstChild.CloneNode(true);
            filedNode.Attributes["Name"].Value = "GPA";
            filedNode.FirstChild.InnerText = "GPA";
            fileds.Item(0).AppendChild(filedNode);

（2）操作xsd文件，将需要添加的列，加入到xsd中，并保存指定路径（保存文件命名为Student1.xsd）；

         private void ModifyXSD()
        {
            XmlDocument xmlDoc = new XmlDocument();
            xmlDoc.Load(AppDomain.CurrentDomain.BaseDirectory + "Students.xsd");

            XmlNodeList nodeList = xmlDoc.GetElementsByTagName("xs:sequence");
            XmlNode node = nodeList.Item(0).FirstChild.CloneNode(true);
            node.Attributes["name"].Value = "GPA";
            node.Attributes["msprop:Generator\_ColumnVarNameInTable"].Value = "columnGPA";
            node.Attributes["msprop:Generator\_ColumnPropNameInRow"].Value = "GPA";
            node.Attributes["msprop:Generator\_ColumnPropNameInTable"].Value = "GPAColumn";
            node.Attributes["msprop:Generator\_UserColumnName"].Value = "GPA";
            nodeList.Item(0).AppendChild(node);

            xmlDoc.Save(AppDomain.CurrentDomain.BaseDirectory + "Students1.xsd");
        }

（2）修改rdlc文件，包括，待添加列、xsd文件路径等，中（或保存为rdlc文件）；

View Code

 1 /// <summary>

 2 /// 修改RDLC文件

 3 /// </summary>

 4 /// <returns></returns>

 5 private XmlDocument ModifyRdlc()

 6 {

 7 XmlDocument xmlDoc = new XmlDocument();

 8

 9 xmlDoc.Load(AppDomain.CurrentDomain.BaseDirectory + "FirstRdlc.rdlc");

10

11 //添加Field节点

12 XmlNodeList fileds = xmlDoc.GetElementsByTagName("Fields");

13

14 XmlNode filedNode = fileds.Item(0).FirstChild.CloneNode(true);

15 filedNode.Attributes["Name"].Value = "GPA";

16 filedNode.FirstChild.InnerText = "GPA";

17 fileds.Item(0).AppendChild(filedNode);

18

19 //添加TablixColumn

20

21 XmlNodeList tablixColumns = xmlDoc.GetElementsByTagName("TablixColumns");

22 XmlNode tablixColumn = tablixColumns.Item(0).FirstChild;

23 XmlNode newtablixColumn = tablixColumn.CloneNode(true);

24 tablixColumns.Item(0).AppendChild(newtablixColumn);

25

26 //TablixMember

27 XmlNodeList tablixMembers = xmlDoc.GetElementsByTagName("TablixColumnHierarchy");

28

29 XmlNode tablixMember = tablixMembers.Item(0).FirstChild.FirstChild;

30 XmlNode newTablixMember = tablixMember.CloneNode(true);

31 tablixMembers.Item(0).FirstChild.AppendChild(newTablixMember);

32

33 XmlNodeList tablixRows = xmlDoc.GetElementsByTagName("TablixRows");

34

35 //TablixRows1

36 var tablixRowsRowCells1 = tablixRows.Item(0).FirstChild.ChildNodes[1];

37 XmlNode tablixRowCell1 = tablixRowsRowCells1.FirstChild;

38 XmlNode newtablixRowCell1 = tablixRowCell1.CloneNode(true);

39 var textBox1 = newtablixRowCell1.FirstChild.ChildNodes[0];

40 textBox1.Attributes["Name"].Value = "GPA1";

41

42 var paragraphs = textBox1.ChildNodes.Cast<XmlNode>().Where(item => item.Name == "Paragraphs").FirstOrDefault();

43 paragraphs.FirstChild.FirstChild.FirstChild.FirstChild.InnerText = "GPA";

44 var defaultName1 = textBox1.ChildNodes.Cast<XmlNode>().Where(item => item.Name == "rd:DefaultName").FirstOrDefault().InnerText = "GPA1";

45

46 tablixRowsRowCells1.AppendChild(newtablixRowCell1);

47

48 //TablixRows2

49 var tablixRowsRowCells2 = tablixRows.Item(0).ChildNodes[1].ChildNodes[1];

50 XmlNode tablixRowCell2 = tablixRowsRowCells2.FirstChild;

51 XmlNode newtablixRowCell2 = tablixRowCell2.CloneNode(true);

52 var textBox2 = newtablixRowCell2.FirstChild.ChildNodes[0];

53 textBox2.Attributes["Name"].Value = "GPA";

54

55 var paragraphs2 = textBox2.ChildNodes.Cast<XmlNode>().Where(item => item.Name == "Paragraphs").FirstOrDefault();

56 paragraphs2.FirstChild.FirstChild.FirstChild.FirstChild.InnerText = "=Fields!GPA.Value";

57 var defaultName2 = textBox2.ChildNodes.Cast<XmlNode>().Where(item => item.Name == "rd:DefaultName").FirstOrDefault().InnerText = "GPA";

58

59 tablixRowsRowCells2.AppendChild(newtablixRowCell2);

60

61 xmlDoc.Save(AppDomain.CurrentDomain.BaseDirectory + "FirstRdlc1.rdlc");

62 return xmlDoc;

63 }

 （3）将得到的XmlDocument实例，序列化到MemoryStream。

/// <summary>

 /// 序列化到内存流

 /// </summary>

 /// <returns></returns>

 private Stream GetRdlcStream(XmlDocument xmlDoc)

 {

 Stream ms = new MemoryStream();

 XmlSerializer serializer = new XmlSerializer(typeof(XmlDocument));

 serializer.Serialize(ms, xmlDoc);

 ms.Position = 0;

 return ms;

 }

#### **第三步：加载报表，并显示**

（1）添加一个Page页面，并添加ReportView控件和ScriptManager控件，页面代码如下：

 <html xmlns="http://www.w3.org/1999/xhtml">
<head runat="server">
    <title></title>
</head>
<body>
    <form id="form1" runat="server">
    <div>
    <rsweb:ReportViewer ID="rvDemo" runat="server" Width="100%">
    </rsweb:ReportViewer>
        <asp:ScriptManager ID="smDemo" runat="server">
        </asp:ScriptManager>
    </div>
    </form>
</body>
</html>

（2）加载报表定义，并绑定数据源（使用LoadReportDefinition（Stream stream）方法加载MemoryStream中信息）

View Code

 1 /// <summary>

 2 /// 加载报表

 3 /// </summary>

 4 private void LoadReport()

 5 {

 6 //获取数据源

 7 DataTable dataSource = GetDataSource();

 8

 9 //修改xsd文件

10 ModifyXSD();

11

12 //修改rdlc文件

13 XmlDocument xmlDoc = ModifyRdlc();

14

15 //将修改后的rdlc文档序列化到内存流中

16 Stream stream = GetRdlcStream(xmlDoc);

17

18 //加载报表定义

19 rvDemo.LocalReport.LoadReportDefinition(stream);

20 //rvDemo.LocalReport.ReportPath = "FirstRdlc.rdlc";

21

22 //添加数据源，rvDemo是页面上的ReportView控件

23 rvDemo.LocalReport.DataSources.Add(new ReportDataSource("dsStudent", dt));

24 rvDemo.LocalReport.Refresh();

25 }

26

27 /// <summary>

28 /// 获取数据源

29 /// </summary>

30 /// <returns></returns>

31 private DataTable GetDataSource()

32 {

33 //伪造一个数据源

34 DataTable dt = new DataTable();

35 dt.Columns.AddRange(new DataColumn[]

36 {

37 new DataColumn() { ColumnName = "RecId" },

38 new DataColumn() { ColumnName = "Name" },

39 new DataColumn() { ColumnName = "Age" },

40 new DataColumn() { ColumnName = "Class" },

41 new DataColumn() { ColumnName = "Scores" },

42 new DataColumn() { ColumnName = "GPA" }

43 });

44

45 DataRow dr = dt.NewRow();

46 dr["RecId"] = "1";

47 dr["Name"] = "小明";

48 dr["Age"] = "26";

49 dr["Class"] = "1年级";

50 dr["Scores"] = "90";

51 dr["GPA"] = "4.0";

52

53 dt.Rows.Add(dr);

54 return dt;

55 }

如此，我们便可以动态的添加GPA这列到报表上了，结果如下：

