

ARP202
**SQL Server Reporting Services for
 Developers**

Paul Litwin
 Deep Training &
 Fred Hutchinson Cancer Research Center

paul@deeptraining.com

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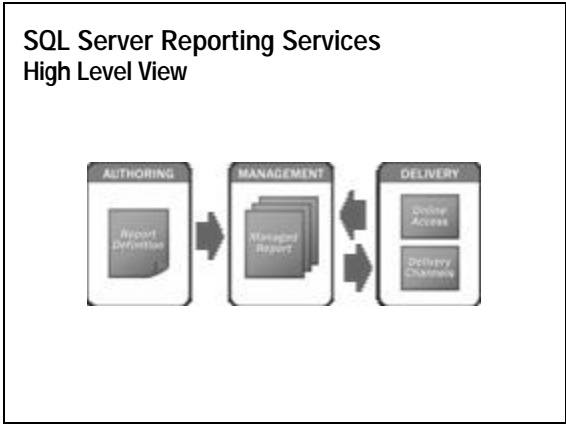
- **Developer**
 - ? Focus: ASP.NET, ASP, VB, C#, SQL Server, ...
 - ? MCSD
 - ? Microsoft MVP
 - ? Lead Programmer with Fred Hutchinson Cancer Research Center
- **Co-Founder and Senior Trainer**
 - ? Deep Training
 - www.deeptraining.com
- **Conference Chair/Speaker**
 - ? Chair, Microsoft ASP.NET Connections
 - ? Member INETA Speakers Bureau
- **Author**
 - ? Author/co-author of a dozen books, including...
 - *ASP.NET for Developers*
 - *Access Cookbook, 2nd edition*
 - *Access 2002 Desktop/Enterprise Dev Handbook*

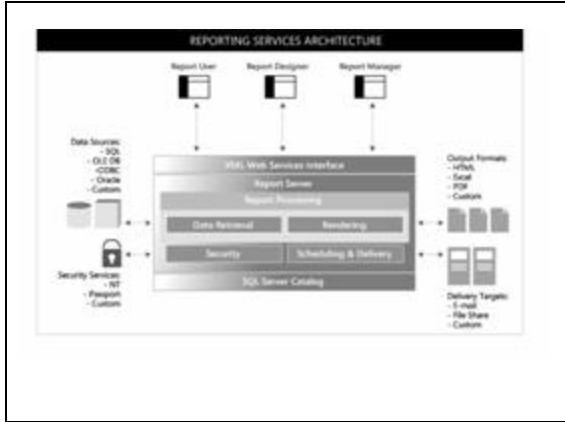
Agenda

- Reporting Services Architecture
- Creating Tabular Reports
- Calculations & Formatting
- Grouping & Sorting
- Parameters
- Matrix Reports & Charts
- Security & Deployment
- Tips, Tricks, & Traps

**SQL Server Reporting Services
Architecture**

- Getting Reporting Services**
- Licensed for FREE to SQL Server 2000 owners
 - Part of MSDN Universal
 - Costs \$5. for others (media fulfillment charge)
 - Info on how to obtain a copy
 - ? <http://www.microsoft.com/sql/reporting/howtobuy/default.asp>
 - Don't forget SP1
 - ? Download from <http://www.microsoft.com/sql/reporting/downloads/default.asp>





Reporting Services Terminology

- Data Source – a database
- Dataset – a query against a data source
- Data Region – an item that displays repeated rows of data

Types of Data Regions

- Table – a banded, tabular report
- Matrix – a cross-tab (or pivot table) report
- List – data arranged a free-form fashion
- Chart – a graph

Creating Tabular Reports

Creating a Reporting Services Project



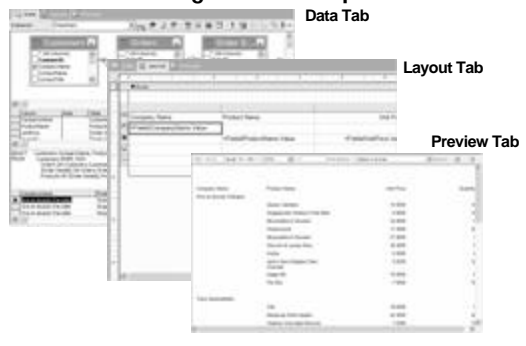
Creating a Report

- A number of ways to create a new report, including
 - ? Right click on the Reports node in Solution Explorer and select
 - Add New Report – starts report wizard
 - Add | Add New Item – to create a blank report
 - Import Reports – to import all of the reports from an Access database

Creating a Report using the Wizard



Demo – Creating a Blank Report



Creating Simple Tabular Report (1 of 3)

Data View

1. Select <New Dataset...> from dropdown
2. Name Dataset and either choose an existing shared Data source or create a new one
3. Select Command type and click Ok
4. Enter query into query designer and test by clicking on ! icon

Creating Simple Tabular Report (2 of 3)

Layout View

1. Drag Table control from toolbox onto report body
2. Drag and drop fields from Field list to cells in Detail row of table; SRS will automatically add field name to table header row
3. Select Report | Page Header or Report | Page Footer to display these sections
4. Drop textboxes onto the header/footer if desired

Creating Simple Tabular Report (3 of 3)

Previewing reports

- Click on Preview tab to preview the report
- -or- Right-click on report name in solution explorer and select Run

Tip: What Happened to the Query Designer?

- When creating a report from scratch, Data view defaults to using the *generic query designer*
- You can switch to the *graphical query designer* by toggling the query designer button



Calculations & Formatting

Textboxes

- Referring to a field in underlying dataset
= Fields!fieldname.Value
- Referring to a parameter of the report
= Parameters!parametername.Value
- Textboxes can also refer to expressions
? See next slide

Expressions

- Reporting Services uses VB-like expressions
- You can use standard +, -, *, /, mod operators
- String concatenation with &
- Aggregate functions:
? Sum, Count, Avg, Min, Max, etc.
- Also supported:
? IIf(), Len(), Switch()

Tip: How to Handle Null Values

- Don't have to!
- Textboxes are *neverNull*
- They automatically convert Nulls to empty strings (for strings, integers, etc.)
- How to test:
 - ? Len(Fields!fieldname.Value)=0
 - ? Example:
 - =IIf(Len(Fields!Title.Value)=0,"Nobody",Fields!Title.Value)

Using Custom Code

- You can write your own VB functions and include them in the Code tab of the Report | Report Properties dialog
- Visual Basic is the only language supported by SRS in the code window
- You can also develop custom assemblies that you can call from reports
 - ? Assemblies can be developed in *any* .NET language
 - ? You have to follow a number of steps to reference, deploy, and access your assemblies (see help for more details)

**Custom Code Example
rptEmployeeSales report**

```
Public Function TitleSub(ByVal strValue As String) As String
  Dim strRet As String
  If Len(strValue) = 0 Then
    strRet = "Employee"
  ElseIf strValue = "Owner" Then
    strRet = "President"
  Else
    strRet = strValue
  End If
  Return strRet
End Function
```

Code

=Code.TitleSub(Fields!Title.Value)

Expression

Formatting Fields

- Formatting Numbers/Dates
 - ? Right-click on textbox and select Properties
 - ? Select from Standard formats or select custom and enter a custom .NET formatting string
- Styles (Font, FontSize, Color, etc.)
 - ? Use property sheet


Conditional Formatting

- Use If, Switch, or a custom function as value for property in property sheet

Conditional Formatting Example rptEmployeeSales report

- Need to display sales over \$1,000 bolded and in red

`=IIf(Fields!Cost.Value>1000,"Red","Black")` 

`=IIf(Fields!Cost.Value>1000,"Bold","Normal")` 

What's Missing?

- Unlike many report writers, SRS has no support for events
- You can use functions and conditional formatting to do some of what you might use events in some other reporting tools

Grouping & Sorting

Creating a Group

- Right-click on left margin of table and select Insert Group
- Select a field to group on or enter an expression
- Select any options (page break at start, page break at end, etc.) and click OK to create group
- SRS doesn't automatically add the group field to the group header (the wizard does, though) but you can add it easily enough

Groups

- You can use Sorting tab of Grouping and Sorting Properties dialog to sort groups and detail with groups
- To edit group, right-click on left-hand margin of group header or footer and select Edit Group
- Groups can be nested many deep

Grouping Example
 rptEmployeeSales2 report

- First group
 =Fields!LastName.Value & ", " & Fields!FirstName.Value
- Second group
 =Fields!ProductName.Value

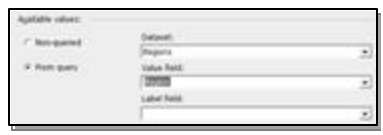
Parameters

Creating a Report based on a Parameterized Stored Procedure

1. From Dataset dialog, set CommandType to StoredProcedure; don't enter sproc name at this time
2. From query designer, select sproc from drop-down
3. Click Run (!) icon to run sproc; you will be prompted for parameters; enter a sample set of parameters
4. Make sure correct query is returned
5. Select Report | Report Parameters; SRS will populate dialog with parameters from sproc
 - From this dialog you can change the order of parameters, the prompt text, etc.

Creating a Drop-Down Parameter


- Create an additional Dataset for each drop-down source
- Select Report | Report Parameters
 - ? Under Available values, select From query
 - ? Enter Dataset, Value and Label fields



Matrix Reports & Charts

Matrix Reports

Layout



Preview

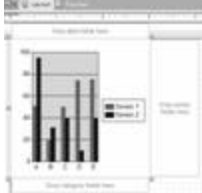
	2000	2001	2002	Total
Richard, Steve	\$16,362.00	\$20,776.47	\$19,691.89	\$56,830.36
Colleen, Jane	\$22,249.52	\$29,722.62	\$49,769.24	\$101,741.38
Sharon, Steve	\$20,764.75	\$20,148.98	\$42,163.67	\$83,077.40
Elizabeth, Anne	\$5,854.52	\$26,274.29	\$41,167.42	\$73,296.23
Felix, Andrew	\$21,757.99	\$75,664.34	\$74,168.76	\$171,591.09
King, Robert	\$70,272.36	\$60,477.25	\$49,662.99	\$180,412.60
Lorettie, Jane	\$79,222.99	\$748,454.76	\$76,362.72	\$824,040.47
Pharrah, Margaret	\$69,949.71	\$128,659.79	\$34,476.94	\$233,086.44
Stephan, Michael	\$70,643.99	\$42,128.37	\$74,168.22	\$186,940.58
Total	\$699,822.97	\$977,985.24	\$449,822.97	\$1,327,631.18

Creating a Matrix Report

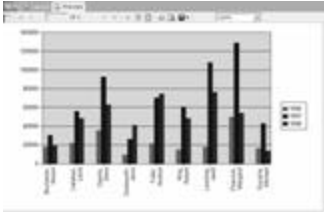
- Create new report
- Create Dataset
- Add Matrix to report layout
- Add Row, Column, and Data fields
- Optionally right-click on row or column and click on Subtotal to add a sub-total

Charts

Layout



Preview



Creating a Chart

- Create a new report
- Create Dataset
- Add Chart to report layout
- Drag and drop data and category fields to chart
- Optionally drag and drop a series field
- Size chart to liking
- Modify chart characteristics by right-clicking on chart and selecting Properties

Security & Deployment

SQL Server Reporting Services Security

- Two parts to security
 1. How will you authenticate and authorize users to run and manage reports?
 - a) Out of the box, SRS only supports Windows authentication of users using roles
 - b) See <http://msdn.microsoft.com/library?url=/library/en-us/dnsql2k/html/ufairs.asp> for info on how to use Forms authentication
 2. How will you authorize people to connect to SQL Server (or other data source) to provide data to report?
 - a) Integrated security (you may have one hop issues)
 - b) Fixed connection string (encrypted within SRS database)
 - c) Prompt user at run time

Authorizing Users to Run/Manage Reports

- Use SRS Report Manager
- Click on Properties tab



Data Source Security



Deployment to Report Server

1. Use Visual Studio
 - a) Set properties of VS project to point to the ReportServer url
 - b) Select Build|Deploy *projectname*
2. Use SRS Report Manager
 - a) Navigate to <http://server/reports>
 - b) Upload and manage reports

Browser Support

Feature	Browser Support
Basic Reports	Most browsers (non-IE browsers will produce basic auth prompt and navigational toolbar will be non-functional)*
Interactive Reports with scripting	Most later browsers supporting scripting (non-IE browsers will produce basic auth prompt and nav toolbar will be non-functional)*
Report Manager	IE 5.5 or later

*Only way to be sure is to test!

Export Support

- SQL Server Reporting Services has wonderful support for exporting (rendering) to a variety of formats



URL Access – Running Reports from your App

- Rendering report to default format (with toolbar)
 - ? http://server/ReportServer?/folder/report
 - ? e.g., http://localhost/ReportServer?/nwrpts/rptEmpSales
- Rendering report to non-default format
 - ? http://server/ReportServer?/folder/report&rs:Command=Render&rs:Format=format
 - ? e.g., http://localhost/ReportServer?/nwrpts/rptEmpSales&rs:Command=Render&rs:Format=PDF
- Rendering report with parameters
 - ? http://server/ReportServer?/folder/report&Param1=value1&Param2=value2...
 - ? e.g., http://localhost/ReportServer?/nwrpts/rptEmpSales&rs:Command=Render&rs:Format=PDF&Country=USA

SRS Web Service

- Complete API for running and managing reports, report security, etc.
? <http://server/ReportServer/reportservice.asmx>
- Using service from VS .NET project
 1. Set Web Reference to ReportService service
 2. Add using/Imports statement
 3. Instantiate Web Service
 4. Set web services Credentials property
 5. Call appropriate method of service

Note: project will have to use integrated security with impersonate turned on in order to call ReportService web service

SRS Web Service Example Reports.aspx

```
string strReportsUrl = @"http://localhost/Reportserver?";
string strFolder = "/SQLReportingServices";

ReportingService rs = new ReportingService();
rs.Credentials = System.Net.CredentialCache.DefaultCredentials;
CatalogItem[] itmReports = rs.ListChildren(strFolder, false);

foreach(CatalogItem itm in itmReports)
{
  if (itm.Type == ItemTypeEnum.Report) {
    HyperLink hlk = new HyperLink();
    hlk.NavigateUrl = strReportsUrl + strFolder + "/" + itm.Name;
    if (itm.Description != null && itm.Description.Length>0) {
      hlk.Text = itm.Description; }
    else {
      hlk.Text = itm.Name; }

    lblLinks.Controls.Add(hlk);
    lblLinks.Controls.Add(new LiteralControl("<br>"));
  }
}
```

Tips, Tricks, & Traps

Tip: Adding Lines to Tabular Reports

- Problem: Line control cannot be added to table
- Solution: Use row selector to select row, and set BorderStyle properties in property sheet

Tip: Aligning Textboxes in Tabular Reports

- Problem: It's difficult to get fields to line up in tabular reports; table cells are confining
- Solutions:
 - ? Select two or more cells, right-click and select Merge Cells
 - ? You don't have to place textboxes in separate cells; you are free to place as many as you'd like in a one cell

Trap: Debugging is a Bear

- Problem: Task List displays the following error message when you attempt to build/run report

Cannot deploy data source *datasourcename* to the server because it already exists and OverwriteDataSource is not specified.

- Solution: This error message is usually bogus; the real error messages can be found in the Output window. Scroll up to see the build errors

Conclusion

Conclusion

- SQL Server Reporting Services is a very capable Web-based reporting tool
- SRS supports tabular, matrix (cross-tabs), and chart reports
- SRS reports support parameters, groups, and formatting
- You can use SRS Report Manager and/or the ReportService Web service to manage reports and security

Resources—Books

Books that I have read (in order of preference)

1. Microsoft Reporting Services in Action by Teo Lachev (Manning)
2. Professional SQL Server Reporting Services by Paul Turley, et al (WROX)

Thank You!

- Please complete evaluation forms
- paull@deeptraining.com
