

Views 2003

ASP.NET and SAS: A new Model for
developing Web-based SAS
Applications.

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- Introduction.
- Why .Net Framework and ASP.NET ?
- SAS/Integration Technologies (SAS/IT) -Why ?
- ASP.NET Application Development tools.
- Components of SAS/IT.
- ASP.NET Starter Kit – Reports Sample.
- Building the ASP.NET Application
- The DataGrid Web Form Control.

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- Bringing the Power of SAS into the Equation.
- Implementation of the Starter Kit SimpleReport driven from SAS.
- ASP.NET Starter Kit – Reports Sample.
- Building the ASP.NET Application
- The DataGrid Web Form Control.
- A Possible Architecture for Future SAS System Development.
- Future Developments.
- Summary

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Why .Net Framework and ASP.NET ?

'One of the things people are looking for is a one-sentence definition of ".NET". What is it? Why should I care? .NET is Microsoft's strategy for software that empowers people any time, any place, and on any device.' - Alan Le Marquand, Microsoft.

(as long as it's Windows !)

- Microsoft's implementation of 'Web Services'.
- Software components (and/or transactions) served - and potentially charged for - on a 'need to use' basis, over the web.

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Why .Net Framework and ASP.NET ?

- An end to ‘.dll hell’ !
- Side by Side deployment.
- Microsoft attempting to maintain market share in enterprise development tools and web server software markets.
- C# - ‘Java Basher’.
- Pre-built easy to build Web Form Controls

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Why SAS/Integration Technologies (SAS/IT) ?

- Open up SAS facilities to other tools and products using standard API's.
- Enterprise-enable SAS.
- Allow better integration and communication between SAS and system software.
- Adoption of thin-client application deployment model.
- Enterprise Guide uses SAS/IT.
- Aimed at application developers and system integrators.

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Why SAS/Integration Technologies (SAS/IT) ?

- Some components of SAS/IT are part of **Base SAS** !

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SAS/IT - Some Buzzwords.

- IOM - Integrated Object Model
- SAS Local Data Provider.
- SAS IOM Data Provider.
- SAS/Share Data Provider.
- Microsoft COM - Component Object Model.
- COM/DCOM - Distributed COM.

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ASP.NET Development Tools.

- .Net Framework
- Visual Studio.Net
- ASP.NET Web Matrix - developed in C# and ASP.NET: a cut down Visual Studio.
- MSDE - Microsoft SQL Server Database Engine: a cut-down SQL Server.

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ASP.NET Web Matrix.

The screenshot displays the Microsoft ASP.NET Web Matrix application window. The title bar reads "Microsoft ASP.NET Web Matrix - [C:\demo\catalog.aspx *]". The menu bar includes File, Edit, View, Format, Layout, HTML, Workspace, Tools, Window, and Help. The toolbar contains various icons for file operations and formatting. The status bar at the bottom shows "Design", "HTML", "Code", and "All" views, with "Design" currently selected.

The main workspace shows a web page titled "Product Catalog". It features a table with the following data:

ID	Product Name	Quantity Per Unit	Unit Price
1	Chai	10 boxes x 20 bags	\$18.00
2	Chang	24 - 12 oz bottles	\$19.00
3	Aniseed Syrup	12 - 550 ml bottles	\$10.00
4	Chef Anton's Cajun Seasoning	48 - 6 oz jars	\$22.00
5	Chef Anton's Gumbo Mix	36 boxes	\$21.35
6	Grandma's Boysenberry Spread	12 - 8 oz jars	\$25.00

Below the table is a form titled "Add an Item to the Catalog" with three input fields: "Product Name", "Quantity Per Unit", and "Unit Price". A blue "Add to Catalog" button is positioned at the bottom right of the form. The form is surrounded by a dashed border, indicating it is a new or edited element.

The left sidebar contains a "Toolbox" with "HTML Elements" and "Web Controls". The "Web Controls" section is expanded, showing controls like Label, Literal, HyperLink, TextBox, CheckBox, CheckBoxList, RadioButton, RadioButtonList, DropDownList, ListBox, Button, LinkButton, ImageButton, Image, and AdRotator.

The right sidebar contains a "Workspace" pane showing a file tree with folders "demo", "backup", and "bin", and files "catalog.aspx", "EditDeleteGrid.aspx", "Filter.aspx", "filtered.aspx", and "FirstPage.aspx". Below the workspace is a "Properties" pane for the selected "Label1" control, showing properties like (DataBindir (ID), AccessKey, BackColor, BorderColor, BorderStyle, and NotSet.

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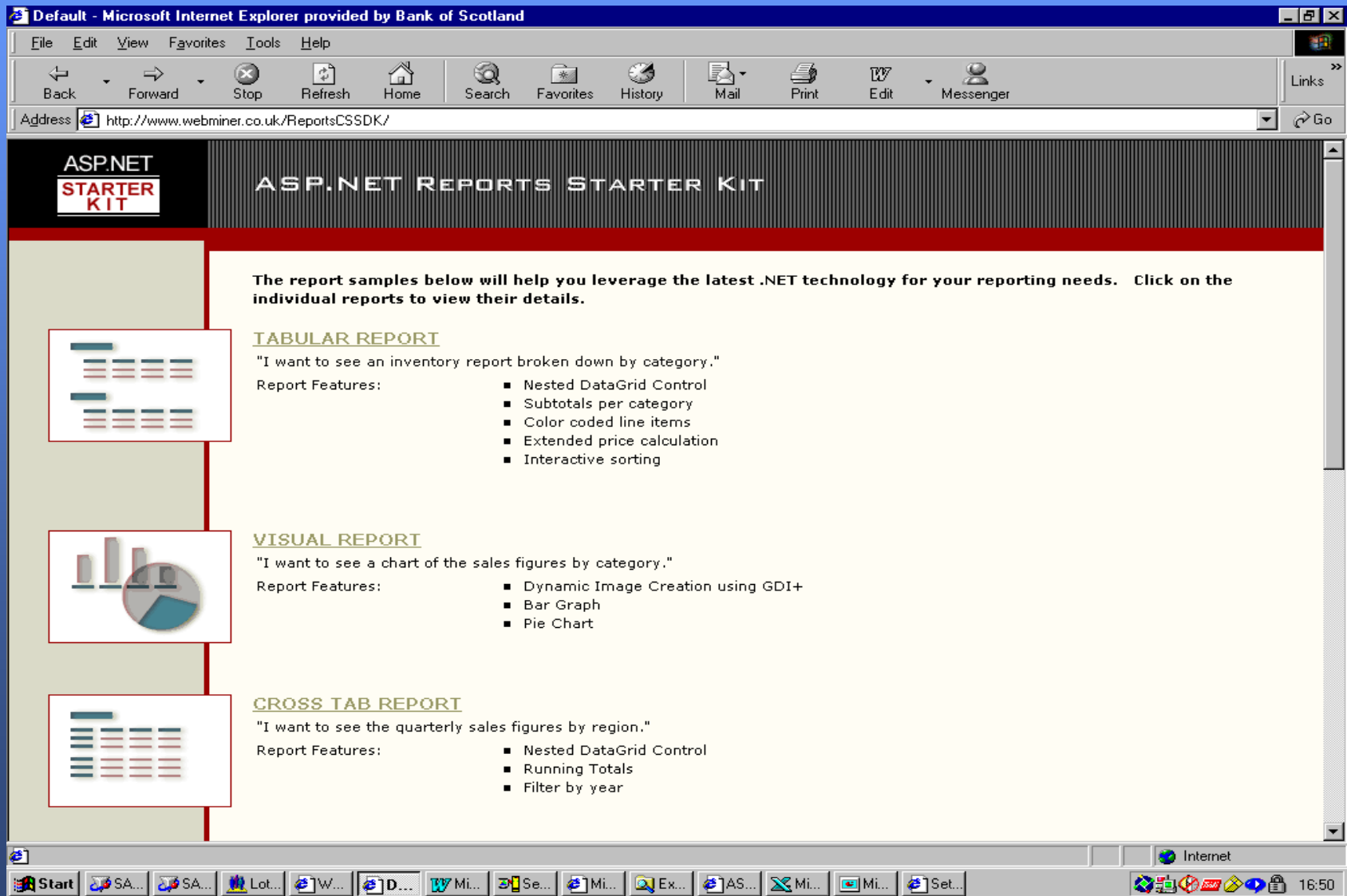
SAS/IT Components.

The object server (IOM) will be installed on a Windows machine and will be accessed by Windows client applications running on the same machine. In this situation, the connection uses COM.

- In our example the Windows client is the web server (IIS) NOT the browser accessing the application over an internet connection.
- Local Data Provider
- There are a number of other components but these are beyond the scope of this paper.

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ASP.NET Starter Kit - Reports.



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ASP.NET Starter Kit – Reports.

- Microsoft have provided a handful of well documented and well-written Starter Kit samples at www.asp.net.
- Each of the samples is available in VB or C#.
- Also at asp.net is an active user forum where you can find help from other developers.

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ASP.NET Starter Kit – Reports.

- Reports Starter Kit – Simple Report.



http://www.asp.net/ReportsStarterKit/SourceViewer/srcview.aspx?path=simple.src&file=simple&rows=5 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print

Address http://www.asp.net/ReportsStarterKit/SourceViewer/srcview.aspx?path=simple.src&file=simple&rows=5 Go

ASP.NET REPORTS STARTER KIT

^ Reports Overview

SIMPLE REPORT

Overview: [Simple Report Overview](#)

Run: [Live Version](#) [Printable Version](#)

Page Source: [SimpleReport.aspx](#)

Business Logic Layer: [SimpleReport.vb](#) [SimpleReportCollection.vb](#) [Global.vb](#)

Stored Procedures: [GetCustomerContacts](#)

CUSTOMER CONTACTS

Company	Contact	Title	Telephone	City
Alfreds Futterkiste	Maria Anders	Sales Representative	030-0074321	Berlin
Ana Trujillo Emparedados y helados	Ana Trujillo	Owner	(5) 555-4729	MTxico D.F.
Antonio Moreno Taqueria	Antonio Moreno	Owner	(5) 555-3932	MTxico D.F.
Around the Horn	Thomas Hardy	Sales Representative	(171) 555-7788	London
Berglunds snabbköp	Christina Berglund	Order Administrator	0921-12 34 65	Lules
Blauer See Delikatessen	Hanna Moos	Sales Representative	0621-08460	Mannheim
Blondesddsl pFre et fils	FrTdTrique Citeaux	Marketing Manager	88.60.15.31	Strasbourg
B=lido Comidas preparadas	Martfn Sommer	Owner	(91) 555 22 82	Madrid
Bon app'	Laurence Lebihan	Owner	91.24.45.40	Marseille
Bottom-Dollar Markets	Elizabeth Lincoln	Accounting Manager	(604) 555-4729	Tsawassen
B's Beverages	Victoria Ashworth	Sales Representative	(171) 555-1212	London
Cactus Comidas para llevar	Patricio Simpson	Sales Agent	(1) 135-5555	Buenos Aires
Centro comercial Moctezuma	Francisco Chang	Marketing Manager	(5) 555-3392	MTxico D.F.
Chop-suey Chinese	Yang Wang	Owner	0452-076545	Bern
ComTrcio Mineiro	Pedro Afonso	Sales Associate	(11) 555-7647	Sao Paulo
Consolidated Holdings	Elizabeth Brown	Sales Representative	(171) 555-2282	London

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ASP.NET Starter Kit – Reports.

- Reports Starter Kit – Simple Report.
- Like a PROC PRINT.
- Program design makes it simple to convert to load data from SAS.

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Building the ASP.NET Application.

- An ASP.NET web form has .aspx extension.
- Web Matrix supports all the filetypes you might need to work with, such as custom web controls (.ascx).
- SimpleReport.aspx defines the report shown on the previous slide.

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Structure of an .aspx Web Form.

- There are two options 'inline code' and 'codebehind'.
- With 'inline code', the .aspx file is split into .NET code (in C# or VB) and HTML markup with custom tags for ASP.NET.
- In the 'codebehind' model the .Net source code is stored in a separate file to the markup language.
- My example will use the 'inline code' format.

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Structure of an .aspx Web Form.

```
<%@ Page language="c#" %>  
<%@ Import Namespace="System" %>  
<%@ Import Namespace="System.Web.UI.WebControls" %>  
<%@ Import Namespace="ASPNET.StarterKit.Reports.Components"  
%>
```

```
<script runat="server">
```

....

- The 'Namespace' is effectively like a .dll or class library, which in this example stores Collection classes to define the data structure for the web controls used to display the data.

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The DataGrid Web Control.

- The data displayed in the SimpleReport.aspx is passed to a DataGrid web control from an SQL stored procedure.

```
/** *********************************************************************
```

```
// The BindGrid method retrieves a collection of simple report items
```

```
// and databinds it to the CustomerGrid
```

```
/** *********************************************************************
```

```
private void BindGrid()
```

```
{
```

```
    SimpleReportCollection customerList = SimpleReport.GetCustomerContacts();
```

```
    SortGridData(customerList, SortField, SortAscending);
```

```
    CustomerGrid.DataSource = customerList;
```

```
    CustomerGrid.DataBind();
```

```
}
```

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The DataGrid Web Control.

- The markup component defines how the web form control is used.

```
<asp:datagrid id="CustomerGrid" OnSortCommand="CustomerGrid_Sort" AlternatingItemStyle-  
CssClass="Content" runat="server" AutoGenerateColumns="False" GridLines="None"  
Width="100%" AllowSorting="True" AllowPaging="True" PageSize="20" CellPadding="5">
```

```
<alternatingitemstyle cssclass="Content"></AlternatingItemStyle>
```

..... tags to control field-level display properties.

```
</asp:datagrid>
```

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Bringing SAS into the Picture

- Use the .Net Web Service sample provided by SAS Institute
- Two 'Web Service' methods of interest.
 - GetDatafromSAS - runs a PROC MEANS and sends the result to a ADO.NET Dataset.
 - RunStoredProcedure - runs a pre-written .SAS file with a couple of extra lines to define it's parameters.
 - First parameter - SAS program filename string.
 - Second parameter - ADO.NET input dataset
- Example call:
`resultDataSet = svc1.RunStoredProcedure("GetCustomers", sourceDataSet);`

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ASP.NET Starter Kit – Reports.

- Reports Starter Kit – SASHELP.COMPANY.

http://www.webminer.co.uk/ReportsCSSDK/SourceViewer/srcview.aspx?path=simple.src&file=simple&rows=5 - Microsoft Internet Explorer p

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Messenger

Address http://www.webminer.co.uk/ReportsCSSDK/SourceViewer/srcview.aspx?path=simple.src&file=simple&rows=5 Go

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SIMPLE REPORT

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Stored Procedures: [GetCustomerContacts](#)

CUSTOMER CONTACTS

Contact	Title	Job	City
James Dargon	ADMIN	ASSISTANT	NEW YORK
Danielle Prost	ADMIN	RECEPTIONIST	NEW YORK
Emily P. Wallace	ADMIN	ASSISTANT	NEW YORK
Veronica Delorge	ADMIN	MANAGER	NEW YORK
Barrett R. Joyner	ADMIN	ASSISTANT	NEW YORK
Deva K. Kumar	ADMIN	RESPONS. FINANC	NEW YORK
Karin Schmidt	ADMIN	ACCOUNTANT	TOKYO
Steffen Graff	ADMIN	ASSISTANT	TOKYO
So Suumi	ADMIN	MANAGER	TOKYO
Natalie Besse	ADMIN	ASSISTANT	NEW YORK
Juergen Heidler	ADMIN	ASSISTANT	LONDON
Barbara Bial	ADMIN	ADMIN	TOKYO
Herbert J. Kirk	ADMIN	RECEPTION	NEW YORK
Lisa Lammers	ADMIN	ASSIST.	TOKYO
Elizabeth Cousteau	ADMIN	RESPONSIBLE	NEW YORK

Start SAS SAS - ... Lotus ... Micro... Web... ecos... Micro... Sessi... Micro... http... Internet 12:12

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Bringing SAS into the Picture

- Create an instance of the SAS web service.

```
SASService svc1 = new SASService();
```

- Create an ADO.NET Dataset to store the Results.

```
System.Data.Dataset resultDataSet;
```

- Call the RunStoredProcedure method.

```
resultDataSet = svc1.RunStoredProcedure("GetCustomers", dummy);
```

- Bind the resultDataSet datastore to the ASP.NET DataGrid web control.

```
CustomerGrid.DataSource = resultDataSet;
```

```
CustomerGrid.DataBind();
```

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Bringing SAS into the Picture

- Display the DataGrid.

```
<asp:datagrid id="CustomerGrid" OnSortCommand="CustomerGrid_Sort" AlternatingItemStyle-  
CssClass="Content" runat="server" AutoGenerateColumns="False" GridLines="None"  
Width="100%" AllowSorting="True" AllowPaging="True" PageSize="20" CellPadding="5">
```

```
<alternatingitemstyle cssclass="Content"></AlternatingItemStyle>
```

..... tags to control field-level display properties.

```
</asp:datagrid>
```

- This hasn't changed.

- Stored Procedure

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Bringing SAS into the Picture

- Stored Procedure

```
%LET outData = work.out;
```

```
%LET inData = _null_;
```

```
*ProcessBody;
```

```
proc sql;
```

```
create table &outData as
```

```
    select level5 as Contact, level3 as Department, level2 as City, job1 as  
    Job
```

```
from sashelp.company as company
```

```
order by department;
```

```
quit;
```

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COM Interop and Web Service Proxy

- The SAS Workspacemanager and Local Data Provider components supplied with Integration Technologies (and Base SAS) have been written for COM.
- To allow the COM calls into the .Net Common Language Runtime, the *tlbimp* utility is provided.

tlbimp /sysarray "c:\Program Files\SAS Institute\Shared Files\Integration Technologies\SAS.tlb"

tlbimp /sysarray "c:\Program Files\SAS Institute\Shared Files\Integration Technologies\SASWman.dll"

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COM Interop and Web Service Proxy

- To implement the web service in and ASP.NET client application you create a web service ‘proxy class’.
- This is done to provide local definition of the web service class methods and properties.

```
wsdl /out:webServiceProxy.vb (.cs) /language:VB (CS)  
http://localhost/WebService/sasws.asmx?WSDL
```

```
vbc (csc) /out:webServiceProxy.dll /t:library  
/r:System.XML.dll,System.Web.Services.dll,System.Data.dll,System.dll  
webServiceProxy.vb (cs)
```

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Possible Architecture for SAS Application Development?

- Many sites have licensed SAS/Intrnet as a replacement for SAS/AF.
- AppDev Studio (WebEIS and WebAF) offers no real productivity gains for many SAS sites.
- Visual Basic skills are more widely available than SAS/AF.
- IIS web server bundled in Windows 2000/Server 2003.
- SAS/IT components available in Base SAS in certain configurations.

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Possible Architecture for SAS Application Development ?

Benefits of SAS/IT and ASP.NET Architecture

- Can reuse current SAS resources (program source).
- Can save additional license costs of SAS/Intrnet, Integration Technologies, AppDev Studio.
- Can make use of widely available GUI developers.
- Can run in IIS or Apache web servers on Windows platforms.
- Thin client, browser-based deployment.

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Possible Architecture for SAS Application Development ?

Benefits of SAS/IT and ASP.NET Architecture

- Introduction of 'Web Service' architecture thereby preparing the way for more pervasive use of web services.
 - Today, internal web service deployment.
Phone call centre requesting Credit Limit increase. Call centre operator requests increase, relays result.
 - Tomorrow, external web service calls.
Customer makes purchase, exceeds credit limit, merchant asks if customer wants to request increased limit.
- Both examples could be doing the same credit score/database check using a web service.

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Possible Architecture for SAS Application Development ?

Summary

- ASP.NET provides the modern thin client GUI and SAS provides the data manipulation and reporting tools.
- Effective re-use of existing resources, SAS programs and programmers and Microsoft Visual Basic or C# for Java programmers.
- Exposing SAS applications to the enterprise rather than the techies in the 'backroom'.

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Questions ???



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GOOD LUCK CELTIC !

UEFA CUP FINALISTS 2003.



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<http://www.WebMiner.co.uk>