Paper 222-28

Tell Them What's Important: Communication-Effective Web- and Email-Based Software-Intelligent Enterprise Performance Reporting

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Abstract

The communication effectiveness and communication efficiency of your information delivery are essential to the success of Enterprise Performance Management. This is true regardless of the management discipline or implementation (such as Balanced Scorecard), used for Key Performance Indicators, Critical Success Factors, or whatever you call your performance measurement parameters. This paper shows that you can design and build a web based and email based Enterprise Performance Reporting System with just Base SAS®, ODS (Output Delivery System), and SAS/GRAPH®, an incisive system that makes best use of the time, and seizes the attention, of its users. Its output designs can serve the communication needs of any enterprise. Software Intelligent construction techniques were used, so the system can adapt to performance data of any enterprise. The application only needs to be told the performance data set name, the names, labels, and formats of the enterprise's performance measurement variables, and its performance standards (numeric values and whether a minimum or maximum). No processing logic changes are required. Though it delivers information via web publishing, the system can optionally have performance exceptions automatically trigger email alerts to concerned persons. The system was developed with SAS Version 8.2, and was validated on Windows and Unix.

Introduction

The need for, and existence of, Enterprise Performance Reporting (EPR) long antedates the Balanced Scorecard, EFQM, Baldrige, or Six Sigma, and SAS Strategic Performance Management (formerly known as Strategic Vision) and SAS/EIS. Without an elaborate "methodology" and special extra software, this paper will show that you can create an excellent EPR system using only Base SAS, ODS, SAS/GRAPH, and SAS macros, on SAS Release 8.2. Its information is delivered and retrieved via the web and (optionally) email.

This paper evolved from prior development work spanning fifteen years (References 1-6). That work began with the software-intelligent implementation of a communication-effective hardcopy-only mainframe-based EPR system. The design and construction ideas were refined and further applied. Now, recent work on communication-effective web design and web publishing (References 7 and 8), and on collision-resistant trend plot annotation and various ways to deliver trend information (Reference 9), enables update here of that earlier EPR system with modern technology.

Distinctive Communication-Effective Design Characteristics of This EPR System

In this paper, you will see a use of color different from the popular "Traffic Lighting" and/or "Radio Dials", which use red vs. yellow vs. green for Danger/Disaster/Bad vs. Caution vs. OK/Safe/Good. Since color blindness occurs in 8-10% of American males, and the commonest type of color blindness cannot distinguish red from green, you can be reliably communication-effective if you substitute, say, blue for green. A good palette for performance signaling of Bad vs. Neutral vs. Good with color is to use red, white (or light gray—to avoid an absence of color if you wish), and blue. Then, to expand your range with shades of bad and good, the natural solution is to use red, pink (light red), white (light gray), light blue, and blue. In any case, the EPRengine macro for this system permits you to turn color-coding off or on. All the tables and plots actually make it easy to discover bad performance without color. The EPR system presented here uses a simple "binary" characterization of performance: Good or Bad, signaled (optionally) by color blue or red.

Rather than the popular table grids for SAS output engendered by now-available ODS capabilities, the authors prefer a simple table. In Figures 1-4 and 6, the macro's option of TableFrame=box is used, to set the table off from the rest of the web page. It is unfortunate that the minimum thickness table frame supported by ODS is unnecessarily heavy. For those who like grids, the macro does support provision of a complete grid between all the table cells. With TableGrid=YES, the macro is able to also replace the otherwise overly thick table frame with an appropriately thin boundary.

The system's distinctive design for trend plots is explained below in Section "Level 3: Trend Plots and History Tables".

There is a very simple, and easily implemented, design principle for communication effectiveness and efficiency, which does not require fancy software features, or any colors whatsoever—**show them what's important, show them only what they need/want to know.** Make it easy for users of your EPR system to stop looking when they have seen enough. For more about the authors' communication-oriented design principles, see, e.g., References 8-11.

User-Selectable Hierarchical Prioritized Reporting

The system produces a three-tier report. The user can pick her/his path through the information, based on what she/he prefers to see. The suggested, but not required, order of presentation and use puts what's most important first, puts what's also, but less, important next, in a concise and easy to digest format, and puts the system's most detailed information last. Web pages are drillable, but also crosslinked via footnote hyperlinks *and* in a Table of Contents frame, for maximum flexibility in viewing the available information.

Level 1: Exception Report (see Figures 6 & 1). When no goals are missed and no dangerous thresholds are reached, i.e., all Performance Standards are met, the Exception Report says that "There were No Performance Exceptions" for the reporting month, and suggests that the viewer "Go To Summary Report to see Actual Performance". A very busy or incurious viewer may not bother to look at the Summary when everything is OK, but has the option.

For any performance criterion not achieved, the Exception Report lists: Performance Measure (its text descriptor), Actual Performance (the numeric measurement for the reporting month), Problem ("Greater Than" or "Less Than"), Performance Standard (the numeric value that is the maximum or minimum acceptable), and Change Since Previous Month.

From here, the viewer can click on any Performance Measure to see the trend plot and detail history table for the number of months specified for the system as displayable history.
The retained history in the performance measurement database may, of course, be far longer than the reported history. Alternatively, the viewer can link to either the Exception History Report (*all* exceptions from the displayable history), or the Summary Report of *all* performance measures for the Reporting Month. See Figure 4 for the **Exception History Report**.

Level 2: Summary Report (see Figure 2). Every enterprise performance criterion is listed with: Performance Measure (its text descriptor), Actual Performance (the numeric measurement for the reporting month), Performance Standard (the comparison numeric value), Type of Standard (“Maximum” or “Minimum”), and Change Since Previous Month. From here, the viewer can click on any Performance Measure to see its trend plot and detail table for the history. Alternatively, the viewer can link to either the Exception History Report, or back to the Exception Report.

Level 3: Trend Plots and History Tables (see Figure 3). A click on the description of a performance measure, in either the Exception Report or the Summary Report, takes you to the composite trend plot and history table for that measurement. The trend plots are designed to focus on starting value, ending value, maximum value, and minimum value. Those values are annotated, for absolute precision and easy discovery. There are no vertical axis tick marks and values. The precise value of *every* plot point is available and printable in the history table, and is also temporarily viewable as flyover text by resting the mouse on the plot point. Assessment of good vs. bad performance is immediate, since the trend plot is supplemented with the Performance Standard as a reference line. The viewer can link back to the either the Exception Report or the Summary Report, or can link to any of the other Trend/History pages via the Table of Contents. (The Table of Contents is also available when looking at information at Levels 1 and 2, but the natural viewing route is probably as described above.)

Getting Their Attention: Getting Them to Use the System
(See Figure 5)

You can implement an EPR passively—i.e., put the web pages out there, and wait for the should-be-concerned persons to get motivated to take a look at them. A more effective solution is active EPR—i.e., the optional Email Alert facility can notify those persons that there indeed is a problem, and delivers the Exception Report as an attached html file. The attachment contains hyperlinks to the rest of the web pages for that reporting month. Also, the email message text includes the URL for the EPR system home page. Email Alert recipients, if interested, can go to look at the other web pages.

The EPRengine Macro

The EPRengine macro is over 1100 lines of code. It is impractical to publish and discuss it in full. The focus here will be on the options supported by, and parameter assignment needs of, the macro. Below the following table of macro parameter functions, you can find a sample invocation of the macro, to illustrate typical assignable values for those macro parameters.

Macro Parameter	**Function**
MeasureLib	SAS data library for the performance measurement data
MeasureData	SAS data set for the performance measurement data
DefineLib	SAS data library for definitions of the performance measurement data and standards
DefineData	SAS data set for definitions of the performance measurement data and standards
WebPagePath	Where to store the output web pages
EmailAlert	=YES for automatic email notification when performance exceptions are detected for Report Month
EmailDistributionList	Distribution List for the Email Alert message (mandatory when EmailAlert=YES)
EmailSubject	Subject Text for the Email Alert message (mandatory when EmailAlert=YES)
EmailSignature	Optional Signature Text to end the Email Alert message
WebPageTitle1Text	Optional custom first title line for all the web pages (can be overridden for home page)
HomePageTitle1Text	Optional custom override for the first title line for the home page
BrowserWindowTitleBarText	Optional custom text that appears in the title bar at top of the browser window
Xpixels Ypixels	Horizontal and vertical dimensions (in pixels) for the Trend Plot graphic area
PlotTitleFootnoteFont	Font name for Trend Plot titles and footnotes
PlotTitleFootnoteSize	Font size for Trend Plot titles and footnotes
AnnotateFont	Font name for annotation of Trend Plot points, and for Trend Plot horizontal axis tick mark text
AnnotateSize	Font size for annotation of Trend Plot points, and for Trend Plot horizontal axis tick mark text
UseColorToDescribePerf	=YES to color code the cell background of Table column that contains the performance measurements
GoodPerfRGBcolor	Cell background color for Table data if performance standard **is** met (ignored if UseColor=NO)
BadPerfRGBcolor	Cell background color for Table data if performance standard **is not** met (ignored if UseColor=NO)
WebPageBackgroundRGBcolor	Background color for all web pages
ReplaceMacroODSstyleWith	Optionally use your own custom ODS style, or one supplied with ODS by SAS Institute
TableTitleFootnoteFont	Font name for Table titles and footnotes
TableTitleFootnoteSize	Font size for Table titles and footnotes
TableHeadingFont	Font name for Table column headings
TableHeadingSize	Font size for Table column headings
TableDataFont	Font name for Table data
TableDataSize	Font size for Table data
TableFrame	Turn on (=box, the authors’ recommendation) or turn off (=void) frame around Tables
TableFrameRGBcolor	Color of Table Frame (if present), or of Table Grid (if present)
TableGrid	Turn off (=NO, the authors’ preference) or turn on (=YES) grid between Table data cells
TableCellPadding	Space between Table data and Table cell boundaries
TOCwidthPercentOfWebPage	Percent of Web Page Window allocated to Table of Contents

How to Invoke the EPRengine Macro

The code below produces the web pages and email message in Figures 1-5, using demonstration data.

```
* %let RunDate = today(); /* this could be your default assignment, to
select data through the month previous to the month of today */

%let RunDate = %sysfunc(mdy(5,1,2003)); /* forces data selection
through April 2003, for as many months as specified by
NumberOfMonths= in macro below */

%EPRengine(

HomePageTitle1Text=
%str(Enterprise Performance Reporting System Demo),

WebPageTitle1Text=,

BrowserWindowTitleBarText=
%str(Enterprise Retail Performance System Demo),

NumberOfMonths = 13,

MeasureLib = c:\epr,

MeasureData = DemoData,

DefineLib = c:\epr,

DefineData = PerformanceCriteria,

WebPagePath = c:\epr\DemoWebPage,

EmailAlert = YES, /* the macro default is NO */

EmailDistList = %str(%"bessler@execpc.com%" %"frc@unipg.it%"),
/* Any number of email addresses is permissible, but each address in the
list above must be inside a pair of %" (percent sign and double quote) */

EmailSubject = %str(Enterprise Retail Performance Exceptions),

EmailSignature = %str(LeRoy Bessler),

UseColorToDescribePerf = YES,
/* if NO, then Good & Bad PerfRGB colors are ignored */

GoodPerfRGBcolor = CXCCCCFF, /* lightest Browser-Safe blue */

BadPerfRGBcolor = CXFFCCCC, /* lightest Browser-Safe red */

Xpixels=563,
Ypixels=185,

PlotTitleFootnoteFont = 'Georgia', /* used by SAS/GRAPH,
you must put font name in quotes if not a SAS software font */

PlotTitleFootnoteSize = 14 pt,
/* you can also use cells or PCT, instead */

AnnotateFont = 'Verdana', /* used by SAS/GRAPH,
you must put font name in quotes if not a SAS software font */

AnnotateSize = 1.00, /* this size is in cells, by default */

WebPageBackgroundRGBcolor = CXFFFFCC,
/* lightest Browser-Safe yellow */

ReplaceMacroODSstyleWith=,
/* You may leave this unassigned. If you assign an ODS style to
override the one built for you in the macro, then all parameters below
are ignored, BUT you must assign WebPageBackgroundRGBcolor to
same color your style uses. If you do not, then people will see
unexpected apparitions in your web pages. */

TableFrameRGBcolor = CX9999FF,
/* light (not the lightest) Browser-Safe blue */

TableGrid = NO,

TableTitleFootnoteFont = Georgia,
/* do not use quotes, must be a Windows or Unix font */

TitleFootnoteSize = 3, /* this is an html font size */

TableHeadingFont = Georgia,
/* do not use quotes, must be a Windows or Unix font */

TableHeadingSize = 1,  /* this is an html font size */

TableDataFont = Verdana,
/* do not use quotes, must be a Windows or Unix font */

TableDataSize = 1,  /* this is an html font size */

TOCwidthPercentOfWebPage = 26)
/* widened to prevent line breaks in Table of Contents */

run;
```

Usage Notes for the EPRengine Macro

The possible html font sizes are 1, 2, 3, 4, 5, 6, and 7. At the viewing web browser, they are mapped to seven different point sizes. The web browser has five different ensembles of seven point sizes. The viewer selects one of the five ensembles by clicking View, then Text Size. The choices presented are: Largest, Larger, Medium (the default), Smaller, And Smallest.

The “lightest colors” selected above may appear washed out on the LED screen of a laptop computer, and worse if displayed with an LED projector. They can be darkened by changing each “C” in the CX color code suffix to “9”, or (darker) “6”.

In all cases, Browser-Safe colors are specified above. Their use guarantees that all web users will see the same color (within the limits of hardware variance), and will see the color that the web page creator saw and intended them to see. For more information about Browser-Safe RGB colors, and RGB color sample charts, please see Reference 11.

Georgia (a serif font, well suited for big characters) and Verdana (a sans serif font, better suited for small characters) were designed for readability on the web. They are the authors’ recommended fonts for developing web pages on Windows.

EPR System Requirements for Its Software-Intelligent Operation

The MeasureData SAS data set must contain each of the variables defined with the code in the following Section, “How To Define Performance Variables and Standards for the EPRengine Macro”. For each performance measurement variable, you must provide:

(a) the SAS name of the performance measurement variable

(b) a text description for that variable (used as the row label when the performance measurement value is listed in a table, and used as the title for the trend plot of the performance measurement values);

(c) the numeric value of the performance standard for that variable;

(d) a text string to identify the standard as Maximum or Minimum acceptable for the variable; and

(e) the SAS output format to be used to display the values of the measurement variable and its performance standard.

The key to each observation in MeasureData must be the variable PerfYYYYMM, a six-character variable, with values that are the concatenation of four-digit year and two-digit month number, where the month number must contain a leading zero where appropriate.

At every run time, the EPRengine macro creates freshly customized code, to serve the then-current needs of the application. This use of Software Intelligence maintains a firewall around the always-reusable logic of the system, ensuring reliability, but supports absolute extendability and easy maintainability via the DefineData SAS data set.

How To Define Performance Variables and Standards for EPRengine

Upon establishment of the MeasureData SAS data set in the MeasureLib SAS data library, the EPR system administrator needs to run, only one time, a simple SAS DATA Step like that shown below. Whenever there are additions, changes, or deletions to the performance measurement variables and their standards, the code below needs to be revised and rerun.

```
libname Define 'c:\epr'; /* Or the name of your folder */

data Define.PerformanceCriteria;
label  PerfDesc          = 'Performance Measure';    /* Do not change */
label  PerfVar           = 'Performance Variable';   /* Do not change */
label  PerfStd           = 'Performance Standard';   /* Do not change */
label  PerfStdType       = 'Type of_Standard';       /* Do not change */
length PerfDesc          $ 50;                       /* Do not change */
length PerfVar           $ 50;                       /* Do not change */
length PerfStd           8;                          /* Do not change */
length PerfStdType       $ 7;                        /* Do not change */
length PerfStdFormat $ 40;                           /* Do not change */

 /* Start definition of New Performance Criterion */
 /* Use UNcommented blocks of the next six statements, with similar
format and content, for as many new Performance Variables and
Standards as you need to add. */
* PerfDesc= 'Example Performance Measure That Could Be Added';
   /* Specify your PerfVar Description above */
* PerfVar   = 'VarForFutureUse';
   /* Specify your PerfVar Name above */
* PerfStd   = 1000;
   /* Insert value for your Performance Standard above */
* PerfStdType = 'Minimum';
   /* Is your PerfStd a Min or a Max? */
* PerfStdFormat = 'COMMA6.';
   /* Specify a numeric format above appropriate for PerfVar, adding an
extra position to its width, to allow space for a minus sign in the
Performance Change value which is computed by EPRengine and is
displayed using this same format. */
* output;
 /* End definition of New Performance Criterion */

 /* 18 statements below are for the Demo Data. For example only. You
would omit them when using your own real data. */
PerfDesc            = 'Sales';
PerfVar             = 'Sales';
PerfStd             = 50000;
PerfStdType         = 'Minimum';
PerfStdFormat       = 'COMMA11.';
output;
PerfDesc            = 'Sales As a Percent of Inventory';
PerfVar             = 'SalesPctOf_Inventory';
PerfStd             = 25.0;
PerfStdType         = 'Minimum';
PerfStdFormat       = '6.1';
output;
PerfDesc            = 'Returns As a Percent of Sales';
PerfVar             = 'Returns_PctOfSales';
PerfStd             = 4.00;
PerfStdType         = 'Maximum';
PerfStdFormat       = '6.2';
output;
 /* 18 statements above are for the Demo Data. For example only. You
would omit them when using your own real data. */
run;
```

Example of the EPRengine Macro's Software-Intelligent Application Construction and Operation

From a run of EPRengine, below are: (a) code that builds a dynamically customized SAS format; and (b) code used in PROC PRINT to supply the clickable hyperlinks in the Performance Measure descriptor column for the Exception Report. This is *not* the code in the macro, but instead the MPRINT output in the SAS log. It shows the result of resolving all the dynamic internal macro variables (symbolic variables that are *not* statically specified by the macro invocation parameters).

```
data toformat;
length start $ 50 bodyname $ 24 label $ 89;
retain fmtname '$lnk';
start       = "Sales";
bodyname = "PerfPlotAndTable1.html";
label       = '<a href=" ' | | trim(bodyname) | | ' ">'  | | "Sales"  | | '</a>';
output;
start       = "Sales As a Percent of Inventory";
bodyname = "PerfPlotAndTable2.html";
label       = '<a href=" ' | | trim(bodyname)|| ' ">' | |
              "Sales As a Percent of Inventory" | | '</a>';
output;
start       = "Returns As a Percent of Sales";
bodyname = "PerfPlotAndTable3.html";
label       = '<a href=" '  | | trim(bodyname) | | ' "> ' | |
              "Returns As a Percent of Sales" | | '</a>';
output;
run;
proc format cntlin=toformat;
run;
proc print noobs split='_'
          data=Exceptions(where=(PerfYYYYMM eq "200304"));
var PerfDesc PerfActual PerfVariance PerfStandard;
format PerfDesc $lnk.;
run;
```

Below is the macro source code, before being executed and resolved as above. The value of &PerfCount is established by predecessor processing which discovers the number of performance measurement variables in MeasureData by analysis of DefineData, and which also establishes, likewise by analysis of DefineData, the values of the various &&PerfDesc&i performance measure descriptors (there are &PerfCount of such descriptors).

```
data toformat;
length start $ 50 bodyname $ 24 label $ 89;
retain fmtname '$lnk';
%do i = 1 %to &PerfCount;
start       = "&&PerfDesc&i";
bodyname = "PerfPlotAndTable&i..html";
label = '<a href=" ' | | trim(bodyname)  | | ' ">' | | "&&PerfDesc&i" | |
'</a>';
output;
%end;
run;
```

Letting the application itself discover the &PerfCount and the &&PerfDesc&i descriptors at run time, is an example of the Software-Intelligent construction and operation of the EPR application. The system administrator merely needs to define the performance measures and standards in DefineData—which is outside the EPR system logic. EPR system logic adapts to what it finds—any number of performance variables, and whatever their descriptions, standards, and formats may be. There is no "hard coding". The reporting machinery is built in EPRengine, once and for all, when the macro source is coded.

Special Implementation Considerations

Unix Fonts. If using Unix fonts, instead of SAS/GRAPH software fonts, for PlotTitleFootnoteFont and AnnotateFont, to build the web pages, it may be necessary to execute the EPRengine macro directly on a Unix server, or on a Unix terminal. The authors found it impossible to get text to display for the Trend Plot in the web pages when executing the macro on a Unix server when using a PC with a particular Unix terminal emulator. Some other emulators may work OK. To get a list of valid Unix System fonts for your environment, use Unix command:
"XSLFONTS > YourChoiceOfFileName.txt".
In the .txt file, you will find both the full names, and the short names.

Email Alert Facility. This facility was validated on a Windows PC. The email message was successfully picked up by Microsoft Outlook, which forwarded it to the email addresses in the distribution list. If running the macro in an environment where you want the email message picked up directly by an email server, there are different implementation requirements. The Email Alert facility was *not* tested with Unix due to email infrastructure constraints at the Unix test site.

Future Development Possibilities

Detail Reports to Explain/Understand Summary Measurements. Performance measures in an EPR system are often the summary of detail data. The system already supports drill-down to trend-plot-with-history-table web pages from row labels of the Exception and Summary tables. It would be possible to also implement drill-down to detail, from a data cell in the Exceptions table or Summary table, or, to get to an earlier reporting month, from a data cell in the history table below a trend plot, or in the Exception History table. Such drill-down could link to, e.g., Subsetting Ranking Reports, either tabular or graphic, such as have been developed in Reference 5.

Summary Reports for Prior Reporting Periods. There are no hyperlinks to Summary tables for prior reporting months. That can be implemented by filing off the Summary web page each reporting month, with the reporting month coded into the file name. The files could be linked to individually, and/or as a collection of individual selections packaged in a Table of Contents frame that is itself a selection on the main Table of Contents.

Other Time Cycle Reporting. This edition of EPRengine is designed for monthly data. By recoding some internals, the EPRengine macro could be adapted to report performance measurement data that is daily, weekly, quarterly, or yearly.

Expanded Performance Characterization. EPRengine could be altered to support Good vs. Caution vs. Bad characterization of the performance measures. Internal logic would change, and three-color support would be added. The DefineData SAS data set would require inclusion of a secondary Performance Standard, for the Caution category.

Conclusion

A tour through web pages that can be deployed with EPRengine, supplemented/motivated by its Email Alert option, is up to the task of informing any concerned person, quickly and clearly, as to the status of Enterprise Performance. EPRengine uses Base SAS, ODS, and the macro facility—tools already available at every SAS software site. Need for SAS/GRAPH is unlikely to be a required new acquisition for most SAS sites, since it's probably the second most frequently installed SAS software component. The authors invite your suggestions, comments, and questions.

Notices

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Your comments and questions are valued and encouraged.

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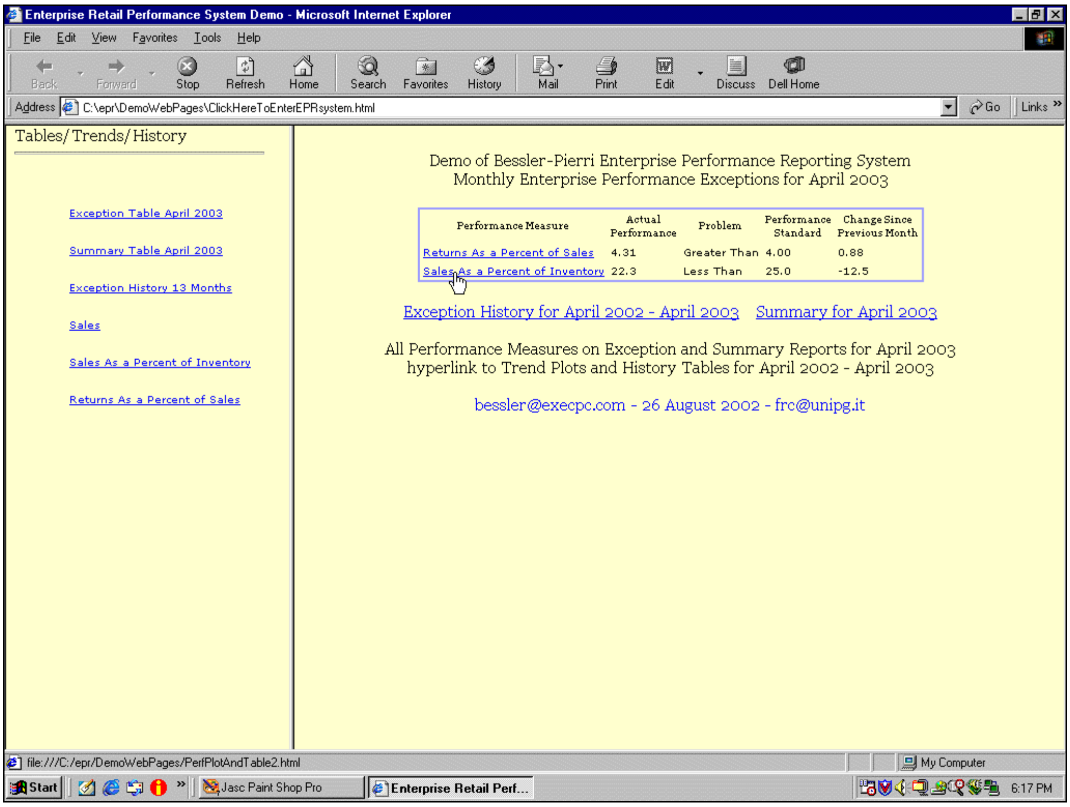
Figure 1. Home Page / Exception Report


Enterprise Retail Performance System Demo - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Dell Home
Address C:\epr\DemoWebPages\ClickHereToEnterEPRsystem.html
Go Links
file:///C:/epr/DemoWebPages/PerfPlotAndTable2.html
My Computer
Start
Jasc Paint Shop Pro
Enterprise Retail Perf...
6:17 PM

Tables/ Trends/ History

Exception Table April 2003

Summary Table April 2003

Exception History 13 Months

Sales

Sales As a Percent of Inventory

Returns As a Percent of Sales

Demo of Bessler-Pierri Enterprise Performance Reporting System
Monthly Enterprise Performance Exceptions for April 2003

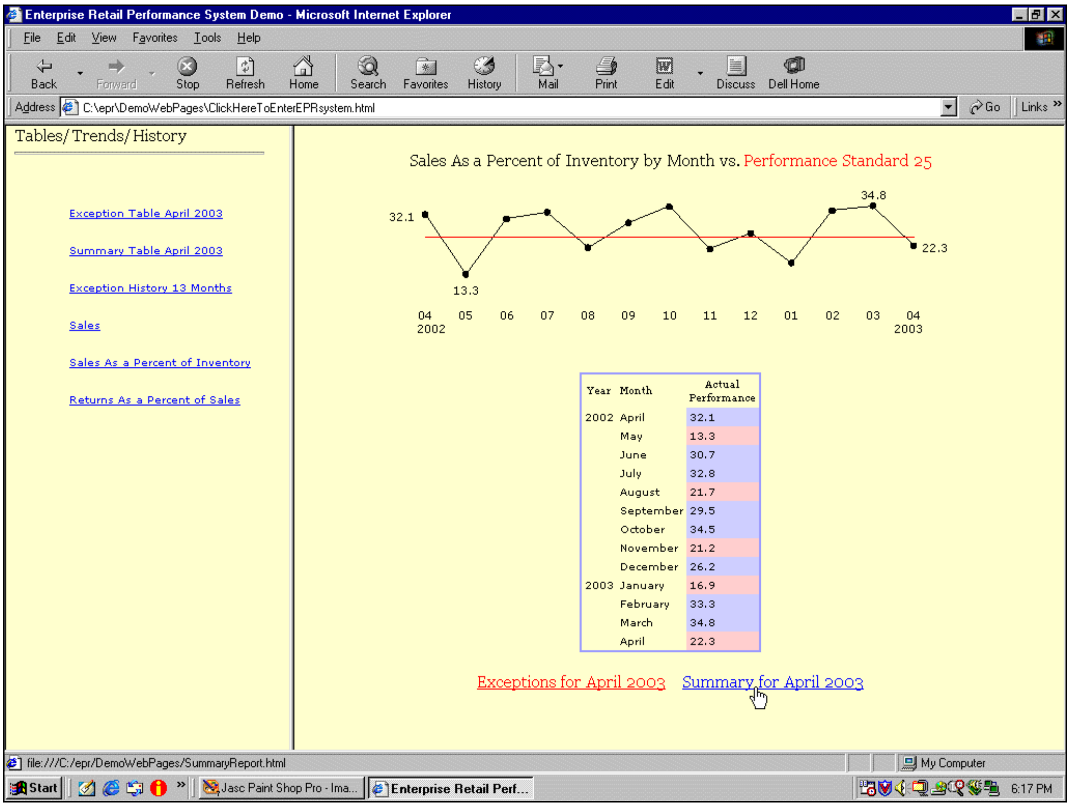
Performance Measure	Actual Performance	Problem	Performance Standard	Change Since Previous Month
Returns As a Percent of Sales	4.31	Greater Than	4.00	0.88
Sales As a Percent of Inventory	22.3	Less Than	25.0	-12.5

Exception History for April 2002 - April 2003   Summary for April 2003

All Performance Measures on Exception and Summary Reports for April 2003
hyperlink to Trend Plots and History Tables for April 2002 - April 2003

bessler@execpc.com - 26 August 2002 - frc@unipg.it

Figure 2. Trend Plot and Table


Enterprise Retail Performance System Demo - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Dell Home
Address C:\epr\DemoWebPages\ClickHereToEnterEPRsystem.html
Go Links
32.1
13.3
34.8
22.3
04
2002
05
06
07
08
09
10
11
12
01
02
03
04
2003
file:///C:/epr/DemoWebPages/SummaryReport.html
My Computer
Start
Jasc Paint Shop Pro - Ima...
Enterprise Retail Perf...
6:17 PM

Tables/ Trends/ History

Exception Table April 2003

Summary Table April 2003

Exception History 13 Months

Sales

Sales As a Percent of Inventory

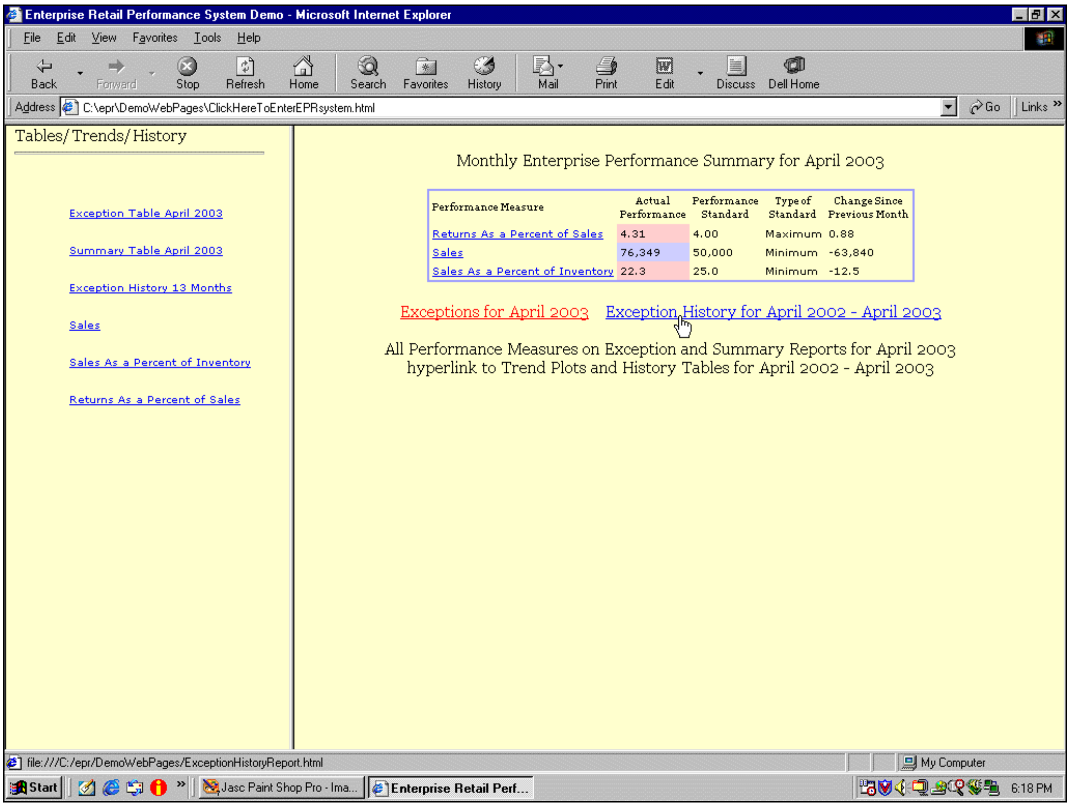
Returns As a Percent of Sales

Sales As a Percent of Inventory by Month vs. Performance Standard 25

Year	Month	Actual Performance
2002	April	32.1
	May	13.3
	June	30.7
	July	32.8
	August	21.7
	September	29.5
	October	34.5
	November	21.2
	December	26.2
2003	January	16.9
	February	33.3
	March	34.8
	April	22.3

Exceptions for April 2003   Summary for April 2003

Figure 3. Summary Report



Enterprise Retail Performance System Demo - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Dell Home
Address C:\epr\DemoWebPages\ClickHereToEnterEPRsystem.html
Go Links
file:///C:/epr/DemoWebPages/ExceptionHistoryReport.html
My Computer
Start Jasc Paint Shop Pro - Ima... Enterprise Retail Perf... 6:18 PM

Tables/Trends/History

Exception Table April 2003

Summary Table April 2003

Exception History 13 Months

Sales

Sales As a Percent of Inventory

Returns As a Percent of Sales

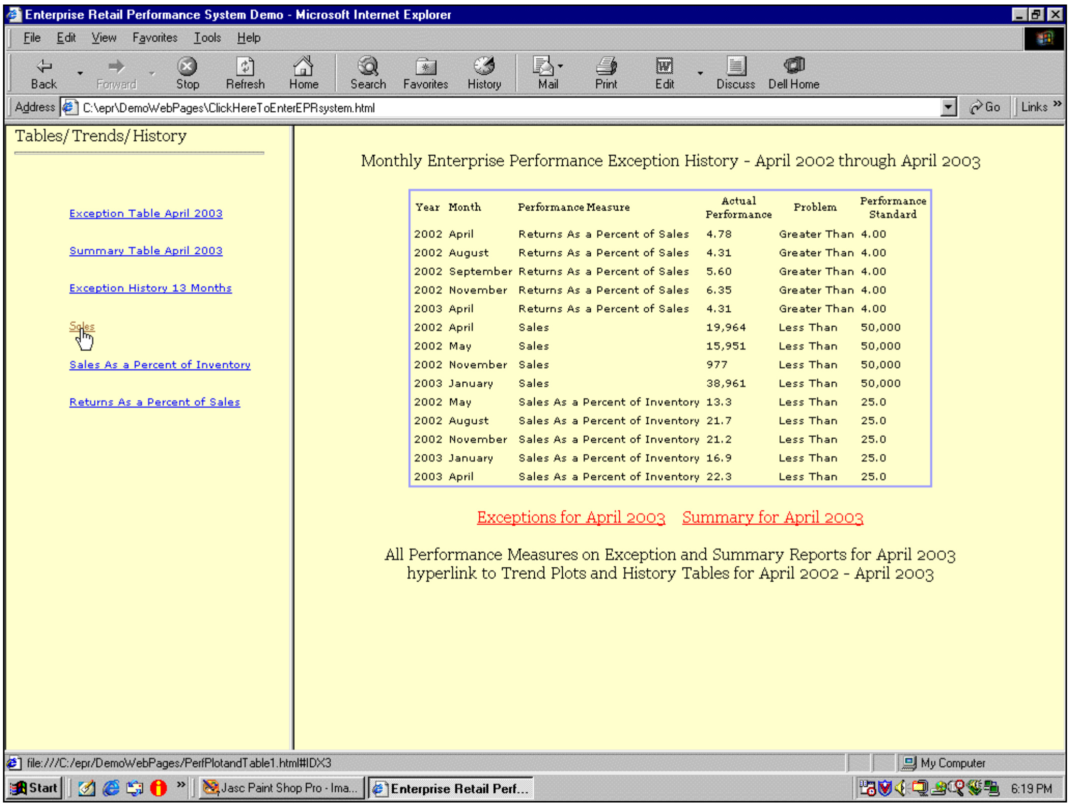
Monthly Enterprise Performance Summary for April 2003

Performance Measure	Actual Performance	Performance Standard	Type of Standard	Change Since Previous Month
Returns As a Percent of Sales	4.31	4.00	Maximum	0.88
Sales	76,349	50,000	Minimum	-63,840
Sales As a Percent of Inventory	22.3	25.0	Minimum	-12.5

Exceptions for April 2003 Exception History for April 2002 - April 2003

All Performance Measures on Exception and Summary Reports for April 2003
hyperlink to Trend Plots and History Tables for April 2002 - April 2003

Figure 4. Exception History Report



Enterprise Retail Performance System Demo - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Dell Home
Address C:\epr\DemoWebPages\ClickHereToEnterEPRsystem.html
Go Links
file:///C:/epr/DemoWebPages/PerfPlotandTable1.html#IDX3
My Computer
Start Jasc Paint Shop Pro - Ima... Enterprise Retail Perf... 6:19 PM

Tables/Trends/History

Exception Table April 2003

Summary Table April 2003

Exception History 13 Months

Sales

Sales As a Percent of Inventory

Returns As a Percent of Sales

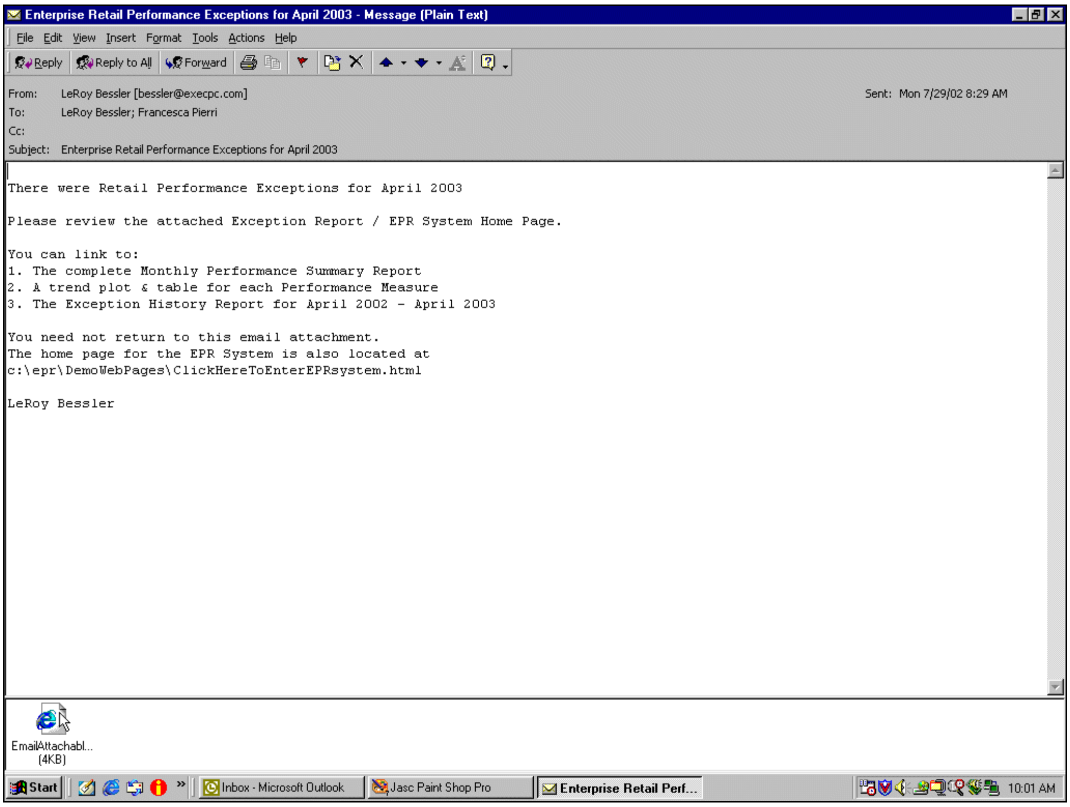
Monthly Enterprise Performance Exception History - April 2002 through April 2003

Year	Month	Performance Measure	Actual Performance	Problem	Performance Standard
2002	April	Returns As a Percent of Sales	4.78	Greater Than	4.00
2002	August	Returns As a Percent of Sales	4.31	Greater Than	4.00
2002	September	Returns As a Percent of Sales	5.60	Greater Than	4.00
2002	November	Returns As a Percent of Sales	6.35	Greater Than	4.00
2003	April	Returns As a Percent of Sales	4.31	Greater Than	4.00
2002	April	Sales	19,964	Less Than	50,000
2002	May	Sales	15,951	Less Than	50,000
2002	November	Sales	977	Less Than	50,000
2003	January	Sales	38,961	Less Than	50,000
2002	May	Sales As a Percent of Inventory	13.3	Less Than	25.0
2002	August	Sales As a Percent of Inventory	21.7	Less Than	25.0
2002	November	Sales As a Percent of Inventory	21.2	Less Than	25.0
2003	January	Sales As a Percent of Inventory	16.9	Less Than	25.0
2003	April	Sales As a Percent of Inventory	22.3	Less Than	25.0

Exceptions for April 2003 Summary for April 2003

All Performance Measures on Exception and Summary Reports for April 2003
hyperlink to Trend Plots and History Tables for April 2002 - April 2003

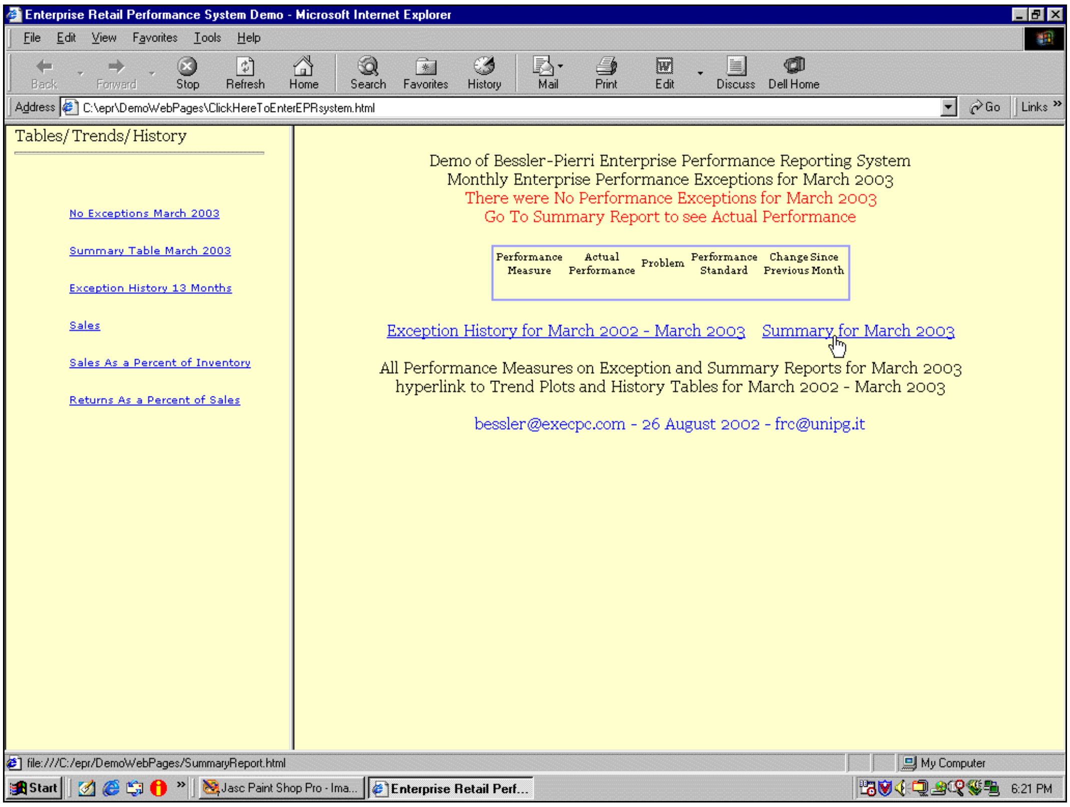
Figure 5. Email Alert Message


Enterprise Retail Performance Exceptions for April 2003 - Message (Plain Text)
File Edit View Insert Format Tools Actions Help
Reply Reply to All Forward
EmailAttachabl... (4KB)
Start
Inbox - Microsoft Outlook
Jasc Paint Shop Pro
Enterprise Retail Perf...
10:01 AM

From: LeRoy Bessler [bessler@execpc.com]
To: LeRoy Bessler; Francesca Pierri
Cc:
Subject: Enterprise Retail Performance Exceptions for April 2003
Sent: Mon 7/29/02 8:29 AM

```
There were Retail Performance Exceptions for April 2003

Please review the attached Exception Report / EPR System Home Page.

You can link to:
1. The complete Monthly Performance Summary Report
2. A trend plot & table for each Performance Measure
3. The Exception History Report for April 2002 - April 2003

You need not return to this email attachment.
The home page for the EPR System is also located at
c:\epr\DemoWebPages\ClickHereToEnterEPRsystem.html

LeRoy Bessler
```

Figure 6. Home Page / Exception Report—when there are No Exceptions


Enterprise Retail Performance System Demo - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Dell Home
Address C:\epr\DemoWebPages\ClickHereToEnterEPRsystem.html
Go Links
file:///C:/epr/DemoWebPages/SummaryReport.html
My Computer
Start
Jasc Paint Shop Pro - Ima...
Enterprise Retail Perf...
6:21 PM

Tables/ Trends/ History

No Exceptions March 2003
Summary Table March 2003
Exception History 13 Months
Sales
Sales As a Percent of Inventory
Returns As a Percent of Sales

Demo of Bessler-Pierri Enterprise Performance Reporting System
Monthly Enterprise Performance Exceptions for March 2003
There were No Performance Exceptions for March 2003
Go To Summary Report to see Actual Performance

Performance Measure	Actual Performance	Problem	Performance Standard	Change Since Previous Month

Exception History for March 2002 - March 2003   Summary for March 2003

All Performance Measures on Exception and Summary Reports for March 2003
hyperlink to Trend Plots and History Tables for March 2002 - March 2003

bessler@execpc.com - 26 August 2002 - frc@unipg.it