A Toolbox of Technologies: Integrating SAS Applications with Flash Multimedia
Incorporating HTML, and JavaScript

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ABSTRACT

The Requirements Integration Process Improvement Team (RIPIT) at Wright-Patterson Air Force Base utilized SAS language and procedures, coupled with Adobe Flash multimedia technology, to develop the Forecast Accuracy Comparison Tool or FACT Plus. This tool enabled Air Force inventory managers to reduce the time and cost of forecasting supply and maintenance needs for Air Force spare parts by 99.5%. The tool automated disparate legacy processes and methodologies and incorporated them into a one-stop centralized application. By drawing upon various web programming techniques, a developer can seamlessly integrate a SAS program into an application that functions via the Internet. SAS programmers can utilize modern technologies to retool their applications to provide clients with more accessible, user-friendly web-based solutions.

OVERVIEW

FACT Plus integrates a mix of technologies including Base SAS, SAS IntrNet, SAS GRAPH, htmSQL, JavaScript, and Adobe Flash. All of these technologies are intertwined and communicate with one another. We will demonstrate how these various technologies are utilized within one powerful application which we feel performs a valuable purpose for its users and is indeed unique in its field.

INTRODUCTION

In September 2006, RIPIT was approached by Secondary Item Requirements System (SIRS) (D200A) functional analysts and statisticians working supply chain management at Wright-Patterson Air Force Base. SIRS generates a quarterly computation process that provides the baseline for the Air Force spare parts buy and repair budget of roughly 6 billion dollars. The challenge: Could we use new technology to build a web-based application to help with forecasting supply and maintenance needs for Air Force
spare parts? Employing existing legacy tools, the process could typically take an item manager or equipment specialist hours per stock number to retrieve and analyze the information needed for each forecast. These processes were too complex for commercial off-the-shelf (COTS) tools to handle. D200A, consisting of approximately 120,000 stock numbers and thousands of data elements, called for the development of a custom web application to integrate these techniques and information.

In addition, D200A uses multiple forecasting methods to satisfy differing forecast requirements. In the past, an analyst would be forced to repeat tasks when moving from one method to the next. FACTPlus offers the users the capability to manipulate key elements within the interface via interactive Flash technology to make changes and execute “What If” scenarios for any given stock number. Users can toggle between methods and mix and match techniques on the fly. These results are automatically saved via Local Shared Objects in Flash. Along with increased efficiency, FACTPlus grants users the additional time to work on the problem. By examining how each of these components work together, we hope to provide SAS users a new approach and the tools to integrate existing SAS programs to function through the Internet.

FACTPLUS

FACTPlus provides the capability to compare the computed forecasted demands to the past actual demands that occurred in the last 12 time periods. FACTPlus also provides tailorable reports specific to defined business rules. Users may tailor reports to set standard selection, filter, and sorting parameters for all available data.

FACTPlus is composed of four primary web pages that users must navigate to select, process, and view a report. Those web pages include the reports generation page, the results page, the individual item drill down page, and the demand forecast worksheet. Both the results page and item drill down page will be dynamically generated with the information you are processing. The demand forecast worksheet allows users to alter values to instantly see the impacts of those changes.
REPORT GENERATION PAGE

The report generation page is composed of four primary sections where users may tailor the selection, filtering, sort parameters, and display options. Command buttons at the bottom of this page include the Submit and Reset buttons.

All selection, filter, sort parameters, and display options will default to values specified in the business rules. If no tailoring is required, click on the Submit button located at the bottom of the page. This will submit your report for processing and return the results page with the report output.

RESULTS PAGE
The results page displays data into group accuracy over time, top error drivers, and detail data. The group accuracy over time graph, located in the upper left section of the screen displays the accuracy of the selected items as a whole over 12 forecast periods. The top error contributors graph, located in the upper right section of the page, displays the items with the least amount of accuracy compared to all items in the comparison. Below both graphs is the detail data, which is a list of detailed data for every item that comprised the total accuracy.
DRILL DOWN ON DEMANDS

Users who need more detailed data on the demands of an individual stock number may click the drill down link to view additional data elements. Users can also view what the forecasts would have been using different forecasting techniques for each of the time periods.
DEMAND FORECAST WORKSHEET

The demand forecast worksheet allows users to change rates, percents, and program data in order to view the impacts of those changes. Using this tool, users can perform multiple scenarios prior to inputting their actual changes into the system. All the data from 8 quarters and 2 fiscal years is loaded into the form via SAS, saving equipment specialist time and reducing the chance of inputting the data incorrectly. All calculations are performed instantly after each keystroke.
NUTS & BOLTS

The purpose of this section is to provide some basic concepts of how SAS, Javascript, and Adobe Flash interact on the demand forecast worksheet. On this report, we use htmSQL technology from SAS to extract the data, Flash to display the data, and Javascript to transfer the data from SAS to Flash. Below is a diagram depicting the data flow of this process.

SUMMARY

RIPIT utilized a mix of technologies including Base SAS, SAS IntrNet, SAS GRAPH, htmSQL, JavaScript, and Adobe Flash to build a web-based application called FACTPlus to help with forecasting supply and maintenance needs for Air Force spare parts. In addition to forecasting spare parts, users can execute “What If” scenarios for any given stock number. Users can toggle between forecasting methods and mix and match
techniques on the fly. These results are automatically saved via Local Shared Objects in Flash. Along with increased efficiency, FACTPlus grants users the additional time to work on forecasting problems. FACTPlus enables Air Force item managers to reduce the time and cost of forecasting supply and maintenance needs for Air Force spare parts by 99.5%. For the period March 2007 through March 2008, FACTPlus had 11,500 hits or visitors to the site. Assuming that each hit represents one analyst acquiring forecast information, with an analyst pay rate of $26.56 per hour and about one hour to gather all the salient data, we calculate a yearly manpower cost of $305,440. With FACTPlus offering the same information in only 15 seconds, or .00416% of the time it would have taken using legacy methods, the cost has been reduced to $1,273 for the same period, for an estimated cost avoidance to the Air Force of $304,167.

CONCLUSION

We have detailed how SAS software can be used with Adobe Flash to create a web application to help with forecasting supply and maintenance needs for Air Force spare parts. The advantages of this approach are no plug-ins need to be installed and it is more flexible than if coded in HTML. The disadvantages of using this approach include more complex coding and thus more development time, and the purchase of a software license for Flash.

This mix of technologies will be applied to the development of future web tools, and serves to bridge the gap when moving from legacy systems to Enterprise Resource Planning (ERP) systems since FACTPlus could be viewed as a sort of ERP module, and gets users to begin thinking about ERP approaches to problem solving and increasing productivity.

Using the FACTPlus approach, application developers can create web tools which streamline work processes and free users to do what they were trained to do. FACTPlus offers a good example of leveraging SAS with other technologies to achieve business results, and improving companies bottom lines by reducing costs.

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**TRADEMARKS**

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