Paper 151-27

FROM DATA WAREHOUSE TO REPORTS WAREHOUSE

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ABSTRACT

Bank Tefachot, Israel's largest mortgage bank is using SAS for it's entire financial reporting, branch analysis and risk management for many years.

SAS v8 has been installed on the bank's UNIX server during 2000 and immediately has created a need for Web reporting in all branches around the country.

The Data warehouse team from EIS Ltd. has built a unique solution called SIGMA/Web that maintains a Reports Warehouse. Users can view reports generated periodically using SAS ODS and to send, via a web browser interface, requests for the SAS Unix server to be processed on-line.

Each user can publish a SAS report to be viewed by other members under certain security limitations. A SAS published report can be enhanced by up-loading a WORD or EXCEL documents or other web formats. These documents along with the SAS reports, formulates a complete publication that is cataloged under Sigma/Web SAS application.

Since the underlying data structure of the bank is very complicated, Meta-Data issues were handled through the report warehouse in order to assist users in understanding complex risk, profit centers and economical reports.

The presentation is aimed for information managers and executives seeking to improve information sharing and knowledge management in the organization. The presentation will briefly describe the SAS products and techniques used in building SIGMA/Web product.

INTRODUCTION

SAS V8 has introduced us with incredible facility for producing HTML output in a BATCH manner. This unique feature has opened an opportunity to develop a "Reports warehouse" that is being fed by periodically jobs that are running against the data warehouse and producing huge amount of HTML pages.

The story of "Bank tefachot" is a good case study of how to add to the Data warehouse layer an additional Reports Warehouse layer which is more suitable for high level and busy executives.

The idea of "Reports Warehouse" raises some new concepts and issues. Usually, in the data warehouse concept we deal with the management of large SAS datasets, Indexing issues and query efficiencies, while in the Reports Warehouse we deal with the management of huge amount of HTML pages and with the way people are interacting with web based archives.

The economic and research department of "Bank Tefachot" was the perfect choice for applying these new ideas and features of SAS V8 and ODS. A SAS based "Profit centers" system that produces huge amount of printed hard-copy monthly reports for all branches around the country was selected as a pilot to demonstrate the power of SAS V8 ODS HTML new features**.**

The bank's vision of the Intranet-based Reports Warehouse consisted the following goals:

1. Eliminate the hard-copy printing of thousands of papers each month.

2. Improve the "Time-To-Market" circulation of the reports.

3. Deliver a more appealing reports to the branches via a media that can also be "Cut & paste" into Excel and Word.

4. Automatically mark "Extreme Values" on each report to notify managers.

5. Link reports and graphs in a way that can help managers "Drill-down" into more detailed reports.

6. Provide security scheme that can handle security issues resulting from the hierarchical structure of branches and sub-branches.

7. Enhance the reports with additional documents that serve as "Meta-Data" for the report and add more related info.

8. Use web techniques to enable interaction of information and personal views between users resulting from the published material in order to reduce the paper working surrounding the older hard-copy reports.

9. Use the web as an easy archive for generations of older reports from previous months.

10. Allow users to submit and "publish" user-defined reports on the web and grant other users access permission to the output.

IMPLEMENTATION

While addressing the first 3 goals is easy with a standard web server and it's a natural outcome of producing HTML reports, moving to the more complex demands require more robust software that was not found as a commercial "Off-the-shelf" product.

Implementation was done in 2 parallel phases:

1. Address goals 1-5 with SAS ODS.
2. Build a specific product to implement the more complex goals.

Two teams of programmers were assigned to the project:

Team 1

The first team consisted of experienced SAS programmers who worked at the bank. They were assigned the job to transform the older SAS proc tabulate code into an ODS based code.

SAS ODS advanced features was carefully studied in order to implement a "Traffic Lights" methodology in each tabular report and to develop the hierarchical links between the reports. (Information of the SAS

techniques used for this step can be found in SAS/BASE documentation).

In order to get a high quality of graphic design the team was able to get help from EIS's web master who contributed to the final design of the product:
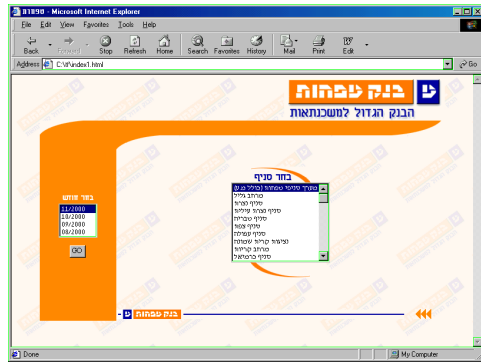

Figure 1: The Home page – Selecting branch and time period

The outcome of phase 1 was developed within one month and consisted a SAS macro that generates 30 different reports and graphs for each branch on a monthly basis:
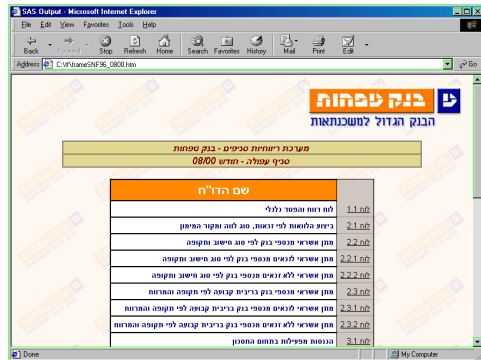

Figure 2: Branch main-menu – Selecting a report/graph
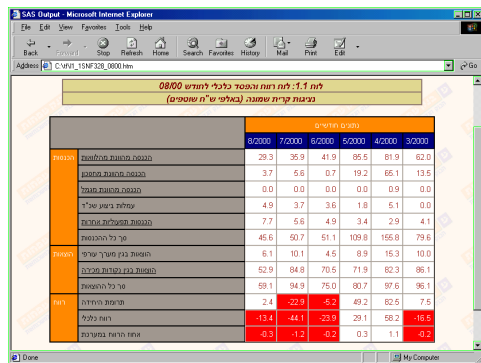
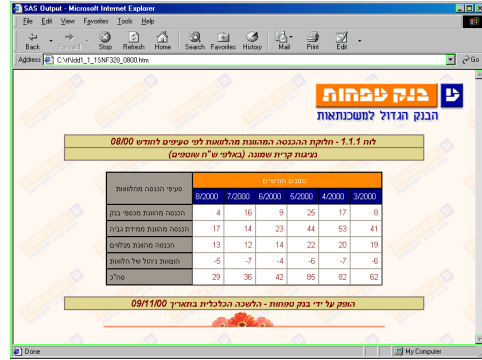*Figure 3: Report with Drill-Down links and Traffic-lights*
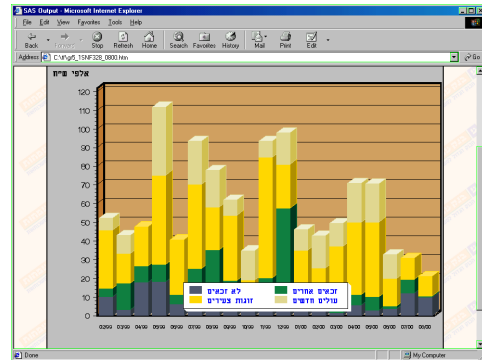

Figure 4: A more detailed linked report

Figure 5: WEB Gif produced by SAS/GRAPH

Team 2

The second team consisted of EIS's web master and additional experienced Perl / Java and CGI programmers. Their job was to develop a product that will address the above goals 6-11 and will run on a standard web platform e.g. SUN SOLARIS server and APACHE web server.

The final product called SIGMA/WEB was designed to be an integral component of the SIGMA family of products. SIGMA/WEB can serve as a REPORTS PORTAL that can accommodate both SAS generated ODS reports as well as HTML (or other formats) reports generated from other resources.

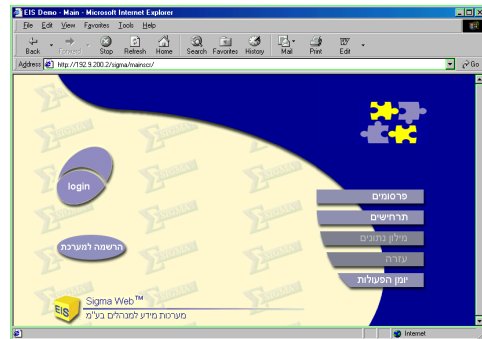The following figures describes the basic functionality of SIGMA/WEB:

Figure 6: SIGMA/WEB main screen

Sigma/Web is a true thin client application that needs only a web browser to run. Security is based upon standard APACHE security and can be optionally enhanced by other additional techniques and products like firewalls and RSA etc.

Figure 7: User identification

Figure 8: Reports warehouse's publication tree

After logging in, a tree structure of the contents of the reports warehouse is presented to the user. Every part (publication) of the tree is marked as "Free entrance" or "No entrance" according to the users access permissions.
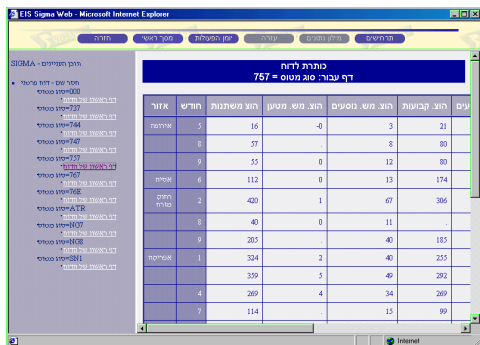

Figure 9: Viewing SAS ODS HTML report

A user can send an application to register to a publication to the "Publication Manager" who is responsible for maintaining the publication's contents; accuracy, refresh policy; additional meta-data and users access policy.
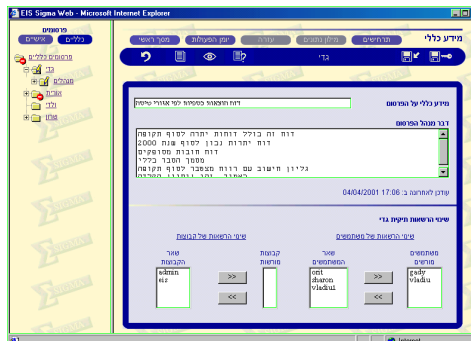

Figure 10: The Publication Manager's GUI – Meta data and security management
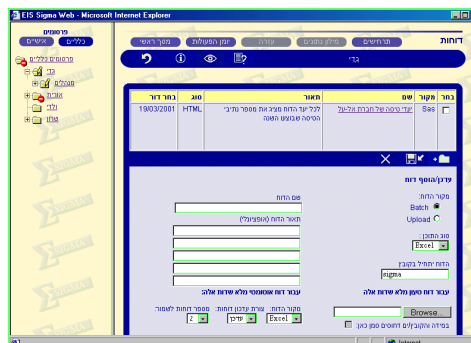

Figure 11: The Publication Manager's GUI, Cont. - Uploading of additional documents

The Publication Manager can upload additional documents such as Word, Excel, PDF or ZIP files in order to enhance the publication. This mechanism can also be used as a stand-alone platform to maintain a structured document repository on the web.

Each publication can be associated with a "Forum" set by the publication manager. This forum can be used by all permitted users in order to exchange views and comments regarding the publication contents.

Each document in the publication can be managed in an "Update" or "Replace" policy. This technique can be used to archive and retrieve generation documents.

Updating publications is made on a periodically manner by running a SAS job (Such as Bank Tefachot's macro). The HTML results are FTP'ed to the SIGMA/WEB server using a special SIGMA/SAS API developed for this purpose.

Figure 12: Generation documents

To further tighten the integration of SIGMA/WEB into our family of SIGMA WAREHOUSE products, A special CGI interface was developed that enables users to submit on-line request ("Stored Procedures") for SAS/SIGMA jobs to be run on the SAS server.

Figure 13: Stored procedures (Scripts)

Each "Stored procedure" is initially developed using SIGMA/WAREHOUSE (A data warehouse SAS based application developed by EIS Ltd.). After testing this "Stored Procedure" in the SAS server it is being moved to the "Production" area located on the web server. SIGMA WAREHOUSE automatically creates an HTML form with all the necessary Java scripts to handle correct data entry.
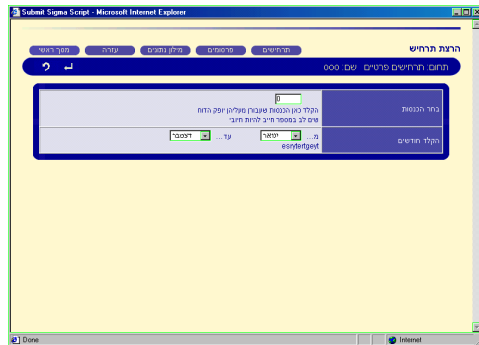

Figure 14: An HTML Form to submit a "Stored Procedure"

Submitting the above form (via the browser) creates a batch SAS job running on the SAS server. (A special Perl program was developed to handle the HTTP channel requests between SIGMA/WEB server and the SAS server).

The HTML output from the Batch SAS job is automatically being FTP'ed to the SIGMA/WEB server and can be viewed by the user who submitted it by then.
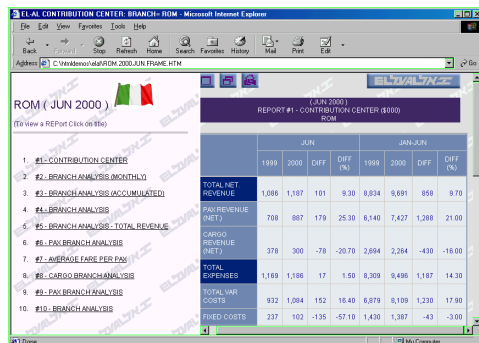

Figure 15: Viewing results from a "Stored Procedure"

To close the execution circle, this SAS generated HTML output can be "published" by the user by granting other users permissions to view the report and optionally uploading additional documents. (The same process as for a General Publication managed by a Publication Manager).

SUMMARY

SIGMA/WEB combines the power of the SAS system in delivering the right information to the right people in the write time and the vision of the Intranet world. SIGMA/WEB is a commercial product that can help organizations in adding a web-based layer that handles all complexities arising from the management of "Reports Warehouse" on the web.

ACKNOWLEDGMENTS

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