

Building a Data Table Project Management Application

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ABSTRACT

Release 6.11 of the SAS® System provides several new FRAME object oriented classes that allow you to develop customized applications that display the contents of a SAS data set in a table or form view. This paper presents the FSPLAN project tracking system as an example of an application that uses these classes to manage project tracking data.

INTRODUCTION

The Data Set Entry classes in Release 6.11 of SAS/AF® software are the Data Table and Data Form classes. The Data Table class allows you to display the contents of a SAS® data set in much the same way that the FSVIEW procedure of SAS/FSP® software displays a SAS data set in a row and column format. The FSPLAN project tracking application uses the Data Table class to present a spreadsheet-like view of the project data.

OVERVIEW

FSPLAN allows you to create and display project data, add and update rows in the Data Table, dynamically control which columns are displayed in the table, apply a WHERE clause to the project data, produce an automatically-generated report, and produce Gantt charts. FSPLAN also has several personal management prototypes associated with it. FSPLAN was developed on the HP-UX platform.

FSPLAN DETAILS

Invocation

FSPLAN uses a UNIX Korn shell script to supply you with a number of command-line

options that can be used to control the behavior of the application. The options include *-build* for building the application, *-contents* for listing the variables in a project data set, *-data* for specifying the project data set to load, and *-where* to supply a WHERE clause.

The FSPLAN shell script sets these options as environment variables and exports them to the shell. The FSPLAN script then invokes the SAS System with an autoexec file named *fsplan.sas*. This file contains data step, Macro, and SQL procedure code that invoke the FSPLAN application and define the REPORT macro, which is detailed later in this paper.

An example invocation is:

```
fsplan -data perm.product -where "title  
contains 'CODE' "
```

Refer to Figure 1 for an example of FSPLAN with a project data set loaded.

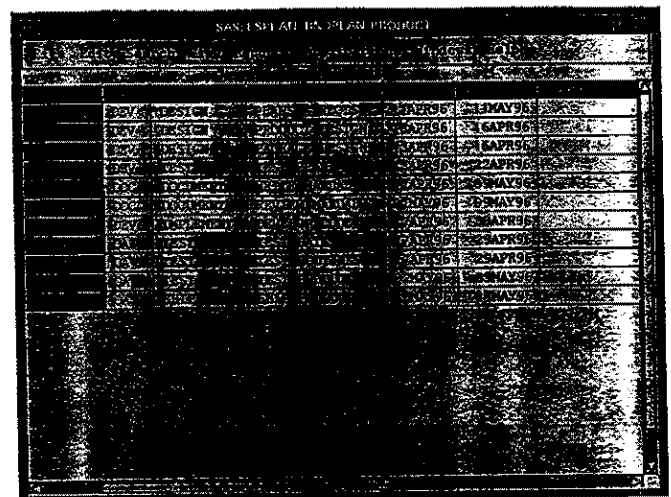


Figure 1. FSPLAN Application

Project Data Set

FSPLAN project data includes specific data set columns. The required columns are referenced in Figure 2.

Figure 2. Project Columns

TASKID	task identifier
TITLE	task title
PROJECT	project a task is associated with
DURATION	length of a task
B_START	baseline start date
B_FINISH	baseline task completion
A_START	actual start date
A_FINISH	actual completion date
REMDUR	remaining task duration
PCTCOMP	percent complete
SUCC1	first successor task
SUCC2	second successor task
SUCC3	third successor task
SUCC4	fourth successor task
SUCC5	fifth successor task
SUPPORT	task owner
RESC1	first resource
RESC2	second resource
RESC3	third resource
RESC4	fourth resource
RESC5	fifth resource
DOC	documentation
NOTES	miscellaneous information
CREATED	user who created task
UPDTBY	user who last updated task
LSTUPDT	when the task last updated
STARTIME	hours:minutes of task start
ENDTIME	hours:minutes of task finish

Opening a Project

An FSPLAN project can be opened through the Open item on the File menu. A list of available project data sets is displayed in the Open Project Window (refer to Figure 3). A default project data set can also be specified in the Preferences window (see Figure 8). Once a project data set has been selected, it is loaded into the Data Table with the `_SET_DATASET_` method.

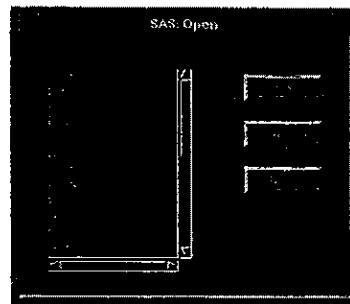


Figure 3. Open Project Window

Command Processing

FSPLAN processes commands off the command line, whether these commands originated from the menus or from commands entered directly on the SAS System command line.

The commands read from the command line are then evaluated to determine whether they are commands native to the FSPLAN application. If not, the commands are treated as SAS global commands and are passed to the `_EXEC_CMD_` method.

WHERE Clause Processing

There are two ways to apply a where clause to the SAS data set. One is on invocation of FSPLAN with the `-where` command line option; the other is through the Search menu in the FSPLAN application.

When a WHERE clause has been specified, it is stored in an SCL list and is passed to the `_SET_WHERE_` method, which applies the WHERE clause to the project data set currently displayed in the table. Figure 4 is an example query. Figure 5 shows FSPLAN after the query has been applied to the project data.

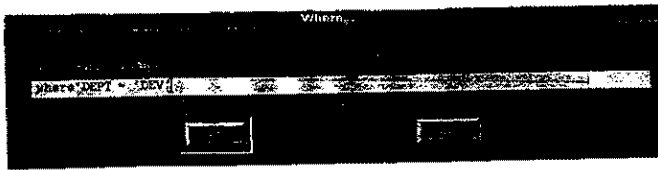


Figure 4. WHERE Clause Window

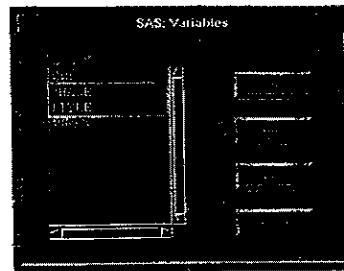


Figure 6. Show Columns Window

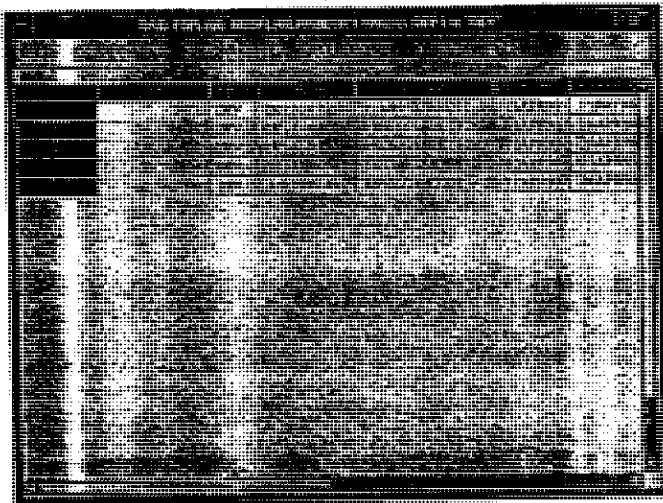


Figure 5. FSPLAN with WHERE clause applied

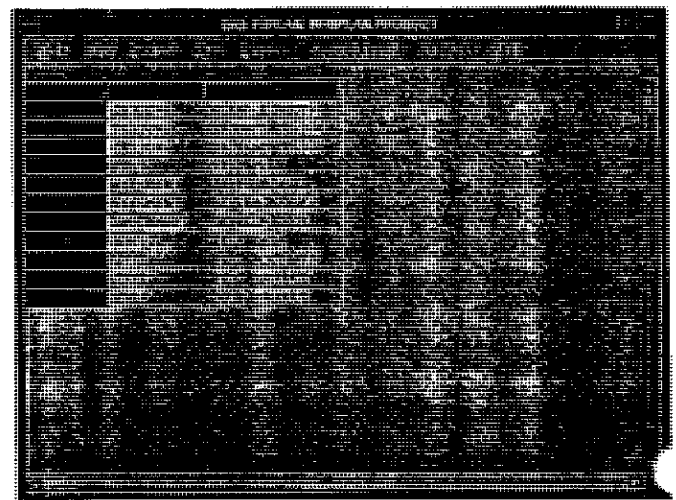


Figure 7. FSPLAN after Show Columns Applied

Showing and Hiding Columns

FSPLAN lets you control which columns are displayed at any time in the Data Table. You can either show or hide columns. The Show and Hide options are available from the View menu.

When you select one or more columns in the Show Columns Window (see Figure 6), FSPLAN uses the `_UNHIDE_COLUMN_` method to display these columns in the table. Refer to Figure 7 of an example of FSPLAN after the PHASE and TITLE columns have been selected from the Show Columns window.

Similarly, when you want to hide a column, select the columns to hide in the Hide Columns window. The list of columns to hide is passed back to the main FSPLAN program, which applies the `_HIDE_COLUMN_` method to the table.

Modifying Project Data

FSPLAN uses record-level locking to allow you to get a lock on an observation in a project data set when you want to update a row in the table. When you select a row in the Data Table, the corresponding observation in the project data set is locked and can be modified until you deselect or move from that row.

Storing User Preferences

FSPLAN allows you to permanently store several user properties. The properties you may store are:

- default WHERE clause
- Text font for Data Table values
- Text font for Data Table labels

- SAS/GRAPH® device name (for GANTT procedure output)
- Printer device
- Default columns to display

An example of the FSPLAN User Preferences Window is shown in Figure 8.

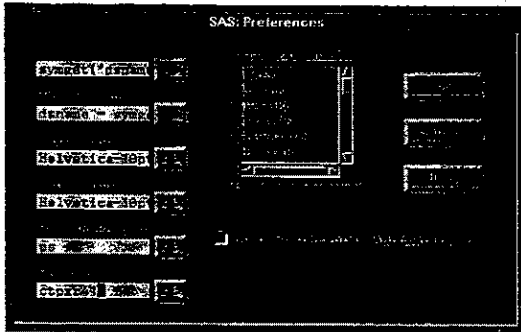


Figure 8. User Preferences Window

REPORT Macro

The REPORT macro produces a report of the contents of the tasks currently displayed in the FSPLAN Data Table. The REPORT macro accepts two parameters:

- 1) active data set name
- 2) WHERE clause (if any)

The current WHERE clause is retrieved from the table with the `_GET_WHERE_` method, which stores the result in an SCL list. The WHERE clause is reconstructed by processing each list item with the `GETITEMC` function and storing the result in an SCL variable. The reconstituted WHERE clause is then made available to the REPORT macro through the `SYMPUT` function.

The REPORT macro runs an SQL procedure step on the table indicated in `&DSNAME`, with the WHERE clause applied through `&WHERECLS`. The `&SQLOB` automatic macro variable is then analyzed to determine whether a results set was created. If so, a data step is run that prints each row in the

results set. Refer to Figure 9 for example REPORT macro output.

Figure 9. FSPLAN Report Output

```

FSPLAN Report
Wednesday, 30JUN95, 09:35
-----
LSTUPDT:  30JUN95
UPDTBY:  SASIXC
NOTES:
DOC:
SUCC5:
SUCC4:
SUCC3:
SUCC2:
SUCC1:  119
RESC5:
RESC4:
RESC3:
RESC2:
RESC1:
PCTCOMP:  0
ENDTIME:
STARTIME:
A_FINISH: 13DEC94
A_START:
B_FINISH:
B_START:  15MAR95
DURATION:  0
STATUS:    N
PROJECT:   DESIGN
TITLE:    DESIGN REVIEW
TASK:     5
-----

```

Gantt Reports

FSPLAN contains an SCL program named GANTT that generates a Gantt chart. The GANTT program accepts two arguments:

- 1) the name of the SAS data set currently displayed in the Data Table
- 2) the active WHERE clause (if any)

The GANTT program performs the following:

- 1) Schedules the project data with the CPM procedure of SAS/OR® Software and stores the output in a schedule data set
- 2) Applies a heuristic algorithm to the schedule data set to determine an optimal number of tasks to display per page on a Gantt chart
- 3) Displays the Gantt chart with the GANTT procedure of SAS/OR software.

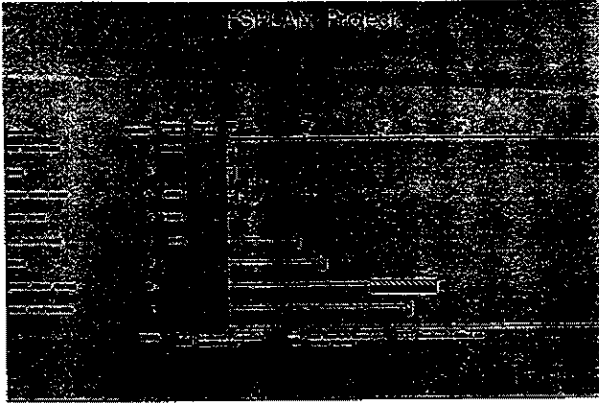


Figure 10. Gantt Chart Produced by FSPLAN

Personal Project Management

FSPLAN contains three additional personal management application prototypes that use Data Table objects to display and manage their data:

- 1) Calendar (see Figure 10)
- 2) Planner (see Figure 11)
- 3) Personal Information Center (see Figure 12)

These three applications extend the functionality of FSPLAN to allow you to manage activities beyond the scope of task-based project management, such as personal goals or appointments that may impact project schedules.

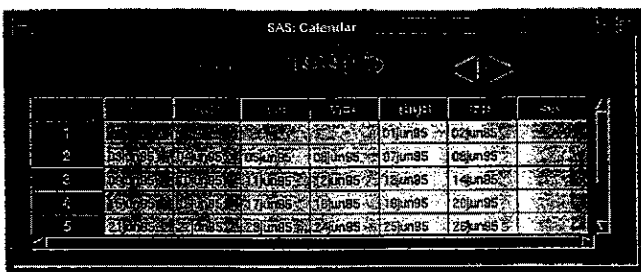


Figure 11. FSPLAN Calendar

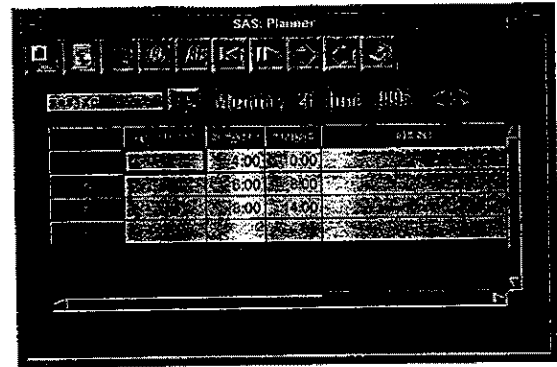


Figure 12. FSPLAN Planner

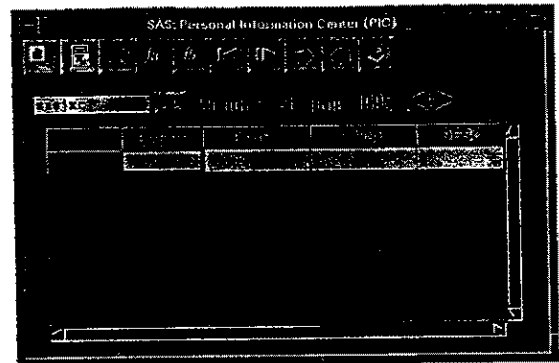


Figure 13. Personal Information Center

Future Plans

FSPLAN may be extended to incorporate a Gantt application that allows you to customize your Gantt chart after it has been displayed by the GANTT procedure. FSPLAN may also be enhanced to support rollback and recovery procedures for managing transaction processing when a project data set is being modified in the table.

CONCLUSION

The Data Table class in Release 6.11 of SAS/AF software allows you to create dynamic business applications, such as a project tracking system. The ease-of-use, rich feature set, and extensibility of the Data Table class as well as of SAS/AF software in general allow you to develop customized applications that can meet any kind of business requirements.

REFERENCES

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NOTES

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