

Reporting Options with SAS

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The purpose of this paper is to provide a comparative overview of some of the current non-graphical reporting options available in 1998 using SAS Version 6.12. Each option presented will have a list of pros, cons, and a general recommendation based on the current technology for both enterprise reporting (defined as ongoing or recurring reporting needs) and ad-hoc reporting (defined as interactive queries or one-time reports). Naturally, since SAS continues to progress forward, what is described in this paper is only the bare minimum expectation which users should have in using SAS.

DATA _NULL_

PROS	CONS
• Major Advantage: Takes advantage of the full SAS Language including macros • Allows for many options for sending reports to the printer through the PUT statement • Allows for simultaneously creating a SAS dataset or sending output to a flat file • Included in the base SAS licensing agreement	• Major Disadvantage: Requires substantial coding even for minor changes • May require learning macros or other advanced coding features to take full advantage of the SAS language
RECOMMENDATION For Enterprises: DATA _NULL_ reporting is excellent for static reports of heavy complexity, particularly when there is the time available to tweak the report to the desired format. For Ad-Hoc Reporting: DATA _NULL_ is a cumbersome approach to ad-hoc reporting, and users should instead choose other options.	

BASE SAS PROCS (Print, Freq, Report, Tabulate)

PROS	CONS
• Major Advantage: With the use of keywords, PROCS allow for programming an entire report often in 5 lines of coding or less • The standard PROCS include the most generally requested types of reports which users require • SAS continues to add additional keywords to these common PROCS • Included in the base SAS licensing agreement	• Major Disadvantage: Structure is limited to what the keywords will allow • Users may have to pre or post process the dataset including a PROC statement using perhaps a DATA step or other PROC (such as PROC MEANS)
RECOMMENDATION For Enterprises: SAS users should be aware of what the various PROCS can do, since these options currently provide the most output given the amount of coding input required. For Ad-Hoc Reporting: The PROCS are an excellent way to provide ad-hoc reports, and SAS users who can combine the concatenating, interleaving, merging, and updating features of the DATA step with these PROCS will be able to quickly produce meaningful results.	

Printer Control Codes

PROS • Major Advantage: Allowing full control of the printer to create output outside the standard monospaced fonts • Control is limited only by the printer technology	CONS • Major Disadvantage: Requires specific knowledge of a specific printer, generally included in separate technical documentation which may not be available for a particular printer • Sensitive to a particular printer's availability for producing critical reports
RECOMMENDATION For Enterprise Reporting: Printer control codes combined with DATA _NULL_ or PROC reporting can provide excellent enterprise reports given that the time is available to work out the details For Ad-Hoc Reporting: Given the time intensity required, this is not a recommended solution for ad-hoc analysis	

FSREPORT

PROS • Major Advantage: The promise of full-screen editing, font selection, and WSIWYG output. • Included in the base SAS licensing agreement	CONS • Major Disadvantage: FSREPORT has been explicitly released as beta, and SAS does not plan to improve or fix current bugs
RECOMMENDATION For Enterprise or Ad-Hoc Reporting: Since the current FSREPORT contains substantial bugs and because SAS will not be supporting FSREPORT, this is not a recommended enterprise or ad-hoc solution.	

DDE (Dynamic Data Exchange)

PROS • Major Advantage: Being able to transfer data among Windows-based applications. • Allows for seamless transfer to popular word processing, spreadsheet, and database applications. • Included in the base SAS licensing agreement	CONS • Major Disadvantage: DDE is limited in the scope of functions which SAS can access across applications • Requires specific technical parameters to be coded which are highly dependent on the external application and version • Sensitive to external application updates
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RECOMMENDATION

For Enterprise Reporting: DDE is a stable technology for transferring data from SAS to other platforms, and SAS users will assess whether the investment is worth the possible changes in external technology
 For Ad-Hoc Reporting: DDE can provide an excellent method for ad-hoc analysis, given that the technical parameters are unlikely to change for a given query set and also that the SAS coder is adept in the particular external application

Automation (formerly OLE)

PROS

- Major Advantage: Microsoft supports it -- VBA (Visual Basic for Applications) is the current platform allowing Automation
- Allows for client-server sessions to be established between SAS and external applications
- Included in the base SAS licensing agreement

CONS

- Major Disadvantage: Microsoft supports it -- it is only a viable alternative in the Windows environment
- Requires specific technical parameters which may need to be gleaned from online help and the Windows registry
- Highly application-specific and subject to change with future external application revisions

RECOMMENDATION

For Enterprise Reporting: Automation is an excellent solution for shops which have already made a heavy investment in Visual Basic or Visual Basic for Applications
 For Ad-Hoc Reporting: Not recommended because Automation, as the name suggests, is best suited for recurrent reporting

Enterprise Reporter

PROS

- Major Advantage: Takes full advantage of SAS security and cross-platform access
- Allows for OLAP analysis across the enterprise without requiring additional SAS user licenses
- Delivers a level of WYSIWYG reporting to SAS, including not only text reporting but also color graphics, images, and fonts
- Output can be exported to HTML

CONS

- Major Disadvantage: Is currently a new release, and still shy of features found in other packages such as Crystal Reports
- Since the features are limited, it may require DATA or other PROC step preprocessing
- May require SCL list programming for calculations outside the standard set provided
- Requires a specific administrator to set up user restrictions for data access
- Sluggish with computers with less than 32 MB RAM (the more, the better)
- Not included with the base SAS licensing agreement

RECOMMENDATION

For Enterprise Reporting: The Enterprise Reporter is a promising alternative for those desiring a complete SAS end-to-end solution, and as well provides an interface for non SAS programmers to do OLAP

For Ad-Hoc Reporting: Given the ease of this tool, Enterprise Reporter is a possible way to allow end users to perform their own ad-hoc analysis and drill-down without requiring the often scarce resource of SAS programmers; also, the Enterprise Reporter may provide programmers with the ability to quickly produce high-quality reports

Future Considerations

A few projects are already well underway by SAS which will greatly increase the number of options available for reporting -- it is recommended that SAS users be aware of these specific developments which may greatly impact or change the best alternative for either enterprise or ad-hoc reporting:

Trend One: SASIntrnet -- This product has just been made available for the mainframe, and promises to provide the ability for programmers to develop OLAP applications or at minimum deliver data queries using the ubiquitous web browser. It is recommended that users be aware of the developments of this product which could produce excellent enterprise or ad-hoc solutions.

Trend Two: Microsoft pushes OLAP -- Many user requests for reports are largely based on real experience with word processing and spreadsheets. With Microsoft's upcoming release of NT version 5 and SQL Server version 7, SAS shops should recognize that Microsoft will continue to drive forward what end users want from cross-platform online reporting. Despite the new Microsoft features, we personally do not recommend abandoning the clear cross-platform advantages of SAS.

Trend Three: JAZZ IDE and Java -- SAS currently intends to extend many Java classes to include what is available in SAS. Java itself is scheduled to shortly release version 1.2 and is a rapidly evolving language, and Sun appears to be committed to extending Java into an entire product line. We may possibly see Java Beans or Applets which could greatly simplify the reporting task. Most industry observers agree that cross-platform enterprise applications, a traditional SAS stronghold, will be the primary area where Java will have its greatest impact.

Conclusion

SAS provides a wide variety of reporting options, and whether SAS users are interested primarily in enterprise or ad-hoc reporting, there are some excellent alternatives currently available. SAS users need to carefully consider the scope, frequency, and requirements placed on reporting in order to choose the technology which best suits the current need.