

Paper 230-30

Using SAS Enterprise Guide in a Global Programming Environment Karen Curran, Omnicare Clinical Research

In 2000, Omnicare Clinical Research was formed through the union of three CROs. At that time, the Biometrics programming groups at each facility used either terminal emulators or PC SAS for windows. To unify programming activities into one global validated environment, all programming groups were migrated to one central Unix server. To allow users a choice of programming interfaces, the system was loaded with SAS Integration Technologies with a front end of Enterprise Guide and VT terminal interfaces. This paper will discuss the advantages and disadvantages of this strategy and the features of using Enterprise Guide Vs individual SAS for Windows site licenses.

History:

The 2000 union of the three CROs combined SAS users across the globe, which had been using different software and hardware environments and differing programming practices. With a Biometrics staff at five geographic locations, three data centers (King of Prussia, PA, United Kingdom and Germany) and several telecommuters, clearly a seamless global biometrics department needed to be created.

The consolidation of organizations forced the need for centralization and standardization. To fully integrate and attain global efficiencies, it was essential for all locations to be validated, be 21CFR11 compliant, and have integrated standard programming practices. The current validated machines could not be upgraded to centralize all geographic locations and support a new release of SAS. A new server as well as a new software compromise was required.

The Options:

The goals for the hardware and software globalization were:

- 1.) All data stored in one location
- 2.) One Unix machine
- 3.) All geographic locations can share work to assist in peaks and valleys of work across geographic locations

Highlights of the options considered are in the table below:

Solution	Bandwidth	Pros	Cons
PC SAS and VT Terminals (everyone has both)	***	⇒ Users have a choice	⇒ Expensive ⇒ Lack of a Common Software Platform ⇒ Lack of Centralization
PCSAS on Citrix	***	⇒ Interface ⇒ Data Centralized	⇒ SAS Recommends using only 8 users per NT server, would need to purchase 6 NT servers ⇒ Extra cost for hardware and software for servers
X Windows	****	⇒ Interface	⇒ Speed is slow ⇒ High dependence on server ⇒ Limited options for users accustomed to PC SAS
VT Terminal	*	⇒ Inexpensive	⇒ Lack of User friendly interface
Enterprise Guide with Integration Technology and VT Terminal	**	⇒ Interface ⇒ Centralization	⇒ Learning Curve ⇒ Untested Software ⇒ New Technology

While the solution of PC SAS and VT Terminals would have been the least disruptive for users, this route would have impeded centralization of programming activities. The cost for individual PC SAS licenses for the required number of users would have been more expensive and the network speed would have been slow.

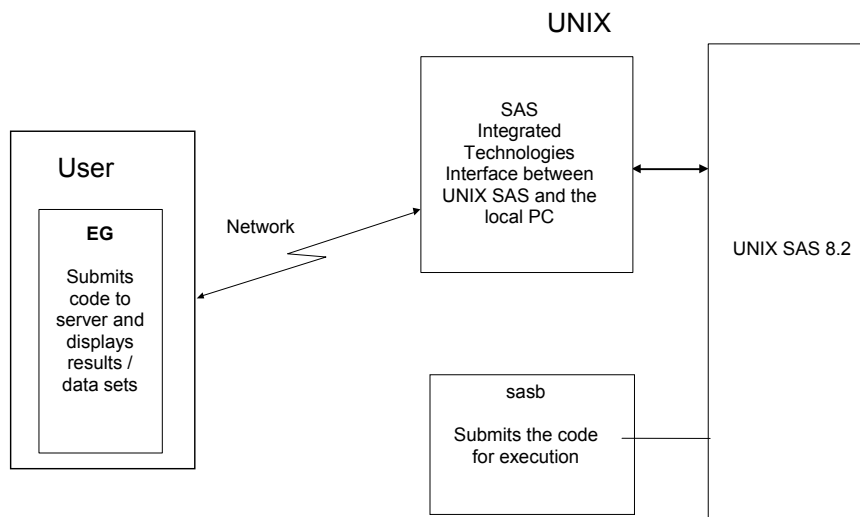
Using PC SAS on Citrix is good a solution if all users are not always utilizing the SAS system. If more users were suddenly hired in a geographic location, an additional server would need to be purchased and expand the system. This option would require additional hardware and software for the many servers that would have been required. This option has a lesser bandwidth issue than other options. While this would centralize the data, it would not meet the criteria of a single Unix server.

The X Windows option would have been a strong contender if we were not a global entity. The high dependence on the server, the European locations found the speed to be unacceptably low. X Windows also does not offer an interface with the perks many of the users were accustomed to in PC SAS.

The VT Terminal-only option, while inexpensive, it does not offer much for users accustomed to a front-end interface.

The final option, EG IT with VT Terminals is a cost-sensitive way to satisfy all users. This solution allows the systems to become centralized on one Unix machine, is fairly efficient while maintaining user flexibility.

The graphic below depicts this solution.



How are we using Integration Technologies?

Integration Technologies is the interface between Enterprise Guide on the user's PC and the SAS session running on UNIX that executes the code submitted from enterprise guide.

This solution allows users the flexibility to submit a job off of a server from Enterprise Guide or a VT terminal interface.

Implementation:

- Initial Data Center Implementation

The implementation occurred over a 1-year period. The VAX, PC SAS and Unix systems were run in parallel so as not to jeopardize any current projects through the transition. First to switch over to the new system were selected users from a data center accustomed to using both PC SAS and terminal emulators. This group was chosen for both technical

expertise and communication abilities thus allowing any issues to be quickly identified and corrected.

Once the initial project was completed, meetings between the project team and the rest of the test data center programmers were held so that all staff could learn from the initial team's experience. After several projects were successfully transitioned, the entire data center transitioned to the new system.

- **Global Implementation**

After the initial data center implementation, a global committee was formed consisting of members from each data center. This allowed the sites that had not transitioned to hear about the issues that had arisen and to learn from the initial data center's experiences.

Since PCSAS users would be most impacted, the implementation times of the remaining centers was determined by the amount of PCSAS used by each data center. The last data center to be transitioned consisted of programmers that had worked solely in PCSAS. To facilitate this transition, users at other geographic locations who had successfully made the transition were sent to the site to assist and train others on the use of EG and to help the data center avoid problems previously identified during the other site's transitions.

The training sequence had other benefits. Direct meetings between department members helped foster global unity. It also allowed the final geographic location to have a dedicated resource to ask questions.

The structured approach to this process allowed the final site to smoothly transition the rest of their department to EG within a three-month timeframe.

Post-Implementation

Thus far the transition has been smooth and effective, even beyond expectations. The global programming committee has turned out to be the biggest asset because it is a sounding board for issues and the 'brainstorming' that has occurred has increased the overall technical abilities of all programmers. It has also helped to foster a team environment among the various sites.

Advantages and Disadvantages:

This solution has brought far more advantages than disadvantages. From the global perspective, we have already utilized multiple data centers to assist during crunch times. Transitioning to a new system has required developing SOPs and guidelines thus fostering a department-wide dedication to common programming practices. In addition, all study data and programs are now stored in one secure area thus creating greater efficiencies across locations.

From the user perspective, the largest advantage of using EG has been the availability of work datasets. After a job completes in EG, the work datasets are available to the user. This has been a huge advantage when comparing datasets or for data dredging. The user has the ability to track a patient through the work datasets without having to do multiple proc prints.

Advantages:

- If all employees use the same software we are close to harmonization
- Allow sharing of work from different sites
- All study data and programs are stored in one secure area
- Software and hardware are upgraded only once and in one location for all users
- Promotes closer working relationships across the company
- Allows access to several SAS servers from a single EG session
- Multi-session application (many sessions of SAS EG)
- Costs of validation decreased because only validating once
- Availability of work datasets when using SAS EG

One of the major disadvantages was in the overall usability of the project team approach with EG. EG is designed to be single user software in which users do not share files simultaneously -similar to PC SAS. In our environment, oriented around project teams, utilizing all of the benefits of EG was difficult. While this is currently a disadvantage, SAS has plans to make this process easier in future enhancements.

Another major disadvantage has been unresolvable bugs. Use of Integration Technologies with EG and Unix, makes it difficult to easily replicate the errors users have experienced. While the errors are not fatal, they prevent efficient work at times and add to the frustration level of the conversion from PC SAS to EG.

Disadvantages:

- SAS bugs with EG (we are using Version 2.0)
- SAS bugs with EG IT make it more complicated to find source of error
- Makes it difficult to send SAS a program to replicate the error
- Some enhancements/fixes to EG are dependent on a newer version of SAS 9.2.
- Learning curve, decreased productivity
- Speed is much slower using EG IT than it is with PC SAS

Conclusion:

The corporate direction was known from the beginning that PC SAS was to be transitioned out, so the resistance to EG was minimal. EG is very similar to PC SAS and the users only listed the benefits of EG and the additional options it offers over PC SAS. Obviously the speed of EG using a server is much slower than SAS on a PC. The sites located in Europe are the most impacted by the speed especially since the server is located in the US. We are still addressing issues with network traffic and the overall design of the matrix within the server. We continue to monitor the system usage and design matrix to ensure we are using EG IT and VT Terminals as efficiently as possible for the needs of all of our users worldwide.

Overall, the biometrics department has been integrated and has successfully completed a few projects involving multiple sites. This process has also served to help shape the department and foster camaraderie among the Biometrics SAS User Community. We have only begun to use the many features in Enterprise Guide. The EG IT solution was a great solution for now, and an even better one for the future.

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Additional Information:

Enterprise Guide Web Site: <http://www.sas.com/eguide>
Integration Technologies Web Site: <http://www.sas.com/rnd/itech/intro.html>

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