CENTRALIZED SAS® SYSTEM MANAGEMENT: JUST DO IT!
A Case Study of the Texas Instruments Management Solution
Suzanne S. Scott, Texas Instruments Inc., Dallas, TX

ABSTRACT
Managing the SAS® System at a large Corporation, such as Texas Instruments (TI), offers many challenges. Different sites, spread across the nation; different SAS System product configurations, from bare minimum to full-up; and different platforms, from mainframe to PC, are just a few of the many challenges to be faced.

At TI, several procedures have been established to ease this large administrative task; provide comprehensive support; and, of course, save money. Detailed spreadsheets are used to keep customer information and product configurations up-to-date; contract summary sheets, called "Release Statements", help maintain legal compliance; SAS System NEWS bulletins keep customers current on new developments; and licensing consolidations across the corporation allow major cost savings.

Policies such as these have made it possible for a small staff of three to manage and provide for the needs of the 300+ SAS System customers at TI.

BACKGROUND
Texas Instruments (TI) is a large manufacturing company employing approximately 50,000 people worldwide. Nine primary sites are clustered around the Dallas headquarters, with satellite sites sprinkled throughout Texas, the United States and the world. Use of the SAS® System is quickly spreading through the many divisions of TI (i.e., Defense Systems, Semiconductor, Consumer Products, etc.), and is being used in vastly different business arenas. Consequently SAS System applications at TI are very diverse, ranging from simple bar charts to complicated statistical analysis.

THE PROBLEM
Initially, use of the SAS System at TI was very limited, just 20-30 copies for PCs were needed. Four years later it has expanded to 200+ copies for PCs, 16 for SUN® UNIX, 33 for HP® UNIX, 8 for Apollo®, with a predicted 50+ to move to Microsoft Windows® in 2nd quarter 1993.

SAS System usage has spread geographically as well with 80% located in Texas and the remaining 20% spread throughout the United States.

Product configuration needs are as diverse as the platforms and geographic considerations. Some customers require only the simplest analysis and manage well with Base and SAS/Graph®. Others are incredibly advanced in their applications utilizing practically the entire range of SAS System products.

Growth of this kind and needs this diverse present many challenges to be faced and questions to be answered. For instance, should site licenses be combined to form one large Corporate license? If so, how will each customer's product configuration be managed? How can contractual compliance be enforced? How should renewals be handled? What's the best method for providing training? How can communication of new SAS System developments to the user community be ensured? What's the best way to save money without jeopardizing quality customer support?

THE TI SOLUTION
Initially, the decision to operate under one, centralized, corporate license was influenced by the relatively small number of early SAS System users at TI. To keep things simple, one corporate license was negotiated with the SAS Institute.

Since then, as use of the SAS System has spread, new users and products have simply been added to the already existing corporate license. It has become readily apparent that, because of the Institute's volume pricing policy, there was, and is, much money to be saved by keeping all sites together in one corporate license.

The user's price per product is much cheaper as the volume increases, as shown in the examples below:

<table>
<thead>
<tr>
<th>Product</th>
<th># Units in Corporate License</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>10</td>
</tr>
<tr>
<td>Base SAS</td>
<td>$250</td>
</tr>
<tr>
<td>SAS/GRAPH</td>
<td>220</td>
</tr>
<tr>
<td>SAS/STAT</td>
<td>220</td>
</tr>
<tr>
<td>SAS/QC</td>
<td>220</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$910</td>
</tr>
</tbody>
</table>
Besides lending itself to the obvious price breaks, maintaining one corporate license has also encouraged a level of statistical software standardization across the company. With the easy availability and low cost, more groups at TI choose the SAS System rather than starting new licenses with other competitors. As a result, different segments of the company are able to share ideas and help each other over the learning curve, benefits that could not be realized without some type of standardization.

Through utilization of the procedures outlined below, it has been possible to manage this large task with a staff of only three people.

ORDERING SAS SYSTEM SOFTWARE

Details for ordering SAS System Software and Manuals are kept on the Company-wide mainframe computer. A menu called "SAS" contains information about current pricing structures, procedures for ordering the software, availability of training, and other miscellaneous topics. An example of this SAS menu is shown below:

```
M  ISAS   SAS INFORMATION and APPLICATIONS
    1  PC SAS Pricing INFO (3 long pages)
    2  Request Copies of PC SAS
    3  WINDOWS UPGRADE Order Form (3 long pgs)
    4  UNIX SAS Pricing INFO (3 long pages)
    5  Request Copies of UNIX SAS
    6  SAS NEWS Bulletins
    7  SAS Course Descriptions and Class Enrollment
    8  Interest in OS/2
    9  Suggestions for User Group Topics
   11  Server Access Control
   22  TCPIP - Transfer Files btw Computers
   33  SMS PEWS Application using SAS A/F

Enter option number below and press <Enter>

OPTION:

By selecting different options, SAS System users have easy access to the needed information.

If unfamiliar with the order placement process, the potential SAS System user can select option 2 from the SAS menu to view instructions. Basically they are required to complete and mail two forms to the central office: the order form and the release statement.

ORDER Form

Option 1 from the menu will display the order form. They can then print it and fill in the appropriate information for their order. An example of the PC order form is shown below:

```
Order Form

To: Jim Hansen  1993 PC SAS
From:
Subject: Approval of PC SAS Software Charges

SOFTWARE:

<table>
<thead>
<tr>
<th>Software</th>
<th>#</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base SAS w/Help</td>
<td>1</td>
<td>$55.00</td>
</tr>
<tr>
<td>SAS/GRAPH</td>
<td>1</td>
<td>$30.00</td>
</tr>
<tr>
<td>SAS/AF</td>
<td>1</td>
<td>$20.00</td>
</tr>
<tr>
<td>SAS/FSP</td>
<td>1</td>
<td>$20.00</td>
</tr>
<tr>
<td>SAS/STAT</td>
<td>1</td>
<td>$30.00</td>
</tr>
<tr>
<td>SAS/QC</td>
<td>1</td>
<td>$30.00</td>
</tr>
<tr>
<td>SAS/IOR</td>
<td>1</td>
<td>$45.00</td>
</tr>
<tr>
<td>COMPLETE PACKAGE</td>
<td></td>
<td>$230.00</td>
</tr>
</tbody>
</table>

DENSITY: high _____ or low _____
SERVER: yes _____ (send 1 physical copy for use by max # above)

MS-DOS/PC DOS MANUALS:

<table>
<thead>
<tr>
<th>Manual</th>
<th>#</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Guides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introductory</td>
<td>1</td>
<td>$13.00</td>
</tr>
<tr>
<td>Master Index</td>
<td>1</td>
<td>$10.00</td>
</tr>
<tr>
<td>Language Guide</td>
<td>1</td>
<td>$20.00</td>
</tr>
<tr>
<td>Procedures Guide</td>
<td>1</td>
<td>$17.00</td>
</tr>
<tr>
<td>Applications Guide</td>
<td>1</td>
<td>$12.00</td>
</tr>
<tr>
<td>GRAPH Guides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graph Guide</td>
<td>1</td>
<td>$35.00</td>
</tr>
<tr>
<td>Graph Hardware LF</td>
<td>1</td>
<td>$14.00</td>
</tr>
<tr>
<td>AIF Guide</td>
<td>1</td>
<td>$29.00</td>
</tr>
<tr>
<td>FSP Guide</td>
<td>1</td>
<td>$26.00</td>
</tr>
<tr>
<td>STAT Guide</td>
<td>1</td>
<td>$34.00</td>
</tr>
<tr>
<td>QC Guide</td>
<td>1</td>
<td>$37.00</td>
</tr>
<tr>
<td>CR Guide</td>
<td>1</td>
<td>$45.00</td>
</tr>
<tr>
<td>MACRO Processing</td>
<td>1</td>
<td>$14.00</td>
</tr>
<tr>
<td>IML</td>
<td>1</td>
<td>$17.00</td>
</tr>
<tr>
<td>Connect</td>
<td>1</td>
<td>$13.00</td>
</tr>
<tr>
<td>COMPLETE PACKAGE</td>
<td></td>
<td>$336.00</td>
</tr>
</tbody>
</table>

Total = $
```

I have reviewed the charges and authorize transfer of funds in the above amounts from the designated cost center to cost center 0761, account number 6901.

** NOTE: This is a leased software with a yearly renewal cost**

CC Mgr: __________________ Signature: __________________
(please print)

Date: __________

1214
Release Statement

To ensure contractual compliance, each new SAS System user must agree to abide by the terms and conditions of our corporate license. A Release Statement must accompany each new request for software. Unlike the order form, which is signed by the Cost Center Manager, this form is signed by the person who will actually be using the software. An example of the release statement is shown below.

<table>
<thead>
<tr>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TI SAS Coordinator: Jim Hansen 480-1008 GMBO</td>
</tr>
<tr>
<td>Customer Support: Suzanne Scott 480-2478 SUZ</td>
</tr>
<tr>
<td>Subject: PC SAS USER RELEASE STATEMENT</td>
</tr>
</tbody>
</table>

Texas Instruments Incorporated (TI) has been given the right to use SAS PC Software under the terms and conditions of License Agreement ###. The following provisions of the Agreement outline your responsibilities as a designated user:

1. The SAS System Software is being leased from SAS Institute, Inc. In addition to the initial license fee, there is an annual renewal fee which is payable in March of each year. SAS Institute retains ownership of the Software.

2. The SAS Software assigned to you will be used on the workstation identified by IPC#________. The software is not to be distributed for use on any other workstations without first contacting the TI SAS Coordinator and paying a license fee for this additional workstation.

3. If the user decides not to renew their license for any year, all stored copies of the SAS System Software will be destroyed and the diskettes will be returned to the designated TI SAS Coordinator.

4. The user will not attempt to modify, reverse engineer, decompile the software, mask or suppress any copyright or other protective notices resident on the Software.

5. The user will not load or operate the software on any workstations outside the United States or Canada.

6. If the user relinquishes responsibility for the SAS System Software, they will promptly notify the TI SAS Coordinator so the records can be updated. The user understands that until the original copy of this Release Form is returned to them and destroyed, they remain responsible for the SAS System Software noted below.

Please mark the software to be installed on the IPC# specified above:

- a) Base SAS 6.04  
- b) SAS/GRAPH 6.04  
- c) SAS/AF 6.04  
- d) SAS/FS 6.04  
- e) SAS/OC 6.04  
- f) SAS/STAT 6.04  
- g) SAS/OR 6.04

My signature below signifies my understanding and agreement to use the SAS System Software per the terms listed above.

NAME: ____________________________

(please print)

USER's SIGNATURE: ____________________________

DATE: ____________________________

DISTRIBUTION

Current policy at the Institute is to send only one set of diskettes per license. As a result, TI received one master copy for each type of active license (i.e., PC, SUN4 UNIX, etc.). Under agreement with the Institute, the master copy can then be reproduced up to the current license level.

The task of copying the master diskettes for PC SAS is subcontracted to an outside supplier who specializes in disk copying, while copies of the master cartridges for various types of UNIX SAS are made in-house.

Diskettes or cartridges, corresponding to the individual's order, are then distributed through TI internal mail.

When enough copies have been sold internally to reach the current level of a particular license, an upgrade is requested from the Institute to increase the size of the license. Corresponding bills are paid, and more copies can then be made with no need to obtain any additional master diskettes.

TRIAL COPIES

Occasionally someone will request a trial copy of the SAS System for evaluation purposes. This is handled internally by "loaning" the individual (or group) a copy of the software for one month, at the end of which time the software is either returned or purchased. Records are kept, and monitored, detailing the current location of each trial copy.

ACCOUNTING

Once an order form (with appropriate release statements) has been received and the corresponding software shipped, the total cost will then be transferred from the individual's cost center to the central support group. The necessary information for this journal entry is provided in a notation at the bottom of the order form by the individual placing the order.

CONFIGURATION MANAGEMENT

It's easy to imagine that management of the many different product and license configurations can quickly become a nightmare. Five different license types with up to eight different products available on each, makes for many possible combinations.
To keep up with everyone, a LOTUS® spreadsheet was created as shown below:

<table>
<thead>
<tr>
<th>Name</th>
<th>IPC #</th>
<th>Original Purchase Date</th>
<th>Division/Cost Center</th>
<th>Renewal Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ray, Frank</td>
<td>16694</td>
<td>x ... x ... x 5/89</td>
<td>1/92</td>
<td>Y Y Y</td>
</tr>
<tr>
<td>Metocha, David</td>
<td>87990</td>
<td>x ... x (... 6/22 3/224</td>
<td>5/20</td>
<td>Y Y</td>
</tr>
<tr>
<td>Chuang, David</td>
<td>17049</td>
<td>x ... x ... x 4/89</td>
<td>1/71</td>
<td>Y Y Y</td>
</tr>
<tr>
<td>Meszkat, John</td>
<td>10048</td>
<td>x ... x ... x 8/90</td>
<td>1/71</td>
<td>Y Y Y</td>
</tr>
<tr>
<td>Reagan, Lisa</td>
<td>20277</td>
<td>x ... x ... x 1/92</td>
<td>1/520</td>
<td>Y Y</td>
</tr>
<tr>
<td>May, Joan</td>
<td>20456</td>
<td>x ... x ... x 1/92</td>
<td>1/520</td>
<td>Y Y</td>
</tr>
</tbody>
</table>

Information is kept for each user detailing the serial # of the PC being used (IPC #), which products have been purchased, the original purchase date, division/cost center accounting information, and the renewal status.

RENEWALS

Current Institute policy includes payment of an annual renewal fee. To simplify matters, the renewal dates of all products on a given platform are aligned. Thus every product on the PC license, for example, will be up for renewal at the end of February each year. If any new products are added to that license, they will be prorated by the Institute to match the February renewal date.

Two months prior to the renewal date, a memo is sent to each Cost Center manager listing the products which are currently registered to them. They then have an option to either renew that software for another year, or decline the renewal. In either case the form is returned and kept on file for future reference.

Appropriate updates are then made to the LOTUS spreadsheet based on the information from the renewals.

TRAINING

A comprehensive introductory course, configured around our applications here at TI, was designed through consultations with the Institute Training Staff. This course features four SAS System products: Base SAS, SAS/GRAPH, SAS/STAT, and SAS/QC. Now, after only one course, students are comfortable enough with the SAS System (in general) to tackle any program. This approach allows teaching an overview of the SAS System in four days, instead of the 14 days it would take with the available Institute courses.

After consulting with the Institute Training Staff, the following material was consolidated from the original courses to form the new course:

1. Overview of the SAS System
2. Fundamental SAS Concepts
3. Reading and Processing Raw Data
4. Processing SAS Data Sets
5. Enhancing Printed Reports
6. Transforming Data Using the DATA Step
7. Storing and Accessing SAS Data Sets
8. Processing Data and Time Values
9. Introduction to SAS/GRAPH Software
10. Controlling Text Appearance
11. Producing Plots
12. Producing Charts
13. Shewhart Control Charts
14. Enhancing Shewhart Charts
15. Tests for Special Causes (Optional)
16. Pareto Charts (Optional)
17. Process Capability
18. Comparing Independent Populations
19. Regression
20. Analysis of Categorical Data (Optional)

Basicall y, half of the time (2 days) is spent on Base SAS topics (Chapters 1 - 8); it is crucial to give the students a good foundation. The final 2 days are divided fairly equally between SAS/GRAPH (Chapters 9 - 12), SAS/QC (Chapters 13 - 17), and SAS/STAT (Chapters 18 - 20).

Hands-on labs are interspersed throughout the course for more effective learning. To provide this capability, it was necessary to utilize a room with multiple workstations. At TI, most students prefer having their own workstation for the lab sessions. While they may consult with their neighbor about occasional problems that arise, most still want to complete the exercises on their own. To be sensitive to this preference, the class size is limited to 15, allowing the students to work alone.

The class has been very successful and popular among TI employees. One factor that may contribute to the success of this course is the large population of engineers and statisticians at TI. Backgrounds of this type, heavy in math and statistical skills, allow students to easily grasp SAS System concepts. Although some have felt "overwhelmed" with the large amount of information, most students appreciate the general background they gain. They are comfortable enough with the SAS System as a whole to tackle any new program.

TECHNICAL SUPPORT

A limited amount of technical support is available locally at TI. While more complicated
questions/problems are routed to the Institute's Technical Support line in North Carolina, questions involving installation or simple programming techniques can be handled on-site by one of the three TI SAS Support staff.

COMMUNICATION

Each SAS System user at TI is encouraged to sign-up for the Institute's SAS Communications magazine. This publication keeps them abreast of new SAS System developments, and most importantly gives each the right to vote in the SASware Ballot. With 300+ people voting, TI can make it's voice heard for future directions.

Internally, an occasional SAS NEWS memorandum is distributed with local information. The TI electronic mail system (on the mainframe) handles this distribution to more than 400 interested parties beautifully.

USER GROUP

Formation of a local TI SAS User Group has been attempted with limited success. A few meetings were held featuring live demos of SAS System applications at TI, but this formal method of communication hasn't caught on yet.

The concept of information exchange and idea sharing is still a good one, and does take place one-on-one throughout the company. In spite of its low level of participation at TI, a public forum for these activities would still be worthwhile. This area needs additional attention to gain full advantage of networking opportunities across the corporation, as well as among local work groups.

CONCLUSION

Centralized management of the SAS System at TI has provided many Corporate advantages. Besides allowing the obvious benefit of price reduction for larger volumes, it has also provided a larger student base to justify development of a customized course for company-wide training. In addition, it is possible to make a significant statement during SASware Ballot voting.

Although it is not usually possible to provide a significant amount of technical support for such a large user base with TI's limited SAS Support Staff of three, there is always the very capable SAS Institute Technical Support line in North Carolina to fall back on. Their support has always been excellent.

All in all, it has definitely been to TI's advantage to consolidate all licenses and manage them centrally. While there is always room for improvement, especially in the area of local SAS User Groups, SAS System users at TI have been able to reap many benefits from the consolidation.

FOR MORE INFORMATION

For more information please contact:

Suzanne S. Scott
Texas Instruments, Inc.
8505 Forest Lane M/S 8618
Dallas, TX 75243
(214) 480-2478

SAS, Base SAS, SAS/GRAPH, SAS/STAT, SAS/QC, SAS/AF, SAS/FSP and SAS/OR software are registered trademarks of SAS Institute Inc. in the USA and other countries. SUN4 UNIX is a registered trademark of SUN Microsystems. HP UNIX is a registered trademark of Hewlett Packard. Windows is a trademark of Microsoft Corporation. OS/2 is a registered trademark of IBM Corporation. LOTUS is a registered trademark of Lotus Development Corporation. ® indicates USA registration.