

CONNECTIONS

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WINTER ISSUE

NATURAL DB2 Update



Norm Nicholson
Product Manager

At the time of this writing, November 29th, NATURAL DB2 V1.3.1 has been shipped to several beta sites. Assuming all goes well, the official release date is now in January. At this time all customers will

receive the NDB V1.3.1 tape, the new NATURAL DB2 and SQL/DS Users Guide, and the Release Notes. This version of NDB has been tested with NATURAL SM4, (base and both the fix tapes), and also with NATURAL SM5. It is the released version of NDB V1.3.0 that many customers are now running, which features the SYSDB2 utility for the DBA, and Static Support for one application plan per execution of NATURAL. NDB V1.3.1 can run under TSO, (online or batch), CICS, and IMS/DC.

By Christmas the next release of NATURAL DB2 will already be installed in a few pilot installations.

It requires NATURAL SM5 as a prerequisite, and features as the major enhancement, support of the SQL SELECT statement from within a NATURAL program. In the program, the programmer can now choose, (when accessing DB2 or SQL/DS) to code a NATURAL FIND or READ statement, and have it translated to a SELECT, or to directly code a SELECT statement. The implementation method is that SELECT is functionally equivalent to FIND or READ in that it starts a NATURAL loop, and must be terminated with an END SELECT statement. The programmer does not have to worry about handling DB2 'cursors', since NATURAL will pass data back a row at a time, as normal. Syntax checking of the SELECT statement is performed

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SAGGROUP Executive Committee Meeting Summary

The SAGGROUP Executive Committee meeting was held at the Hilton Hotel in Anaheim, California in conjunction with the 20th International Software AG Users' Conference.

Conference

Next year's conference is in San Antonio, Texas from November 4-8, 1990.

A price break for shops sending more than 1 person was asked about. Software AG said that the conference is zero budgeted, meaning no money is made from it. If the price goes down for someone, it would have to go up for someone else. They will take the request into consideration. It was mentioned that Software AG try and keep the cost of the conference under \$1000. This appears to be the magic number for some shops.

"Knowledge Express 1990" will take the award winning Software AG presentations from the conference, package them together and take them on the road to different cities. This will allow people that didn't get to go to the conference the ability to hear some of the presentations. This will take place some time in January or February.

8 new products were announced at this year's conference.

NATURAL RDB/RMS

NATURAL/OS2

NATURAL CONNECTION for the Macintosh

PREDICT CASE

NET-WORK APPC

NATURAL 2—VAX

NATURAL ISPF

NATURAL CONSOLE

Technical Issues

There was a meeting the Friday night before the conference to discuss technical issues. It was attended by most of the Software AG Product Managers. Main topics discussed were how to improve the Change/Enhancement process, concerns from the different user regions, and specific problems relating to NATURAL and ADABAS.

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President's Message



Bill Wagner

Remember the last time you bought a new car? Remember how you'd never noticed Belchfire 500s on the highway until you bought a Belchfire 500 of your very own, and remember how once you got behind the wheel it seemed like there were Belchfire 500s everywhere? Well, I had a similar experience last month in Anaheim. Only instead of automobiles, I suddenly became aware of the international flavor of SAGGROUP and the Software AG conference.

My "international week" started when I met Dieter Storr, the SAGGROUP representative from the German region. He had brought with him the names of the SIG chairmen from his region, and asked about exchanging these lists for their North American counterparts. Global cooperation among Software AG and its affiliates is certainly a reality, so similar communication among SAGGROUP international areas is a reasonable goal. And with FAX becoming commonplace and Service Connection nearly released, the tools for such communication are clearly in place.

Once I had started wondering about these possibilities, I made it a point to talk to as many people from overseas as I could during the remainder of the conference. To name a few, I met folks from Argentina, Australia, Denmark, England, Germany, Israel, Japan, New Zealand, South Africa, and Venezuela. Although the problems faced by users differ in different places around the world, the goals and objectives of the area user groups remain the same. There is much that we can learn from each other, and the Executive Committee has made it a project to facilitate that learning as much as possible during the coming year.

Dieter's lists have been given to the Functional Area Representatives, who will in turn distribute them to the SAGGROUP SIG chairmen. I will soon be contacting the area representatives from around the world to solicit and distribute similar lists, and enhancements to Service Connection. Worldwide communication will be high on the list of agenda items to be covered with Software AG at the next Executive Committee meeting in April.

We hope to culminate this project with an "International Year" theme at next year's Software AG conference in San Antonio, where the international area and regional representatives can meet to plan further details of establishing closer ties with each other. I am extremely excited about the potential opportunities we are facing, and hope that these first few steps will lead to a truly global SAGGROUP.

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Software AG Expands Customer Relations Group

For the past seven years, each of us has benefited from the commitment of Larry Jayne in his position of Manager, Customer Relations. With his assistance, our user community has developed into an organization of more than 3000 people.

Recently Larry has been offered and accepted the position, Manager of the Software AG Customer Information System Development Team. We regret the loss of his experience with SAGGROUP, but we're confident you will be pleased with the increased level of service extended to you through a valid and workable CIS. We all wish Larry much success with his new endeavor and offer our gratitude for his many years of service to the SOFTWARE AG Users' group.

In 1990, SOFTWARE AG is focusing on business solutions and solving our customers' problems. With our new management, our increased customer base and our technology integrating to new platforms, the customer relation position has been enhanced and expanded. A new group has been formed to meet these challenges. Charles Enwright, Director of Market Relations and Jen Norman, Manager of Market Support will continue to provide the ongoing support to our users.

Additionally, we realize the need to develop strategic alliances within our industry, outside associations and consultants. We want our customers to be able to capitalize on the multiple options that these relationships can bring. Whether you elect to take advantage of the strengths of a premiere application vendor or a large consultant firm, our goal is to have SOFTWARE AG products which meet your needs.

We are anxious to meet each of you and listen to your suggestions. Over the next several months, one of us will be attending a Regional User

Group meeting in your area. Until then, feel free to give us a call. You can reach Jen at 703/391-6727 or Charley at 617/982-9098.

Charles Enwright Jen Norman

Speakers, We Have Speakers

Jack Hauber
Customer Training Group

If you're in charge of planning your next users' group meeting and are wondering who you might invite to be your speaker, here's an idea. Ask someone from Software AG's Customer Training Group. We have members of our staff available to make such presentations. In fact, we stay pretty busy doing just that—it's our pleasure to share information from Software AG's customer training courses and future training directions.

For example, we have staff prepared to make presentation on the following:

- Mini-classes or excerpts from some of Software AG's training courses
- Excerpts from current Conference presentations
- Overview of current training offerings and future directions
- Discussion on creating training curricula to meet business needs

Choosing a Topic

In the past quarter or two, members of Software AG's Customer Training

Group have made the following presentations at regional users' group meetings, and we can do the same for your group, too. Give us enough notice and in most cases we can even tailor our presentations to meet your group's interests.

ADABAS Physical File Design: A short review of the basics of ADABAS file design, including compression designations, file groupings and descriptors, and efficiency trade-offs in the use of various options.

ADABAS 5 Changes for Programmers: A summary of new features, programming enhancements, and problem resolutions that are now available to the direct call programmer under ADABAS 5.

Effective Interface of Your Data Dictionary and Application Development Environments: A discussion on how PREDICT interfaces with NATURAL and techniques for designing and maintaining NATURAL applications using the data dictionary.

NATURAL 2 Security Administration: Excerpts from our two-day course of the same name, including

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ELITE Has Been VAX-inated

P. Robin Moen
Computer-Based Training Group

It's finally here! NATURAL ELITE is now available for the VMS customer. NATURAL ELITE (VMS) is Software AG's computer-based training system, designed specifically for the VMS customer. ELITE is an acronym for Effective Learning in an Individual Training Environment.

Basic and Extended Packages Available

NATURAL ELITE (VMS) is available in two different packages. The basic package includes the Administration and Presentation systems, while the extended package includes the Administration, Presentation, and Authoring systems. Both packages allow students to register and take courses.

With the Administration and Presentation components, you may take courses and be tracked and scored. The Authoring feature not only allows you to take courses, but also to develop your own. For example, you can develop courses which teach employees how to use systems specific to your industry, such as:

- Communications hardware and software
- Accounting software
- Computer hardware and software

ELITE (VMS) Differences

NATURAL ELITE (VMS) is very similar to NATURAL ELITE for the IBM. However, there are some differences that make NATURAL ELITE (VMS) unique.

1. Throughout all of the courses, you will see references to PF-keys 1, 2, 3 and 12. Within the VMS environment, you will need to use your equivalent GOLD keys. You should contact your training administrator to find out which are the GOLD keys for your keyboard.
2. When editing or creating a map (screen) in the Authoring component, you must *always* clear your work area (function code X) before you begin. You could

have another map in the work area and might edit the wrong one. After submitting the CLEAR SOURCE AREA command, be sure you receive the following message: WORK AREA HAS BEEN CLEARED.

3. NATURAL ELITE (VMS) runs on VMS NATURAL 1.3.

How to Use ELITE (VMS) and Introduction to NATURAL (VMS) are the only courses currently available for NATURAL ELITE (VMS). ADABAS (VMS) Fundamentals is presently in beta test, and development on SUPER NATURAL (VMS) Fundamentals is scheduled to begin soon. Below is a brief description of all VMS courses.

How to Use ELITE (VMS)

How to Use ELITE (VMS) teaches the student all aspects of using ELITE, including:

- Accessing and using ELITE
- Student registration and course administration
- Course development

This course is accompanied by a Student Guide, which includes exercises and solutions designed for students to gain practical knowledge.

Introduction to NATURAL (VMS)

The Introduction to NATURAL (VMS) course teaches the commands, statements, and proper syntax required to write NATURAL programs ranging from simple to complicated and integrated. This course also includes a Student Guide which provides exercises and solutions to reinforce what the student has learned.

ADABAS (VMS) Fundamentals

ADABAS (VMS) Fundamentals is designed to introduce the student to the ADABAS data base environment by explaining the following ADABAS-related functions;

- Definition of a DBMS
- Data compression
- Data formats
- Data storage

- Data definition modules

Because students cannot directly access ADABAS, this course does not include a student guide.

SUPER NATURAL (VMS) Fundamentals

SUPER NATURAL (VMS) Fundamentals is designed for end-users who will be using SUPER NATURAL (VMS), a report generator. The student is introduced to both FIXED FORMAT and FREE FORMAT modes. The course will include a Student Guide with exercises using SUPER NATURAL.

For More Information

If you have any questions or comments about NATURAL ELITE (VMS), please call me at (703) 391-6545.

DB2

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before it is passed to the DBMS, and the stated support is for the ANSI standard SELECT, plus applicable IBM extensions.

Other enhancements included are: the ability to switch application plans while NATURAL is running in the IMS/DC and CICS environments, support for the FIND UNIQUE statement which will translate to a form of the SELECT statement which retrieves one row only and does not use the FETCH statement internally. The purpose of this is to provide relief from some usability problems which have been reported when DB2's referential integrity is being used.

Finally, while not an NDB release, I should mention that PREDICT 3.1 which was demonstrated at Anaheim, provides support for DB2. PREDICT can now be used to keep the elementary definitions which make up the DB2 tables, views, and databases. DB2 tables and views may be generated from PREDICT, or existing tables/views can be incorporated into PREDICT. There is also a comparison facility, between information on the DB2 catalog and PREDICT.

Announcing the 2nd Annual VMS SIG Conference

Michael Livingston
University of Houston

Howdy, Pard'ner!

It's roundup time in Houston, Texas again. Yes, it's time for the **Second Annual International Software AG VMS SIG Conference!** If you attended the conference last year in Houston you already know how informative and thought provoking the event was. If you didn't attend let me tell you what you missed.

The 1989 conference hosted over 200 Software AG VAX users from 12 countries. The conference theme was *internals* and Software AG blew the roof off the house when Dr. Herbert Fischer and Peter Holdermann stepped into the classroom and taught a series of seminars on NATURAL and ADABAS over a three day period. (If you don't know, **Dr. Fischer and Peter Holdermann are the chief developers from Software AG, Darmstadt, West Germany for NATURAL VMS and ADABAS VMS respectively.**) Some of the material had never before been offered to anyone outside of Software AG—several attendees remarked that the conference book alone was worth three or four times the conference fee! In addition to the extensive *internals* information provided by Software AG, the conference featured many user presentations on managing ADABAS and NATURAL in a VAX environment. Beyond the information shared at the conference, the attendees were treated to cooking and hospitality that only Houston, Texas can provide.

The Software AG VMS SIG conference is dedicated to fostering interaction and communication between VMS users and with Software AG. The conference provides an opportunity for both VAX users and Software AG VMS support personnel and developers to meet and discuss common concerns and problems in depth.

At present, the conference agenda is under development but I can announce at this time that **the dynamic duo of Fischer and Holdermann will be back again this year!** You can rest assured that Software AG and the University of Houston are once again committing significant time, effort, and personnel to bring you the very best program possible. A preliminary agenda will be mailed to you sometime in the next month.

The conference is scheduled to begin on Sunday, February 11, 1990 and will continue through Wednesday, February 14, 1990. The conference will once again be hosted by the University of Houston in Houston, Texas at the luxurious Stouffer Presidentè Hotel, formally Stouffer Greenway Plaza. The conference registration fee for this extraordinary opportunity is a mere \$250.00 for all registrations postmarked on or before January 15, 1990! Registration forms postmarked after January 15, 1990 must include an extra \$50.00 processing fee (\$300.00 total). A companion program is available for \$125.00. The companion program does not include entry to seminars or a conference book (meals and after seminar activities are included). Checks and money orders must be drawn on U.S. banks and payable in U.S. Dollars. The Stouffer Hotel has made single rooms available for \$75.00 and double rooms are available for \$85.00.

Room reservations are the responsibility of the attendee. Please call the Stouffer Presidentè Hotel at (713) 629-1200 now to make your reservations. Each attendee should mention the Software AG VMS conference to the Stouffer reservationist to ensure the proper billing rate. Attendees will be asked for either a credit card number or advance payment of the first night to guarantee accommodations. Conference attendees are encouraged to arrive early during the weekend to take advantage of Houston's delightful nightlife and tourist attractions.

I'd like to emphasize that this conference will prove an invaluable learning experience to each attendee and their employers regardless of their expertise. No one involved in the development and maintenance of NATURAL or ADABAS applications can afford to miss this conference. The success of an active and successful VMS Special Interest Group which will continue to flourish tomorrow relies upon your participation today.

Please watch your mail for future news and agendas. Time is limited, so please sign up today!

Remember to mark your calendar to be in Houston from February 11—February 14, 1990 for this exciting event.

Note: You may have received a prior communication that the dates of the conference had been changed to a later date due to scheduling conflicts. The problems have been worked out and the conference is confirmed to begin on February 11 and end on February 14, 1990.

If you have any questions please feel free to contact me at (713) 749-7121. I look forward to seeing you in Houston.

1990 Connections

Issue	Editorial Deadline
Spring—April	February 12
Summer—July	May 14
Fall—October (Pre-Conference)	August 13
Winter— (Post-Conference)	December 10

Database Functional Area Representative Report



By Bob Becker
Foremost Insurance Company
Grand Rapids, MI

This is my first opportunity to write to you since the Anaheim conference. I felt, like many of you, that this was probably the best Software AG International Conference to date. I was pleased to meet many of you at the conference and discuss your concerns and needs in the area of Database Administration, specifically with the use and performance of ADABAS.

As mentioned to many of you at the conference, we are in the process of placing ADABAS Version 5 into production in a phased approach. We are using the Migration Aids Facility to alleviate the problem of an all or nothing situation between ADABAS Version 4 and ADABAS Version 5. We are obtaining outstanding results with our testing of the ADASAV Dump Restore Facility under Version 5. At the time of this writing, we have dumped our 10 Pack Tridensity production Database under Version 5 in approximately 60 minutes using the DRIVES-3 command in ADASAV. We were able to restore the same Database back to the full 10 Tridensity Packs in 52 minutes using the same multi drive approach. Therefore, all is going well with our evaluation of ADABAS Version 5 and we expect to be in production by the time that you read this newsletter article.

Software AG is planning on allowing us to review and test the Centralized Security Interface. More specifically, we are planning on evaluating the Top Secret component of the Centralized Security Interface. This very important area is moving exceptionally well within Software AG and we expect to have ADABAS under Top Secret control in the very near future. We will let you know in a subsequent article how the interface testing proceeded.

Many of you attended the ADABAS Performance and Tuning Session which I presented at the conference. I spoke with several of you after the presentation on your specific tuning questions and concerns. Please feel free to call me at any time to discuss your performance concerns and considerations, whether you are in production under ADABAS 5 or under ADABAS Version 4. I would be happy to assist you in your performance and tuning concerns. Presently, as mentioned above, we are very pleased with many of the areas under Version 5 that we are testing prior to our implementation into production.

In a preceding newsletter, I asked for several volunteers to fill the various vacancies within the Database functional area. I am pleased to announce that several of you have come forward and have volunteered. Christine Georgilas of Mitre Corporation has been appointed as our new Database Tools Coordinator. At the end of this newsletter article, I will pass along all names, addresses, phone numbers and FAX numbers as I have them to date for the newly appointed representatives. Christine should be contacted if you have any tools that would pertain to ADABAS in general. She and I have chatted and her plan is to produce a new tools tape which would encompass ADABAS Version 5. Presently, I am debugging several User Exits for Version 5 at our location. Most specifically, ADABAS User Exit 2 which processes dual PLOG and CLOG data. It is my intention that we will be providing this on the DBA Tools tape when properly debugged. Also our Exits are being written so that they take full advantage of 31 bit addressing, as well as running above the 16 MEG line.

Larry Rauch has taken the large Database SIG position. I thank Larry very much for filling this very important SIG and we should be hearing from Larry as the large Database users contact him with their concerns and advice in the large Database arena.

The TAC's are being filled by several volunteers who came forward

during the Anaheim conference. Etem Dolem of BP Exploration, Inc. has accepted the TAC position of CICS ADABAS interface. Dan Burger of Gold Bond Building Products is our newly appointed ADABAS Review TAC. Jim Crystal of American Family Insurance has accepted the NET-WORK/ADANET TAC position. I am pleased to have these people coming forward and volunteering for these very important areas. Presently, I have several vacancies. I need TAC's for the following areas:

- ADABAS VSAM BRIDGE
- ADABAS DL1 BRIDGE
- ADABAS TOTAL BRIDGE
- ADABAS IMS/DC INTERFACE
- ADABAS TSO INTERFACE
- ADABAS REFLECTIVE DATABASE
- ADABAS TEXT RETRIEVAL
- and ADABAS CONVERT.

If you have any interest in being the representative of any of the above products, please feel free to contact me. It is not an exceptionally time consuming position, however, it does provide me with knowledge about products that I am not fully versed in and also provides us information as these products evolve.

We are planning to move more quickly on the ADABAS Future's Panel. This is a group of people who can volunteer their time to review future design considerations of ADABAS which would be sent to us from Software AG prior to its release. This allows us as a user panel to provide our input to Software AG about their proposed plans in any number of products related to ADABAS or features within ADABAS itself. This is an exciting panel which can offer valuable information back to the developers. If you have an interest, please contact me and I will sign you up. Other panels are working quite effectively within some of the other functional areas and I wish to have it become an effective panel within the Database arena.

I hope to hear from you soon on any number of the above topics or if you have any questions or concerns in general, please do not hesitate to contact me.

Thank you.

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DATABASE

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Administrative Product Representative

Patti Piccola
BP Exploration

The 20th Annual Software AG Users' Conference is over and we are all back in our offices pushing through the piles of work which stacked up and was waiting for us when we returned from California. So, what is new in the Administrative Functional Area? Well, there was exciting news announced at the conference, especially on the NATURAL Engineering Series. I will recap some of the new products and their current status for those who were unable to attend the conference or for those who were torn among the ten concurrent tracks. We had to make some difficult decisions on which presentation to attend and which one to miss! Next year before heading south to San Antonio, Texas we should devise a way to clone ourselves so we can attend all the informative presentations which fall into our areas of interest and cover the products we support.

First, and foremost, was the inspiring news on PREDICT CASE (PCA),

Software AG's Computer Aided Software Engineering tool which is the centerpiece of the NATURAL Engineering Series. What is PREDICT CASE? To summarize, it is a mainframe repository within an integrated application development environment, based on an object-oriented database management approach. PREDICT CASE includes:

- Object and set level repository maintenance
- PC Workstation based diagram generation and editing
- Schema Generation
- Program Composer
- Documentation generation facilities

Additionally, PREDICT CASE integrates all information captured during the development process and provides the user the ability to "navigate" the repository data model to view user specified information, or in other words, customized models. PCA is a sophisticated, comprehensive tool which addresses business requirements throughout the entire System Development Life Cycle (SDLC).

There were several presentations on PREDICT CASE and the NATURAL Engineering Series. Jim O'Leary, Software AG of North America and Wolfgang Martin, Software AG, Darmstadt, both did a great job in communicating the strategic goals of CASE and Software AG's direction on the new technologies which can be used for the development and implementation of corporate-wide information systems. In addition, Software AG responded to IBM's A/D Cycle. Software AG is currently positioned to address CASE tools and System Development Life Cycle today with existing products, while IBM talks about futures. PREDICT CASE was demonstrated in the conference demo room to standing-room-only crowds all week, unveiling Software AG's premier CASE tool.

Sue Lombardi and Pamela Howe, Software AG, North America (Denver), gave a very interesting presentation on CASE application development. Both Sue and Pam have worked extensively with the two American PREDICT CASE Beta sites, Washington State University (WSU) and British Petroleum Exploration (BPX), and presented

"real world" experiences with PREDICT CASE and the strategic direction of the product. Greg Hagan, Software AG of North America, PREDICT CASE product manager, made multiple presentations on PCA and also made himself available to all PREDICT Special Interest Group sessions and the data dictionary workshops to answer any PREDICT CASE questions. (Greg published an interesting article on PREDICT CASE in the September 1989 issue of *Connections*, Vol. 14, No. 3, Page 1).

Dr. Jim Thoman, Software AG of North America, gave a presentation on building applications using ISO-TEC, the methodology of PCA. Dave Wells, WSU, and Patti Piccola, BPX, gave a joint presentation on developing applications using PREDICT CASE. WSU and BPX were the two American Beta sites and these individuals gave an open and comprehensive report on their Beta experiences. (Both WSU and BP Oil, London, have purchased PCA.)

One of the more colorful presentations on PCA was given by Wolfgang Martin and Guenther Mueller-Dorn, both Software AG, Darmstadt. The presentation delivered the message with both humor and a "real world" analogy, comparing PCA with the complexity of making an international business trip. Sound unusual? This was one of the most unique presentations ever delivered at a Software AG conference. For those of you who missed this particular presentation it was exceptional. If you are interested in purchasing a tape the presentation was PREDICT CASE: Planning and Organizing the Application Software Development Cycle (N3).

Debuting in the demo room was PREDICT Version 3.1, demonstrating new, sophisticated functionality, including both User Defined Entities (UDEs) and support of PREDICT Application Control (PAC). At editorial deadline (Nov. 20, 1989), both PAC and UDEs are selectable items. If you are interested in either product, contact your local Software AG office for pricing and release dates. User Defined Entities (UDEs) provide the ability to create additional user-defined entities. User Defined Entities will have 24 keywords, each with extended descriptions and short comments. A UDE can be defined as a 20 byte Alpha/Alphan-

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ADMINISTRATIVE

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umeric field. The dictionary user can define UDE relationships with any other PREDICT entity (either a SAG or a user defined entity except for elementary fields due to addressability). The UDEs work as normal with PREDICT maintenance, all functionality is available: add, copy, modify, edit description, edit link, etc. A UDE can be connected to 50 other objects.

The PREDICT Application Control System provides a controlled environment to ensure the integrity of an application throughout its life cycle from development through testing and into production and then from production to maintenance. PAC was also demonstrated at Anaheim and many positive comments were passed along to me in hallway conversations. BPX will be Beta testing PAC and will report on the product in the Administrative FAR report following completion of the Beta test.

PREDICT VERSION 3.1 will contain:

- Modified Menu Structures
- Integrated ADABAS Online Services (AOS)
- New attributes for databases and files
- Extended functionality of incorporates with AOS
- Extended functionality of compare ADABAS File
- Generate ADABAS File: Load and modify FDT
- Refresh ADABAS file (load null file)
- NATURAL Process: new logic documented in PREDICT
- DB2/SQL Functionality now supported by PREDICT
- New Subsystem "Implement File"
- Save SET functionality
- Extended program documentation for third generation languages
- More entry points in Version 3.1
- PREDICT is now prepared for ADANET
- Processing Rules: free rules can be protected with NSS
- Extended LIST XREF command and extended functionality of PFKeys
- PREDICT CASE is supported

nection (Vol. 14 No. 3, pg 15, September 1989).

In addition to the status of PREDICT and PREDICT CASE is the following:

NATURAL Security: Current Version 2.1

The new version, V2.2, will be available the fourth quarter of 1990 and offers the following:

- Reworked user interface with CUA/SAA standards
- History Information
- PREDICT Application Control (PAC) Support
- Incorporate RACF, Top Secret Security (TSS), ACFII profiles

NATURAL Process: Current Version 1.1

Version 1.2 will debut in the first quarter of '90 and will be providing:

- Enhanced security interfaces
- New views providing SYSLOG and console access
- Enhancements to the SAG editor

NATURAL Operations: Current Version 1.1.0

Version 1.2.1 does not have an announced delivery date, but it will contain the following when it arrives:

- NATURAL Reports Manager will be integrated
- Expanded Restart/Recoverability facility

All of the above information referred to IBM products *only*. Next, here is the news for the VMS product line and Wang products:

PREDICT (VMS): Current Version 1.1:

The new version, 2.3, will be available the first quarter of 1990 and it will now be based on NATURAL 2 and is said to be identical to the IBM version PREDICT V2.3, which supports validation rules.

PREDICT (WANG): Current Version 2.3.1

Version 3.1 has been announced for the second quarter of 1990. See the IBM related notes for the Wang functionality.

End User Functional Representative Report

Laura Jacobs

The conference is over now and I'm trying to figure out how I can implement all the new ideas I learned. This year's conference was the best one I've been to in the last five years.

I want to thank everyone for the support I received in becoming the End User Functional Area Representative. I hope to serve you well in the next two years.

There is interest in starting two new Special Interest Groups. Chris Guinn would like to start a NATURAL ARCHITECT Group. If you're interested, call Chris at (512) 463-4157. Joe Huber would like to start a CON-NECT Special Interest Group. He can be reached at (608) 246-6112.

Conference Overview—3 Workshops Held

Chris Burback, chaired the SUPER NATURAL Workshop. Sue Cover gave an interesting talk on the effects of file changes on SUPER NATURAL transactions. A couple of interesting tidbits were found. With PREDICT 2.4, users will have the capability of looking at file descriptions within SUPER NATURAL. This has been needed for a long time. The other thing to be careful with in SUPER NATURAL is when SUPER NATURAL generates a READ LOGICAL statement when using ADABAS security by value. This will read the entire file not just the secured values.

Secondly, Tony Cortese chaired the NATURAL ELITE Workshop. Jim Hoying gave an interesting presentation on the results of a programmer going through ELITE courses. ELITE 1.4.2 will be released in November. This will be written in NATURAL 2 code. (Finally, I can take out my NATUR12 module in NATPARMS.) It's interesting to note that ELITE now has over 200 customers. Twelve courses have been released. The Customer Support Group in Denver now beta

END USER

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tests ELITE courses. Who better to test the courseware, but I wonder how much they really learn?

Lastly, Clayton Clendinen chaired a NATURAL CONNECTION workshop and also gave a presentation. NATURAL CONNECTION for the Macintosh was released.

As always, if I can be of any help to you, please give me a call. I hope you have a Happy Holiday. See you on the ski slopes!

Natural Tips and Techniques SIG News

Lew Levy and Darrell Davenport

We would like to take this opportunity to thank everybody involved with the Tips and Techniques SIG in Anaheim: the presenters and panelists (Nancy Donnelly, Cathy Lester, Bill Anderson, Nehman Moukaddam, Scott Sinclair, Jim Wisdom, and Jim Yashinski); Jon Church for his many contributions; Larry Jayne and Karen Taylor for their immense help and patience; and a special thanks to all the attendees who made it all possible.

Minutes of Anaheim meeting

- Nancy Donnelly discussed the NATURAL OPTIMIZER.
- Cathy Lester distributed and explained a survey on NATURAL 2.1 usage.
- Bill Anderson discussed 'data driven design' techniques.
- Nehman Moukaddam presented an applications design.
- Scott Sinclair discussed various coding techniques.

A panel made up of Jim Yashinski, Scott Sinclair, Nehman Moukaddam, Jim Wisdom, Bill Anderson, and Darrell Davenport (moderated by Lew Levy) held an open forum discussion.

New news

The Tips and Techniques SIG is being split into two groups:

1. Applications Design to be chaired by Lew Levy.
2. Tips and Techniques to be chaired by Darrell Davenport.

Please forward any questions and/or suggestions to:

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Tips

Tip #1: (by Darrell Davenport, Lew Levy, and Veer Pawate)

If you ever wished more than one help routine could be defined for a field on a map, then read this tip—there is a way!

1. Define the HE parameter at both the field and statement level;
2. At the field level define the help routine as a text constant (HE = 'help-rtn');
3. At the MAP/INPUT level define the help routine as a variable (HE = #help-rtn);
4. The field level help will be invoked automatically when the help character is entered (default is '?');
5. The field level help can be invoked manually by using the REINPUT USING HELP MARK *field statement;
6. The MAP/INPUT level help will be invoked automatically when the help character is entered in a field with no help routine defined (not recommended);
7. The statement level help can be invoked manually by using the REINPUT USING HELP statement (note the absence of the MARK clause);

8. To make the statement level help dynamic set the #help-rtn variable before the REINPUT USING HELP statement;
9. When either version of the REINPUT USING HELP is used (MARK or no MARK), the use of STACK TOP FORMATTED prior to the REINPUT will allow you to pass data to the help routine (passed data can include data from the screen, a text message, message number, subprogram name, etc.);
10. A help routine can check *DATA to determine if data has been passed (IF *DATA > 0 INPUT #data);
11. Remember that a help routine can not call another help routine, but can de CALLNAT's and INPUT USING MAP's.

Tip #2: (by Darrell Davenport and Lew Levy)

When stacking data, there are a few efficiency and program size issues involved. Stacking numeric data adds overhead to the INPUT process as NATURAL has to include a sign byte and check for non-numeric data. All variables placed on the stack should be defined with an alpha format, be kept to a minimum, and be input with the IP parameter set to OFF (each variable being input has the input prompt and attribute definition compiled with it and needs to interpret the attribute definition at compile time). Remember: a group field does not count as one element, but as the total number of elements in the group (same with arrays).

In conclusion:

1. STACK only alpha fields;
2. INPUT all fields with IP = OFF;
3. STACK many fields as one large alpha field (redefined);
4. Don't STACK group fields.

SAGGROUP

continued from page 1

It was mentioned that the SVC will change over the next few releases of ADABAS because of ongoing NET-WORK development.

Software AG has started using the database to issue behind the scenes calls to perform certain functions in NATURAL. Specifically, NATURAL itself can issue an E.T. This has caused some users to experience RSP 9's and RSP 21's. Software AG said they will be doing more and more of this to add functionality to NATURAL. There will be something put out to all users explaining when NATURAL issues E.T.'s.

Support for "MOVE INDEX" and "+ Variables" will continue through NATURAL 2.1.6. There is a Change/Enhancement by Boston University that will probably go into NATURAL 2.2 to do a Define Data Dynamic on + Variables at the start of the program. The recommendation of the Product Developers is to start moving + Variables to the beginning of your programs now.

There is currently an open issue about whether + Variables should continue to exist across Logon areas like fields in your GDA.

The issue with "MOVE INDEX" is whether or not to keep the statement. In NATURAL 2, capabilities exist so you don't have to use "MOVE INDEX". Jim Wisdom, Application Development Functional Representative, mentioned that he sees a use for "MOVE INDEX" in dynamic array processing which NATURAL currently does not support.

"MOVE INDEX" and + Variables will continue to be discussed at future Executive Committee meetings. If you have an opinion on either of these issues, contact your Regional Representative or Jim Wisdom. (Addresses are in the back of Connections)

Tools

Anyone interested in being involved in a NATURAL Tools SIG should contact Jim Wisdom.

There is a new COM-LETE Tools tape available. It includes putting the NATURAL Buffer Pool above the line. Anyone interested in getting a copy should contact Ellen Birch, Communications Functional Representative. (Addresses are in the back of Connections)

Technical Survey

The results of the Technical Survey showed the largest drop off in the area of Technical Support, especially timeliness of callbacks. The area that showed the greatest improvement was documentation. The next survey will go out in January and you will have until March to get it back to the Technical Survey Chairperson. These results are distributed to those in Software AG who need to get this feedback the most, so please take the time to fill it out.

Timeliness of Call Backs From Denver

Jim Hill, North American Area Representative, distributed a compilation of notes he received from the Regional Representatives. The #1 issue was the time it took to get a response from Denver on NATURAL V2 logs.

Software AG has come up with a priority system for logs recently. Working with this new method for 3 weeks before the conference cut the number of untaken calls from 350 to 8. Bob Galley, Director of Technical Support, said that Denver's goal is to return every call within 24 hours. I think all users would like to see Bob reach this goal.

International Area Representative Report

Dieter Storr, the International Area Representative, told us about SAGGROUP in Germany. They deal with the same problems we have. His goal is to begin the exchange of information between SAGGROUP in North America and SAGGROUP around the world. Everyone agreed that this is a wonderful goal, and to work towards that end, the following steps will be put in place:

- 1). Functional Representatives will get in touch with their counterparts overseas and discuss common problems and issues.

- 2). The Change/Enhancement Coordinator will work on consolidating Change/Enhancements from around the world and communicating Software AG's responses to SAGGROUP worldwide.

SOFTWARE AG

All new product releases go through a "Product Delivery Cycle". Software AG releases a product to about 10% of the shops first. This is called the "early shipment". These users are urged to test the new release to ensure there are no problems. After about a month, Software AG meets to determine if general distribution should proceed. Software AG is currently refining the list of "early users" who do field testing.

A copy of the XA/ESA upgrade policy was sent out to all IBM user sites with VM shops and above. This will also be sent to all DOS users. If you have not received a copy, contact your local Sales office. (Note: All current Products that run under X/A will also run under ESA with no changes.)

An added functionality of ADABAS under X/A and ESA will be to change the Buffer Pool mechanism to not search sequentially through memory anymore. This was done because the Buffer Pool can become so large that you spend a lot of time searching. An indexing approach which uses a 3rd level Caching will allow you to reduce your physical reads by as much as 60%-80%. For some applications, physical reads will all but disappear. This 3rd level Caching will use above-the-line storage in X/A and Dataspaces (if you have a lot of Real Storage) or Hiperspaces (if you have a lot of Secondary Storage) in ESA. Look for more information on this topic to be sent out by Software AG.

Software AG is currently running all products at the most current levels in Production throughout their data center. There is a formal action item from R&D, the data center, and the support group to move releases into Production as fast as they can. This allows the administration of Software AG to become a User of the products like the rest of us. This sometimes causes problems because Denver can't go back to a customer's level,

especially those users who are still on NATURAL 1.2. Software AG mentioned that they would love to get everyone on NATURAL V2 and drop support of NATURAL V1.2. This would allow Customer Support to handle the calls more efficiently. What Software AG does not want is mass panic when they announce the date V1.2 support will be dropped. Be forewarned, that day is coming! It's inevitable. NATURAL V2 is a stable product and I advise you to convert as soon as possible.

Software AG distributed a Customer Satisfaction Survey at the Conference. They will also distribute this to all users once a year. It will go directly to Software AG upper management and will tell them how Software AG is doing as a company in the eyes of their customers.

Software AG will put more into advertising next year. Hopefully this will help them break the mold of being "the best kept secret in the industry."

Software AG will be surveying the user base to determine how many have 3480 cartridge drives to determine the need to distribute releases on cartridges. Currently, if your shop has only 3480's, Software AG will send your release tapes on this medium at no charge. If you have both 3420's and 3480's, and you want your release tapes on cartridges, there will be a copying charge. (Note: Software AG needs 10 days notice if you want cartridges.)

Documentation

PC emulation on the VAX was not the same for NATURAL 1.4 and NATURAL 1.5. To address this issue Software AG will include the keyboard layout in the documentation.

There are 11 or 12 User Exits in NATURAL. These will be documented and officially available with NATURAL 2.2. All User Exits for all products will be documented in future releases.

An issue came up concerning additional manuals which users purchase that become obsolete within a short time period. Therefore, a policy will be put in place that states if you purchase a manual within a specific period of time

prior to a complete manual change, Software AG will replace it with a current version, *if you call them*. (Note: You will still receive the number of copies specified in your contract.)

Education

Software AG is currently putting together a NATURAL Internals course. This is something we have wanted for years!

The course "Advanced ADABAS for Programmers" really covers ADABAS Internals for programmers. Software AG took their 3 day "ADABAS 5 Internals" course and asked "how can we teach similar information to programmers?" This course will take care of this.

The course "ADABAS System Design" is a 5 day course covering a wide range of topics including how you would integrate Software AG products to solve a particular business need.

What happened to the "ADABAS 5 Performance and Tuning" class? Is ADABAS 5 so wonderful that it doesn't require any tuning? Sorry, ADABAS 5 does require tuning. Software AG said that 50% of the "ADABAS 4 Performance and Tuning" class was on ADARUN parameters and the rest was on the Command log and design issues. They increased the "ADABAS 5 Internals" class from 2 to 3 days to cover ADARUN parameters. They put specific product design issues back into their appropriate class, and created a 1 day class called "Command Log Analysis" to cover the Command Log.

Executive Committee Elections

It is always difficult to get people to run for offices on the Executive Committee (and in the Regions). I have never understood this given all the information you receive and the ability you have to present your opinions directly to Software AG management. If you would like to know more about the benefits, call or write to myself, Mary Ellen Woods, Nominations/Elections Chairperson, or Colette Farabaugh, Vice President, and we will send you a letter explaining in detail all the benefits you get from being a member of the Executive Committee. (Addresses are in the back of CONNECTIONS)

Other ways to get involved, without going through the formal election process, is to become an officer in your region or to volunteer to become a Technical Advisory Committee (TAC) Chairperson. There is a TAC for every product Software AG has (over 60 at last count). A list of Software AG products is in the back of CONNECTIONS on the Change/Enhancement form. If you are interested in one of these, contact the Functional Representative who has responsibility for that particular product.

The outcome of this year's election is:

Vice President ... Colette Farabaugh

Data Base Functional Representative..... Bob Becker

Communications Functional Representative..... Ellen Birch

End User Functional Representative..... Laura Jacobs

Congratulations to the winners, and thanks to those who ran.

The next meeting of the Executive Committee is scheduled for April 25-27, 1990 in Reston. If you have any specific concerns, or comments, please contact your Regional Representative or someone on the Executive Committee.

Connections Editorial

Please send to:

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Questions? Please call me at
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Need More Space in Your Version 5 Data Base?

Jody Colhouer and Robert Krause

ADABAS Group, Customer Support

Suppose it's 4:30 on a Friday afternoon and your thoughts are leaning toward the weekend. Your manager appears in your doorway and proclaims, "I want you to load this file immediately. I have to run some reports from it before I leave town."

What's the problem, you ask? All users know that such requests must be backed by field definitions and an input data set. So, why the long face?

Staring up at you from the center of your desk is your latest ADAREP—and there just is not enough space on this data base for another large file. Cheer up—it isn't that bad.

You have two options: Either ADD to the data base or INCREASE it. Both options are functions of the ADADBS utility. The ADD should be used if the space will reside on a different device type from where the data base currently resides. This is straightforward and is well-

explained in the ADABAS 5 Utilities manual, so let's concentrate on the INCREASE.

Hopefully, you are not confronted with this sort of emergency often, but it can happen. For that reason, we stress that you execute an INCREASE on your test data base to familiarize yourself with the process.

Let's draw a picture of our current data base.

For purposes of this example, the device type we will use is a single density 3380 with 883 cylinders available for use. Currently, our ASSO is 750 cylinders and DATA is 1000 cylinders. We want to increase ASSO by 250 cylinders and DATA by 500. The "increased area" for ASSO is available on ADA002. We want the increased area for DATA to reside on the new pack, ADA005.

The following steps should be used to INCREASE in an OS environment. NOTE: The procedures for CMS and DOS will be covered in a future issue of *Connections*.

Step 1

Execute an ADAREP CPLIST to establish a baseline snapshot of the existing data base prior to the INCREASE.

Step 2

Execute ADASAV SAVE. This is for your protection in case you should need to restore the data base to its state prior to the INCREASE.

Step 3

Execute ADADBS INCREASE. A change with Version 5 is that you can now INCREASE both ASSO and DATA with one execution of ADADBS.

Step 4

Execute ADAFRM. At this point, you must allocate and format the increased area. You have only two options where the increased area can be allocated: on the current pack or on a different pack. If you are increasing both ASSO and DATA, the formatting can be done with one execution of ADAFRM.

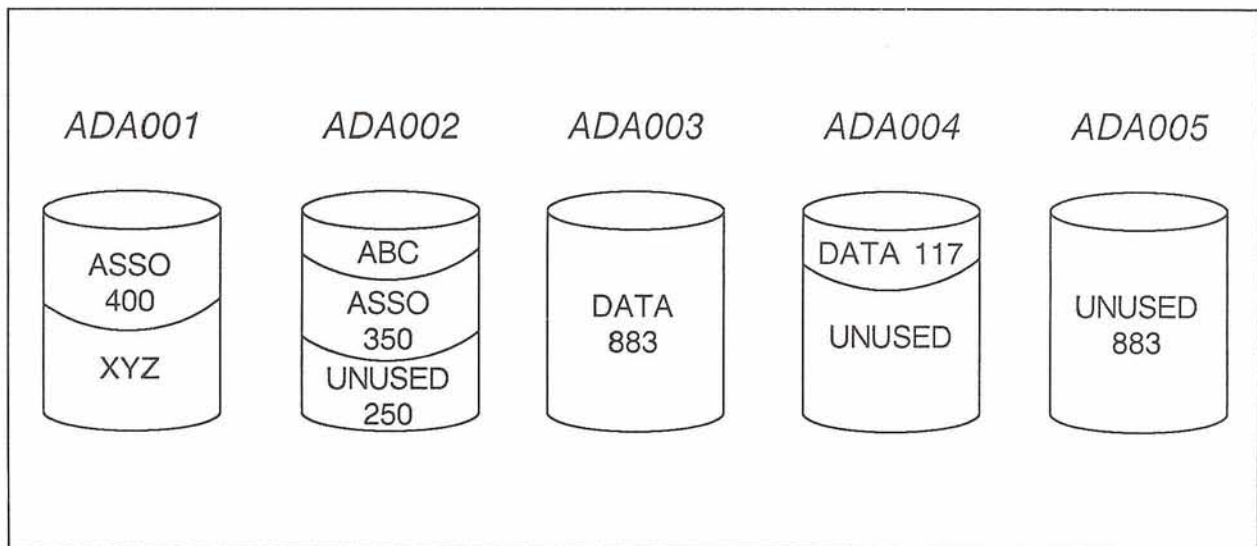


Figure 1: Current Data Base

VERSION 5

continued from page 12

If the increased area is on the same pack, as with our ASSO example, then the following JCL and Control Cards should be used:

```
//DDASSOR1 DD DSN = V5.ASSO,DISP = (MOD,KEEP),UNIT = (3380,2),
//          SPACE = (CYL,(0,250)),VOL = SER = (ADA001,ADA002)
//DDKARTE DD *
ADAFRM ASSOFRM SIZE = 250
/*
```

When allocating the increased area to a new pack, as with our DATA example, there are several more steps that must be considered. A new VOLSER cannot be added to the catalog; therefore, the data set must be uncatalogued, the new VOLSER included and then recatalogued. Another consideration is that OS will take the space requested on any pack(s) in the VOLSER list where it is available. As a result, any free space on packs prior to the pack to which you're increasing must be allocated to a dummy data set to force the increased area to the pack where you want it.

In this example, the following JCL and Control Cards should be used:

```
//UNCAT EXEC PGM = IEFBR14
//DD1 DD DSN = V5.DATA,DISP = (OLD,UNCAT)
//DUMMY1 DD DSN = DUMMY.ADA004,DISP = (,CATLG),UNIT = 3380,
// VOL = SER = ADA004,SPACE = (CYL,(766,0))
/*
```

Then for the FORMAT step,

```
//DDDATAR1 DD DSN = V5.DATA,DISP = (MOD,CATLG),UNIT = (3380,3),
//          SPACE = (CYL,(0,500)),VOL = SER = (ADA003,ADA004,ADA005)
//DDKARTE DD *
ADAFRM DATAFRM SIZE = 500
//DEL EXEC PGM = IEFBR14
//DUMMY1 DD DSN = DUMMY.ADA004,DISP = (SHR,DELETE)
/*
```

Step 5

Execute ADAREP CPLIST to verify that the INCREASE was successful. Pay particular attention to the VOLSER in the Physical Layout of the Data Base to make sure the new VOLSERS are listed and not

Step 6

Execute ADASAV SAVE to save the INCREASE. This step is not required, but is recommended so that in a recovery situation the INCREASE procedure would not have to be repeated.

Now that we've INCREASEd ASSO and DATA, what about WORK? Since the WORK data set contains information pertinent to a given nucleus session, we need not worry about "accidentally" formatting over existing data during the INCREASE.

Providing the last ADABAS nucleus session terminated normally, you may change the size of the WORK data set. This is done using the ADADEF utility, the NEWWORK function. On the physical side, you need to scratch the existing data set and just allocate a new one with the size that you wish.

A sample jobstream was included in the Frequently Asked Questions document handed out at the Anaheim Users' Conference. If you would like to receive a copy, please call either of us at (303) 233-6500.

User Exits for SUPER NATURAL Transactions

Lisa Crispin

*NATURAL Applications Group,
Customer Support*

SUPER NATURAL trivia question: What's the shortest chapter in the SUPER NATURAL User's Guide?

If you answered Chapter 14, Exit Specifications, you win the satisfaction of knowing you are an informed user. Despite the short length of the chapter, however, this is not a trivial subject. User exits can be an important tool for SUPER NATURAL users. If you have ever wondered about possible applications for user exits in SUPER NATURAL or are confused about how to create a user exit, this discussion should enlighten you.

What is a User Exit?

A user exit is simply a program that is stored outside SUPER NATURAL and is invoked by one or more SUPER NATURAL transactions. This external program can be a NATURAL subprogram or a third-generation language program stored outside NATURAL. We will use a NATURAL subprogram as our example since it is the simpler method of creating a user exit. The same basic procedures would apply to an external program, such as a COBOL subroutine.

If the concept of a user exit is new to you, just think of it as a task that requires an investment of resources that saves you more resources over time. A power tool may cost you more than a hand tool, but you can get the job done faster and even do jobs that wouldn't be feasible with the hand tool. You might need some extra instruction to learn how to use the power tool, and you may need to take it to the shop periodically for maintenance, but it is a good investment. A user exit takes some work to create and implement, but it should save you work in the long run.

Any time you have a need that seems hard to meet using SUPER NATURAL, think about how the job could be done with a user exit.

User exits are useful for repetitive tasks that will be done by many transactions, such as a table lookup. Providing end users with a user exit may save them from having to enter a complicated set of logic statements or calculations, especially if the task must be performed by many transactions.

If one file is always used in conjunction with another, a file user exit can be used to bring necessary data back from the second file in any transaction involving that file. For example, if you have an employee file containing a job code for each employee and a separate table file containing the job title for each job code, you could code a user exit to retrieve the job title from the table file each time the employee file is accessed.

How Do You Implement a User Exit?

SUPER NATURAL transaction user exits are invoked via a CALLNAT statement for a NATURAL subprogram or a CALL statement for an external, non-NATURAL program. The first step in implementing a user exit is to write the user exit program according to the end user's specifications. The person who codes the program (or NATURAL subprogram) will then provide its name, and parameters to the end user. Once the user exit program has been written, it is simple to specify its use in a SUPER NATURAL transaction using the Exit Specification screen.

As an example, we will create a user exit that will allow us to retrieve an employee's full name using the employee's personnel ID number. By doing this task with a user exit, we will avoid having to do a file link or lookup to the file where the employee's name is stored.

Writing the NATURAL Subprogram

In order to code the NATURAL subprogram for a user exit, the programmer must know the specifications for the user exit and what data will be passed between the SUPER NATURAL transaction and the exit subprogram.

For our example, we will pass a personnel number to the user exit program. This personnel number is alphanumeric for eight positions. Once the name is retrieved and formatted, it will be sent back in an alphanumeric field containing 25 possible characters. Since this is a subprogram, we have to code a DEFINE DATA PARAMETER statement to identify the two fields passed between the SUPER NATURAL transaction and the subprogram. See Figure 1 for the sample user exit code. This example was written in reporting mode, but structured code may also be used.

The user exit subprogram object module must be stored in the private SUPER NATURAL library ("y-lib") of each user who will specify the user exit on a transaction. (NOTE: If you run SUPER NATURAL under NATURAL SECURITY, you will need to define the "y-lib" to NATURAL SECURITY in order to store the user exit module there.)

Specifying the User Exit in the Transaction

As the end user, we are told the name of our user exit subprogram, NAMEEXIT, and that we need to pass it two parameters: the employee's personnel number and a field for the name that is alphanumeric for 25 positions.

For our example, we will create a transaction that links the Automobiles and Finance files. We want to create a report that compares Ferrari owners with Ford owners and print each person's name, make of car, net worth, and hobby. We will use the user exit to retrieve the correct full name of each employee from the EMPLOYEES file. Since this file does not contain the employee's hobby, we will use a lookup to retrieve that field from the PERSONNEL file.

Our first step is to make sure we have the correct fields to pass as parameters to the user exit. One of the fields is personnel number. We have OWNER-PERSONNEL-NUMBER on the Automobiles file, but it needs to be put into an alphanumeric field for the user exit. The other parameter is a 25-character name. We have to define these fields using "&" in the function column on two empty lines in the field list. We use a calculation to place the value of OWNER-PERSONNEL-

```

>
All .....1.....2.....3.....4.....5.....6.....7..
0010 DEFINE DATA PARAMETER
0020     1 #PERSONNEL-NUMBER (A8)
0030     1 #NAME (A25)
0040 LOCAL
0050     1 EMPLOYEES VIEW OF EMPLOYEES
0060         2 NAME
0070         2 FIRST-NAME
0080         2 MIDDLE-I
0090         2 PERSONNEL-ID
0100     1 #INITIAL (A2)
0110 END-DEFINE
0120 FIND EMPLOYEES
0130     WITH PERSONNEL-ID = #PERSONNEL-NUMBER
0140 IF MIDDLE-I NE ' '
0150     COMPRESS MIDDLE-I '.' INTO #INITIAL LEAVING NO SPACE
0160 ELSE
0170     RESET #INITIAL
0180 COMPRESS FIRST-NAME #INITIAL NAME INTO #NAME
0190 CLOSE LOOP (0120)
0200 END
.....1.....2.....3.....4.....5..... S 20 L 1

```

Figure 1: Sample User Exit Subprogram

```

17:10:30          ***** SUPER NATURAL *****          89-10-11
                  - Exit Specification -                  M3500101
Command: ___

Exit NATURAL      Program  Parameter  Exit Location
Subprog.
1.      -          _____  - *        at start
2.      -          _____  -         before primary file read
3.      -          _____  -         before secondary file read
4.      -          _____  -         before lookup, logic & calculations
5.      x          nameexit    x         before external/buffer sort
6.      -          _____  -         after external/buffer sort
7.      -          _____  -         before work/PC-write & add/update
8.      -          _____  -         before report output
9.      -          _____  -         before end of read loop(s)
10.     -          _____  -         at end

*) Means: no parameters available

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
cont help cmd end save run main

```

Figure 2: Specifying the User Exit

17:11:20

***** SUPER NATURAL *****
- Exit Specification -

89-10-11
M3500201

Mark required parameters with a number from 1 to 40 to specify the sequence.

Seq	Field Name	Seq	Field Name
---	-----	---	-----
---	MAKE	---	OWNER-PERSONNEL-NUMBER
---	MODEL	---	PERSONNEL-NUMBER
---	BODY-TYPE	---	NET-WORTH
---	NUMBER-OF-CYLINDERS	---	CREDIT-RATING
---	HORSEPOWER	---	COLLEGE
---	PISTON-DISPLACEMENT	---	INVESTMENT
---	WEIGHT	---	SAVINGS
---	COLOR	---	BANK
---	YEAR	---	PERSONNEL-NUMBER
---	SERIAL-NUMBER	---	HOBBY
---	DATE	1_	PERSONNEL-ID
---	MILEAGE	2_	NAME

more: Y

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10---PF11---PF12---
 cont help end store save run main

Figure 3: Specifying Parameters

17:09:12

***** SUPER NATURAL *****
- Reporting: Record Selection and Fields Used -

89-10-11
M3050101

Command:

Select: 1 MAKE = FORD OR MAKE = FERRARI
2

more N

Ref	Dis	S/C	Func	Field Name	Ref	Dis	S/C	Func	Field Name
AA	---	---	---	G CAR-DESCRIPTION	AN	---	---	---	K .DATE
AB	1_	C1_	---	K .MAKE	AO	---	---	---	K .MILEAGE
AC	---	---	---	K .MODEL	AP	---	---	<---	K .OWNER-PERSONNEL-N
AD	---	---	---	K .BODY-TYPE	AQ	---	---	---	K PERSONNEL-NUMBER
AE	---	---	---	K .NUMBER-OF-CYLINDE	AR	---	---	---	G*MAJOR-CREDIT
AF	---	---	---	K .HORSEPOWER	AS	---	---	---	K*.CREDIT-CARD
AG	---	---	---	.PISTON-DISPLACEME	AT	---	---	---	K*.CREDIT-LIMIT
AH	---	---	---	G CAR-DETAIL	AU	---	---	---	K*.CURRENT-BALANCE
AI	---	---	---	.WEIGHT	AV	---	---	---	K*OIL-CREDIT
AJ	---	---	---	K .COLOR	AW	3_	---	A1_	K NET-WORTH
AK	---	---	---	G REGISTRATION	AX	---	---	---	K CREDIT-RATING
AL	---	---	---	K .YEAR	AY	---	---	---	G*INSURANCE-POLICY-T
AM	---	---	---	.SERIAL-NUMBER	AZ	---	---	---	K*.INSURANCE-COMPANY

Select. lines: ST=top SU=up SD=down SB=bottom SI=insert more fields: Y
 Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10---PF11---PF12---
 cont help cmd end top up down bot save run main

Figure 4: Transaction Example

17:16:55

***** SUPER NATURAL *****

11/10/89
M3050201

- Reporting: Calculation and Fields Used -

Command: ru

Calc: 1 personnel-id = owner-personnel-number _____ more N
2

Ref	Dis	S/C	Func	Field Name	Ref	Dis	S/C	Func	Field Name
BA	_____	_____	_____	K*.POLICY-AMOUNT	BO	_____	_____	_____	_____
BB	_____	_____	_____	K COLLEGE	BP	_____	_____	_____	_____
BC	_____	_____	_____	G*VACATION	BQ	_____	_____	_____	_____
BD	_____	_____	_____	K*.ON-VAC	BR	_____	_____	_____	_____
BE	_____	_____	_____	K INVESTMENT	BS	_____	_____	_____	_____
BF	_____	_____	_____	K SAVINGS	BT	_____	_____	_____	_____
BG	_____	_____	_____	K BANK	BU	_____	_____	_____	_____
BI	4	_____	_____	L HOBBY	BV	_____	_____	_____	_____
BJ	_____	>	_____	PERSONNEL-ID	BW	_____	_____	_____	_____
BK	2	>	_____	NAME	BX	_____	_____	_____	_____
BL	_____	_____	_____	_____	BY	_____	_____	_____	_____
BM	_____	_____	_____	_____	BZ	_____	_____	_____	_____
BN	_____	_____	_____	_____	CA	_____	_____	_____	_____

Calc. lines: CT=top CU=up CD=down CB=bottom CI=insert more fields: N
 Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10---PF11---PF12---
 cont help cmd end top up down bot save run main

Figure 5: Transaction Example

MAKE	NAME	NET-WORTH	MOST LOVED HOBB
SAMPLE MAKE = FORD OR MAKE = FERRARI			
FERRARI	CLARE D. PRATT	5,640	GOLF
	JENNIFER J. SVIRIDOV	5,900	BOATING
	ANN P. DAVENPORT	10,840	FISHING
	HEATHER DILWORTH	10,860	RAISING PETUNIAS
	HEATHER GILYAREVSKII	11,040	BIRD WATCHING
	STEPHEN O. WOOLSEY	15,900	FOLK MUSIC
	JACK J. PAPAYANOPOULOS	15,920	GOURMET COOKING
	JEFFERSON WATSON	15,940	
** control break (1) **		11,505	
FORD	VERNON D. FLETCHER	5,620	ASTRONOMY
	CLARE D. PRATT	5,640	GOLF
	ANN P. MOUREAU	5,720	TABLE TENNIS
	CLARA C. WATSON	5,740	TRANSLATING FAIRY TALE
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10---PF11---PF12---			
down	print mod	pos top	down <- -> main

Figure 6: Example Output

