Downsizing Applications from Mainframes to Client/Server

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The problem with most new technologies is that they require you to throw away the applications you've built and start from scratch. This has especially been true for database conversions. I remember a project from the mid 1970's where Massachusetts Blue Cross wanted to convert several major applications from IBM to Honeywell computers. Since IBM's IMS database management system was an essential component of IBM processing, the applications were to be converted to Honeywell's IDS database management system on Honeywell 6000 computers.

After 16 months of conversion effort and no success, the joint Honeywell/Blue Cross team gave up. The logic of the applications was so enmeshed with the data models that using IDS to emulate another DBMS's data model produced neither programming nor developmental advantages, and in reality, extracted a performance penalty. Ultimately, the joint conversion team was successful - they discarded the idea of a "conversion" and redeveloped, rather than converted, the Blue Cross applications for the Honeywell IDS approach.

Since those days, new application development technologies such as relational DBMSs, 4GLs and CASE have promised important productivity enhancements for the application developer. Taking advantage of these new technologies, however, has required users to rewrite existing applications. The questions then become: Will rewriting be necessary when downsizing? Which existing

In This Issue
- Downsizing Applications from Mainframes to Client/Server .......................Page 1
- The Last of the Buggy Whips ........................................Page 1
- Users Take Note: One Plunge Made, You're Locked In .........................Page 2
- Early Standard Bearers ..........Page 5
- Changing the Changers: Process Re-eng. for Information Systems Development ..........Page 6
- Shop Talk ........................Page 6
- Hydro-Quebec Plugs into the Power of CASE ........Page 17
- On-Line Unix Alternative for DOS and OS/2 Users ..........Page 18
- Workgroup Computing Solutions Target "Quick" Managers ..........Page 19

Continued on Page 4
applications can be converted to client/server approaches? Can we save our investment in existing code, especially if it's already relational?

The answers to all three questions is, well maybe, but probably not. The discussion below details some of my observations and experiences in reviewing a number of "conversions" to client/server computing.

Change the Architecture of the Application

Let's first look at the technical process involved in building a client/server approach. Here, we confront a very different architecture—one that places applications on desktops and data on shared servers. Jim Davey, Senior Consultant for DCI, has been developing a new analysis approach for the client/server environment (an article from Jim is in the works). Regardless of the analysis approach used, it is clear that the native I/O code that once resided in the application will now be removed and/or executed on a different computer. So the first step in a conversion to client/server computing is to re-analyze data I/O and re-code to accommodate any necessary changes.

Change the Application's Approach to Record Locking

Along with the I/O code, a migration to client/server requires a change in the approach to record locking. With traditional applications, the record locking code is intimately tied into the process logic flow of the application program. With client/server, record locking needs to reside almost entirely on the data server.

Take Advantage of Stored Procedures and Triggers

Pioneered by Sybase and Ingres, client/server DBMS products have brought new functionality to database processing in the form of additional integrity. Stored procedures and triggers are the best known examples of the new functionality available on the server. Stored procedures are precompiled programs that reside in the database, and have both procedural and database access logic.

Triggers are similar to stored procedures except that they are automatically executed whenever the status of the database reaches predefined conditions. For example, a trigger can be set so that whenever an entry is made to the OVERDUE table, action is initiated. Some DBMSs support a capability where triggers can be "cascading" and are initiated in series depending on the nature of the database activity.

Most system developers feel that these types of features are enormously valuable as development aids. They allow data-based edits to be properly stored with the database and uniformly applied for all programs with access. Anytime such a "database concept" can be applied to program logic, development and maintenance ease are improved.

Change the Application (Continued from Page 1)

Re-Architect and Move to Windows-Style

The application logic flow in a G environment is very different from the panel-based, time-sharing application. Most developers want to take advantage of the "Windows" look in designing new client/server application Color, pull-down menus, mouse control, multiple open windows, all of which will all change the logic flow considerably. Most developers have found that by taking advantage of these new capabilities, the number of screens that must be navigated can be drastically reduced. They have also found that since much of the application logic was centered around the flow of screens, none of the logic is salvageable for the migration to client/server.

Continued on Page
Surprise! Throw Away Your Old Programs

In review, the changes that need to occur when moving an application to a client/server environment are:

* Splitting an application across two machines
* Moving functionality from the application to the new database code
* Redesigning the user interface

Interestingly, after all of these changes are made, most applications have nothing left to convert.

An Alternative Approach

Some software vendors are offering a short cut to client/server approaches and downsizing. They are selling alternatives, PC and LAN-based products that are compatible with their older mainframe offerings. The idea here is to allow the customer to downsize (and possibly migrate to client/server applications by simply running the older code on a PC platform rather than a mainframe).

Computer Associates (CA) and Microfocus are two leaders in this short cut approach. CA now offers PC-based implementations of its mainframe IDMS and DATACOM product offerings. Tools such as ADS/O and IDEAL have also been migrated to the PC. If you have an IDMS and ADS/O application running on a mainframe, it is possible to port that application down to the PC without changing any source code. Of course if you do that, your application will still look and operate the same. It won't have new GUI or trigger functionality, but then it won't need to be redeveloped either.

Many of CA's customers have found advantages in distributing their current applications in this manner to small remote offices without redevelopment or time delays. This form of downsizing also quickly takes advantage of the significantly cheaper MIPS available on PC platforms.

A large disadvantage of "short cut" downsizing, however is that your application doesn't have the new Macintosh/Windows-type GUI, and isn't able to take advantage of the improved architecture offered through the stored procedure approach. Another disadvantage is that the resulting downsized application is closely tied to the CA product line and therefore, is not open. Many of the new client/server style tools are open in the sense that they

Lotus

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Lotus Notes is a document database used for building applications that enable workgroup communications and information sharing to take place across local and wide-area networks. Notes is used by people who need to create and access shared information, such as words, spreadsheets, graphics and images. Notes lets you discuss ideas, track sales, distribute reports, route messages... and solve problems together. All with a single easy to use product.

Magic Software Enterprises

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An Object-Oriented, code-Free Application Development System based on a table-driven post 4-GL technology. Basic design tasks include Environment and Menu Design; Data Definition; Automatic Program Generation; Object-Oriented Programming; and Display and Report Design. Magic runs on DOS, UNIX, VAX/VMS, OS/2 BTOS/CTOS, and supports MS-Windows deployment.

MSP

Lexington, MA
MSP, known worldwide for its flagship repository product DATAMANAGER, will demonstrate METHODMANAGER its repository based Application Development Environment (ADE) framework in which an organization can support, automate and integrate their chosen methodology and CASE tools.

MUST Software International

Norwalk, CT
MUST Software provides high-powered productivity tools for distributed applications and transparent access to data on
IBM and compatible mainframes, PCs and DEC VAX machines. MUST's flagship product, NOMAD, a comprehensive 4GL/DBMS, provides flexibility for application development, power for reporting and overall performance in client/server design.

**NETRON**

Netron, Inc.'s NETRON/CAP combines CASE and object-oriented design methods for designing and constructing COBOL applications for downsized, multi-platform client/server and open systems architectures. Netron's NETRON/Client products provide full GUI support for Presentation Manager, Windows 3.X, and OSF/Motif.

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**Schussel**

Schussel are designed to work with any of the popular servers (SQL Server, Oracle Server, IBM's Data Base Manger, etc.). The full realization of openness is still in the future, but through the efforts of groups such as SQL Access Group, as well as individual vendors, the direction towards independence of tools from DBMS is unmistakable.

The Microfocus approach to downsizing is to offer exact execution or simulation of mainframe products like COBOL, IMS, and DB2. Many customers don't want to run COBOL on the PC, but want to take advantage of the cheaper MIPS, faster turn around times, and greater programmer/developer productivity- all benefits realized when developing mainframe applications on PC platforms. Realia, a major Microfocus competitor that offers PC-based mainframe development tools (including COBOL), was recently acquired by CA. XDB, another competitor, is currently selling a DB2 clone for PCs.

**Conclusion**

Some types of downsizing can be rather simple. If you want to migrate mainframe application development to PCs, there are tools that can help you do this quickly and with a good return on investment. Some mainframe software vendors have aggressively moved to offer downsized versions of their mainframe applications almost overnight. Those who take this path can later take advantage of the improved functionality offered by PC LANs by re-architecting their applications.

But, for maximum advantage from the added power, functionality, and richness of downsized client/server approaches, you'll need to trash your old applications and rebuild them from scratch with the new generation of tools now available.

The good news is that new "Windows 4GLs" from companies like Revelation Technologies and Powersoft allow the application building process to proceed faster than ever before. And, the new generation of SQL-based servers offers performance and functional richness far superior to any previous database technology.

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