Crystal, Smithware Announce Improved Btrieve Report Writer

Smithware’s Enhanced Crystal Btrieve Drivers and Database Tools Significantly Improve Crystal Reports’ Btrieve Support

Vancouver, British Columbia — June 1, 1995 — Crystal announced today that Smithware will begin shipping Smithware Crystal Reports for Btrieve in July. The product, which includes Crystal Reports combined with Smithware’s Btrieve database definition and setup tools, will be marketed as a complete reporting solution for developers and users of Btrieve-based applications.

“We’re very excited to see the growing industry awareness and third-party support developing for the huge installed base of Btrieve applications.” said Ron Harris, Btrieve Technologies’ President and CEO, “especially when an industry leader like Crystal recognizes the market potential for Btrieve-specific enhancements to their product.”

“Crystal’s mission is to provide our customers with a way to access their data and turn it into useful information.” said Mark Sochan, Manager of Strategic Relations. “We recognize that a significant number of our customers have their data in Btrieve applications. This alliance with Smithware will be a great benefit to these customers.” Crystal claims sales of over 1 million copies of its Windows report writer, including direct sales and sales through partnerships with companies such as Microsoft, Borland, Symantec, Delrina, Hewlett Packard and others.

Smithware has made substantial modifications to the Crystal Reports Btrieve drivers. According to Steve Mook, Smithware Vice President for Development, “We have added support in the Crystal Drivers for the extended field definition capabilities provided by DDF Builder: Pascal and COBOL data types, and types from the Magic and TAS development systems are among those supported. The new drivers will also handle variable length records, data compression, and password-protected files.” The drivers have also been optimized to improve client/server performance. John Kelly, Quality Assurance Engineer for Crystal said, “We are testing the new drivers and have been consistently getting results that are more than three times as fast.”

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From the Cockpit...

I know you are probably wondering about the revised title of my column, and perhaps about the photograph of the goofy looking fellow to the left. Basically, it's been a long time (over a month) since BDJ editor Steve Mook and I saw our "corporate aircraft." We just received a replacement for the insignificant piece that fell off the wing the last time we flew it, so I decided that while we went through the arduous task of putting together another issue of BDJ (instead of flying) I wanted to be constantly reminded that it is waiting for us in the hanger the moment that this issue goes to the printers!

This issue of BDJ sees a lot of changes around here. First of all, we are extremely excited to welcome Jim Kyle to the post of BDJ News Editor. Jim, as you may know, is the author of the new Addison-Wesley Btrieve Complete book due out this summer. Jim has certainly brought a degree of enthusiasm and proficiency to the job that Steve and I never really had the time to give it, and he writes better than we do. I know that everyone will be pleased to see Jim continue our long-standing policy of supporting all Btrieve/Scalable SQL products and services.

Also, we welcome to our staff Jim Perry as assistant advertising manager. Jim, along with advertising manager Carolyn Lighty, will work hard to search for more products and services for you to read about in our publications.

We are rather sad to announce, however, that Mad Poarch has resigned as BTI's Vice President of Customer Service. She called Steve a few weeks back to tell him that she had realized that it was time to move on. I will certainly miss working with Mad and her assistance with the Technical Corner will be missed.

At any rate, I hope you enjoy this issue.

While you're reading it, Steve and I will be cruising at about 1,000 feet somewhere between Leiper's Fork and Hohenwald, Tennessee.

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Btrieve Technologies Turns One Year Old

Much of the Year Spent on Getting New Products Out the Door While Rebuilding the Company’s Presence and Image

By Jim Kyle, News Editor

Austin, Texas — It was a Texas-style party this past May 2, even though the location was San Francisco’s Sheraton Palace Hotel. Btrieve Technologies Incorporated celebrated its one year anniversary (a few days late: the actual birthday was April 29) while participating in DB/Expo ’95. But while parties are fun, BTI’s first birthday has more significant implications for those of us who use their products. To put into perspective the events, accomplishments, and progress of that first year, we spent a couple of hours chatting with Bo Holland, director of product marketing for BTI.

First, let’s look at the major events of the first 12 months. On April 29, 1994, the deal transferring Novell’s database business to BTI was closed. This returned Btrieve and its associated products to the control of the people who originated the program in 1982. Just a month after that, in May 1994, Btrieve 6 for Windows started shipping. By June, with the company only 60 days old, the ledgers were in the black.

By 90 days, a second product (Btrieve 6 for DOS) was shipping, and in August, Scalable SQL for Windows joined the line of released packages. SSQL for Windows marked the second module based on the MicroKernel Architecture.

In September, BTI joined forces with Microsoft to port Btrieve to the Windows NT Advanced Server. The contract will make it possible to bundle a discount deal for Btrieve for Windows NT Advanced Server with both Windows NT Advanced Server and the later Microsoft Back-Office products.

The year ended with a bang when the Scalable SQL NLM for NetWare shipped in November. In January 1995, IBM contracted to include Btrieve for OS/2 with the CICS for OS/2 product. By March, the new Btrieve server for NetWare began shipping, and a native ODBC solution had been announced.

In April 1995, BTI obtained venture capital to support aggressive international expansion, and entered a joint venture agreement with Novell KK, AG Tech, and Empower, to form Btrieve Technologies Japan and accelerate Asia Pacific market development. This month also saw completion of cross-platform development for the Btrieve/Windows NT Advanced Server engine, cleared for shipment in May, and announcement of SSQL 4.0 to be available later in the year.

That’s the tally of major events for the first year of BTI’s existence. We asked Holland to pick, if possible, the one most important accomplishment from the list. At first, he found it a bit difficult to single out any one of them since all are truly major. The “huge amount of technology” shipped was quite significant, but so was the establishment of good relationships with such major industry leaders as Microsoft and IBM in addition to the long-standing relationship with Novell.

We went through the year’s accomplishments in some detail, noting each as “significant.” Then Holland picked something that wasn’t on the event list at all, as the most significant happening of BTI’s first year: “We’ve made tremendous strides,” he concluded, “in repairing the image of Btrieve.”

At the time of BTI’s birth, Novell hadn’t announced an upgrade or, indeed, given the product line any publicity for more than two years. Many within the computer industry had concluded that the package was either dead, or dying. Outside the industry, potential users of database products were being barraged by hype for other systems, but not a word about Btrieve reached them. The consequence was that in many corporate information technology departments, developers were being told to replace existing Btrieve applications with “more modern” ones based on Borland’s Paradox or Microsoft’s Access.

As the October 1994 Summit Conference in Austin, top BTI management recognized that rebuilding the product image was a top-priority goal. “It was absolutely our biggest job,” Holland recalled.

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But at DB/Expo in May 1995, BTI and its customer Arctco were honored with the RealWare award for excellence in developing a working client/server database solution. Industry observers rate this as one of the most significant awards a product can receive, since it’s not sponsored by any individual publishing firm and is based primarily upon value to a real-world customer.

“I would have never expected it to happen this quickly,” Holland admits. A pair of industry analyst organizations, both of which had repeatedly downplayed the importance and effectiveness of Btrieve, did rapid about-faces. “I still wouldn’t say they’re exactly our biggest fans,” says Holland, “but at least they talk to us now, and we understand each other much better.”

One of the problems faced at the outset by BTI was the public perception that Btrieve and the other database products had not changed since 1982, and were obsolete technology. Another was a widespread assumption that Novell had “dumped” the products. The first year’s record would indicate otherwise.

In fact, the top positions at BTI are held by the same people who led Novell’s database business from 1987 until 1994, and who before that created SoftCraft to market Btrieve in 1982. Rather than being an “old” technology, Btrieve and its relatives enjoy the benefits of maturity (in contrast to many more recent innovations, not all of which have been beneficial to their users). In fact, Btrieve was totally rearchitected when Btrieve version 6 was introduced under Novell. They were not especially eager to turn over control of the product line, but agreed to do so only on condition that the network giant would always have the right to license and distribute BTI products.

“Actually,” said Holland, “our relationship with Novell is closer now than ever before. Even in the days before BTI, the database division was more like a separate company within Novell.”

What about future plans? The company isn’t resting on any laurels. They have high hopes for the MicroKernel Architecture as the base for even greater improvements to come.

See Birthday on page 6...
First, though, the needs of developers faced with new operating system platforms must be met.

For instance, on the day we spoke with Holland, Microsoft had announced August 24 as the delivery date for Windows 95. At the moment, BTI has no support for this platform, but they've been working on it along with the products that have been announced. According to Holland, “We’re working with Microsoft on Windows 95 support. By early summer we will have at least a pre-release version of a Windows 95 development kit. This will be based on version 6.15 of our engines. Our target for a full Windows 95 package, though, will be version 6.5, which is still an unannounced product. You’d be safe to say that it’ll appear by the end of the year.”

How’s the announced ODBC driver coming along? The initial release estimated that beta tests might begin as early as April, but at the time of our talk it was already mid-May and the estimates had changed to “June or July.” Holland said, “We just started testing the Alpha 2 version, and haven’t done any special tuning on it yet, but it’s only 3 percent slower than native Btrieve on most operations. Our goal was to be no slower than 10 percent across the board, and I don’t think we’ll have any trouble doing much better than the goal.”

When the ODBC driver beta does get underway, it will be conducted in parallel with the beta test for SQL Server Version 4.0. Since ODBC defines an SQL application interface for both SQL-based and navigational file-based data access, it has to be built on an SQL foundation for maximum speed. “This is where the MicroKernel comes into its own,” Holland explained. “Instead of being built on top of the navigational layer the way that XQL was built on top of Btrieve, now we put the interface layer directly on the MKD engine itself. This allows many things to be done more effectively, and gives us a unified architecture for all kinds of database activity.”

One aspect of BTI’s independence has bothered many developers and end users, who had become accustomed over the years to receiving the Btrieve server as part of NetWare. Now, it’s necessary to buy licenses directly from BTI or through their reseller network to get immediate access to upgrades. While Novell will, most probably, eventually release the Btrieve for NetWare Server upgrades as part of NetWare, that’s not likely to happen until a major NetWare change takes place.

Many developers have become upset at the thought of having to buy a new Server Engine license, for example, to obtain freedom from preloading BREQUEST.EXE under DOS before going into Windows. With the arrival of Windows 95, where such preloading isn’t allowed by the system, the complaint volume has increased. We asked Holland whether the new requester DLL would be made available as a separate product, to meet such criticism.

“How could we price it?” was his response. “You can upgrade a 5-user server system for $99 at least through the end of 1995, and a 10-user system for $195. For those prices you get the newest server and the DLL, plus all the utilities needed.” We were floored, since those figures represented the extremes of the price we had intended to suggest for the DLL requester as a standalone product, and asked about the discrepancy between these prices and those we had seen bandied about earlier.

“We’re being aggressive in our upgrade pricing strategy,” he responded. “Everybody on the planet is entitled to the upgrade prices at this point.”

He also said the company is planning to communicate this strategy more effectively, and to urge third-party developers to become part of BTI’s reseller network so they can bundle the new engines with their applications. Most of the emphasis during the first year has gone to Btrieve and SSQl, the stars of the BTI stable, but Xtrieve Plus hasn’t been forgotten. Plans for its future are currently under study, said Holland, but “Xtrieve for Windows will still be a requirement.” A survey of current Xtrieve users has identified two distinct groups: one uses the product as a development tool, while the other consists of end users who use Xtrieve for ad hoc inquiry into the database.

For developers, those parts of Xtrieve that build data dictionaries, or edit and repair databases, will appear as separate utilities to be included in the Developer Kits for Btrieve 6.5 and SSQl 4.0, Holland said. “These capabilities need to be part of the basic toolkit in any event,” he explained. He went on to indicate that the end-user group can expect upcoming versions of Xtrieve to be simpler in use: “We’ll get it re-focused on what it should be.”

For the long term, BTI is looking toward something they call the Information Management Network, which Holland describes as “really important.” The idea is to marry application and network services with the goal of providing plug-and-play interconnection between third-party applications based on mutual linkage to a “super data dictionary.” While it’s an ambitious idea, BTI is convinced it can be brought about, and is factoring this target into all their current product planning.

For a one-year-old startup firm, they don’t seem to be doing so badly. That may be due, at least in part, to having been under the same immediate management for all the thirteen-plus years the product has been in existence. Then again, maybe it’s just because they’re following the prescription set down for all software toolmakers back in 1974 by Brian Kernighan and P. J. Plauger: “Do just one thing, but do it superlatively well.”

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**New Btrieve-Lotus Notes Options**

**Brainstorm Technologies**
(617.492.3399) in Cambridge, MA has announced its DataLink for Lotus Notes 1.2 priced at $1,495 which can map many database files into Notes files and transfer data between the two systems. The package supports Btrieve via ODBC.

**Trinzic Corporation**
(312.380.4389) of Chicago, IL has introduced its InfoPump which can connect between a dozen or more different systems including Btrieve and Lotus Notes. The starting price of about $30,000 for the server includes interfaces for any two systems. Additional interface modules are priced at $2,500 each.
**BTI Wins Award at DB/Expo**

*Austin, Texas* — Anyone who doubted Btrieve’s position as a client/server tool should have been in the audience at DB/Expo in San Francisco on May 9. That’s when a panel of leading industry experts selected BTI and its customer Arctco, Inc., for the RealWare Award recognizing outstanding real-world user applications.

Judging was conducted by a panel including Judith Hurwitz, David Kalman, Scott Mace, Barbara Cole, and Alan Alper. All are editors or publishers of prominent industry journals in the client/server area. They chose BTI’s solution based on innovation, uniqueness, robustness, and performance.

The winning application allowed Arctco, manufacturers of the Arctic Cat line of snowmobiles, to downsize from a UniSys A12 mainframe to a distributed client/server network using Tricord ES5000s, Novell NetWare, Btrieve, Scalable SQL, and Visual Basic. This provided better performance, significant reduction in training costs, and increased reliability and data integrity. Ray Koukari, MIS director for Arctco, noted that the solution allows his firm to adapt to rapidly changing business needs. The application, supporting 250 on-line users at several sites, was one of several featured at last year’s Summit Conference in Austin. Total time necessary for the conversion was 18 months.

“We are extremely proud of the judges’ recognition,” said Ron Harris, president and CEO of BTI. “This award reinforces the market’s belief in the future potential of our company.”

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Upgrades to Btrieve 6.15, additional interfaces, available via CompuServe

Upgrades packages for both Btrieve for DOS and Btrieve for Windows are available to registered developers from the BTI support forum on CompuServe. The latest version as of mid-May was 6.15.3. DOS upgrades are in Library 8 (DOS Updates) while Windows upgrades are in Library 9 (WIN Updates).

If you don’t have access to these areas, but own one of the products, download the file BTRUPD.TXT from Library 1 (General Information) and read it. Follow the instructions to get access and the appropriate passwords for unzipping the files.

Besides the engine upgrade packages, self-extracting file BTRXFC.EXE in the Current Upgrades library adds new C and Pascal interfaces to Btrieve for DOS. The new C interface supports Borland’s PowerPack and Phar Lap’s v6.0 extender. The Pascal interface adds Borland’s Pascal 7.0 protected-mode compiler to the list of those supported. In addition, the README file in this package provides information about support for WIN32S applications.
Frequently, we are asked whether we know of data conversion products that support Btrieve. To help answer that question, we have reviewed three tools that can help you move data from one source to another. Data Junction from Tools and Techniques, Open Exchange from Innovative Solutions & Technologies, and Opt-Tech Sort/Merge from Opt-Tech are three products that can be used to port data into, or out of, Btrieve files.

Data Junction

There’s a reason that Data Junction from Tools and Techniques has taken the Data Based Advisor Reader’s Choice award for best file conversion tool 5 out of 5 years. This program is a hoss. The new version 5.1 for Windows still has a few kinks in the user interface, but even on the off-chance that the company never fixes them, they’d be worth getting used to. In addition to Btrieve, Data Junction will also convert Lotus Notes, DIF, DataEase, Excel 5.0, DataFlex, Oracle, WordPerfect, SQL Server, and SuperBase, and that’s nothing close to a complete list. Those are just the new ones added with the version 5.1 release. In the more complete list of over ninety different database formats supported by this product, there were a lot more formats we didn’t recognize than those we did, and we couldn’t think of any we might want to use that weren’t already there.

Data Junction uses its own data dictionaries and templates to define the data source and target information for all of its data sources. It has the ability to import DDF dictionaries for Brieve files, or, for the adventurous and stout-hearted, it also offers utilities for parsing these definitions from files for which no DDF dictionaries are available. We won’t kid you and tell you that the well-designed parsing screens makes this otherwise loathsome task a lot of fun, but they sure help.

Now, everybody knows that there are more types of fields out there in Brieve databases than the double handful or so that the Brieve people will admit to. And, chances are, the fields you most need to look at are those other kinds. So we’ll let you in on a little secret - with a list of eighty-four or so data types to choose from for a field in a Data Junction dictionary, chances are that if you can’t find the one you need, you didn’t really need it after all.

The program is not without limitations. It does not claim to support Brieve files containing variable length records, or files which do not have a consistent field structure across all of the records. But it will open files with Brieve owner names, and it supports Brieve version 4.x, 5.x, and 6.x files.

Data Junction allows a user to define and store every aspect of a data conversion. The first step in creating a new conversion is to define a source file. If you’re converting from Brieve, DDF definitions can be imported at this step if you have them, otherwise you can define the fields you wish to extract. The next step is quite similar - defining a target file. Once again, the user selects a file type and a file, and has the option to modify the field definitions. The final step involves defining a conversion map to map fields from the source to the target file. At this stage the user may add record filtering, data verification, and even expressions to modify the data as it is being converted.

In short, there don’t seem to be many database conversion problems this program can’t solve. Like any powerful tool, it can be complicated to use. But Tools and Techniques has done a good job of limiting the scope of this application. It converts data. It will handle simple conversions without much trouble, and it will also handle very complicated ones.

Open Exchange

Open Exchange from Innovative Solutions & Technologies is a new entry on the database information exchange market. Open Exchange uses Microsoft’s Access database technology as implemented in Visual Basic 3.0 and Access 2.0 to transfer data to and from sources supported by the Microsoft Jet Engine.
These formats include various databases, including Btrieve.

As with any Visual Basic application that uses the Jet Engine, Open Access’ operations on Btrieve files will not win any speed races. In fact, browsing Btrieve tables can get you into a one-on-one match between you and an hourglass mouse pointer for a while. But the ease at which we were able to quickly get the product started on a conversion more than made up for it.

The installation process of Open Exchange did install the complete Btrieve Client Engine version 6.15. (In fact, the product introduction screen gives credit to Btrieve Technologies for their copyright) Be careful, though, because it installed Btrieve in our C:\\WINDOWS\\SYSTEM directory. If you already have Btrieve installed, you may want to be sure that your installation does not get lost.

The interface to Open Exchange is very well designed and intuitive. Our first task was to export a marketing subset database containing about 2,000 records to a comma delimited ASCII text file. We first pointed to the DDF that contained the table to export (you must have accurate DDF’s to access Btrieve tables), then pointed to the desired table, and then specified the output file’s type and filename. You are given the option to use the source file’s structure for the output file’s structure or another file’s structure to facilitate table restructuring.

We were able to apply a query against our Btrieve table such that the exported records were restricted to those containing only desired records, and we were able to easily adjust the field mappings between the import and export files.

Open Exchange also offers a developer’s kit that allows you to build custom applications in Visual Basic that use the Open Exchange converter. This is accomplished with a message VBX which allows communication between your VB application and Open Exchange.

Open Exchange is currently in beta release and will be shipping their final version later this Summer. For a beta release, however, it was quite complete and we encountered very few problems with it. In fact, we were impressed that the software and documentation made it very easy to contact a very responsive technical support department.

Op-Tech Sort from Op-Tech Data Processing is a powerful general data handling and sorting library and utility program. The version we evaluated, Op-Tech Sort version 5.0 for DOS, includes input-file support for Btrieve files when used in conjunction with either BTRIEVE.EXE or BREQUEST.EXE. The thorough and concise documentation included with the product made getting started easy, and sample code included examples for linking with just about every C, BASIC, COBOL, Pascal, FORTRAN, Prolog, PL/I, dBase II and III, and Assembly Language project imaginable. A linkable library, a TSR library, and a command-line EXE interface are included to support this wide range of options.

The product contains functions to sort, merge, and to perform record selection and re-formatting from a number of different input file formats. Op-Tech writes records to sequential files which can contain data records, physical record addresses (GetPosition result buffers in the case of Btrieve files), or a combination of record addresses and key values. It can also be used to create BUTIL-LOAD/SAVE format files.

Btrieve developers will find this product particularly useful for creating temporary indexes into a Btrieve file for reporting and query purposes. Though Btrieve has the ability to add and drop indexes, it’s not always practical or desirable to use internally-maintained indexes to facilitate short-term or infrequently used lookups.

Op-Tech Sort gives programmers a flexible and practical tool for producing temporary index files or dumping collated snapshots of data from Btrieve database files without having to alter the structure of the database file itself. The product functions equally well to produce collated output files from COBOL, dBase, fixed-length-sequential, FORTRAN, ASCII Text, and several other sources.

Programmers who are familiar with the Btrieve API will feel most at home with this product, as the data handling concepts are similar. Like Btrieve, Op-Tech Sort deals with data on the record level, leaving field-level tasks to the application programmer. No data dictionary interface is included.
News Briefs

Intelligent Objects Corporation
(800.876.6585) in Cartersville, GA has announced SQL OLE!, an “intelligent object” that supports OLE Automation which can provide any Windows application with complete access to Btrieve, Scalable SQL, Sybase, Oracle, SQL Server, and a host of other database and record managers. Pricing starts at $799 per platform.

Btrieve Technologies Inc.
(512.794.1719) plans to be a significant participant in the NetWare for PowerPC package. “Btrieve will be an integral part of the NetWare version that Apple is building,” says Kristin Burkland, BTI’s director of business development. A key promise of Apple’s future line of PowerPC servers is the achievement of an optimal price/performance balance for databases.

Summit National Group announces Btrieve Components for Delphi

Chicago, Illinois — Since the introduction of Delphi, the new visual application development tool from Borland that was introduced at Software Development ’95 in February, one of the most frequently asked questions on the Btrieve support forum of CompuServe during the past several months has been, “How can I hook up Btrieve and Delphi?” While Delphi provides facilities to use either VBX controls or ODBC, neither approach allows an application to achieve the tool’s performance promise.

One answer has come from Summit National Group, a developer of financial software systems since 1983. Summit National developed a complete set of Delphi components for their own internal use, and are now making the toolkit available to other Delphi users. Shipment is expected to begin on July 1, and the package price has been set at $395.

Summit National’s Bruce W. McDougal says “We feel this is a significant breakthrough which will enable developers to produce quality Delphi applications very quickly.” He added that the Btrieve Components package, unlike most other interfaces, does not require any Data Dictionary (DDF) files; they implement native Btrieve functionality and thus preserve the performance and reliability for which Btrieve is noted. However, DDFs can be used at design time if they are available, to assist in application development.

The components are designed so that a form’s access to Btrieve data can be managed by dragging and dropping components onto the form and setting their properties. Other manipulations are also available through the use of the components and the classes defined in the components.

Components included in the package fall into five groups: Source, Editing, Driver, Driver/Editing, and Miscellaneous. For more details, contact Aaron Symanski at (800) 621-9531, or via CompuServe at 73420, 3727.

Report Writer…

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The release also coincides with the release of DDF Sniffer, Smithware’s new Btrieve database parsing tool, and DDF Builder version 3.0. Both products will be included in the Smithware Crystal Reports for Btrieve bundle. “DDF Builder was originally developed to support Borland’s ObjectVision back in ’91,” according to Mr. Mook. “Version 3 has been updated to make it much easier for end-users to understand. Enhancements include a new toolbar, improved data editing and viewing capabilities, and a look and feel that is consistent with Crystal Reports. DDF Sniffer was designed to analyze a Btrieve data file and determine its field structure for DDF Builder.” Regarding the new tool, Bill Langley, Smithware’s DDF Sniffer product manager, said, “Advanced data parsing techniques permit DDF Sniffer to be very accurate in determining the field structure of most unknown-format files. It is not perfect, of course, and that’s why it is so tightly integrated with DDF Builder. DDF Sniffer’s results can be checked and modified with DDF Builder using data from the application.”

The product bundle will include the most recent version of the Btrieve Client Engine and Requesters for Windows, giving it both local and client/server access to Btrieve data. Documentation on Btrieve setup and configuration is included. All of the Btrieve database setup and configuration utilities from Btrieve Technologies are also included in the package.

Smithware Crystal Reports for Btrieve will carry a suggested retail price of $495. Users who already have Crystal Reports 4.0 can purchase the Crystal Reports Btrieve Tools Pack containing all the products from the full package, except the report writer for $349. Both products are expected to ship in July of 1995. Contact Smithware at 800.828.7438 or 615.386.3100.

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C-SOFT SHIPS ONE UPGRADE, ONE NEW PRODUCT

Lilburn, Georgia — C-Soft, Inc. has released an upgraded edition of its BTedit utility package, a powerful Btrieve file editor/browser compatible with all Btrieve files regardless of version. The program includes the ability to mark a select group of records for deleting or for export. It also provides ASCII search and replace, and column data replacement.

Besides the BTedit upgrade, C-Soft has added BTcreate to its product line. BTcreate allows definition and maintenance of Btrieve files (in both 5.x and 6.x formats). When defining files you may specify whether to create DDFs or not. BTcreate consists of two programs: BTsource, which creates and maintains file definitions, and BTcreate to create the data files themselves. BTcreate accepts command line parameters so that an automatic procedure can be created, eliminating user interaction. Since the two programs work independently and can be licensed separately, BTcreate provides maximum flexibility in use. For more information and full featured demos contact Andre Larmet, C-Soft, Inc., (404) 279-9493.

SOLUTIONS DIRECTORY DEBUTS IN SAN FRANCISCO

San Francisco, California — The Btrieve Solutions Directory’s first edition made its public debut at DB/Expo in San Francisco. This directory, intended to eventually list all applications and tools that use Btrieve or Scalable SQL, is compiled by BTI primarily for internal use by sales and marketing personnel, but will also be distributed to the public at trade shows.

While it might appear that the Solutions Directory and Smithware’s Btrieve SourceBook are two solutions to the same problem, BTI’s Amy Billingsley says that the publications actually address very different needs. The SourceBook will continue to be packaged with every Btrieve product shipped, while distribution of the over 400 page Solutions Directory book will be much more limited for obvious reasons.

The Solutions Directory catalogs applications and tools both vertically and horizontally, allowing a rapid overview of the tools available for any specific market area in addition to the more usual functional groupings.

The initial printing lists between 400 and 500 applications, but BTI believes this number represents only a fraction of the total now in existence. There’s no charge for a listing in the Solutions Directory, but software developers must fill out a Product Profile form for each product to be listed.

These forms are available via CompuServe’s Btrieve forum, in Library 10 (Third Party Developers), or can be obtained via fax by calling BTI at (512) 794-1719 and requesting a copy. You can also contact Ms. Billingsley via Internet E-mail, as abilling@btrvtech.com for additional details, or by phone at (512) 794-1471.

MAD POARCH RESIGNS AS BTI’S VP OF CUSTOMER SERVICE

New Employees Already on Board

Austin, Texas — Mad Poarch, BTI’s Vice President for Customer Service has left BTI to pursue personal interests. Quickly on the heels of her resignation, BTI announced several additions to their growing staff.

Brett McAnally has been promoted to SSLQ Product Manager and Krishnan “Kam” Aghoramurthy assumes the role of Btrieve Product Manager. Kam comes to BTI from Tivoli Systems in Austin.

Charles Craft, Formerly with Dell Computer Corporation, has become BTI’s new Director of Sales.

BTI Development News

New Versions

The procession of microkernel engines for additional platforms continues, with shipment of OS/2 and NetWare versions of Btrieve 6.15, and Scalable SQL for DOS, version 3.01. Not long after starting shipments of SSLQ 3.01, BTI announced version 4.0 of the product, scheduled to be available during the third quarter of 1995. Additional features promised in the new version include standard ANSI SQL triggers and stored procedures. Workstation engine pricing starts at $149 per station, while server engine prices will depend on the number of concurrent users allowed. Entry-level server editions will be a 10-user server, for $995.

Shipment of the Windows NT server engine, which has been in Beta test most of the year, is also imminent. Microsoft’s recent preview release of Windows NT version 3.1 appears to have created a few problems for the engine. No firm release date had been set at this writing; BTI was waiting for Microsoft to stabilize the operating system before committing to a shipment date.

ODBC Driver Still in Development

Despite an initial target date of April for the start of beta testing, the native ODBC driver announced by BTI in early March was still in development by mid-May. Current forecasts predict that testing will start in “June or July.” Initially only a 16-bit driver is in the works, although it’s being designed for simple migration to 32-bit platforms according to BTI.

The new ODBC driver is intended to take advantage of new features provided in the next generation of Btrieve engines. ODBC compatibility functions are also being added to the MicroKernel Database Engine to further increase performance. Existing ODBC drivers for Btrieve have drawn many complaints from users, who report that the drivers forfeit most of the speed advantages gained by using Btrieve.

Dewitt Gimblet will be BTI’s Advanced Product Planning Manager. In this role, he will identify, define, manage, schedule and coordinate production of new database software products based on emerging technology.

Mark Marshall, formerly with CRI of Seattle, Washington, has joined BTI as Vice President of Development and Services and will be responsible for directing the activities of software development and the development of the company’s technology vision.

Charles Craft, Formerly with Dell Computer Corporation, has become BTI’s new Director of Sales.
Can You Tell Me Where to Get the 51-K DLL?

Btrieve version 6.15 represents a new architectural direction for Btrieve. The underlying Btrieve file format has changed with this release, and previous versions of Btrieve will no longer open and read Btrieve version 6 files. As with earlier version updates such as this one, version 6 engines will read and update files created using pre-version 6 Btrieve engines correctly, though some Btrieve version 6 features will not work with older file formats. In addition, BTI has adopted a cross-platform architecture roughly based on the Btrieve for NetWare NLM. Whereas before, individual Btrieve engines were implemented differently on different platforms (a TSR in DOS, an NLM in NetWare, a DLL in Windows) the new microkernel database engine for any given platform now has much more in common with its cross-platform cousins. The engine is implemented in DOS as a protected-mode executable program with a TSR hook. In Windows, the implementation is a Windows executable called WBTR32.EXE, accessed by application programs via loader and requester DLL’s.

To appreciate the changes, we need to look first at the 5.10 implementation of Btrieve for Windows. Btrieve 5.10 was implemented as a DLL, about 51K in size, which handled both program interface and file IO. Renamed WBTRLOCL, this DLL could be called by the NetWare requester DLL WBTRCALL (about 13K in size) to handle access to files which were inaccessible to the NetWare Btrieve NLM, giving Windows applications client-based access to local files via the Btrieve for Windows 5.10 DLL, and client-server access to NetWare Btrieve files via the requester DLL and BREQUEST.

The Thigh Bone’s Connected to the Hip Bone...

The Btrieve version 5.10 client-only configuration involves an application EXE linked with WBTRCALL.DLL. A Client Engine called WBTRCALL.DLL interfaces directly with the application, handling file IO. This engine takes its initialization parameters from the [Btrieve] section in WIN.INI.

In Btrieve version 5.10 client-server configuration, a requester version of WBTRCALL.DLL interfaces to the application. If, in the NOVDB.INI [Brequest DPMI] section, the “Requester=Yes” option is set, this interface will try to pass API calls to BREQUEST.EXE, which must be running as a TSR underneath Windows. BREQUEST.EXE in turn handles communication over NetWare to and from the Btrieve NLM, which handles the actual file IO. If this DLL is unable to open the file in client-server mode, it checks NOVDB.INI [Brequest DPMI] section for the setting “Local=Yes”, to determine whether or not to attempt to load WBTRLOCL.DLL and open the file using the client engine. The file WBTRLOCL.DLL, which is the exactly the same as the 51K WBTRCALL client engine, renamed, interfaces with WBTRCALL.DLL. It reads its initialization parameters from the [Btrieve] section of WIN.INI, and handles file IO for all Btrieve files which are inaccessible to the NetWare Btrieve NLM.

In the version 6.15 configurations, the application EXE links with WBTRCALL.DLL, which checks BTI.INI for its configuration options. It may then call the client engine loader WBTRLOCL.DLL, which in turn loads the Btrieve client engine. The client engine, the code which handles local file IO in version 6.15, is the file WBTR32.EXE, a Windows executable which is a close cousin to the NetWare Btrieve NLM. Access to NetWare Btrieve version 6.10 currently uses the same DPMI call to BREQUEST.EXE running under DOS. But a DLL-only requester for Windows is currently shipping with the Btrieve for NetWare 6.15 Server Edition Upgrade, which will route calls to the NetWare Btrieve process without requiring that BREQUEST be loaded in DOS. Plans are to eventually incorporate Windows NT Advanced Server requester access in this module as well. All Changes to the Btrieve for Windows Client Engine version 6.15 configuration are made in the initialization file BTI.INI, located in the Windows directory. Btrieve Technologies Inc. release notes on Btrieve 6.15 configuration options are contained in the file BTIINI.WRI.

A Brief History of Config Files, or, The Decline and Fall of NOVDB.INI

Btrieve database engines running on different platforms get their configuration from different places, which can make setup confusing. Recent changes both in architecture and product ownership have confused the matter further. This is a brief look at important developments, and how they affect Btrieve configuration for Windows applications:

DOS Engine Configuration

BTRIEVE.EXE version 5.x for DOS took its parameters as command line arguments.

BTRIEVE.EXE version 6.x for DOS uses BSETUP.EXE to write these to an initialization file.

Since Windows applications cannot access the DOS Btrieve engine, these changes do not affect Windows applications directly. Since DOS and Windows applications can share the same files, however, it is important to be aware of them.
Building a Windows Btrieve Diagnostic

Over the past few years my trusty 486/66 has run just about every version and combination of Btrieve configuration one might name: Btrieve for Windows, DOS, and NetWare, each with its own initialization running in local mode, client/server mode, peer-to-peer network mode, or combinations thereof. And every now and then a new piece of software or a change in one of the configurations would cause something else on the system to simply stop working. After considerable hair loss, I’d realize that I was loading the wrong version of one or another of the Btrieve components, which would mean a tedious search of hard disk and network to find out where it might be coming from.

This little program doesn’t do much, but I’ve found it to be very useful in situations like these. It uses Btrieve’s version call to determine what Btrieve Client Engine and Requester versions are being loaded by Windows applications, and it uses the Windows TOOLHELP.DLL to determine the path from which each of the component modules is loading.

A slightly zippiest version of this application (one with a Save option and an About box) is available for download from CompuServe in the BTRIEVE and MSACCESS forum libraries. Now that Btrieve Technologies has begun adding version info resources to their Windows modules, one useful addition might be to include this information in the display. Other possible improvements suggest themselves as well, such as a listing of the options selected at initialization.
```c
#include <windows.h>
#include <toolhelp.h>
#include "wbc.h"

.Microsoft

Function: WinMain - Program entry point

int PASCAL WinMain (HANDLE hInstance, HANDLE hPrevInstance, LPSTR lpCmdLine, int nCmdShow)
{
    MSG msg;
    WNDCLASS wc;
    if (!hPrevInstance)
    {
        wc.style         = NULL;
        wc.lpfnWndProc   = (WNDPROC) MainWndProc;
        wc.cbClsExtra    = 0;
        wc.cbWndExtra    = 0;
        wc.hInstance     = hInstance;
        wc.hIcon         = LoadIcon (hInstance, IDC_ICON);
        wc.hCursor       = LoadCursor (hInstance, IDC_ARROW);
        wc.hbrBackground = COLOR_WINDOW+1;
        wc.lpszMenuName  = gszMenuName;
        wc.lpszClassName = gszWndClass;
        if (!RegisterClass(&wc)) return FALSE;
    }
    if (!InitInstance(hInstance, nCmdShow))
        return FALSE;
    while (GetMessage (&msg,NULL,NULL,NULL))
    {
        TranslateMessage (&msg);
        DispatchMessage (&msg);
    }
    return msg.wParam;
}

Function: InitInstance - Creates an instance of the application

static int InitInstance (HANDLE hInstance, int nCmdShow)
{
    ghInst = hInstance;
    ghWnd = CreateWindow (gszWndClass,
        gszAppName,
        WS_OVERLAPPEDWINDOW,
        CW_USEDEFAULT,
        nCmdShow,
        CW_USEDEFAULT,
        CW_USEDEFAULT,
        NULL,
        NULL,
        hInstance,
        NULL);
    if (!ghWnd) return FALSE;
    ShowWindow (ghWnd, nCmdShow);
    UpdateWindow (ghWnd);
    return TRUE;
}

Function: MainWndProc - Main window process

long FAR PASCAL MainWndProc (HWND hWnd, UINT message, WPARAM wParam, LPARAM lParam)
{
    static HWND hwndEdit;
    switch (message){
    case WM_CREATE:
        hwndEdit = CreateWindow ( "Edit", NULL,
            WS_CHILD | WS_VISIBLE |
            WS_VSCROLL | WS_HSCROLL |
            WS_TABSTOP | WS_DONTCONTEXT,
            hWnd, 0, 0, 0, 0,
            GetWindowWord(hWnd, GW_HW-placeholder),
            NULL);
        SendMessage(hWnd, WM_SETTEXT, 0, (LPARAM)lpText);
        GlobalUnlock (hText);
        GlobalFree (hText);
        break;
    case WM_SIZE:
        MoveWindow (hwndEdit, LOWORD (lParam), HIWORD (lParam), TRUE);
        return 0L;
    case WM_COMMAND:
        switch (wParam){
        case IDM_UPDATE:
            SendMessage (hWnd, UM_UPDATE, 0, 0L);
            return 0;
        case IDM_EXIT:
            DestroyWindow (hWnd);
            break;
        default:
            return DefWindowProc(hWnd,message,wParam,lParam);
        }
        break;
    case WM_DESTROY:
        WBTSTOP ();
        PostQuitMessage (0);
        return 0;
    }
    return DefWindowProc (hWnd,message,wParam,lParam);
}
```

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Hello and welcome to the Summer issue of Btrieve Technologies’ Technical Corner. It is hard to believe, but we celebrated our one year anniversary in April! Many things have happened to BTI during that time. We released upgrades to many of our products and gave them new names and face-lifts. We won the RealWare Award for Client/Server Computing in Support of Mission-Critical Operations at DB/Expo in San Francisco during May. And we saw the coming and going of BTI-ers.

We welcome Krishnan “Kam” Aghoramurthy as Btrieve Product Manager. Brett McAnally has been named Scalable SQL Product Manager, and Dewitt Gimblet is our new Advanced Product Planning Manager. Charles Craft has joined us as Director of Sales, and Marc Marshall as Vice President of Development and Services.

One face that will definitely be missed around BTI is that of Mad Poarch. Mad has decided to pursue other interests. Her guidance and contribution to BTI, and especially to Customer Service, will surely be missed.

In her place, I have been chosen as the acting Manager of Developer Support. Many of you will recognize my name and face. I was in the last issue of BDJ under “Who’s Who at Btrieve Technologies.” So you can go back and take a look!

I, and the rest of the team, wish Mad well and good luck in her future endeavors. And I look forward to the challenges and rewards ahead of me as we all work together to produce quality products and services.

Chris R. Ojeda
Acting Manager, Customer Service
Btrieve Technologies, Inc.

In the last issue, we explained how to develop applications that use Btrieve. This article will explain how to develop applications that use the Scalable SQL Engine. Scalable SQL is a relational data access system built on the MicroKernel Database Engine architecture. It provides a relational interface for accessing your Btrieve data.

Btrieve Technologies provides several developer kits for creating Scalable SQL applications. In addition, there are several development tools available from other vendors. This Q & A reviews the functionality provided by the Scalable SQL developer kits available from Btrieve Technologies.

What developer kits are available for Scalable SQL and how do I get them?

Scalable SQL developer kits are currently available for DOS (v3.01) and Windows (v3.01); a developer kit supplement is available for OS/2 (v3.01). The DOS and Windows developer kits each include a workstation Scalable SQL and MicroKernel engine. The OS/2 supplement does not include any workstation engines. All three kits include documentation, interface files, utilities, and sample code for use when developing Scalable SQL applications. These applications can be used with the workstation Scalable SQL engine, or with the client-server Scalable SQL for NetWare (v3.01) engine. Each developer kit can be purchased directly from Btrieve Technologies, Inc. or through an Authorized Btrieve Technologies Solution Network Partner.

What programming languages are supported?

Scalable SQL developer kits support most common 3GL languages, including C/C++, Pascal, BASIC/Visual Basic, and COBOL. Interfacing information provided in the developer kits documents how to use the most popular compilers for these languages.

How does an application call the Scalable SQL engine?

The Scalable SQL Application Programming Interface (API) provides a means for sending Structured Query Language (SQL) statements to the Scalable SQL engine. This is done with a set of function calls with certain parameters which tell the Scalable SQL engine what to do. A status code is returned to the calling application indicating whether or not the requested action was successful. An example of a Scalable SQL function call looks something like this:

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The Scalable SQL engine is called through exported function calls. Unlike the Btrieve API, which has one basic function defined (BTRV) which performs all database activity, the Scalable SQL API has many functions defined. These functions each perform separate activities, such as logging in to a database, logging out of a database, sending in an SQL statement, fetching data, etc. Most activity is performed by sending an SQL statement to Scalable SQL via the XQLCompile function as shown above. The Scalable SQL Programmer’s Manual included in each developer kit describes in detail how to set the parameters for each function, and what results to expect after the operation is complete.

How does a DOS, Windows, or OS/2 application make Scalable SQL calls?

The methods used for calling Scalable SQL on different platforms are the same as those described for Btrieve in the previous issue of Btrieve Developer’s Journal. The DOS Scalable SQL engine is implemented as a TSR (SSQL.EXE) which is called by most applications via an interrupt. The Windows Scalable SQL engine is called through a Dynamic Link Library (WXQLCALL.DLL). An OS/2 Scalable SQL application also uses a Dynamic Link Library (XQLCALLS.DLL), which is a component of the Scalable SQL requester for OS/2 used in conjunction with Scalable SQL for NetWare. Each Developer Kit includes interface files that are either source code or object modules that are linked to the application source code.

How does an NLM application call the Scalable SQL for NetWare NLM?

The NLM Scalable SQL engine can be called through exported symbols. Although there is not a developer kit available for creating NLM applications, it is possible to develop an NLM that calls the SSQL.NLM. The function calls are basically the same as the calls defined in the DOS, Windows, or OS/2 kits. With the Programmer’s Manual from one of these packages, and a few additional interface files available from Btrieve Technologies Technical Support you can create an NLM application. Of course, you will also need the NLM Software Developer’s Kit available from Novell.

What’s the difference to my application if I’m using a Scalable SQL workstation engine or a requester?

When compiling and linking your application, you do not need to decide whether your application will be run using a Scalable SQL Workstation Engine, or in a Scalable SQL client/server environment. The application interface is the same in either case.

What support is available for developing an ODBC application that uses Scalable SQL?

Currently, Btrieve Technologies does not supply an ODBC driver for the Scalable SQL engine. This is planned as part of an upcoming release of Scalable SQL; see the “Scalable SQL 4.0” article on the following pages for more information about the next release of Scalable SQL. A third-party Windows ODBC driver for Scalable SQL v3.01 is currently available from Intersolv.

### Who's Who at Btrieve Technologies

**Brett McAnally**

Scalable SQL Product Manager

Brett McAnally joined BTI as a founding team member in April 1994. As Scalable SQL Product Manager, Brett’s primary duties include managing, defining, and coordinating the production of Scalable SQL.

Before joining Product Marketing, Brett was a member of the BTI Business Development group. In this role, he worked with strategic partners like Novell and Microsoft. Prior to his tenure at BTI, Brett spent six years at Novell in Product Marketing and Sales.

Brett is a graduate of the University of Texas at Austin where he received a Bachelor of Business Administration. He and his wife, Kelli, are expecting their first child, Emalee, in August. In his spare time, Brett enjoys golf, reading and family.

**James Sneary**

Engineering Leader, Scalable SQL

Jim Sneary leads the BTI Scalable SQL Development team. His primary duties include product design, development and implementation. Jim is also responsible for resolving software defects in existing products and determining resource requirements for existing and future development efforts.

Prior to joining BTI as a founding member, Jim was a software engineer at Novell for seven years and a Software Developer at SoftCraft before his Novell tenure.

At the University of Texas at Austin Jim received his Bachelor of Science in Mathematics with a Computer Science minor. He and his wife Nancy have a two year old daughter, Jennifer. Jim’s hobbies include bowling, golf, tennis, racquetball, pool, and ping pong.
Scalable SQL v4.0 is the next generation client/server relational database engine from Btrieve Technologies. This product has several new features based on comments and suggestions from important customers like you. This article describes these features so you can share our excitement about the upcoming release of Scalable SQL v4.0 (SSQL).

**Database Replication**

With today’s global market expansion, data is being distributed more than ever before, and sharing data among several corporate sites is becoming commonplace. One of the problems with distributing and sharing distributed data is consolidating the modifications at each of the corporate sites. SQL v4.0 solves this problem by supporting two-way database replication, which allows you to make changes to any copy of a database, and then distribute those changes to all other copies (replicas) of the database. This distribution of the changes is called replicating the database, and SSQL provides a choice of replication modes: immediate, time-scheduled, or on-demand. In immediate mode, whenever you make a change to any data in the database, the data replicates to all other sites immediately. In time-scheduled mode, your data modifications replicate at specific scheduled times. In on-demand mode, the administrator controls when data replicates by manually triggering the replication action.

As a database becomes more widely distributed and users begin updating each replica of the database, conflicts between updates become more common, and must be resolved. SSQL provides two methods of resolving update conflicts: reducing the number of conflicts that occur, and resolving the conflicts that do occur. To reduce the number of conflicts, SSQL provides update filters that allow the administrator to state precedence when an update conflict occurs. These conflict rules determine which update occurs. They may be as simple as “the update that occurred at the earliest time,” or more complex, such as “if user A and user B both updated the same record, then user A’s update succeeds, and user B’s update is ignored.”

**Query Optimization**

SSQL v4.0 incorporates a cost-based query optimizer. This optimizer not only looks at the indexes defined in your database, but also looks at the data itself to determine the fastest access plan. As the data in your database changes, SSQL may choose a different access plan when executing your queries. With the new optimizer, SSQL includes two other changes: enhanced fetching algorithms, and a set of application interface functions that let you manipulate your query information about the selected access plan.

**Transaction Processing**

SSQL includes enhanced transaction processing in three areas.

First, it includes support for two-phase commit, which maintains the “all-or-nothing” nature of transactions, even if the data files accessed within the transaction are distributed among several file servers. Second, SSQL includes support for nested transactions, which allow the ability to specify checkpoints to which you may want to rollback. Finally, SSQL includes full transactional logging, which causes all operations on a single database to be logged in a single file, improving both transaction durability and logging performance.

**Stored Procedures and Triggers**

SSQL v4.0 includes support for stored procedures and triggers. Stored procedures provide you with a means of incorporating your application’s database logic in the database using common programming and SQL language constructs. These constructs include variables, IF statements, LOOP statements, and SQL cursors. Triggers provide you with a means of defining and enforcing any kind of data integrity constraint. They are invoked whenever a specific data modification occurs (such as INSERT, UPDATE, or DELETE), and each trigger is defined on a specific table. You commonly use triggers to enforce business rules, such as “if the invoice falls below 10, then restock the supply.”

SSQL supports multiple triggers of the same type on the same table; you can define more than one INSERT (or UPDATE, or DELETE) trigger on a given table. This helps you to produce much clearer definitions, as the following example illustrates:

```sql
CREATE TRIGGER UPD_LOW_STOCK_PRICE
ON STOCK_PRICE ORDER 1
AFTER INSERT
FOR EACH ROW
REFERENCING NEW AS NEW_STOCK_INFO
WHEN NEW_STOCK_INFO.PRICE < ( SELECT Low FROM HighLow
WHERE Company = NEW_STOCK_INFO.Company )
BEGIN
  -- Record the new minimum in HighLow.
  UPDATE HighLow SET Low = NEW_STOCK_INFO.PRICE,
  WHERE Company = NEW_STOCK_INFO.Company;
END

CREATE TRIGGER UPD_HIGH_STOCK_PRICE
ON STOCK_PRICE ORDER 2
AFTER INSERT
FOR EACH ROW
REFERENCING NEW AS NEW_STOCK_INFO
WHEN NEW_STOCK_INFO.PRICE > ( SELECT High FROM HighLow
WHERE Company = NEW_STOCK_INFO.Company )
BEGIN
  -- Record the new maximum in HighLow.
  UPDATE HighLow SET High = NEW_STOCK_INFO.PRICE,
  WHERE Company = NEW_STOCK_INFO.Company;
END
```
The previous example uses two triggers: one to record a change to the minimum price of a stock, and one to record a change to the maximum price of a stock. By using two triggers, you can make each trigger condition very basic, and still get the complete functionality you need.

Programming Extensions

SSQL v4.0 includes several features that widen its range of development environments, and improve performance in currently supported environments. First, SSQL includes an ODBC driver that has demonstrated very promising performance in the early phases of development. Second, SSQL includes several new and enhanced data types, as shown in the accompanying table. Finally, Visual Basic™ compatible scripting provides and industry standard language for developing routines which can be executed directly or within an application.

SSQL includes additional fetch operations that allow you to retrieve all column descriptions for a query in one call, or retrieve value descriptors for each record fetched. The value descriptors include information about each column value in the fetched record (null value, truncated data value, etc.). SSQL also includes enhancements to the XQLFetch API to handle BLOB, LVAR, and NOTE columns of unlimited size. Finally, SSQL incorporates chunk operations that are structured very similarly to the Btrieve chunk operations. These operations let you access the portion of your data record that is beyond the 32K limit that the XQLFetch API imposes. Btrieve’s chunk operations allow you to read rectangular areas of a data record, or specific unrelated segments of a data record. All of the XQLFetch enhancements are also available in the xInsert and xUpdate API calls (except for the chunk operations, which are available through the xUpdate API to enable you to add data beyond the 32K API boundary).

New Data Types in SSQL 4.0

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTEGER</td>
<td>Expanded to include support for 1, 2, 4 and 8 byte values.</td>
</tr>
<tr>
<td>UNSIGNED</td>
<td>New data type for SSQL. Valid sizes are 1, 2, 4 and 8 bytes. SSQL uses the same data format as the INTEGER data type when storing UNSIGNED values, but interprets the values as non-negative.</td>
</tr>
<tr>
<td>CURRENCY</td>
<td>New data type for SSQL. Always an 8 byte value. SSQL uses the same storage format as the INTEGER and UNSIGNED data types, but interprets the values with an implied 4 digit scale. This means that SSQL interprets all values as the actual binary value, divided by 10000. The fractional component of the value is significant. This data type is the same as the Visual Basic and Access CURRENCY data type.</td>
</tr>
<tr>
<td>TIMESTAMP</td>
<td>New data type for SSQL. This data type represents the date and time (in micro-seconds) in Universal Time Coordinate (UTC), and occupies 8 bytes of storage space.</td>
</tr>
<tr>
<td>LVAR</td>
<td>Enhanced to allow columns of unlimited size. To define a NOTE or LVAR column of unlimited size, use the default size. (Previous versions of SSQL had no default size for these two data types.)</td>
</tr>
<tr>
<td>NOTE</td>
<td>New data type for SSQL. This data type allows you to include any type of data in the value. Like the NOTE and LVAR data types, if you specify a data value size for a BLOB column, that size must be from 1 to 32767. If you require more space for the data values in each record, you define the BLOB column with the default size, which is unlimited.</td>
</tr>
</tbody>
</table>

Internationalization

SSQL v4.0 is the first SQL product produced by Btrieve Technologies that is available as a localized version for Japan, and eventually for European and other Asian/Pacific languages. SSQL supports localized database object names and collation sequences that you can include on columns or indexes. Each localized version supports the definition of columns that operate based on the collation and character set for that language.

Other New Features

The SSQL v4.0 engine includes support for the IPX network protocol, which improves the performance of client/server installations in WAN configurations. This IPX is provided in addition to the current SPX support, since SPX is a less error prone protocol. SSQL also includes very large file support, which increases a database table’s maximum data file size from 4 gigabytes to 64 gigabytes. Additional Windows utilities improve ease-of-use and include Status Monitor, Administration, and Maintenance tools.
Making Btrieve/Brequest Work In DOS/Windows Boxes Under OS/2
Btrieve 6.15

How can Btrieve/BRequest be made to work under OS/2? As is the case with all new environments, each piece should be stable, and the foundation of a good DOS BOX should be present. Step 1 will be to make sure the application runs without a problem with 6.15. Step 2 will be to make sure the DOS BOX is set up and the NetWare requester is installed correctly. Step 3 is to make sure Btrieve is configured correctly for what needs to be accomplished.

Make sure the application works with 6.15
This is the first and easiest step. Load the application on a standard DOS or Windows machine. Make modifications to the bti.cfg or bti.ini to make it run successfully. Move this bti.cfg or bti.ini to the OS/2 machine with the application. This will allow a verified working application to be set up.

Make sure the NetWare requester is set up correctly
If local Btrieve is being used instead of the Btrieve NLM, read below to modify the XMS_MEMORY_LIMIT. All other notes apply to the NLM and requester only.

This setup is based on information that was present as of the date of this document. It is not meant to supersede any suggestions made by Novell. The information is based on Btrieve Technologies experience, and may not be the only configuration that will work.

First of all, the most recent version of the NetWare requester will be needed; as of this date, that is version 2.11. The setup requires patch file R211ft.exe. For this, it is a good idea to check NWREQ.SYS in the NetWare directory. If NWREQ.SYS is dated '95, the patch has been applied already. If not, one will need to be added.

Both of these files can be found in the Novelfiles forum on CompuServe. Before the requester is installed, a decision should be made on whether Global or Private DOS boxes will be used. If you are still experiencing problems, such as a Btrieve error 79, add the line VME=NO to the top of your NET.CFG file. Under OS/2, the Windows and DOS environment have basically the same settings for the DOS emulation that will be running underneath them.

The following is a generic setup procedure, and its instructions should be applied accordingly based on the resources that are being used.

Single click on the icon of the Windows and DOS box from which the Btrieve application will be launched. Select the right mouse button. This will bring up a menu from which the settings and the session tab must be chosen. Next, click on the DOS/Windows Setting button. This will bring up another pop-up menu that will either categorize the resources or list them. If it shows the former, click to view all resources.

The following is a list of resources, how they should be set, and any special instructions that might apply:

- **WINDOWS_RUNMODE** enhanced
  - DOS_AUTOEXEC AUTOEXEC.BAT
  - May need to be modified to load BRequest
- **XMS_MEMORY_LIMIT** ratio
  - Should be the last physical drive.
- **NETWARE_Resource** GLOBAL/PRIVATE
  - Must match NetWare requester install option
  - These settings should be saved.

Next, the AUTOEXEC.BAT should be addressed. This program will need to be executed by the DOS/Windows box. The NetWare requester installation should have included TBMI2.COM and NETX.EXE. If not, it will need to be added. The NETX.EXE that is loading here must be the one that came with the OS/2 requester. When loading, if it does not echo “GLOBAL” or “PRIVATE”, it is the wrong one.

BRequest will need to be loaded if using DOS or the DPMI requester for Windows. It should be loaded before Windows, unless you are using the WBTRCALL.DLL that ships with Btrieve for NetWare 6.15. BRequest should be loaded after NETX.EXE in a Global DOS box, or after a login is run in a private DOS box.

TBMI2.COM should find a net.cfg that has the following lines added to the top of the file:

```
ECB CNTL = 20
DATA ECB CNTL = 89
```

This is necessary to instruct TBMI2.COM to allocate enough resources to manage the SPX/TLI packets being used in the Btrieve requester.

Make configuration changes
In order to launch the application under Windows/DOS, the user must log in to the network. If you are using Global DOS boxes, go to an OS/2 box and login. All of the mappings will be available when starting the DOS box. If using a private DOS box, that DOS box must be selected for logging in. After doing so, run the application. It should work just fine.

When using local Btrieve, there are some problems one might run into that can easily be addressed. On certain hardware configurations, Btrieve for DOS will lock up when the user timer interrupt 1C is triggered. This can be fixed with a modification of the bti.cfg file.

First, add the line “timerint=8” to the bti.cfg under the [Btrieve client] section. If this does not resolve the problem, enter the line with “timer=No” instead.

If having problems with IPX/SPX initializing, check the AUTOEXEC.BAT for the TBMI2.COM Line as discussed above. The Config.sys should be checked as well to make sure SPX.SYS and SPAEMON.EXE are not commented out.

If launching multiple DOS or Windows boxes, the user must change the local file sharing to multiengine, as well as set a unique location for each “box” launched. These changes are made in the Bti.ini or the Bti.cfg.

Remember, the 2.11 requester should be used with the R211ft.exe patch. These have quite a few fixes that directly affect Btrieve when using the NLM and Brequest. Following these steps should have the system up and running. If you run into a Btrieve related problem during this process, you can contact Btrieve Technologies Support. Please be sure to state that you are running under OS/2, and be at the machine with the issue.

**Scalable SQL Status 2103** / Btrieve Status 20
Scalable SQL for NetWare 3.01
Btrieve for NetWare 6.15.2

With the Windows “DLL requesters” released with Scalable SQL for NetWare v3.01 and Btrieve for NetWare v6.15, many customers are running into problems connecting to the network running at the server. Previous versions of Scalable SQL and Btrieve included DOS Protected Mode Interface (DPMI) requesters for Windows applications, which required the DOS requester to be loaded before Windows. The new DLL requesters do not require this anymore, and are built using the Novell TLI (Transport Layer Independent) protocol. As a result, if Windows is not properly configured for NetWare, the new requester will not work, most often resulting in a status 2103 “Scalable SQL is not Active on the Requested Server” from a Scalable SQL Windows application, or a status 20 “The Microkernel or Btrieve Requester is Inactive” from a Btrieve Windows application.

The following is an explanation of the configuration for using the new requesters and some troubleshooting hints for resolving these errors.

**Configuration**
The following Windows files are required to run a Windows Scalable SQL application:

```
WXQLCALL.DLL* 63K  8/10/94
WXQLRES.DLL*  3K  8/10/94
```
To run a Windows Btrieve application, these files are necessary:

- WBTICOMM.DLL* 5K 8/10/94
- WBTTRCALL.DLL* 15K 6/08/94
- WBTICOMP.DLL* 7K 3/14/95
- NWCALLS.DLL
- NWIPXSPL.DLL
- NWLOCALE.DLL* 38K 11/2/93

The files marked with * are included in the Scalable SQL or Btrieve package. The remaining DLLs are provided by Novell. Other files which are provided by Novell are also used in conjunction with the Windows requesters, such as VIPX.386, VNETWARE.386, and NETWARE.DRV.

Refer to the Troubleshooting notes below for more details about the versions of these files. Note: the Btrieve Windows requester that is included in the Scalable SQL v3.01 package is the DPMI implementation which requires BREQUEST loaded before Windows.

The Scalable SQL and Btrieve Windows requesters use a file called BTI.INI which must be located in the users local Windows directory. The following sections and settings of this file are pertinent to using the requester:

- [Scalable SQL]
  - local=No
  - requester=Yes

- [Scalable SQL Requester]
  - datalength=4096

- [Btrieve]
  - local=No
  - requester=Yes

- [Btrieve Requester]
  - datalength=4096

The above settings instruct WXTQLCALL.DLL and WBTRCALL.DLL to load the Windows requester support, and to allow a datalength of 4096 (corresponding to the /d: parameter on the DOS requester used in the older configuration).

Troubleshooting

When troubleshooting the Windows requester, it is best to use a standard utility provided by Btrieve Technologies rather than a custom application. When testing the Scalable SQL Windows requester, use the SQLScope utility, which is included with Scalable SQL; when testing the Btrieve Windows requester, use the Btrieve File Manager, which is included with Btrieve for Windows. Refer to the appropriate Installation and Operation manual included with Scalable SQL and Btrieve for details on running these utilities.

Make sure you only have ONE copy of each of the files listed in the configuration section. They can be located in your WINDOWS\SYSTEM directory, your application directory, or a directory in your path. Search your entire local drive and all network drives that you are search mapped to for duplicates of these files; rename or delete any that are found that do not correspond to the sizes and dates listed above.

Check the SYSTEM.INI file in your local Windows directory; make sure the following entries are included in these sections:

```
[boot]
  network drv=netware drv

[386Enh]
  network=\vnetbios, vnetware.386, vipx.386

If you are running Windows for Workgroups and it is configured for both the Microsoft network and NetWare, make sure the SYSTEM.INI file contains entries similar to the following:

```
[boot]
  network drv=\wfinet drv
  secondnet drv=netware drv

[386Enh]
  network=\vnetbios, \vnetware.386, \vredir.386, \vserver.386
  secondnet=\vnetware.386, \vipx.386

Also, execute the Network Setup and remove the IPX/SPX compatible driver from the adapter. If this TDI layer is not installed, then the Novell VIPX.386 driver interprets SPX communications.

Check the versions of the following files in your WINDOWS\SYSTEM directory:

- NETWORK.DRV
- VNETWARE.386
- VIPX.386

The *.386 files should be dated October '93 or later. Also, there are two different NETWORK.DRV files - one is used in conjunction with NETX.EXE and one is used in conjunction with VLM.EXE. Make sure you have the appropriate version of this file. These files are part of the Windows support for NetWare, and are available from Novell.

Check the versions of the Novell DLL files used by the requesters:

- NWCALLS.DLL
- NWIPXSPL.DLL
- NWGDLDL.DLL
- NWLOCALE.DLL* 38K 11/2/93

These should have a date of November '93 or later. If you have older versions of these DLLs, you can download updated versions from the Novell forum on Compuserve, or obtain them from your local Novell reseller.

Make sure a DOS application using the DOS Scalable SQL or Btrieve requester can successfully communicate to the server engine.

To test Scalable SQL, load SQLREQ in a DOS box under Windows, and use the XQI utility to access a database on the network. Refer to the Scalable SQL Installation and Operation manual for instructions on using the XQI utility.

To test Btrieve, load BREQUEST in a DOS box under Windows, and attempt to run a DOS Btrieve application that accesses a file on the server. If you have a DOS version of the BUTIL.EXE utility, you can attempt to perform a BUTIL -STAT of a Btrieve file on your network.

If you do not have a DOS application, you can use the BSM.EXE utility that is available for download on Compuserve (file BTOOLS.EXE in LIB 5 of the Btrieve forum). Running "BSM <filename> *" after loading BREQUEST will attempt to open the specified file.

If these tests fail, you may have problems with SPX communication in general, rather than the Scalable SQL and/or Btrieve requesters. To confirm this, try running the NetWare utility RConsole.exe in the DOS box. The RConsole utility requires the REMOTE.NLM and RSXP.NLM components loaded at your server. If RConsole is unable to successfully access the server, you have an SPX configuration problem that must be addressed before Scalable SQL or Btrieve will work.

Consult your LAN administrator or your local Novell reseller for assistance in NetWare configuration.

If the DOS tests are successful but the Windows requester still fails to connect, the problem lies somewhere in the Windows network configuration. For example, a Windows for Workgroups user resolved the problem after finding an incorrect frame type setting in their NET.CFG and PROTOCOL.INI.

If you are attempting to use the requesters in a Windows session running under OS/2, first make sure they are working on a straight Windows workstation. If so, refer to the Technical Insight "Making Btrieve/BRequest Work In DOS/Windows Boxes Under OS/2" for more configuration specific to this environment.

Currently, the Scalable SQL and Btrieve Windows requesters will not work in a Windows session running an NT workstation. This is due to a problem in the Windows NT IPX driver support in conjunction with an application using the TLI and SPXI interface. It is not known at this time when a fix will be available for this combination. To avoid this problem, the older requesters which required the DOS TSR loaded before Windows (i.e. from AUTOEXEC.NT) can still be used.

Compiling Visual Basic™ for Windows

Btrieve for Windows 6.15

When compiling Microsoft Visual Basic™ for Windows applications, the error statement "Bad DLL Calling Convention" may be reported. This happens when an application does not
explicitly declare the DefInt A-Z statement prior
to the Btrieve function declaration.

There are two possible ways to solve this
problem. Add the DefInt statement, or redefine
the function declaration as shown in the
following example:

Declare Function btrcall Lib
"wbtrcall.dll" (ByVal Op% As Integer,
ByVal Pb$ As Any, Db As Any, DL% As Integer,
Kb% As Integer, ByVal KN% As Integer) As Integer

Slow Return from BSTOP and Btrieve
Appears to Halt
Btrieve for NetWare 6.x

A customer was experiencing two distinct
problems: the network was dropping packets
due to concentrator collisions, and status 95’s
(session no longer valid) were being returned
from Btrieve.

The customer consulted Btrieve
Technologies about the status 95’s and was
given the standard advice for this situation,
which is to raise the SPX timeout parameters
from the following defaults:

Net.cfg
SPX Abort timeout = 540
SPX Listen timeout = 108
SPX Verify timeout = 54

SPXConfg.nlm
SPX Watchdog Abort Timeout = 540
SPX Watchdog Verify Timeout = 108
SPX AckWait Timeout = 54
SPX Default Retry Count = 10

Notice that the Verify, Listen, and Abort
timeouts in Net.cfg, and the AckWait, Verify
and Abort timeouts at the server are in a 1:2:10 ratio.
Generally, it is advised that these parameters be
filtered, whichever is larger. Previous versions
of Btrieve.nlm would appear to halt. The reason for this was due to the
collisions that were taking place at the
concentrator. These collisions were causing
the packets to be dropped. Closer inspection
using BTRMION’S Statistics screen revealed
that SPXConfg was still sending packets, but it
was waiting a long time to resend them
because of the high SPX parameters. Because
of the long wait between retries, the users
were rebooting their workstations. The
collisions at the concentrator made the SPX
layer unstable. This instability contributed to
the status 95’s and made Btrieve unstable.

Using Get Next Extended With
Variable Length Records
Btrieve 6.x

A status 61 (Workspace too small) may
be returned by the GetNextExtended
operation. The file being accessed allows
variable length records, and the error is only
countered when a long record is accessed.

In this example, the application’s data
buffer for the GetNextExtended call is set up
to retrieve only the fixed portion of the record.
According to the “Btrieve for Windows
Installation and Operation Manual”, an
internal databuffer overflows producing a
status 61.

There is a buffer used by Btrieve when
processing extended operations. This is
configured by the /b: parameter. Currently,
you need to set the /b: parameter to the largest
record size that will be processed by the
extended operation. The /b: parameter is set to
a K value (16 means 16K which is the
default; 64 is the maximum).

Starting with the 6.15 release of NetWare
Btrieve, the use of this buffer has been
enhanced so that it only has to be configured
large enough to hold the data that is being
returned out of each record, or the data being
filtered, whichever is larger. Previous versions
require it to be configured to hold the entire
record.

Performance Problem with NetWare
Btrieve
Btrieve for NetWare 6.1x

A Btrieve application accessing the
Btrieve NLM on a NetWare server would
sometimes run very slowly with frequent
pauses, even though the server showed no
demand time, the Btrieve.nlm would appear to
halt. The reason for this was due to the
collisions that were taking place at the
concentrator. These collisions were caused
the packets to be dropped. Closer inspection
using BTRMION’S Statistics screen revealed
that SPXConfg was still sending packets, but it
was waiting a long time to resend them
because of the high SPX parameters. Because
of the long wait between retries, the users
were rebooting their workstations. The
collisions at the concentrator made the SPX
layer unstable. This instability contributed to
the status 95’s and made Btrieve unstable.

This problem was seen on a NetWare
3.12 server and a NetWare 4.10 server, both
of which had an NE3200 network card and an
incorrect NE3200.LAN driver. The problem
was corrected by updating the NE3200 LAN
card driver at the server.

File Versions Returned from Btrieve
File Manager
Btrieve 6.x

The Btrieve for Windows v6.15 product
is supplied with a File Manager that allows for
opening a Btrieve file and viewing its statistics.
The Version field can return several values.
This value corresponds to the minimal Btrieve
version which can support the file. Possible
values are:

3.00 Use Btrieve v4.00 or earlier.
4.00 The file uses new features in 4.10,
such as supplemental keys and key
types.
5.00 The file uses new features in 5.00
such as compression, key only, data
only files.
6.00 The file uses new features in 6.00
such as PATs, case-insensitivity, more
than 24 key segments.

If you want the version to display a
particular value, the file must be created with an
appropriate feature found in that version of
Btrieve.

Database Access across a WAN
Btrieve for NetWare
Scalable SQL for NetWare

If a requester, either Btrieve or SSOL, is
unable to see remote file server, make sure all
routers are configured so they are not filtering
Btrieve or Scalable SQL SAP (Service Advertising
Protocol) packets. Btrieve advertises as service 75
(4B hex), and Scalable SQL and named
databases advertise as service 76 (4C hex).

Status 11 in Xtrieve with Btrieve 6.15.x
Btrieve for DOS

When Btrieve for DOS v6.15.x is used in
conjunction with Xtrieve PLUS to access a file, a
Status 11 (Invalid File Name) will be returned if
the dictionary contains a relative path as part of
that file’s location. For example, suppose the
dictionary contains a location of
APPATENTS.DTA for the Patients table, which
is located under the F:\APP\DATA directory. In
order for Xtrieve to find the file, the XTRPATH
environment variable is set to F:\APP\DATA.
However, when attempting to read from the
Patients table, a Btrieve status 11 is returned.
(This problem does not occur when using Btrieve
for DOS v5.10a.)

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If the user’s current working directory is the same as the XTRPATH setting when Xtrieve is
started, the status 11 will not occur. For example, if Xtrieve is started from the F:\APP\DATA
directory, the F:\APP\DATA\AP\PATIENTS.DTA file will be opened successfully. The Xttrieve
executable does not have to reside in the F:\APP\DATA directory, nor do the DDFs. It just has to
be the user’s current working directory.

Accessing Local Files With Btrieve For DOS
Btrieve for DOS 5.x

When accessing a local file with Btrieve for DOS, the time it takes for Btrieve to read
the next physical record increases as it gets deeper into the file. This situation is due to the way DOS
handles the FAT (File Allocation Table) for random accessed files. The larger the file, the longer it
takes to do a sequential search of the FAT in memory. Sometimes it will actually thrash the DOS
buffers, thus producing an increase in access time. To avoid this problem, open the file in
Accelerated mode or Exclusive mode and/or increase the BUFFERS in the Config.Sys.
I have heard these questions dozens of times. The first two questions never got me into looking at the details of Btrieve file sizes. I always figured, “It almost does not matter. Disk space is cheap. Get 4 times what you think you might need, and you will have no problem.” The last question did get me thinking about this issue for the first time since the time I wrote a system that was intended to have the Btrieve database reside on floppies. If you are specifying what size disk drive should be purchased for hundreds of machines, that 4x multiplication factor mentioned above seems a bit lame. “Boss, I think we need 1 gig drives on each of 300 machines for the XYZ project, but just get 4 gig to be safe…” I decided that maybe this issue deserves more thought.

Why is it so difficult to predict file size? Btrieve files are not just data. Some other database/record manager systems have two types of files: Data files and Index files. In dBase III, the last of the dBase and descendants that I am actually familiar with, the data file contained a minimal header, followed by the records and an active flag for each record. Using the data file only, you could do little more than scan through the files and get them back in retrieval order. dBase files use index files that contain the information required to look at the records in some other order.

Btrieve files contain everything required for accessing the file in a single file, with each type of information contained on individual “pages” of the file. If you are not familiar with the concept of pages in a Btrieve file, refer to the last two installments of this column, where I have beaten the subject to death. Suffice it to say that the issue of pages is critical to understanding how Btrieve files get to be the size they do.

Look at figure 1. This is the statistics screen from my BTFILER utility that displays information on a Btrieve file, WRIN.DAT. This is a fixed length, version 4 format file. Note that if you create a Btrieve file with Btrieve 5.x and it does not take advantage of any 5.x related feature, such as variable length, Btrieve 6.x will report the format as 4.0. In addition to the normal statistical information such as record length, page size and number of records, it reports “Bytes per Record” and “% utilization”. These
potentially confusing values have very specific meanings. Bytes per record simply means the total size of the file divided by the number of records it contains. This is not the same, and in fact will never be the same, as the record length! In the example in figure 1, notice that the record length is reported as 770, and the bytes per record is reported as 1018. This means that although each record is only 770 bytes long, the overhead of the file, the 8 indices or keys, the File Control Record (FCR) and in version 6, Page Allocation Table (PAT) pages, and space where deleted records were takes up an additional 248 bytes per record. The percent utilization simply measures the space devoted to data as a percent of the total file size, in this case, 75.6 percent.

To try and get a better feel for the actual overhead, I packed this file - essentially doing a CLONE followed by a COPY to ensure that no space was taken up by deleted records. The record length, of course, remained the same. But the bytes per record was reduced to 994. This file had very few deleted records, but the deleted records did take up, on average, 24 bytes per valid record. Percent utilization increased to 77.5 percent. Note that if I deleted every record from the file, the file would still take up exactly the same space on the disk unless I did the equivalent of the pack previously mentioned. An empty clone of the WRIN.DAT file, built in version 4.0 format, takes up 40960 bytes. This is the file with 0 records!

Some quick math indicates that since the page size is 4096, there are 10 pages in this file. I believe that there is a page for the FCR, a page for each index, and an empty data page. Looking at the file in a hex editor, it appears that the only index page that looks as if it is properly set up (that is, with the bytes that indicate a page belongs to a particular index in a Btrieve 5.x file) is a page that is for index 0 (also, the only index that does not allow duplicates and is not a NULL key). The same file, created in version 6 format, has 13 pages. The pages are: 2 FCR pages, 2 PAT pages, 1 for each index (for a total of eight) and one for data.

In the case of the version 6 file, all the pages have what appear to me to be the details in the header to clearly identify them. This file size will not increase for some number of records. Determining that number will help determine the size of the file as it grows.

The record image of 770 bytes is the major part of the data page, but there are other things associated with each record that take space on the data page. From what we know about Btrieve version 6 files we know that the physical record length of each record is stored in the header of the Btrieve file. At bytes 18-19 hex, we find 34 03. Byte swapped, this gives us the value of 334 hex, or 820. What are the additional 50 bytes used for? Two bytes are used for a usage count, and

![Figure 1 - File Statistics for Sample File WRIN.DAT](image-url)
an additional 8 bytes are used for each of the 6 indices that allow duplicates. From this we know that each of the data pages (which are 4096 bytes long) can contain 5 records, with some waste. From this, we can expect to use 70 data pages (346 records/5 per page equals about 70). If we are looking for the actual size while a file is being used, when we can expect that uncommitted data pages exist (pages written that will become “good” data pages and get a higher usage count than the previously “good” page), we would multiply this by some “fudge factor.” For instance, if the file in question is almost always having new records inserted, rather than existing records updated, this factor would be very low (as small as 1.05). If the file has large numbers of updates that are not localized (that is, updates to records that were added at about the same time) you should make this a lot larger (perhaps as large as 1.4).

The other major space-users in a Btrieve file are the index pages. This is the area where we begin to see that file size determination is more an art than a science. We can see from figure 1 that index 0 is made up of four segments, and the total length of all segments is 19 bytes. Since index 0 does not allow duplicates, our job is easier. Each index entry is made up of a 4 byte logical page pointer to the “less than” record, the actual key value (in the example above, 19 bytes), and a pointer to the first record with the key value. If the key allows duplicates, there is an additional 4 byte pointer to the last record with this value. In this example, each entry will be 27 bytes. We can expect to fit 151 index entries on each page. With 346 records, we can expect that index 0 will consume 3 pages.

Look at listing 1. This lists the indexes in the file. Index 0 is the index just discussed. For other indices, we have to do the calculation of the size of each index entry, and then (this is where it gets messy) guess how many unique entries for each key will be in the file. The calculation of the size of the index entry is straightforward: 4 bytes for the “less than” pointer, 10 bytes for the actual key value, and 8 bytes for the first and last record pointers, for a total of 22 bytes. Taking into account the 12 bytes overhead on an index page, we can fit 185 entries on an index page for index 1 (4096-12=4084, 4084/22 equals about 185). With this, we can tell almost nothing about how much space this index will contribute to the overall size of the final file.

Using our knowledge about the file, we can say that there will be relatively few different corporations (in the test file, a grand total of 3!). This means only one page should be needed for index 1. In reality, we can expect that at least 2 pages will be used in a Btrieve 6.x format file, since there will be an “old” page as well as a current page as changes are made.

Many of the other indices in the file are dates, and one would expect that they would not be unique, and there can only be at most one entry per day, per year that the files cover. Each index entry for a date takes up 16 bytes. 255 index entries will fit on each page, and if you are only concerned with work days, a rough approximation will be one year on each index page. If every day can be an entry, each year will take up about 1.43 pages.

Index 6 is a NULL index. This means that not all records will be indexed. If a record has all of the NULL indexed field filled with the NULL value (in this case, 32 - see Figure 1) then the record is not indexed. So, what we need to know about this index is the number of records we expect to be indexed, and since the index does not allow NULLs, simply calculate the number of pages filled using the formula mentioned above for the non-duplicate index 0.

I purposely selected a version 5 file to begin with. My intention was to see if what I know about this file would hold true for the version 6 copy of the file created with BTRIEVE.EXE 6.15. We know that the overhead in a Btrieve 6.x file is at least 4 pages (2 FCR’s, 2 PAT’s). In addition, I expect the data will take up 70 pages. Index 0 will take up 3 pages, and each additional index will take up about a page or 2. Allowing for some slop, I expect the file will take up about 90 pages. I had not done the rebuild in version 6 format until I actually wrote down my guess. And
the result of the actual test was... (drum roll, please...) 141 pages.

Surely, there must be a mistake. Perhaps if I pack the file. Yes, that will do it, I’m sure of it. Well, not exactly. Would you believe 158 pages? Sigh. Not one to give up easily, I took the same file, all 158 pages of it, and re-built it on a Novell network, using Btrieve 6.10c on the server. The file was significantly smaller at 112 pages, but still far larger than my guess.

At this point, my interest in the file size was less important than the difference between the two file sizes. This was troubling. Realizing that the most recent Btrieve 6.15 for DOS update was sitting on my hard disk, but not yet unpacked, I placed the update in the proper directory, and after rebuilding, the file was now somewhat smaller than the previous 6.15 file, but still too large at 150 pages. I have some thoughts on the matter, but I will reserve judgment until I get the word back from BTI.

What conclusions can we draw from my failed experiment? First, Btrieve 6 files are almost always bigger than their 5.x counterparts. My estimate for the size of the file was almost perfect for the version 5.x file, which turned out to be 84 pages. Very close, when you remember that right off the top, Btrieve 6.x files have 3 extra pages of overhead. Version 5 files have slightly different amounts of overhead per record as well.

Second, if you know your data, and if you work through the experiment that I worked through, you should be able to come up with an estimate that will be correct for version 5.x and will be about 60% of what you can expect in a real version 6.x file. Considering that the file will not require an additional .PRE file, which could sometimes grow quite large, the overhead is not all that bad.

Notice that we have been dealing with fixed length, non-compressed records. The fixed record image for records that allow variable length will be 4 bytes larger, with trailing blanks truncation adding 4 bytes of overhead as well. Compressed records add another wild card to the deck. These files will be almost impossible to estimate size. Experience with your data will be required for variable, compressed or blank-truncated records.

<table>
<thead>
<tr>
<th>Key</th>
<th>Segment</th>
<th>Field Name</th>
<th>Type</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>WIN CORP</td>
<td>NO-DUP</td>
<td>10</td>
</tr>
<tr>
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<td></td>
<td>WIN PID</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>WIN DATE</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>WIN TIME</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>WIN CORP</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>WIN DATE</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>WIN DATE RETURN</td>
<td></td>
<td>4</td>
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<td>4</td>
<td>0</td>
<td>WIN DATE RESTRICTED</td>
<td></td>
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<td>0</td>
<td>WIN DATE FULL DUTY</td>
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<td>4</td>
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<td>10</td>
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<tr>
<td>7</td>
<td>0</td>
<td>WIN DISCHARGE DATE</td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

Listing 1 - Index Characteristics for Sample File
In the first two parts of this series, we discussed opportunities available for the Btrieve developer in assisting companies in getting the most from their accounting software. The second column discussed low end, inexpensive Btrieve-based packages. In this last of three parts, we cover high-end accounting packages which use Btrieve.

High-end accounting encompasses software costing from $600 to $3,000 per module. These packages often come from minicomputer roots, and in the past, ran under DOS or UNIX. Standard modules include Accounts Receivable, Accounts Payable, General Ledger, Inventory Control, Order Entry, Purchasing and Report Writers. All have multi-company capability. Most sell through VARs, and few directly or through retail channels.

CA-ACCPAC/2000

The largest company in our roundup, Computer Associates does extensive cross-pollination between its various lines of accounting, and the higher-end Masterpiece series and CA-ACCPAC/2000 are an example of this heritage. CA’s diversity in accounting software, from home finance and taxes, now part of the 4Home Productions subsidiary, to small business (Simply Accounting), to mid-range PC (ACCPAC BPI), to ACCPAC Plus, to accounting software for minis and mainframes, means that the importance of the PC line is diluted, but can benefit from lessons learned elsewhere. CA promises a seamless data growth path from Simply Accounting up through ACCPAC BPI, ACCPAC Plus and so on.

CA-ACCPAC/2000 General Ledger and System Manager (which provides common services and application services (like their visual report writer and designer) are the only modules shipping after one year. Plans for other modules are yet to come, as well as plans to operate on other platforms besides DOS, Windows, and NetWare. Customer demand will drive development. The system uses Btrieve 6.

CA-ACCPAC/2000 is targeted at DOS high-end users looking for more functionality. All of the key field sizes are much larger than its DOS brethren (e.g. 45 digits in the General Ledger chart of accounts, 22 digit invoice identification number, 14 digit vendor number and customer identification number).

As with most higher end products, you will be able to customize CA-ACCPAC/2000 screens and reports. CA plans to tie together mixed DOS and Windows platforms by providing a data migration from DOS sub-ledgers to the Windows General Ledger. The General Ledger boasts a powerful financial reporting engine, extended budgeting capabilities and more flexible import/export capabilities, including DDE. Drill down capabilities let you find the underlying transaction detail by clicking on a summary number.

The visual report designer, based on the CA/RET report writer, lets you modify standard reports, add logos, and change fonts. You can completely redesign invoices with the visual report writer. Some data entry screens will be also re-arrangeable at the end user level. Other parts of the CA-ACCPAC/2000 include their Realizer Basic and SuperCalc spreadsheet.

CA-ACCPAC/2000 will come in single user and network versions. The single user General Ledger is $1,295 and the system manager is $595. We reviewed version 1.05. An immediate turn off is the parallel port copy protection device. Running programs is done by selecting icons from program groups - it seems like it might be easy for the average user to accidentally erase the icons. Screens are clean; detail lines are on the same screen as the headers information, so it is easier to follow the data entry flow with this product than with its comparable competitors.

The system exudes power, but seems slow. Features include huge field sizes, search routines that can filter information on-the-fly, a macro language based on Basic, optional user designed tables, multi-company and multi-currency support, and almost unlimited history retention. Financial statement setup is much like using F9, a marked improvement from ACCPAC Plus. The System Manager and General Ledger alone took up almost 50 MB so the system isn’t for those cramped for disk space. Contact Computer Associates International, Inc. at (800) 225-5224 or (516) 342-5224.

Accounting Vision/32

AV/32 versions are available for Windows, OS/2, and Windows NT. Data files are interchangeable among versions. Database choices include Btrieve and Scalable SQL. Screens are modifiable at the User and Global level, and all changes are contained in overlay files that are not affected by program
updates. DDE and import/export capabilities are strong. AV/32 is multi-company and multi-currency.

Additional user defined fields are available, and can be easily maintained on a second screen. Items can be hidden and renamed. Any function can be placed on the desktop as a push button, bitmaps can be added for decoration, and important operating information can be displayed. All reports and help screens are user modifiable. Menus can be modified by the user to remove unnecessary items. AV/32 boasts superior searching capabilities, intercompany transactions, and date-sensitive, unlimited general ledger history. You can enter 4 budgets per year, and restrain entries to the budget.

Available modules include a 12-digit General Ledger with Check Reconciliation, with options including 25 and 50 digit General Ledger accounts, Fund Accounting, Accounts Payable, Accounts Receivable, Inventory Management, Payroll, Point of Sale, and Sales Order. Purchase Order is planned for release soon, and Job Cost is planned, but not scheduled. Modules range between $995 and $7995 per module - $1,495 per module for the 5 user network version without extra General Ledger digits.

AV/32 is a powerful and flexible system for wholesale, retail and not-for-profit businesses. It’s somewhat stark desktop begs you to add groups of push buttons for common tasks. AV/32 has task-oriented, rather than module-oriented menus, and using its data entry screens can be confusing - the system does not lead you through the data entry process as well as some other packages. Rather than cram all of the necessary fields onto a screen or two, push buttons that take you into detail lines, addresses, comment fields and optional areas litter the screen. However, with a little training, your users should get a lot of support from this system. Contact Intellisoft, Inc. at (800) 933-4889 or (817) 467-7243.

**CYMA IV/Accounting for Windows**

CYMA Systems, Inc., is an established provider of DOS-based accounting software. CYMA has also recently announced CYMA IV/Accounting for Windows. The product consists of a series of interoperable modules that can be opened simultaneously.

CYMA IV/Accounting for Windows has four foundation modules: system manager and accounts payable (in beta for almost one year), general ledger and accounts receivable (no scheduled release date). Additional modules will include a report writer and payroll, inventory and order processing, job control, client accounting, and bank reconciliation modules.

CYMA IV/Accounting for Windows boasts a simplified, consistent Windows interface, extensive context-sensitive help facilities, flexible network configuration, and cross-platform integration. No plans are made at this time for screen modification capabilities.

The software, which uses Btrieve to store its data, is also compatible with CYMA’s DOS-based PAS III software. The data dictionary files necessary for access by third-party tools are easily available, and are used by the Crystal Reports DLL engine for reporting. Each CYMA IV/Accounting for Windows module is priced from $795 to $995 each. System managers range from $295 to $1295.

Custom data fields are extremely easy to set up. Screens are clear and the menus, modular by nature, are easier than others to follow. Some of the data flow in the Beta version was hard to follow, but some of the user interface issues will be cleaned up by the time the software makes it into production. Smaller field sizes than most (6-digit AP vendor, 16-digit General Ledger accounts) are a weakness; user notes, cash or accrual options, and the customizable user fields are a strength.

If you are a present CYMA user or looking for a system that will not confound you with too much sophistication, CYMA IV/Accounting for Windows will be a natural choice. As in their DOS version, the ability to easily add user-definable fields that can be used in reporting is a major strength. Contact CYMA Systems Inc. at (800) 292-2962 or (602) 831-2607.

**Great Plains Dynamics LAN Release 2**

Great Plains was the first major vendor to market high-end, customizable accounting software, but initially suffered adverse publicity due to its perceived sluggishness and the lack of an order entry or purchase order module. Dynamics LAN now has better performance, if you have powerful enough equipment. Module prices range from $1,000 to $2,000. Shipping modules include General Ledger, Payable Management, Receivable Management, Invoicing, Inventory Control, U.S. and Canadian Payroll. Future modules include Sales Order Processing, Receiving, Purchase Order Processing, and Cash Management. A higher end client/server version is priced at $5,000 to $40,000.

Dynamics LAN ships for Windows, Windows NT, Novell, Macintosh, and Power PC clients. Great Plains is long on customization tools. Along with the strength of the basic system, there are many end user and consultant tools for turning the software into what you want. The tools include Dexterity - a 32-bit, graphical, cross-platform, 4th Generation Language development system written in industry-standard ANSI C code, available to customers and consultants. Scalable SQL in Dynamics LAN Release 2.0 will give access to Dynamics data files. Their developer’s kit will allow any developer using virtually any tool to access Dynamics data, including Visual Basic, Microsoft Access, R&R Report Writer, Crystal Reports, and other Btrieve and Scalable SQL access tools. ODBC drivers integrate Dynamics data with all ODBC-compliant applications, and DDE adds inter-application communications capabilities.

The Modifier lets you modify screens including importing graphics, changing prompts, and removing fields, all without changing underlying source code. However, it cannot add logic or new fields.

Dynamics LAN requires 32-bit Windows, which may require additional setup on your systems. In addition, it takes up a great deal of hard disk landscape.

The screens are attractive, although the number of push buttons next to each field is confusing. The system is task-oriented, and it can be difficult sometimes to find a particular task. Line items are on the same screen as headers, an advantage. Field sizes are generous - 20 digit General Ledger accounts, with an option for up to 45 digits. Data entry is intuitive.

The Dynamics order entry and purchasing systems have not yet shipped. Sales order processing and multicurrency management are both scheduled to be released with the May 1995 2.1 release of Dynamics LAN. An interesting feature in the Sales order processing system is an unlimited number of process holds, used in work flow management.
Great Plains Accounting Version 8.0 (for DOS)

Great Plains text-based system has at least one more life in it - time will tell if it has the staying power of a cat or not. If you are concerned, a migration kit from Great Plains to Dynamics LAN is readily available.

Always a solid package from a company known for its support, Version 8 keeps the DOS version of Great Plains competitive. In the race to provide customizable screens, Great Plains has fired a salvo with its new Windows Editor, which lets you change screen text and prompts, add defaults to field entries or remove them from the screen, and add comments on the data entry and master file screens.

Modules include Accounts Payable, Accounts Receivable, Cash Management, General Ledger, Payroll (US or Canadian), Inventory, Order Entry, Purchase Order, Job Cost, and Project Tracking. Version 8 improvements include enhanced security, printing and inquiry capability, enhanced inventory capabilities, including serial and lot processing, and improved reporting. Module are priced from $295 to $1,295. Contact Great Plains Software, Inc. at (800) 456-0025 or (701) 281-0550.

Libra Signature Version 4.0

Formerly known as specialists in construction software, Libra has changed their vertical focus to high end accounting in a multi-company environment.

Signature is a very robust package, offering strong accounting and branching off into other vertical markets, such as construction companies, retailers, restaurants, and not-for-profits. Entries can be made multi-company or split across companies. Available modules which include the cross-company capability include Accounts Payable, a General Ledger which includes encumbrance accounting for non-profits, Accounts Receivable, Billing, Payroll, and Order Entry. Also available are Cost Accounting, Inventory, Purchasing, and Client Write Up. Prices range from $795-$1,295 per module.

In addition to multi-company processing, Signature offers user-defined maintenance and data entry screens. The system can have 999 databases and 99 companies per database, making multi-company processing faster and permitting file inquiry across companies, vendors, and customers.

Signature has been running under Btrieve for 5 years. Something unusual about their filing system is that the data structure for each system is unique, and is built by the system after a setup questionnaire is entered. Although transaction files are not configurable, the master and detail files for every Signature system are different, which may make doing external Btrieve development for more than one customer a challenge. Libra was not made available for our review. Contact Libra at (800) 453-3827.

Macola Progression

Macola, Inc. is positioning itself for the nineties to provide technologically advanced accounting systems that preserve a company’s present investment in hardware, software, and training, while giving customers tools to tailor their system to their own particular needs. Macola has the ratings (four consecutive PC
EnVision ERS Report Writer works in a similar manner to Windows packages like Microsoft Access. In addition, the designer seemed intuitive for anyone accustomed to working with and manufacturing depth unmatched by its chief rivals. However, not all of the MCBA programming has been replaced, resulting in some out of place questions and fields.

Progression Series 6 with Dual System Manager is the total set of modules from Macola, available in Windows and DOS. The Windows version has full mouse support, Windows boxes and conventions, and a graphing engine based on their EnVision report writer. However, version 6 does not contain the customization capabilities included in version 7. There is no MDI - that is, you must fire up a completely new program to get a second Macola window. Version 6 has largely the same function set between DOS and Windows. All of the version 6 modules are available under Windows. This includes a full set of accounting, distribution, and manufacturing modules. Modules include Accounts Payable, Accounts Receivable, Bill of Materials, Capacity Requirements Planning, Customer Order Processing, Fixed Assets, General Ledger, Inventory Control, Job Cost, Labor Performance, Maintenance Management, Master Scheduling, MRP, Payroll, Purchase Order, Standard Product Costing, and Standard Product Routing. Accounting and distribution modules range from $995 to $1,895. Manufacturing modules are $2,500 each.

Macola’s EnVision Enterprise Reporting System has been designed with graphics that can update on a real-time basis and sophisticated report designing capabilities that let you work in graphical, detailed, and outline modes. There will be developer and end-user versions available. With EnVision ERS you can access one or multiple database types simultaneously, including Scalable SQL, dBase, Microsoft SQL, or Sybase.

Progression 7, which has started shipping in part as of April 1995, is true MDI, and offers screen, menu and report customizability, although field sizes will not be alterable. You can mandate, hide, default, and list entry fields, by user, redefine order of entry, group areas of the screen, and even move fields between screens.

Modules now shipping include General Ledger, Accounts Receivable, Accounts Payable, Currency Manager and Bank Book. F9, a spreadsheet link, is also available.

Reports can be customized in EnVision. EnVision reports can be run from its menus. Accounting will be batch oriented, so individual clerks can enter and post entries independent of others performing the same task.

Macola 6’s strength is its depth. Largely a DOS transplant under Windows, it is slightly more awkward to work with than its brethren designed for Windows. However, it offers distribution and manufacturing depth unmatched by its chief rivals.

Version 7 adds to depth and user interface. The screen designer seemed intuitive for anyone accustomed to working with Windows packages like Microsoft Access. In addition, the EnVision ERS Report Writer works in a similar manner to Microsoft Access. Contact Macola, Inc. at (800) 468-0834.

M*A*S 90 for Windows

Almost three years ago, with great fanfare, State of the Art held a phone conference announcing Momentum, its next generation graphical accounting package, with a cross-platform development language and capabilities to tame Great Plains Dynamics.

Now the costs of the development language have been written off, and development has been postponed to get out M*A*S 90 for Windows, a Windows version of the present M*A*S 90 line of products. M*A*S 90 for Windows will be Btrieve-based, permitting better access to data files for those who can’t program in Business Basic. It may be written in Visual Basic.

For ease of use and flexibility, the M*A*S 90 product line, as it stands, is one of the best. We feel that it is the most intuitive product there is in its class. The program leads you through most processes automatically, asking you if you would like to proceed onto the next logical step in data entry. In most cases, the Windows versions of accounting packages rely more on your being able to find your way around and knowing the next step than the DOS packages!

M*A*S 90 for Windows’ release is dependent upon the release of Windows 95. Although we have not seen M*A*S 90 for Windows, preliminary information showed a blend of the best of the DOS package with superior lookup and movement capabilities added. We anxiously await its introduction. Contact State of the Art, Inc. at (800) 854-3415 or (714) 753-1222.

Platinum Accounting

Platinum accounting software was written from the ground up for the PC platform and was an early user of Btrieve. Recent business setbacks are now being overcome by a new management team and funding. The Platinum product has a strong database feel, and considerable power and flexibility, with a level of sophistication and complexity that make it best suited for those who need its power.


Platinum has available interfaces for almost any Btrieve tool. However, there is little end user screen or field customization capability, and a long promised Windows version was not available for our review. Contact Platinum Software at (800) 999-1809 or (714) 453-4000.

RealWorld Accounting

RealWorld has been slow in introducing a high-end Windows accounting package. As of April 1995, the first modules of their version 7 for DOS are due to ship, aimed at an audience of corporate back room accounting. Plans for a Windows version are less formal, with a Microsoft Access front end being developed and version 8 slated to have a Windows release.

See Accounting on page 36...
Clarion for Windows is a complete application development system that uses a database dictionary, interactive code generator, and a comprehensive 4GL language coupled with a well proven optimizing compiler that generate true native code which rivals the performance of C or Pascal compilers. The application generator interacts with the developer through user-modifiable templates which are written in a completely documented and accessible scripting metalanguage. All application development tools are integrated through the IDE and work together to provide a seamless application development framework. Editors, windows formatters, report developers, option selections, and visual design tools are all available through simple pull down menus and icon buttons.

TopSpeed Corporation, the developers of Clarion for Windows, is the result of a merger between Jensen & Partners, International (JPI) of England and Clarion Software located in Pompano Beach, Florida. Niels Jensen, the founder of JPI was an original founder of Borland.

Unique Register Calling Convention

Clarion for Windows uses the same high performance optimizing compiler as the rest of the TopSpeed family of languages (C, C++, Pascal, Modula-2). One of the hallmarks of this compiler is the ability to pass parameters through registers whenever possible. Most other compilers use stack-based parameter passing, for example Windows internal API calls use the Pascal calling convention. Of course there are only so many registers that can be used at one time, so after Clarion has used registers AX then BX then CX then DX, it reverts to passing parameters on the stack. Clarion functions with short parameter lists that can take advantage of register-based usage, which can show a significant boost in performance over other compilers.

I had a need to count the number of bits set to One in a 32 Bit long integer. An old programmers trick is to test the High Bit of the signed long integer (a negative value indicates that the bit is ON). If it is ON then increment a counter, do a bit-wise shift to the left by 1 bit and repeat until all bits have been tested. There are better algorithms for counting bits (I found 7 other algorithms) but this one is simple and serves as a good example. The Clarion code for this function was elegant in its simplicity, see Listing ##. The function called, BIT_COUNT(), simply accepts a LONG integer as a parameter, performs the count, then returns a SHORT integer which contains the results. This function is completely reusable and can be compiled as an OBJ or added to a LIB or DLL file. The next time I need to use this function, I only have to link it in to my new application.

Curious about the efficiency of the optimizing compiler, I disassembled the BIT_Count() function and examined the assembly language listing. The results are shown in Listing ##. If you are familiar with assembly language, you will notice that everything took place in registers! If I had written this algorithm in with most C or Pascal compilers, the parameter would have been passed on the stack. Also, some of the bitwise operations may have required additional calls to internal library functions. With Clarion, all operations were rendered with pure assembly language. And not surprisingly, performance tests showed that the Clarion produced algorithm was significantly faster than that of other compilers.

Of course not all Clarion source code is converted into pure assembly language. But Clarion’s internal register-based calling convention makes these necessary function calls perform at “top speed”. Connectivity to external routines written in other languages is possible through Clarion Function Prototypes. This allows you to specify the...
calling convention as C (stack-based, right to left), PASCAL (stack-based, left to right), or use the TopSpeed Register-based convention. As an example, I tested a Clarion internal API function for copying null terminated string by memory addresses with a similar function found in the Windows API (Clarion API: _strcpy and Windows API: LSTRCPY). In an iteration test, the Clarion internal function proved to be about twice as fast as the Windows API function. With the current version of Clarion for Windows (version 1.002) most of the common language functions are in a single runtime DLL. But this isn’t a standard Windows DLL. Again, wherever possible, Clarion is communicating with this DLL through register-based parameters for maximum performance.

Self-Extensible

Clarion for Windows is self-extensible. That is, the Clarion language itself can be used to extend and personalize the language. I wanted to create a simple scrolling list box that will display all of the current environment variables. There is an excellent example of how to do this in Charles Petzold’s book, PROGRAMMING WINDOWS 3.1 from Microsoft Press. He shows how to create this list box in just three pages of cryptic C code.

I recreated this mini-program in less than one page of simple, readable Clarion code, see Listing 3. I could also use this same source code to create a reusable LIB or add this as a function to a DLL. Once again, the TopSpeed compiler produced output code that is as fast as or faster than C code.

Multi-language within same IDE

Clarion for Windows ships with a built-in TopSpeed C compiler. C code modules can be blended into a Clarion application seamlessly. The TopSpeed single backend compiler technology will compile and link the two languages together without fuss. The Clarion external function prototyping system allows complete connectivity to the Windows API.

Database Drivers

Clarion for Windows supports a variety of database drivers through direct connections with DLL files. Supported files systems include: ASCII, Basic, Btrieve, Clarion, Clipper, dBase III, dBase IV, DOS binary, FoxPro and FoxBase, Paradox 3.5, and the new high performance TopSpeed driver. The ODBC (Open Database Connectivity API) Windows DBMS interface is also supported. An ISAM database driver developers kit is also available for those that need to “roll their own”.

Btrieve Connectivity

Clarion uses a set of universal database record access commands that hide the complexity of the underlying database driver. Simple commands like ADD(file) and DELETE(file) are used to perform records operations that are “polymorphic” and will be translated then passed on to the appropriate database driver. Btrieve connectivity with Clarion is simple and direct. You can forget about Btrieve Operations Codes and long lists of parameters. Likewise, Btrieve returned Status Codes are intercepted by Clarion and mapped into the appropriate Clarion Errorcode if necessary.

Clarion for Windows supports all of the Btrieve Extended Key Types either directly or through simple workarounds. Clarion uses a rule-based automatic data type conversion system to allow the easy mixing of data types in expressions. For example, Clarion’s standard date and time functions are designed to work with LONG integers. However, if these functions are used with Btrieve-style DATE and TIME data types as parameters, all internal data conversions are transparent and require no special attention by the programmer.

Multi-language within same IDE

Clarion for Windows ships with a built-in TopSpeed C compiler. C code modules can be blended into a Clarion application seamlessly. The TopSpeed single backend compiler technology will compile and link the two languages together without fuss. The Clarion external function prototyping system allows complete connectivity to the Windows API.

Note: The Btrieve data types Logical, Money, and Numeric are not directly supported but can be emulated by using other Clarion data types. Clarion also provides a variety of other “legacy” data types that makes connectivity with other language systems convenient. These alternative data types can be used in Btrieve record structures but they are not recognized when used as components in Btrieve.

Figure 1 - Clarion has extensive on-line help

Figure 2 - Debug Window
keys. So, some caution is necessary.

Clarion does not directly support Btrieve Autoincrementing fields. However, if a Btrieve file is created outside of Clarion and uses AUTOINCREMENT fields, then Clarion will graciously allow the Btrieve engine to increment these fields (as long as Btrieve’s rules are followed, i.e. upon adding a record, if the field is 0 then it will be assigned the next number). Clarion does however provide its own code-based technique for autoincrementing fields as a Database Dictionary selection. This technique works across all database driver formats, not just Btrieve.

Clarion developers have been successful in interfacing directly to popular software that uses Btrieve data files, such as accounting modules from Great Plains and Platinum. Vertical market application written in Clarion and using Brieve are starting to emerge.

Btrieve dynamic link libraries for Windows development is included with Clarion for Windows (WBTRLOCL.DLL, WBTRCALL.DLL, WBTRVRES.DLL, etc.). A developer-only license is included with the Clarion for Windows registration agreement. A redistribution license from BTI is needed to distribute applications.

<table>
<thead>
<tr>
<th>Btrieve</th>
<th>Clarion</th>
</tr>
</thead>
<tbody>
<tr>
<td>String</td>
<td>STRING or BYTE array</td>
</tr>
<tr>
<td>Integer (2 bytes)</td>
<td>SHORT</td>
</tr>
<tr>
<td>Integer (4 bytes)</td>
<td>LONG</td>
</tr>
<tr>
<td>Float (4 bytes)</td>
<td>SREAL</td>
</tr>
<tr>
<td>Float (8 bytes)</td>
<td>REAL</td>
</tr>
<tr>
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</tr>
<tr>
<td>Bfloat (8 bytes)</td>
<td>BFLOAT8</td>
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<td>CSTRING</td>
</tr>
<tr>
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<td>Date</td>
<td>DATE</td>
</tr>
<tr>
<td>Time</td>
<td>TIME</td>
</tr>
<tr>
<td>Unsigned Binary (2 bytes)</td>
<td>USHORT</td>
</tr>
<tr>
<td>Unsigned Binary (4 bytes)</td>
<td>ULONG</td>
</tr>
</tbody>
</table>

Table 1 - Btrieve-Clarion Data Type Conversions

After Market Add-ons

A strong after market of third-party add-ons for Clarion for Windows is starting to emerge. Customized Templates, code libraries, programmer utilities, books and publications are now available. Most Windows DLLs written in other languages will work with Clarion for Windows. Many Visual Basic VBX (Level I) controls can be used. An interface to InterSolv’s PVCS, a popular software configuration management tool, has been announced by a third-developer. Interfaces to Lotus cc:Mail, Lotus Notes, Folio VIEWS, and other popular will be available soon.

The Future

A combination 32 and 16 bit compiler is now in Beta Test. This single development environment will produce both Windows 3.1 or Windows ’95 applications with little more required than flipping a selection switch. Client-server database drivers for Oracle, Sybase, and others will be available soon.

If you require a complete, high performance, professional Windows application development system then consider Clarion for Windows. It’s the shortest from inspiration to application.

Randy Goodhew is the Editor in chief of The Clarion Tech Journal, an independent publication of the PC Information Group, Inc. He is the Executive Editor and co-author of the book Tips, Tricks & Templates for Clarion Database Developer and he is the developer of the Advanced Language Extensions for Clarion for Windows.
Accounting... Continued from page 32

RealWorld is one of the oldest manufacturers here, with a huge installed base. Modules available include Accounts Payable, Accounts Receivable, Check Reconciliation, General Ledger, Inventory Control, Job Cost, Order Entry, Payroll, Professional Time & Billing, Purchase Order, Sales Analysis, and Sales Management Solutions.

RealWorld software is solid and clean. The company makes source code available, and a huge directory of third party modifications for every industry, need, and platform is available. Version 7 improvements bring the software up to the standard of most of the DOS competition, with features that will be of special interest to larger organizations: security that extends to reports printed to disk, retention of audit reports after their printing for user defined periods of time, enhanced batch control, import of general ledger transactions from disparate systems, and other features.

RealWorld’s user interface, which lets users easily switch between tasks, including the capability to visit another area and return without losing data entered in the first task, have dulled some of the pain of no Windows availability. Contact RealWorld Corp. at (800) 678-6336 or (603) 224-2200.

Solomon III for Btrieve

Solomon III is one of the most recognized names in the industry. Always known for its strong general ledger reporting capabilities, the product began to suffer in the eighties due to its database engine. Things changed when Solomon switched to Btrieve. Available modules include Accounts Receivable, Cash Management, General Ledger, Inventory, Job Cost, Order Entry/Billing, Payroll, Purchasing, and a slew of development tools, the most interesting of which is SolomonNote. SolomonNotes lets you add templates of information to fields or documents; each template can hold 99 fields that can interrelate with the standard data. SolomonNotes can take data from a Solomon field, run it through a spreadsheet calculation, and return the value. Modules cost $495 for single user, $795 for multi-user. Solomon III Btrieve is also one of the few packages that can run on a cash or accrual basis.

Solomon IV for Windows

Solomon Software has also released its Scalable SQL-based, client/server accounting information system, Solomon IV for Windows. Based on the features and functionality of the Solomon III LAN-based accounting software, Solomon IV for Windows provides extensions to the Solomon III accounting design, combined with Windows and Scalable SQL database technology. Solomon has taken an open architecture approach, using tools like Microsoft’s Visual Basic and R&R SQL Report Writer.

Solomon IV for Windows offers medium-sized businesses an open accounting information system with flexibility and data accessibility, if you are willing to live within the platform limitations that adopting DOS/Windows tools impose. Solomon IV is priced on a per-user, per-module basis: $495 for single user, $795 for 3 user, $1,295 for 6 user, etc.

Solomon IV is distributed on CD-ROM, making it easy for consultants and clients to install. A complete installation of nine Solomon IV modules and Scalable SQL takes less than 15 minutes, per company reports.

The core set of accounting, inquiry, and reporting modules includes: General Ledger, Inventory, R&R SQL Report Writer, Accounts Payable, Order Processing, System Manager, Accounts Receivable, Customization Manager, Visual Basic Rapid Development Tool Kit and Forest & Trees View Kit. Customization Manager lets you make changes on your screens without programming, including adding new fields that can be incorporated in processing, or using Microsoft’s Visual Basic programming language to add logic.

Modules currently in beta testing or scheduled for later releases include: Purchasing, Bill of Materials, Bank Reconciliation, Currency Manager, Fixed Assets, Job Costing, a data import facility, and Payroll. Other plans include the release of Script for unattended processes and report queuing, and Inquiry for extended drill-down capabilities.

Solomon IV has large system requirements: the single user version needs 8 MB of RAM and a lot of available hard disk. The server version requires 8 MB on the workstation and 24 MB on the Server. The screens are the most attractive and intuitive of the packages tested. However, doing data entry required pressing buttons to go to subscreens, a minor annoyance. Field sizes are generous (GL Account - 30 digits in 8 segments, Inventory Item - 20 digits) as is history retention (99 years in GL). The features of the package are also very good.

As Scalable SQL becomes available on Windows NT and other operating systems, Solomon is been expanding their base, including a new Client Edition for peer-to-peer networks scheduled for May/June 1995. “We’ll also be releasing Solomon IV for Windows on the Windows NT platform using Scalable SQL for Win NT in the summer,” said Skip Reardon, Senior Marketing Manager at Solomon. “We have their beta now, and if everything goes well, we can expect a July release of our product on that platform. That gives us both options for client/server network configurations: Solomon IV with Scalable SQL running on NetWare, and Solomon IV with Scalable SQL running on Windows NT Server — either way, we got it covered.”

For a programmer with limited knowledge and those who work with Microsoft Products like Access, the Visual Basic programming of Solomon IV is more intuitive than Dexterity with Dynamics. Solomon is a technical leader with its work in Lotus Notes and the Internet. Solomon IV is an excellent and powerful series; Solomon Software needs to work on developing its internal organization and its dealer base to take advantage of its very attractive package. Contact Solomon Software, at (800) 879-0444 or(419) 424-0422.

Conclusion

High end accounting: it costs more, does more, and provides a more solid base for development. The ASVs are more apt to work with developers and assist in their marketing efforts, and VARs can be a regular source of leads. As we conclude this series on accounting software, remember: every business can use some accounting system customization.


```c
if (!lstrcmp (modName, "WBTRVRES")) ||
    !lstrcmp (modName, "WBTICOMM") ||
    !lstrcmp (modName, "WBROLL") ||
    !lstrcmp (modName, "NWIPXSPX") ||
    !lstrcmp (modName, "TLI_SPX") ||
    !lstrcmp (modName, "TLI_WIN") ||
    !lstrcmp (modName, "DBU_UI") ||
    !lstrcmp (modName, "WBTICOMM") ||
    !lstrcmp (modName, "WBTRVRES") ||
    !lstrcmp (modName, "WBTRVRES") ||
    !lstrcmp (modName, "OBULIST") ||
    !lstrcmp (modName, "TLI_WIN") ||
    !lstrcmp (modName, "TLI_SPX") ||
    !lstrcmp (modName, "WBEXEC") ||
    !lstrcmp (modName, "WBMANAGE") ||
    !lstrcmp (modName, "WBROLL") ||
    !lstrcmp (modName, "WBTICOMM") ||
    !lstrcmp (modName, "WBTRVRES") ||
    !lstrcmp (modName, "OBULIST") ||
    !lstrcmp (modName, "TLI_WIN") ||
    !lstrcmp (modName, "TLI_SPX") ||
    !lstrcmp (modName, "WBEXEC") ||
    !lstrcmp (modName, "WBMANAGE") ||
    !lstrcmp (modName, "WBTRVRES")
) return TRUE;
else return FALSE;
```
Dear Btrieve Developer’s Journal,

...[BDJ] is one of the best journals that we get. I was very interested in the book review in the last issue but did not understand why the two books from Midi America, *The Illustrated Guide to Btrieve* and *The Illustrated Guide to NetWare Btrieve 6.x*, by Richard Trocino, were not mentioned.

Michael D Gardiner, 100435.733@compuserve.com

*Michael,* We understand from the publisher that *The Illustrated Guide to Btrieve* has been discontinued, but *The Illustrated Guide to NetWare Btrieve 6.x* is alive and well. We plan to review both the Addison-Wesley book *Btrieve Complete* by Jim Kyle, and Richard Trocino’s book in a future issue.

Dear Btrieve Developer’s Journal,

First, love the new issue of BDJ. Reading the article on Scalable SQL has tempted me to buy it. We are a NetWare shop. Any reason not to buy the NLM? Can’t wait to read Jim Kyle’s book on Btrieve... I have most of his other *Undocumented* books. Should be good reading... Thanks for you good products and great magazine. I just wanted to thank, encourage, and support you on your editorial policy of discussing and promoting competing products in BDJ. As you probably well know, BDJ has filled an important and valuable niche in the Btrieve world just as Smithware has. Thanks!

Bill Trierweiler, btree@interaccess.com

Dear Btrieve Developer’s Journal,

...I read every copy of Btrieve Developer’s Journal I receive from my subscription cover to cover. I especially enjoy the “down & dirty” techno-articles that Doug Reilly, Steve Mook, et al, contribute. And I hope that back issues will be available online soon for text file searches.

Kenneth A. Lundberg, 76743.1663@compuserve.com

*Kenneth,* The text of back issues of Btrieve Developer’s Journal since Volume II Issue 4 are available in the Reference Shelf section of the Btrieve forum on CompuServe.

Dear Btrieve Developer’s Journal,

After reading with envy on the seminars, parties and junkets enjoyed by our American Btrieve-using cousins I was wondering... if and when you are likely to expand your presence over the pond? I don’t know about the other UK Btrieve users but I know that I would feel a lot more comfortable if I had access to a local help desk rather than trying to dredge up a number in Austin, wherever-it-is. If such a thing already exists could you supply a phone number, if not, how about it you guys? Finally, I must say that Btrieve for DOS is a fine piece of kit.

Derek McGill, 100444.2546@compuserve.com

*Derek,* BTI has established an office in France: phone 33-1-4773-9090. The two people there are Patrick Duboisset and Jean-Noel Gillot. Also, you may wish to call up Southdown House in the UK who offer their own brand of Btrieve support and services; phone 01306-877998.

Dear Btrieve Developer’s Journal,

In your “Hands-on Review” from the Oct-Dec issue, you state: “Disregard what the Access BTRIEVE.TXT file says about where to put transaction files. In a multi-user, non-client-server environment, each Btrieve Client Engine requires its own transaction control file, so make sure that this file is in its own directory for each installation of the client engine.” I believe this is just plain wrong. and could lead to file corruption in the case of multiple-user access involving Btrieve transactions. But, I am using Btrieve 5.10a... is there a change of rules with version 6.15? If not, you are flatly contradiciting the Btrieve and Microsoft documentation without any explanation. What testing did you do on this?

Ken Kletzien, 75170.505@compuserve.com

*Ken,* The Btrieve for MS Windows Installation and Operation guide for 5.10 states: “In a multitasking environment, all users who start Btrieve with a Transaction Filename should specify the same location for the transaction control file... all filenames specified by different workstations must resolve to the same physical location on the network.” This is *NOT* true for the version 6.15 Btrieve Client Engine. The manual indicates that, “If you are running on a network, you can specify a directory on the network. However, each workstation must have a unique location for its copy of the transaction control file.” It seems our earlier statement was unclear on the version difference. Thanks for bringing it to our attention.