

EXE

APRIL 1999

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C++ Builder 4

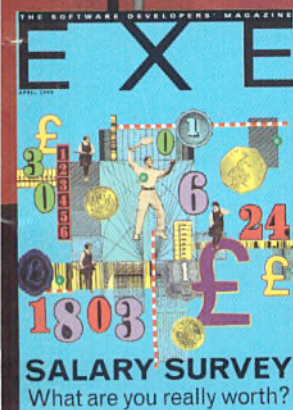
Borland's back on the job

Raymond's bazaar views

XML in
Java out

New code
for old Lego

Supplement
inside:

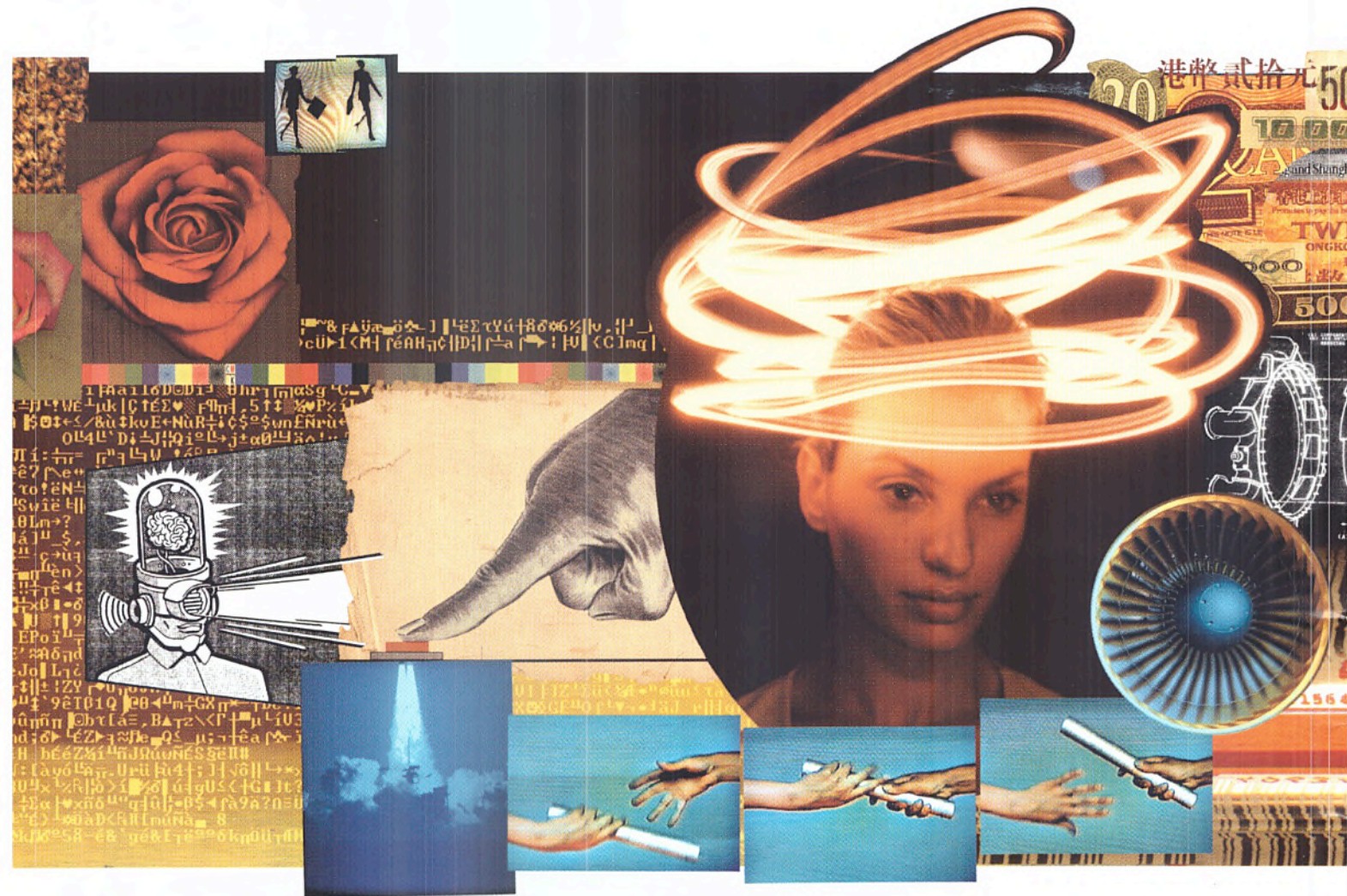


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Are you getting enough?
See supplement

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news

C++Builder 4

Would You Like A One-Stop C++ Compiler?

C++Builder 4 is probably the only C++ compiler you will ever need. Whether you are building Windows front ends, ActiveX controls, COM/MTS or CORBA server objects, client/server or multi-tier database apps, web server apps, even device drivers - C++Builder 4 is the most productive compiler on the market.

GP-Version

Do You Think Version Control Is A Good Idea But Can't Be Bothered?

GP-Version is the version control system for those who don't like version control systems! It is very easy to set up, simple to use yet powerful and flexible - and half the cost of the 'industry standards'. It plugs into Delphi, C++Builder, VB5, Word 97 and Excel 97 or it can be used with any file-based tool. It even includes a free add-in that keeps track of bugs and feature requests.

Genitor 4.0

Is This The Fastest Way To Write C++ Code?

Genitor 4.0 is a collection of tools designed to bring you the full benefits of object-oriented thinking. The main idea is that it is more effective to work with objects than it is to work with files. As a developer, you think and talk about code elements as things in their own right, not as textual representations within various files.

Ignite for Web Graphics Optimisation Are You A Web Designer?

Ignite is a new web graphics optimisation and composition program that has been specifically developed for web designers who need to produce small, high quality GIFs and JPEGs in the shortest possible time.

InstallShield for Windows CE

Are You Developing Applications For Windows CE?

Then your software should install quickly and easily - there is nothing worse than a bad setup program. InstallShield for Windows CE is just what you need, especially if you are already using our best-selling installation package, InstallShield 5.5 Professional.

SpyWorks 6.0

Does Visual Basic Get In The Way Sometimes?

We all know that Visual Basic does a great job of hiding the complexity of Windows programming. However, it also hides some of the functionality of Windows which you occasionally need to use. SpyWorks exposes this hidden functionality so you can create application extensions, implement system-wide hotkeys or macro recorders and add other low level features to your applications.

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think tank?

Is Linux ready for the desktop?

The latest version 2.2 supports 64-bit CPUs (Alpha and Sparc64), improved support for non-Intel 32-bit CPUs (Sparc, Power PC, MIPS, ARM and 68000) as well as greatly improved multi-processor support (up to 16 processors!) and a host of other improvements.

And Lotus Notes is being ported to Linux.

So we can expect to see even wider adoption as a server platform - but how about the desktop?

For more on this and to contribute yourself, check out:

www.greymatter.co.uk/thinktank

software

Windows

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|--------------------------------|-------|
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| ActiveX Voice Tools | £245 |
| AddFlow | £168 |
| Barcode Suite | £1341 |
| Chart FX 98 | £285 |
| Codewright Pro 5.0 | £150 |
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| Digital Visual Fortran Std 6.0 | £423 |
| Doc-To-Help 4.0 | £319 |
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| DynaZIP-32 | £194 |
| Greenleaf CommX | £150 |
| InstallShield 5.5 Pro | £492 |
| LEADTOOLS Imaging Pro | £634 |
| MKS Toolkit | £318 |
| Multimedia Imaging Suite | £404 |
| PC-Lint for C/C++ | £127 |
| Real-Time Graphics ActiveX | £87 |
| RoboHELP Office | £458 |
| Spread 3.0 | £217 |
| Total VB SourceBook | £269 |
| True DBGrid Pro 6.0 | £223 |
| VideoSoft VSFlexGrid Pro | £168 |
| WinRT for C/C++ Win9x | £324 |
| Wise InstallBuilder | £257 |
| WSpell | £128 |

Web

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|-------------------------------|------|
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| ColdFusion App Server Pro 4.0 | £949 |
| English Wizard Expose | £585 |
| GDIdb Commercial | £59 |
| HoTMetaL Pro 5.0 | £98 |
| Ignite | £75 |
| URL Live! Development Suite | £449 |
| VideoSoft VSFLEXFORUM | £296 |
| Visual Cafe for Java Pro 3.0 | £196 |
| WebTrends Log Analyzer | £280 |

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What is and what should never be



To what extent can programmers be held responsible for the systems working out in the world that contain their code? This question was prompted by a leader in *The Financial Times*, which reported the Chinese government's way of concentrating minds to tackle the Millennium Bug. Allegedly, the order was given that all airline bosses, from the small Hainan Airlines to the international Air China, must be in the air on their own carrier's aircraft next January 1.

The Guardian picked up this story and added to it by reporting that the British Airways chief executive, Bob Ayling, has a good excuse not to be in the air – he's going to a party. As chairman of the New Millennium Experience Company, he has a prior engagement at the Dome's opening. But that still leaves the British Airways vice-chairman. What's in his diary for that date?

It's an interesting idea, showing the buck really could stop at the top, and the idea of it makes you smile. But it's not true. No such order has been issued and the origin of the tale, according to Tasty Bits from the Technology Front (tbtf.com/archive/1999-01-26.html#s11), was apparently a joking employee of a Chinese airline.

But, picking up my original question, I wonder how many readers thought to themselves that it would be even better if the people who created the Millennium Bug are similarly tested – the programmers. It's their code, isn't it? They are responsible, aren't they? Surely, the people who create

the programs that cause such problems are the people who should be blamed.

One could follow the analogy of airline bosses having to be in the air with their planes. Have you worked on a banking system? Would you like your life savings to be invested within that system come 1 January 2000? Perhaps you worked on a project for London Underground – should you be travelling on the Northern Line come the New Millennium. Did you help develop a SCADA system? Should you be standing up on some remote hillside by a pumping station, or down on a flood plain?

Should programmers ever compromise the quality of the code they produce? Who decides just how low the trade-off should go?

What should our defence be? (And I am talking about general software development, not just Y2K-related issues such as why, in the past, people may have used two digits instead of four to store a date, etc.) My own belief is that the person at the end of the command chain – as a programmer often is – cannot be held completely responsible for the context in which their work took place. And only to the extent that you had control over the context of your work can you be expected to take responsibility for it.

I would suggest that with software development many programmers have little control over the 'production' of their own systems (not all, but many). The important

parameters for a given project will already have been set.

Who was it who set them? Who decided when delivery of the system had to be made? Who decided what resources, in terms of time, manpower, or equipment should be devoted to the project?

In terms of resources, one can always imagine that with more time and better tools higher quality code could be produced. For example, when you last worked on a large project, were serious team-based testing tools available? Had such tools even been considered, or would they have been deemed an unnecessary expense, an 'extra'? How many

problems could such tools have identified, and how many bugs would they have found? What about modelling tools: with a better documented design, what potential architectural problems could have been avoided?

Then there's software configuration management and version control, the list goes on... The commercial reality is that financial constraints, not quality of code, will represent the 'bottom line'. But who is to judge the (real) cost of undetected bugs – who is then *really* responsible for the code that was produced by a given department at a given time?

Of course, shortcuts can be made by people other than the developers. *The Guardian* piece

went on to report that Zhao Bo, the man from the ministry of information industries, and the person in charge of China tackling the Millennium Bug, had warned that some airlines may be using pirated software. We believe this bit of the story to be true, and it would mean the Bug would not have been corrected. Using pirated software; how big a shortcut is *that*? (I will pass over the question of the extent to which the original programmers could still be held to be responsible.)

As another example, I know of a programmer who was accused (if that is the right word) of 'trying to produce Rolls Royce code' by a project leader with an eye on stage payment deadlines. Should programmers ever compromise the quality of the code they produce? Who decides just how low the trade-off should go in terms of quality versus time available? Will the context in which the work took place be completely forgotten months or years later if problems start to emerge, when a call comes in from a remote site demanding *you* fix a bug in *your* work. It is always easy to point a finger of blame.

Again, I am not saying that developers do not have a share in the responsibility for any finished software system, that programmers can code irresponsibly and that it is the duty of someone else to tidy up behind them. Rather, every effort should be made at every stage to help ensure the production of quality code. This should be the goal of professional developers. However, in what sounds like a Zen proverb, there are many seats on the plane of responsibility.

Alun Williams



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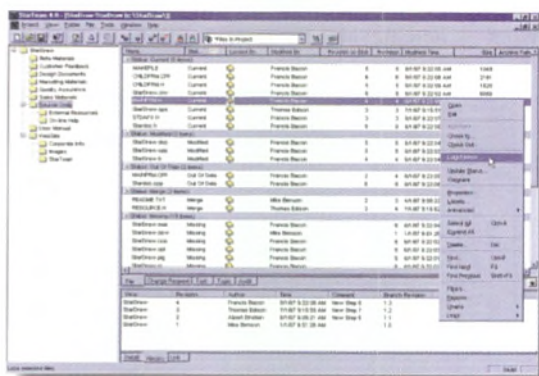
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The new Star of version control

Expanding the existing range of configuration management products from StarBase are StarTeam 4.0 and the StarTeam Enterprise Suite. Added in StarTeam 4.0 is a 'promotional model' where promotional states can be assigned to individual objects as labels, and an interface to Microsoft's NetMeeting collaboration tool. With the promotional model, it becomes possible to partition logically files and objects in a project into appropriate tiers or subsystems, and move them from one state to another – for example, from Development to Testing – as a group. The NetMeeting interface simply allows developers who may be working on the same group of files or projects within StarTeam to start and control a NetMeeting session from within the product, with appropriate application-sharing and whiteboard options already set up.

The Enterprise Suite adds several new components to the basic

StarTeam 4.0 package. The Task Management Component is a project planning and task organising system, which can be used to coordinate the activities of developers across the system; it can be used to record task progress, with



assignments checked in and out of the repository like any other file in the project. Like its competitor Continuous/CM, the Enterprise Suite adds Microsoft Project integration to the Task Management Component, enabling project leaders or developers who might have Project already to use it as an interface to the task management system.

Perhaps the most developer-friendly feature of the Enterprise Suite is StarDisk, which implements an interface to the StarTeam repository as a native NT filesystem. Checking files in and out of the repository is then

as simple as opening a file directly from disk, and can be achieved using the ordinary File Open and Save dialogs of any application. This allows Enterprise Suite to work seamlessly with applications that don't support it, or would not normally be used with a change management system.

Since a primary objection to the use of CM systems appears to be the time taken to check files in and out, StarDisk should make inroads into the single-developer market where CM has never traditionally done well. Both products should ship within the next three months, at an as-yet undisclosed price.

W www.starbase.com

Join the Cobol Express to the Net

From Merant, the gestalt entity that MicroFocus and Intersolv have become, comes another version of NetExpress, the tool that lets legacy (and indeed new) Cobol applications migrate to the Web. By slightly amending some of the Cobol keywords and adding one, NetExpress makes it possible to receive input from and output to web pages. The goal, obviously, is to allow businesses to avoid having to re-architect or rebuild their existing applications in new, more web-friendly languages. It's even possible to turn Cobol programs into Corba or COM objects that can be used on any tier of the application.

Version 3.0 adds the Internet Application Wizard, which will generate a web client/server app from any existing Cobol code, and a Form Designer, which allows the developer to build forms that will render in HTML in a visual way. The Form Designer understands and can work with client-side ActiveX controls or Java applets, and can also use Dynamic HTML and CSS (the former only on IE4+).

Naturally, a cut-down version of PVCS 6.0 is supplied and closely integrated into the product, although Merant is keen to point out that the product can use any compliant version control system including SourceSafe.

A mere snip at £3,630 per seat for fans of the Language that Wouldn't Die, NetExpress 3.0 is available now.

W www.merant.com

The StrongArm of GNUPro

Cygnus Solutions, which provides software development products based on an open source model, has announced a release of its GNUPro tools for Intel's StrongARM microprocessors. This represents the 40th microprocessor that the software development toolkit supports (125 cross-development environments). Available from Cygnus in the second quarter of 1999, no price has been released.

Cygnus GNUPro will also be optimised for Celeron and Pentium II processors (there are plans to optimise support for Pentium III). Cygnus Solutions is working with Intel to optimise its GNUProToolkit for Linux on Intel architectures. The toolkit is priced at \$79 and is available for Red Hat Linux 4.2, 5.1, and 5.2 on x86 platforms.

W www.cygnus.com/gnupro

OEWS 3.0 is the UK release of the German CASE tool. Working to UML 1.2 for the implementation of C++ and Java, the tool from Innovative Software features automatic documentation, a fast symbolic parser, and the handling of complex graphs. An on-line demo is available.

www.innovative-software.co.uk

Tools.VC++ 1.0 is a non-GUI class library designed to make programming with ATL and MFC easier and more powerful. It features collection classes, string parsing classes, and utility classes (wrapping XML elements). The collection classes are built on Tools.h++ but are source-compatible with MFC collections.

www.stingray.com/tools/default.asp

MKS (Mortice Kern Systems) has acquired DataFocus, which specialises in Unix-to-Windows interoperability. The DataFocus flagship NuTCRACKER suite will be incorporated into the MKS Integrity Framework family of products. MKS acquired DataFocus for \$10 million in an all-stock transaction.

www.mks.com

Entera 4.2 is a major upgrade of Inprise's middleware. As well as tighter integration with the Inprise DCE-Corba bridge, there's new Internet firewall security, and enhanced support for Java. It's available for AIX, Solaris, HP-UX, and Windows NT platforms.

www.inprise.com

Intel's VTune 4.0 is a suite of performance tools to help developers extract maximum performance from their code on Intel architectures, including the Pentium III. This release sees an upgrade to the Intel C/C++ compiler and new versions of the Intel Performance Libraries. It costs £299 and also supports Java, Delphi, VB, and Fortran.

www.pts.com

A new outlook on UI features

Rogue Wave Software has acquired NobleNet, a provider of distributed object technology. The intention is to integrate NobleNet's **Nouveau ORB** into Rogue Wave's **InterNet** Architecture (RNA) framework, providing interoperability between COM, C++, and Java over the Internet. www.roguewave.com

Centura Software's release of the embedded **database** SQLBase Suite includes SQLBase Safe-Garde [sic], providing developers with **encryption** and tampering-prevention measures. These focus on the privacy and integrity of data, and network security. Pricing starts at \$395 for a single user. www.centurasoft.com/products/sqlbase/

FaxMan, from Data Techniques, allows Windows developers to provide send and receive functionality for faxes, with full control over the faxing process and the user interface. Using the DLL, VBX, or **ActiveX** controls, users can control class 1, 2, or 2.0 fax **modems**. It costs £389. www.componentsource.com

Reflex has added a Java cross-compiler to its range. FastJ generates native machine code for direct execution on microprocessors. It can compile bytecode directly to machine code for **embedded** developers to take advantage of libraries distributed in **Java** bytecode form. www.reflex-tech.co.uk

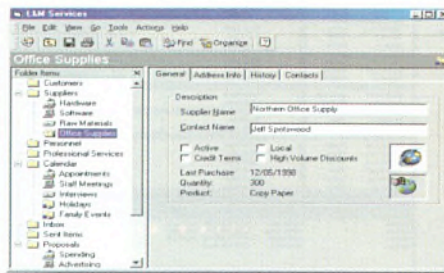
ViewPro Version 4.0, an ActiveX from Hexatech, is a report generator, print engine, and print preview control. Using templates, it lets you place tables, graphs, pictures, and drawings onto text report pages, which can be imported/exported as WMF (Windows metafiles). It costs \$179. www.hexatech.com

Version 6.0 of ActiveX Component Suite provides Microsoft Outlook-style UI features, as well as Look Ahead typing, XML exporting, euro currency support, and advanced soundex searching. This release of the suite brings all member products (DataExplorer, DataTable, TreeViewX, and WinX Component Library) to the same version number (6.0).

The DataExplorer combines a tree-view with a list-view pane to help create an application front-end. To mimic Microsoft Outlook, caption headings can appear above the pane section of the component. These captions are automatically synchronised with the node-level names. To hide or show the tree-view, users click the 'x' to remove it, or click the caption heading and 'pin' the tree-view in place. DataExplorer v6.0 also features checkboxes on nodes, and images on ListView column headers. It can sort on date types, share image lists, and create a customisable Microsoft Internet Explorer-style toolbar.

Version 6.0 of the DataTable grid component sees a number of data input and UI enhancements. In terms of data input, Look Ahead

typing allows users to begin to edit a cell and have DataTable complete the entry based upon a previous one. Soundex text searching works with drop-down boxes in DataTable and allows DataTable to jump to the appropriate record as the text is typed. In terms of UI enhancements, sorting of the



DataTable can be done with a column header click. For DataTable cells, multi-column drop-down boxes can be provided without coding, and the placing of images in cells has been added with this version. You can export data to any Ascii delimitation, or in HTML or XML format.

The new version of TreeViewX includes the use of check boxes, radio buttons, and colour and font properties for each node in the tree.

To conclude the member products of the suite there is the WinX Component Library. In addition to the inclusion of TreeViewX, there are 16 data input and validation components (MaskEdit, Time, Currency, Numeric Edit, and Date Edit). The new version can use the euro currency format in the currency component. The DataTable allows for WinX Component Library controls to be used in cells for data input/validation, allowing it to take advantage of the euro currency support.

Finally, ProtoView also provides the ActiveX Enterprise Suite. This includes the ActiveX Component Suite, together with version upgrades and technical support for the period of a year. It is intended for other benefits to appear as the program develops.

The ActiveX Component Suite v6.0 retails for £299. The ActiveX Enterprise Suite retails for £599. The DataExplorer v6.0 and DataTable v6.0 cost £175, TreeViewX v6.0 £95, and the WinX Component Library v6.0 £145.

Upgrade pricing is available on the ProtoView website.

www.protoview.co.uk/activexsuite

The 'Spirit of Delphi' lives on

In January of last year EXE published *Spirit of Delphi*, an article on Delphi freeware initiatives in which Will Watts admired the legendary and award-winning Delphi library RxLib, the Delphi Super Page, and Jedi. At the last BorCon the former two products received a Spirit of Delphi award from Borland. Now the Jedi has also received official borland.com endorsement, see www.borland.com/techvoyage/jediinitiative.html. Three out of three, keep up the good work borland.com!

In the same article Will Watts suggested that there might be a team effort to produce an English help file for RxLib. Olivier Dahan has just produced a first cut of an English language help file (instead of the original Russian one). It is downloadable from well-known Delphi web spots the Delphi Super Page (sunsite.icm.edu.pl/delphi/) and Torry's (www.torry.ru/), filename `odrxhelp.zip`.

Dahan is now looking for assistance expanding and correcting his text and providing extra examples. If you are already an RxLib user and would like to give a hand, email him at odahan@mail.dotcom.fr. The new version of RxLib is 2.6 (filename `rxlib260.zip`) and it's available from the same sites.

[e odahan@mail.dotcom.fr](mailto:odahan@mail.dotcom.fr)

The CM Project

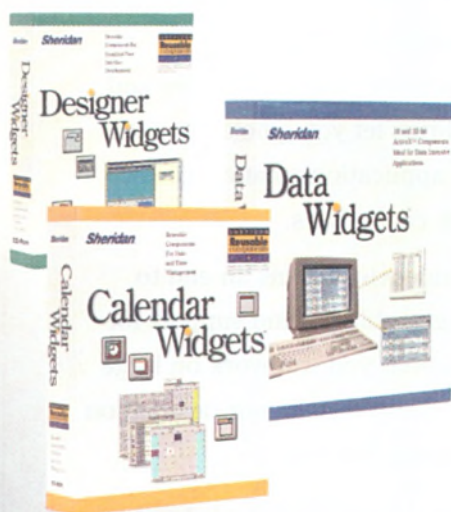
According to Continuum, a significant percentage of all software project managers use Microsoft Project for their task planning. Since the company bills its Continuum/CM change management product as the only 'task-based' CM solution, it would make sense to somehow integrate the two products; which is just what has been done. Aimed at the busy project manager who would really prefer not to have to get into Continuum/CM's task management interface – something best left for developers – the MS Project integration allows them, via add-ins, to view the current task situation as a Project diagram, and to plan and assign new tasks in the same way.

www.continuum.com



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Calendar Widgets

Calendar Widgets is the perfect set of Components for use in any Windows-based application that needs to visually display, select and manage dates and times. Including versions for 16-bit Visual Basic Custom Controls and 16-bit and 32-bit ActiveX controls, Calendar Widgets consists of four controls: SSMonth, SSYear, SSDateCombo and SSDay. Besides being a great fit for a typical Personal Information Manager (PIM), Calendar Widgets is a natural for data entry, accounting, billing, project management, or any other application which uses time and dates.

Data Widgets 3.1

Supplied as 16-bit and 32-bit ActiveX controls, Data Widgets 3.1 optimises database front-end development through a set of six powerful controls. The enhanced new features of Data Widgets' 3.1 DataGrid gives you the freedom to print to paper or export to HTML. You can also export data to ASCII-delimited text files. With fully integrated masked editing and full IntelliMouse support, Data Widgets 3.1 brings database front-end development to new heights.

Designer Widgets 2.0

Designer Widgets 2.0 is designed to give your applications interfaces similar to those of today's most popular commercial applications. They are supplied as 16-bit Visual Basic Custom Controls, and 16-bit and 32-bit ActiveX Controls. Designer Widgets 2.0 is loaded with the most enhanced interface controls, including Dockable Toolbar, the Notebook Tab Control, the Index Tab Control, and FormFX. There is no other package that combines controls that allow you to program with the style and power of Designer Widgets 2.0.

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SGI embraces the Open Source model

Silicon Graphics is embracing the Open Source model of software development. It has announced a commitment to 'contributing technology from its core competencies in visualisation and high-performance computing'. The Open Source strategy will initially be focused on solutions for small servers for high-volume market areas.

The company is currently building engineering teams to develop and support Open Source products. Through 1999 Silicon Graphics will make available technology from its Irix operating sys-

tem, which it claims as the first Unix to support a complete, integrated 64-bit environment and advanced real-time and graphics features.

'The Open Source software model is the future of Unix software development. This fast-developing community of talented and committed engineers is eager to work with higher levels of technology,' said Kurt Akely, company VP and co-founder. 'With Silicon Graphics' firm commitment to accelerate adoption of the Open Source model, the community will further extend its spectrum of highly innovative applications and solutions.'

The company has a history of involvement with the Open Source community on various projects, including working to provide Linux on its Indy line of workstations since 1996. In December 1998, it joined Linux International and introduced support of Samba 2.0 for its Origin server line. In February of this year Silicon Graphics released GLX source code into the Open Source community, helping to set the stage for the acceleration of OpenGL as the foundation for 3D graphics on Unix and Linux.

www.sgi.com

Compuware's UNIFACE **WebApplication** Server is for the deployment of e-business applications. It enables the deployment of **legacy** systems onto the Web, and development features include the construction of server-based application logic **components**. It supports version control and team development.

www.compuware.com

SA-FileUp V2.3 is a server-side component that allows users with a web browser to **transmit** files from their local hard disk to a Microsoft IIS-based web server. Software Artisans' **component** can also receive and process user input while staying within the context of an ASP app.

www.componentsource.com

A black art in a black box

Sax Comm Objects 6.0 is an OCX to help you build apps involving serial comms. Features in this release include speed enhancements, support for Visual Studio 6, no MFC or VB runtime dependencies, and **HTML Help** that links directly into Visual Studio.

Sax CommSpy will monitor comms I/O and events, and can generate logs of communications activity for remote debugging. A multi-threaded design enables

the simultaneous control of up to 64 communications ports.

There is full support for Visual Basic 6.0 (and 32-bit 4.0 and 5.0), Visual C++, Visual FoxPro, Delphi, and PowerBuilder. Sax Software's control, 250 KB in size, can be used as a custom control or as a standalone object, and can help build web pages using ASP.

Sax Comm Objects 6.0 retails at £175. A 5-user licence costs £345 and a site licence £1,699, with upgrades from £70. It is source



code compatible with previous versions and with MScmm and PDQComm.

www.contemporary.co.uk

InstallShield's **Java** Edition 2.5 includes features such as multiple source and target directory support, multi-lingual end-user dialogs, and command line access, which includes support for a silent mode. The **InstallShield** Installation Applet creates installations for popular web **browsers**.

www.installshield.com

An ORB embeds itself in lots of places

An embedded ORB with a replaceable transport component is in prospect for embedded C++ developers with the collaboration of two companies. ObjecTime, which specialises in software engineering tools for distributed embedded software systems, and Objective Interface, a provider of Corba tools, are to bring Objective Interface's ORBExpress product to the embedded market.

By allowing the replacement of the ORB's transport component, embedded systems developers can prescribe the network or bus that the ORB uses for communication. For example, a system built with ORBExpress could use special telecommunications-based protocols as the native communication mechanism.

ORBExpress will become part of ObjecTimes Connectivity family, tools designed for the high performance connection of elements within distributed embedded systems.

ObjecTime ORBExpress will be available in May for Wind River System's Tornado, Sun Solaris, and Windows NT. Other platforms will follow throughout 1999. Pricing for the embedded version of the ORB starts at \$9,000 per seat.

ObjecTime has also released ObjecTime Connexis, a middleware connectivity system for users of Rational Rose RealTime (a modelling environment that describes real-time embedded systems using UML). Designed to bridge applications and real-time operating sys-

tems, it enables embedded software developers to interconnect the UML software components developed with Rational Rose Real Time, to speed the development of large distributed software systems.

The system comprises a locator service and an ORB core. At runtime, the locator service can automatically establish routes between objects whether they are located on the same processor or across a network. The ORB provides the communications pathways and supports comms over TCP/IP on Ethernet, as well as other transport mechanisms.

ObjecTime Connexis will be available in June with pricing starting at \$5,000 per seat.

www.objectime.com

Soft Option **Web Access** is PC-based software to provide full **Internet** access to existing applications. Remote users open the 'home page' for the old application and the system handles the translation, which includes changing the style of the interface. The system can link to two or more applications **transparently**.

www.softoption.com

Coinciding with the release of UnixWare 7 Release 7.1 with its Webtop interface, **SCO** is launching a new global developer **programme** aimed at developers targeting the **Intel**-based Unix server market. Benefits include discounted and free software, together with optional software development technical support.

www.sco.co.uk

Office 2000 develops further

W3C has released the **Resource Description Framework (RDF) Model and Syntax specification** as a **W3C Recommendation**. It is aimed at the management of **metadata**: 'data about data'. For example, a library catalogue is metadata because it describes other publications.

www.w3.org

XBuilder version 2 is a website compiler that can build web pages onto laptops, CDs, and other locations where there is no web server, only a web browser. It can **compile** sites written using ASP, Perl, CGI, or other scripting languages. New features include the ability to combine HTTP domains, to add files from FTP sites, and to configure which **HTML** tags are crawled. It supports MIME-type detection.

www.componentsource.com

Microsoft has revealed details of the Developer edition of Office 2000 (ODE2000). Building on the apparently successful reception given to the Developer edition of Office 97, ODE2000 will bundle the contents of the highest-priced version of the desktop product, Office 2000 Premium, together with a raft of developer tools old and new. The Premium edition is new to the Office 2000 release, and incorporates Word, Access, Excel, PowerPoint, and Outlook, plus Publisher 2000, PhotoDraw 2000 (a new photo-manipulation and drawing tool), and FrontPage 2000.

Developer tools bundled with ODE2000 include the VBA Code Librarian, a repository for storing and sorting code fragments for team development – sort of a poor man's Visual Component Manager, the VBA Code Commenter, which automatically adds relevant procedure, function, and history information to your VBA code, and the VBA Error Handler, which automates the addition of error handling routines to VBA code. There's also the COM Add-In designer, which allows VBA to create add-ins that can drop into any Office application by compiling standalone COM DLLs (VBA cannot create application-independent or standalone code under normal circumstances). Templates for creating add-ins using the Visual Studio tools are provided.

This time around, all the Office applications support VBA – even Outlook, although forms still have to be coded using VBScript – and data access via ADO. Microsoft is heavily stressing the ability to use all the components in Office together to build complete solutions – one example was a reporting tool for an insurance company which gathered data from an ODBC data

source and created a Word document with an embedded Excel spreadsheet, illustrated with auto-drawn charts, together with a PowerPoint presentation. Just to push the point further, one button press brought FrontPage on stream to turn the whole thing into a web publication. According to Microsoft, the time and cost savings produced by using the ready-built components of Office over writing custom software can be huge.

As before, ODE comes with full printed documentation – which makes for a heavy box but is nonetheless very welcome – as well as a royalty-free distribution licence for the included Microsoft Database Engine (MSDE), a runtime version of SQL Server 7.0 offered as an alternative to the venerable JET engine. No UK pricing or ship date had been announced at the time of writing.

www.microsoft.com/office/dev

Visual Intercept incidents via the Internet

It has been confirmed that on Saturday April the 17th, in Oxford, the Association of C & C++ Users together with EXE will be holding the **Java and C/C++ Seminar (JACC)**. **Bjarne Stroustrup** will give the keynote talk entitled 'What is an Object, and what isn't'.

www.accu.org

Elsinore Technologies' Visual Intercept Web is a web-based system for communicating bug tracking and other incident information. The tool provides remote developers, beta testers, or end-users with Internet access to the central Visual Intercept database. These

users, with a browser, can submit incident reports, check the current status of previously recorded incidents, and submit and review suggested work-around solutions.

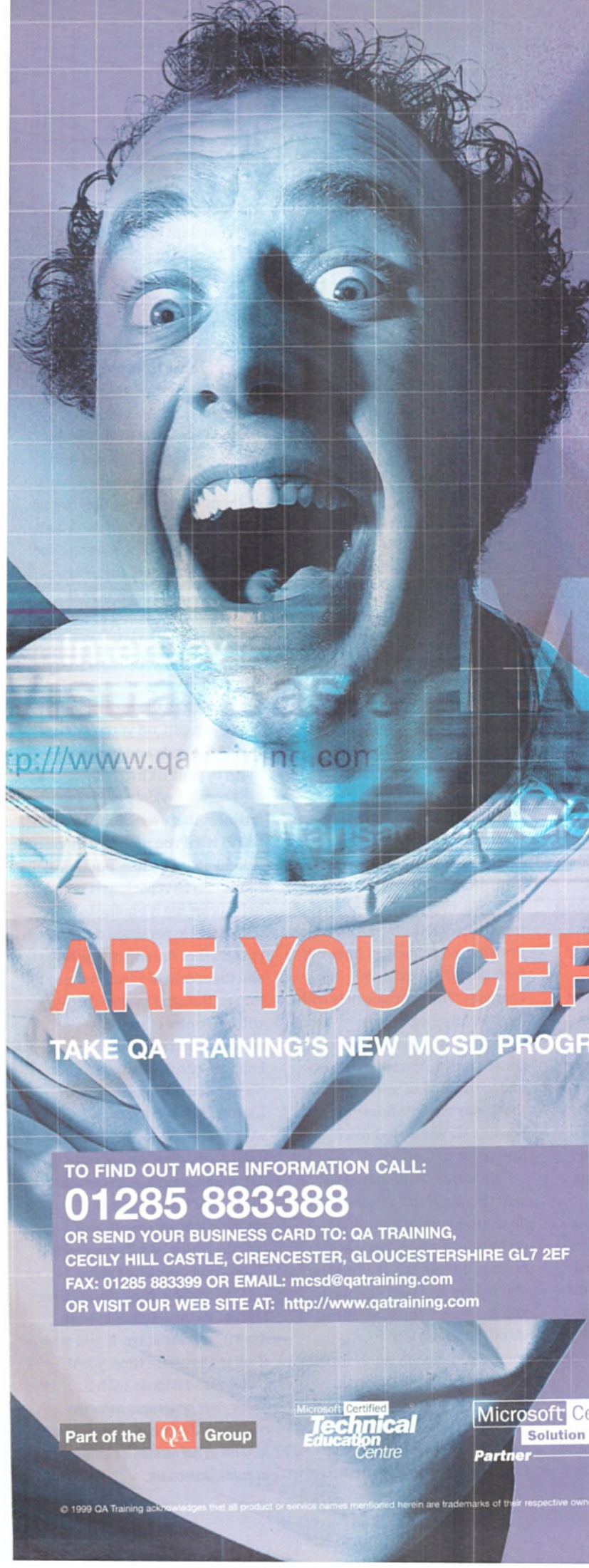
When an incident is posted with Visual Intercept Web, the Visual Intercept system notifies the

project manager that an incident has been reported. As action is taken, the software is used to post status changes onto the Web. There's full control over the functionality that may be accessed by the remote user.

www.highlander.co.uk

Books received this month

| Publisher | Title | Author | ISBN | RRP |
|----------------------------|---|-----------------------------------|---------------|--------|
| John Wiley & Sons | Advanced Cobol (third edition) | Gary DeWard Brown | 0-471-31481-1 | £32.50 |
| John Wiley & Sons | Choosing a database for your web site | John Paul Ashenfelter | 0-471-29690-2 | £22.95 |
| John Wiley & Sons | Client/server survival guide (third edition) | R. Orfali, D. Harkey & J. Edwards | 0-471-31615-6 | £29.95 |
| John Wiley & Sons | Internet architectures | D. Minoli & A. Schmidt | 0-471-19081-0 | £32.50 |
| John Wiley & Sons | XML specification guide | Ian S. Graham & Liam Quin | 0-471-32753-0 | £25.95 |
| John Wiley & Sons | Programming mobile objects with Java | Jeff Nelson | 0-471-25406-1 | £32.50 |
| John Wiley & Sons | Securing Java - getting down to business with mobile code | Gary McGraw & Edward W. Felten | 0-471-31952-X | £22.95 |
| Cambridge University Press | Kent Beck's guide to better Smalltalk - a sorted collection | Kent Beck | 0-521-64437-2 | £24.95 |
| Cambridge University Press | More process patterns | Scott W. Ambler | 0-521-65262-6 | £24.95 |
| Cambridge University Press | The distributed Smalltalk survival guide | Terry Montlick | 0-521-64552-2 | £20.95 |
| Cambridge University Press | Tried and true object development with UML | A. Jaaksi, J.-M. Aalto & K. Vättö | 0-521-64530-1 | £24.95 |
| Addison Wesley | Objects, components and frameworks with UML | Desmond D'Souza & Wills | 0-201-31012-0 | £36.99 |
| O'Reilly | Learning Perl/Tk | Nancy Walsh | 1-56592-314-6 | £21.95 |
| O'Reilly | Open Sources: voices from the Open Source revolution | C. DiBona, S. Ockman & M. Stone | 1-56592-582-3 | £16.50 |
| O'Reilly | Perl cookbook | Tom Christiansen & Torkington | 1-56592-243-3 | £26.50 |
| O'Reilly | Perl in a nutshell | E. Siever, S. Spainhour et al | 1-56592-286-7 | £14.95 |
| O'Reilly | Perl/Tk pocket reference | Stephen Lidie | 1-56592-517-3 | £6.50 |



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Into the vacuum

Bill Gates said that what's bad for Microsoft is bad for everybody, and things are not going well for Microsoft.

As I write, the prosecution has arrested its (somewhat damning) case, and Microsoft has taken the stand to render its defence which, if it continues as it has started, will be quite as incriminating. By the time you read this, the verdict will not yet have been delivered, but published opinion will be reaching some consensus about what it will finally be.

Prediction is a risky business. Frequently the universe contrives to confound any attempts for no better reason than to remind some luckless hack that it is the universe, not the journalist, who is in charge. Nevertheless, I am not afraid of even that perverse opportunity for Mr Gates to avoid his just deserts, and will predict anyway, with the confidence possessed only by the absolutely certain and the desperately hopeful.

The fact is that Microsoft is operating a monopoly, and it is precisely the kind of monopoly that the anti-trust laws were erected to put a stop to. When Gates told an investigation that 'what was bad for Microsoft was bad for the computer business, and what was bad for the computer business was bad for everyone else' he was playing directly into the hands of his accusers, effectively pleading guilty to all the charges laid before him, and placing his neck, quite firmly, on the block. In a culture that is dedicated to freedom and opportunity, such assertions would have been seen as arrogance to a remarkable power, and powerful people would have seen it as their bounden duty to take him down, whatever the consequences. Of

course, the consequences will be borne by these people hardly at all, but they will stand by the anti-trust laws and appeal to the common good. 'Better for you to die on your feet,' they would sermonise, 'than for you to live on your knees'. Such is politics. Unfortunately, neither Mr Gates in particular nor Microsoft in general understands politics. Why should they? Until now they've had the financial muscle (first IBM's, then their own) to steamroller anyone in their path. Whatever, if there's any justice left in the American system (and it would be sad, indeed, if even that last guttering flame died) Microsoft will be found guilty, and the sentence will be execution, by a thousand cuts.

Once the party has died down (and Microsoft has sufficient enemies to ensure a truly riotous occasion) the industry will suddenly realise that, with only months to go before the Millennium Meltdown, its most pervasive software is now officially without any effective support (unofficially, it has been without effective support for years) and a yawning chasm has opened underneath the feet of the entire industry (though in reality, it's been there, yawning away, for years). What then?

The PC box itself isn't going anywhere. Though flawed in its original design, it has matured nicely over the years and is now entering a graceful middle age with its nasty personal habits hidden under a veneer of middle-class respectability. Windows, too, attempted some good things over the years and even succeeded at some of them; we've now got so used to being able to

plug all manner of exotic hardware into a system that we no longer wonder at the universality of software drivers. Plug and Play returns some of this functionality to the hardware level, but fancy printer and monitor drivers still require software, and that software requires Windows. The industry isn't going to give up that kind of convenience if it can avoid it. There will be a plethora of Windows-compatible microkernels, made possible by the sudden stability of the Windows 'platforms', and made commercial to overcome the immediate, short-term support problem.

But, business being business, and anything Microsoft being tainted, the watchword will be 'Run away!', and business being business, everyone will do so together, each fleeing IT manager drawing ovine comfort from the fact that he's in extensive company. The microkernels will be a useful stopgap, but ultimately will be of lasting benefit only to games designers and to the kind of software house that today runs its flagship product on Windows-hosted Spectrum simulators.

What then will be sucked into this vacuum? I thought that Java might make its way into operating systems, and then silicon, but nobody is thinking about Java as a real language, and it seems to be condemned to wander the world's communication systems forever, a virtual Flying Dutchman. There's only one contender sufficiently well placed to excite any enthusiasm, and that is Linux. It's reasonably mature,

and it's reasonably complete (and what it doesn't have is readily available elsewhere). Unfortunately, many companies are reluctant to take it on, because its support seems to be provided by an army of dedicated amateurs. That's missing the point; though dedicated, the supporters of Linux are far from amateurish, and they promise a far better outcome than the kind of 'professionalism' to which the world has been subjected until now. What's more, there's loads of them – locust-like, they'll get into every nook of industry and every cranny of the system. The great advantage of this pluralistic approach is that development is going to take the form of evolutionary tinkering, rather than revolutionary (and bug-ridden) upgrades. And if you don't like the direction it's going you can, on your own, get inside the code and tweak it more to your liking.

There's a widely-held belief in business that everything is worth what you pay for it. It's ridiculous, of course, but unless Linux can be repackaged with a hefty price tag it's going to be quite hard to persuade decision-makers that the end of WinNT and the ascent of Linux are good things (though I'm sure there will be armies of ex-NT administrators who will be happy to oblige). Business also needs business applications; Linux needs a standard wordprocessor, spreadsheet, and database engine. And armies of old programmers who remember the Californian Dream are salivating in anticipation of creating the next killer app when the market opens up again.

One thing is sure; through no fault of its own, Linux is being drawn onto the stage. If you want a job in five years time, you'd better make friends with it. ■
Jules' first programs ran on a creaky old Unix box. You can call him on 01707 662698, or email him at jules@cix.co.uk.



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Well-tempered rants

Dear Sir,

I used to read .EXE (as it was) ages ago (1991?) but gave up when the only bits still worth reading were Jules' well-tempered rants. I just picked up a copy of the January '99 edition from a friend's desk, and I see that Jules is still at it (*MFC – my favourite code*). The MFC rant is superb; it's concise, accurate, and sums up about 10 years of the average graduate developer's experience.

Glad to see that he hasn't fallen victim to his fame, gone all Jerry Pournelle, or lost his precise sense of irony.

One point though. I agree entirely, but then I think who I would have preferred to have dominate the desktop, the commodity applications, and the software development tools marketplaces over the last 10 years. Sun? Oracle? Novell? Lotus? Borland? IBM? Apple? God forbid... Microsoft might be mediocre in the extreme, and as you note none of their tools scale up or down, but at least their cock-ups are mediocre too.

And Microsoft might be a nasty un-ethical predator to its competition, but at least it has previously treated developers within its environment as 'friendly'. I don't know when you last tried to contact one of these other 'giants' to find out what was required or available to develop software for their environments, but I started to run out of pounds-of-flesh before I'd even been allowed to get the part number of the equivalent of an SDK for most of them. Borland was better than most of the others, and its compilers were very nice, if a little cheap and cheerful, but I blame it for the Wizard/IDE debacle that Microsoft now suffer from.

I wonder, if Borland hadn't pushed so hard its OWL, IDEs,



We welcome short letters on any subject relevant to software development. Please write to: The editor, EXE Magazine, St. Giles House, 50 Poland Street, London W1V 4AX, or email editorial@exe.co.uk.

'tick buttons', etc, as well as their applications, whether Microsoft would have left its compilers and libraries as base commodity goods, and we could have had a decent bit of planning and forethought and some nice tools layered on top by individual vendors (not, need I say, the CASE vendors, who manage to release the worst quality, badly designed, and most ill-suited tools, but expect you to adopt their procedures).

Oh well, I see I'm getting carried away – this wasn't meant to be my rant, but a congratulations and smile to a familiar face.

Keep it going... and good luck
Tim Meadowcroft
tim@compansr:demon.co.uk

Bitter experience

Dear Sir,
I've just read *Mayhem (Home Alone, February)*, and I sympathise with the situation your SOL (Sweet Old Lady) was in. I used to work for Granville Technology (the parent company of Time, and other companies) on the technical support line. We were paid nothing for our work there, probably because of the cheap price of PCs. And new recruits at the time were being employed more for their communication skills than anything else. This would be fine if they had any technical initiative or if Granville had an expert system to allow these 'Computer Novices' to work through solving problems even when they didn't have the knowledge themselves.

I think that the whole computer market has placed itself in an ever-decreasing circle, where all the companies are trying to undercut each other, supplying cheap

components, and, as you say, not being able to afford to support the products they are selling. Perhaps they should take a leaf out of the book of a company like Dell; although not perfect, it charges more to provide better service and better equipment.

I am now working in the software development industry, as my degree dictated, and I have to say my experience with Granville has left me scarred. I never want to work in a telephone/technical support role again.

Name and email address supplied

Home alone II

Dear Sir,
I just read *Mayhem (Home Alone, February)*. I'm not surprised. I had an on-going horror story with Time which resolved itself about a year ago. If you want to publish it, feel free.

Time has more court cases pending against it, and has been featured on BBC's Watchdog programme and *Which?* magazine as a company to avoid.

The full gory details follow...

The Pentium II P300 machine costing £2,319.45 was ordered on September 5, 1997 with the assurance that it would turn up by the end of the month. The only thing that did turn up at the end of the month was a credit card bill! The machine did not turn up until early November. (I'm not sure whether they are strictly allowed to do this.)

When the machine did turn up, the CD did not work; the cable was disconnected.

Next, the TV card didn't work (a software fault), and the technical support were positively unhelpful with the suggested cure. The local store fixed it.

The modem only worked at the shop, and not on three domestic phone lines where it was tried. The shop swapped modems, so it worked okay at last.

[...Problems with the A: drive, the sound card, and the SCSI card. And then the mouse and keyboard would not work...]

I asked for my money back (well anyone would wouldn't they after all that), and wrote to Time. I waited two weeks for head office to phone. They got my name wrong and the problem wrong, and said that they wouldn't give me my money back.

I spoke to someone else who said they'd take it back and test it, but the spokesman didn't think it was Time's fault, and besides, I'd loaded lots of software on the machine, so that was probably the problem. (Isn't that what you do with a computer?) Time also wanted to charge me for not retaining the original packaging!

After two weeks, Time sent the computer back to me. A letter was included in one of the boxes saying that the components worked – but not as I hoped.

Eventually, after engaging a PC magazine's help and a very expensive solicitor I got part of my money back.

I would recommend that no one buys a Time PC. If you leave it alone it will work fine (probably), but if you do anything with it (like adding extra hardware or software) it's a complete dog. It wasn't until March 1998 that I got some money back. I then bought a new machine from a local shop for less money – and it works like you'd expect.

Cheers.

Trevor Eddolls
Editor
Xephon

Back to Borland. Yes, you read that right. After making a big fuss about its 'growing focus on enterprise computing', Borland changed its name to Inprise Corporation at the end of April last year. Almost exactly nine months later, a bouncing new baby was delivered in the shape of borland.com. The arrival of this particular baby is a very welcome event. Put simply, the company has finally woken up to the fact that wooing big corporates takes more than a change of name, and that holding on to your existing customer base is just as important – actually, far more so.

You might detect a slightly cynical note in the above comments, but personally I'm delighted that Borland (I'm sure they won't mind if I call it that) is now making efforts to return to its roots. The last thing any of us want to see is a development tools marketplace where the only supplier is Microsoft. Up until very recently, Borland seems to have given every impression of having a corporate death wish. With the resurrection of the brand name, I fervently hope that particular corner has been turned...

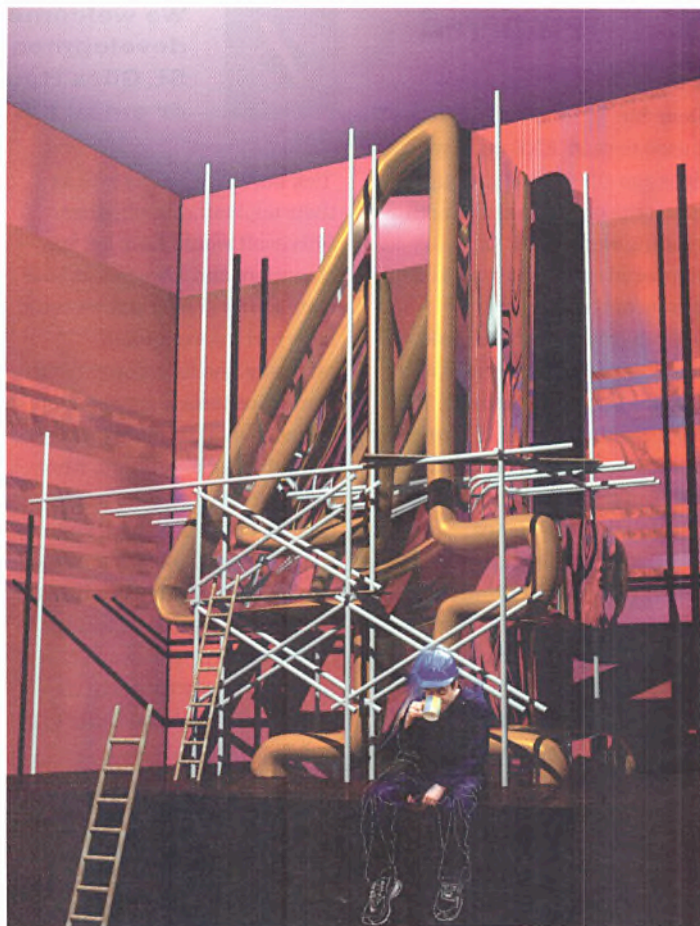
Okay, enough of the political commentating. What's new in C++Builder 4.0, and why should you buy it? As you're probably aware, Borland has a long-standing tradition of adding innovative features to its Pascal language products first, and subsequently adding the same goodies to its C/C++ development systems. I'm not quite sure why Pascal/Delphi developers have the honour of being the guinea pigs – maybe it's because the new code compiles that much faster under Delphi than it does with C++?

VCL docking support

In a nutshell, C++Builder 4.0 gives C++ developers pretty much the same feature set that's provided by Delphi 4.0. Launching the new development system is a somewhat slower process than it used to be because, like with Delphi 4, the new IDE is considerably larger than its predecessor. As with its Object Pascal cousin, the IDE has now been 'packaged', with most of the core IDE code residing in a huge BPL file that tips the scales at 3.7 MB. Once the IDE is up and running, the first thing you'll notice is the main application window, which now sports a set of 'tear-off' dockable toolbars. You can pull these toolbars away from the main window and leave them floating, but they won't actually dock anywhere except back on the main window. Even the component palette has been implemented in this way, although the menu toolbar can't be removed from the main window.

Obviously, the same ability to create docking toolbars is available to application programs created with C++Builder 4.0. However, there is a penalty to pay. Borland has implemented docking support at a very low-level within the VCL hierarchy, meaning that even basic classes such as `TControl` have new properties and methods such as `UndocHeight`, `UndocWidth`, `DockOrientation`, `DoStartDock`, `DoEndDock`, and so forth. To be honest, I'm not convinced that this is the correct approach. I feel deeply uneasy about cluttering up the low-level VCL ancestor classes with high-level concepts such as docking. Aesthetic architectural sensibilities notwithstanding, you'll also find that the size of an EXE file in C++Builder 4 is considerably larger than was the case with C++Builder 3.0. The size of an application comprising of a do-nothing, empty form has suddenly swollen from 191 KB to 285 KB, representing nearly 100 KB of extra code. I'd hazard a guess that most of that increase is due to the presence of docking code in the EXE file, which is never needed and never called.

A while back, Jordan Russell, creator of the popular `Toolbar97` docking component for Delphi, expressed the view that the new docking architecture in Delphi 4 (and thus, by inference, C++Builder 4.0)



Daniel Machie

simply wasn't the way to do it. I fear he may be right. As an alternative to Borland's new component docking architecture, you could try Russell's toolbar (www.jordanr.ml.org), or check out the very sexy `ExpressBars` components from `Developer Express` (www.devexpress.com), but it goes without saying that if you use these alternative components in conjunction with Delphi 4 or C++Builder 4, you've still got to put up with the additional overhead of Borland's docking code. Because it's so tightly bound into the deepest recesses of the VCL, there's no way of optionally removing it.

While we're on the subject of all things dockable, Borland has made many of the IDE tool windows into dockable items. For exam-

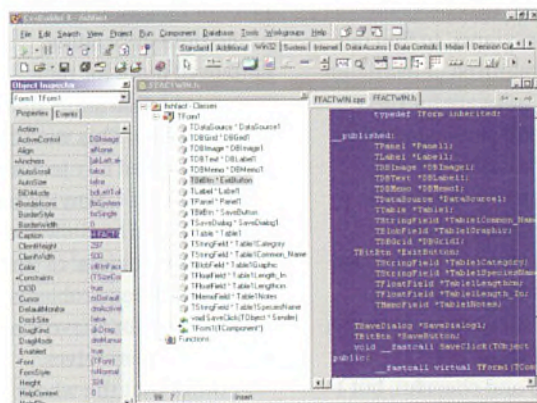


Figure 1 – Here's an overall view of the new C++Builder development environment. The new Class Explorer window is shown docked to the Code Editor, though it can also be docked to the Object Inspector, the Project Manager, and various other dockable IDE windows.

C++ Builder 4.0 – the construction continues

The development division of Inprise, borland.com, was launched with a new version of its C++ visual development system. Dave Jewell takes a first look.

ple, you can make the Project Manager window visible in the usual way, and you can then drag it across to the Object Inspector whereupon the two will dock to one another. As with the docking windows in Microsoft's Visual Studio development environment, you can optionally disable the docking behaviour by right-clicking a specific window and unchecking the Dockable item from the resulting context menu.

Not only can the Project Manager and Object Inspector be docked to one another, but you can dock either or both of them to the Code Editor window, if that's what you want to do. Many of the debugger windows can be docked in the same way. Speaking of the

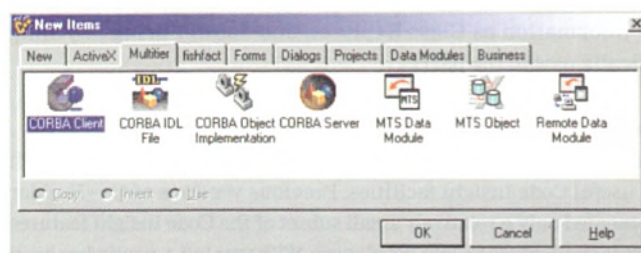


Figure 3 – Database devotees have been catered for with the inclusion of new Corba technology. A couple of wizards control the creation of Corba client and server projects, and you'll see that there's also support for Microsoft Transaction Server.

Code Editor, you'll find that, by default, there's a new Class Explorer window clinging, limpet-like to the left-hand side. The Class Explorer is in the same category as the other dockable windows I've described so far, in the sense that they can all be docked to one another in various ways. I did find one strange omission in the IDE docking support – under Delphi 4, it's possible to move one tool window into the centre of another one and drop it there. If you do this, it's taken as an indication that you want to coalesce the two into a single window that has tabs to swap between the two views. This is a nice feature (in fact, I find it indispensable to minimise the amount of screen estate used by multiple tool windows) but I couldn't get the C++Builder IDE to play ball in this respect.

Class exploration

The Class Explorer window is new to C++Builder but will already be familiar to Delphi 4 developers. In essence, it provides an object-oriented view of a project with the project as the root, the various forms below the root, and then the individual form controls and methods beneath each form. If you double-click the name of a method, the Code Editor window will jump to the code for that method, whereas if you click a control, you'll be taken to the location of that control's declaration in the overall form definition. You can use the Class Explorer in one of two modes. There's a 'flat' mode, which displays all the forms for the entire project, and there's a 'per file' mode, which shows only the stuff that pertains to the current file.

The Class Explorer certainly helps you to find your way around inside a large project, but I couldn't help thinking that the system imposes too rigid a demarcation between the code view and the form view, and that the overall degree of 'synergy' could be improved. For example, if you right-click a method, you'll see a context menu that offers you the choice of jumping to the method's implementation or declaration. So far so good. But there's no option for deleting an existing form, control, or method from the Class Explorer, and nor can you rename any of the displayed items – unlike with the Delphi 4 Class Explorer. Suppose I right-click on a control – it would be nice if the context menu had a 'Properties' entry that took me straight to the Object Inspector, with the clicked control already selected. Double-clicking a control should take me to the form (not to the Code Editor!) with the control selected as before. My opinion is that the Class Explorer gives every indication of being a hastily cobbled together 'me-too' response to the likes of CodeRush. It hasn't been properly thought through, and doesn't do half of what it should do. I made similar comments in my review of Delphi 4 (*Delphi 4 – the next generation*, EXE, August 1998). The same things could be said about the dockable Class Hierarchy window, which is accessed from

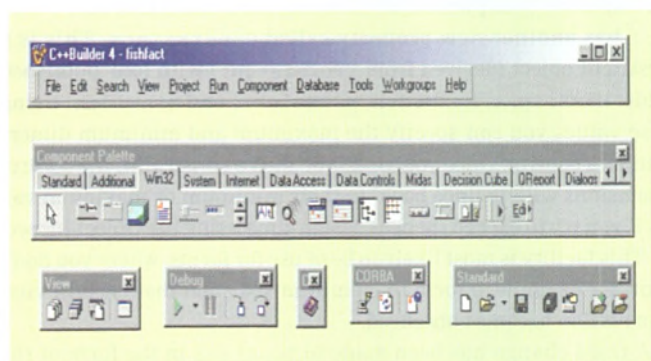


Figure 2 – The main IDE window has received the dockable treatment, and includes six separate toolbars, each of which can be 'torn away' from the application window and left floating. This includes the component palette but not the program's menu bar.

a context menu item in the Class Explorer – it's really displaying the same information as Class Explorer, and doesn't bring anything drastically new to the party.

An insightful addition...

Fortunately, these deficiencies are well compensated for by the much more useful Code Insight facilities. Previous versions of C++Builder implemented only a relatively small subset of the Code Insight features that were available to Delphi developers. With version 4, parity has been restored. For example, if you type the name of some object variable pointer and then follow it with the C++ arrow operator (`->`) you'll be presented with a list of possible methods, properties, public fields, or whatever. Choose one and it gets inserted at the current editor position. This is referred to by Borland as Code Completion. There's also Code Browsing, which allows you to jump quickly to the place where a particular method, class, or data type is defined. If you press the Ctrl key while moving the mouse over program identifiers in the Code Editor window, browseable items will be highlighted and displayed with an underscore, just like a hypertext link. If you click the highlighted item, the file containing the declaration will be opened, and the cursor placed at the relevant declaration. This sort of facility is much more useful in C++Builder than it is in Delphi: in Object Pascal the methods of a class are almost invariably located in the same file as the declaration of that class, whereas in C++, of course, declarations go in a header file with the actual code in the CPP file of the same name.

Still with Code Insight, the Code Parameters facility has now been added. This works by popping up a small tip window that 'walks' through the list of parameters to a function as you type them in. This is extremely useful when working with Windows API routines that take a large number of parameters. Finally, there's a new ToolTip Symbol Insight facility. You can move the mouse over an identifier (this time, sans the Ctrl key) and you'll see a small tip window indicating the filename and line number of the corresponding declaration. Added together, all these navigational facilities add up to a comprehensive package, though there's some overlap between the different bits.

On the negative side, the IDE seems to take longer to retrieve the necessary information than is the case with Delphi – and that’s true even for tiny projects. On my 300 MHz, 128 MB Pentium II the cursor often changes to a watch-cursor for a second or so as I randomly

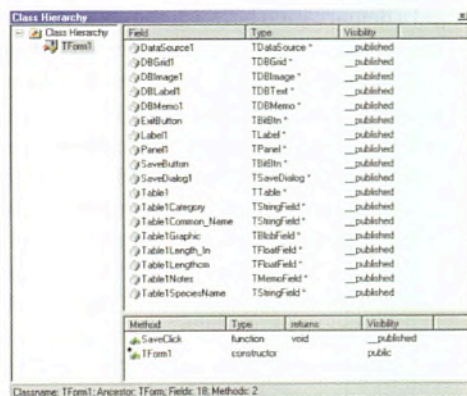


Figure 4 – The new Class Hierarchy window provides a quick view of the various forms in a project, together with the defined controls and method handlers, while context menu entries allow you to navigate straight to the place where a clicked-on item has been defined.

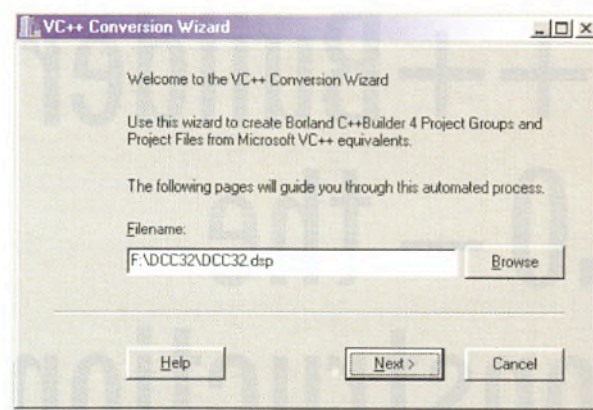



Figure 5 – C++Builder 4 now includes a Visual C++ conversion wizard, which takes an existing Visual C++ 5.0 project and creates a set of equivalent files for use with the C++Builder IDE.

move the mouse over different identifiers. Each time this happens, a background thread is scurrying away to get the necessary symbolic information for Code Insight. If it wasn't successful (eg I move the mouse over the declaration of some identifier – there's nothing to retrieve 'cos we're already at the declaration point) then the I-beam simply changes to a watch-cursor and back again. The overall effect is that the cursor has developed a bout of hiccups!



I mentioned that Code Insight in C++ Builder 4.0 is now the equal of that in Delphi. Well, that's not totally true. A cute addition to Delphi 4 was a feature called Class Completion. With Delphi, it's possible to type in a property declaration, hit Ctrl-Shift-C and have the IDE generate all the necessary support code for the property. Sadly, this feature is conspicuously absent in the C++ version. Finally, before leaving the subject of navigational/Code Insight enhancements, Delphi's Module Navigation feature didn't make it to C++ either. This is a keystroke combo (Ctrl-Shift-up/down-arrow) that enables you to move instantly between a method body and the method declaration. I suspect that this facility was too much like hard work for the team at Borland, bearing in mind that the two live in different files as already noted.

As you'd expect, assorted additions have been made to the VCL library. I've already discussed the changes that were made to `TControl` in order to implement docking support. You'll find that `TControl` has another new property called `Constraints`. This is a persistent object (derived from `TPersistent`) with four published fields: `MaxHeight`, `MaxWidth`, `MinHeight`, and `MinWidth`. Using these values you can specify the maximum and minimum dimensions of a control. Once you've established a constraint, the control dimensions will 'bounce back' to their minimum or maximum values if you try to exceed them at design-time using the Object Inspector. This facility is most likely to be of use for forms, where you don't want, for example, a form to be minimised such that certain vital information becomes obscured.

A third change has been made to `TControl` in the form of the `Anchor` property. This is a set property that determines whether a child control should maintain a fixed position relative to the top, left, bottom, or right edges of its parent. Because it's a set, you can apply one or more of these 'anchors' simultaneously. Used judiciously in conjunction with the existing `Align` property, this particular feature can greatly simplify the resizing logic of an application.

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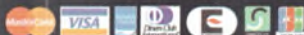
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Lights, camera, ActionLists!

Speaking of simplifying logic, C++Builder 4.0 now sports action lists. If you're as long in the tooth as me, you'll know that traditional Windows programming consisted of a `WndProc` function with a huge `switch` statement that dealt with all the possible Windows messages we were interested in. Inside this `switch` statement, you'd typically have a second, nested `switch` statement that handled all the `wParam` possibilities that needed to be fielded when responding to a `WM_COMMAND` message. Well, happily, those 'Spaghetti Junction' days are long gone for most of us, but at least one could argue that the 'traditional' approach had the benefit of centralising event handling in one place. These days, Delphi, C++Builder, and Visual Basic all tend to encourage a system whereby event processing is split up into dozens of bite-sized event handlers.

The action list component, `TActionList`, doesn't radically change that scenario, but it does make it much easier to manage and reuse event handlers. Some folks have difficulty understanding the concepts here, so let me give you a blow-by-blow account. You start by dropping an action list component onto your form. This is a non-visual component and doesn't show up at runtime. If you double-click the component, you'll then find yourself in the action list editor. From here, you can add actions to the action list by using the right-click action menu or by using the toolbar in the action list editor. An action contains a number of properties such as `Caption`, `Enabled`, `Category`, `Name`, and `Checked`, together with the all-important `OnExecute` event handler. Suppose we're writing an email program and we want to implement a 'Send and Receive Now' action. We might use the previous string as the caption, name the action `SendReceive`, set the category to `Comms`, and add the necessary code to the `OnExecute` event handler. So far we've defined our action, but unlike conventional Delphi/C++Builder programming, the action isn't tied to a single user interface element. To connect the action to a push-button (for example), we add a push-button to our form and set the push-button's `Action` property to `SendReceive`.

(Note: I haven't mentioned it before, but `Action` is another property that's been added to `TControl`. When you click a component's `Action` property, you'll see a drop-down list of all the actions that have been defined in the action list.)

Here's the really clever bit: as soon as you set the push-button's `Action` property to point to a defined action, the `Caption` property of the

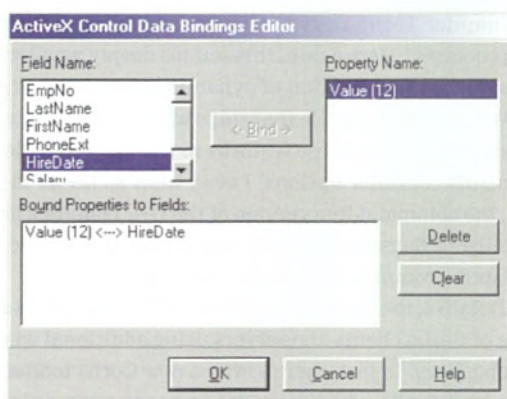


Figure 6 – The new ActiveX Control Data Bindings Editor makes it possible to bind fields in a dataset to selected properties in a data-aware ActiveX control, thus ensuring that changes in one are automatically directed to the other. This shows the `Value` property of the Microsoft Calendar control, bound to the `HireDate` field in an Employee database.



Figure 7 – The C++Builder IDE now includes the C++Builder Direct applet. While you have a connection open to the Internet, this applet chats away to an Inprise server and retrieves news stories and press releases relating to Borland development tools.

button will instantly change to reflect the caption string that's been defined in the action. In a typical program you'll often want to trigger the same action from more than one place, such as a toolbar button and a corresponding menu item. By pointing both user interface elements at the same action, you've centralised control and ensured that (for example) changing the action's caption will be reflected in both the menu item and the button. In a similar way, when you change the `Checked` and `Enabled` properties of an action, any 'dependent' user interface elements will be redrawn to reflect the change. In fact, the `TAction` object (a single element in the action list) even has an `ImageIndex` property, which (in conjunction with the list's `Images` property) allows a glyph to be associated with each action. Again, this will automatically display on bitmapped buttons and menu items.

The action list editor provides a number of predefined 'canned' actions that relate to dataset manipulation (next record, previous record, etc), standard edit actions (cut, copy, paste), and so on. You can divide your actions up into categories within the action list editor or, if you prefer, you can place multiple action lists onto the same form, treating each action list as an individual category. If you adopt the latter approach, the `Action` property of user interface elements will show all the actions defined across all action lists.

One word of warning: being an inveterate 'tweaker' I inadvertently set the width of the category column in the action list editor to zero, and then found that the editor wouldn't let me open out the column again! Even exiting the IDE and restarting didn't fix the problem. After a bit of registry spelunking, I tracked the problem down to the following place – there's a value called `CategoryWidth` at this key location. If the same thing happens to you, you'll know where to go:

```
HKEY_CURRENT_USER\Software\Borland\C++Builder\4.0\
Property Editors\ActionList Editor\TActionList
```

Still on the subject of VCL enhancements, Borland has added the ability to create VCL-based NT services by introducing two new classes: `TService` and `TServiceApplication`. The documentation states that if you select `Service` or `Service Application` from the 'New' dialog repository (click `New` on the `File` Menu) then a new Service Wizard will guide you through the rest of the process. Unfortunately, the wizard in question was away on vacation at the time the product was shipped, and you'll find that not much happens if you follow the above procedure. However, I understand that he's now back in Scotts

Valley for a spell (groan...) and you can have the pleasure of his company by pointing your browser at: http://www.borland.com/devsupport/bcppbuilder/file_supplements.html.

EZ-COM, EZ-GO?

The dynamic array technology of Delphi 4 has now been ported over to C++ land, courtesy of a new C++ template called... `DynamicArray`. As in the Delphi implementation, dynamic arrays can be multidimensional, but there is no built-in support for sparse arrays. The following example is taken from the online documentation:

```
int TotalArray (const DynamicArray<int>& arrayOfInt)
{
    int total=0;
    for (int i=arrayOfInt.Low; i<=arrayOfInt.High; i++)
        total += arrayOfInt[i];
    return total;
}
```

As you may know, Windows 98 offers the capability to work with multiple monitors, a feature which, needless to say, I haven't had occasion to use so far. For those who do wish to add multiple monitor support to their applications and utilities, Borland has simplified the underlying API by adding a new property, `DefaultMonitor`, to the `TCustomForm` class. By setting this property you can determine whether a particular form appears on the primary monitor, whether it appears on the same monitor as the application's main form, and so forth.

When C++Builder 4.0 was first announced, the press release proudly proclaimed that it had a new feature called EZ-COM. I fully expected that this feature would allow me to use wizards to create ActiveX controls from scratch, or at the very least might be mentioned in the online help. In fact, neither seems to be the case, and I can't help wondering exactly what happened to EZ-COM. A case of EZ-COM, EZ-GO, perhaps?

Although I love the ability of C++Builder and Delphi to convert an existing VCL component into an ActiveX control, I reckon it's high time that both development environments provided substantially more support for the creation of ActiveX controls from scratch. After all, the C++Builder press release rather aggressively talks about moving away from Visual C++ to C++Builder, and in fact this version of the development system includes an increased amount of compatibility with existing Microsoft projects; there's a new con-

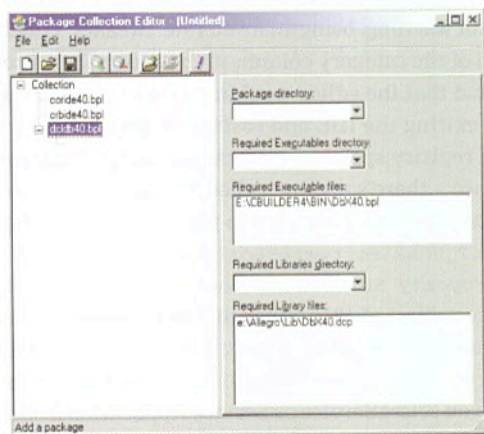


Figure 8 – The Package Collection Editor is new to version 4.0. It allows a number of BPL files to be compressed (using ZLib) and rolled into a single package collection file along with other needed files, the idea being that it eases installation and deployment issues.

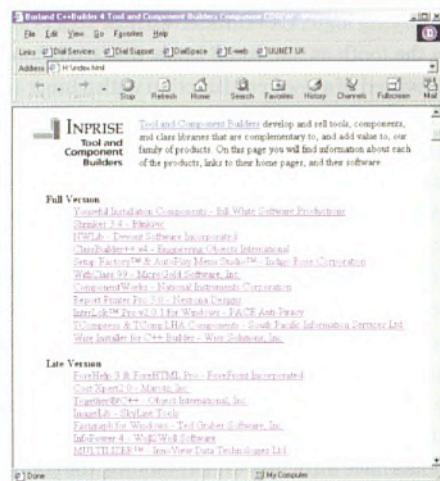


Figure 9—The Companion Tools CD includes a number of shareware and commercial applications, although it has to be said that the 'full' versions are perhaps not as full as they're claimed to be. Well, there's no such thing as a free lunch I suppose, but at least this lot ought to save you a few hours in download time...

version utility, called VCTOBPR, which is designed to convert existing Visual C++ 5.0 projects for C++Builder. With all this in mind, I reckon it's time that Borland made a full frontal assault on that aspect of Visual C++ that it's particularly good at – creating ATL-based ActiveX controls from scratch.

One nice addition is the inclusion of the same ActiveX data binding facility that's used in Delphi 4. If you import a data-aware ActiveX control into C++Builder, drop it on a form, and hook it up to a data source, you'll then find that you've got a Data Bindings menu item on the control's right-click context menu. If you select this, you'll see a data bindings editor that displays all the fields in the current data set, and the data-aware properties of the control, giving you the opportunity to establish bindings between compatible fields and properties.

Another interesting snippet from the press release mentions ‘a host of compiler enhancements including Dynamic Compilation and Adaptive Compiler Technology (ACT), which radically speed compiler build processes’. Here again, this sounds deeply wonderful, but I was unable to find any mention of dynamic compilation or ACT in the actual ‘What’s New’ help file that ships with the product, nor was I able to see any reference to these features in the Project Options dialog that controls compiler options. I even went so far as to fire up `BCC32.EXE`, the command-line version of the C++ compiler, and look through the list of flags for anything that hinted at dynamic compilation or adaptive compiler technology. Not a dickybird.

As with Delphi 4, the Enterprise edition of C++Builder 4 supports the building of Corba clients and servers using additional wizards in the 'New' repository. In fact, there's even a new Corba toolbar in the IDE (hidden by default), which provides access to commonly needed Corba operations. Corba support is provided by Inprise's VisiBroker ORB system, which comes on the same CD as C++Builder but is installed through a separate procedure.

And goodies galore!

In accordance with recent practice, C++Builder 4 is offered in three different flavours: Standard, Professional, and Enterprise. In order to

entice you into going for the latter two options, Borland is offering a number of tempting goodies. Not only do you get a copy of JBuilder 2 (as you might have guessed, JBuilder 3 is waiting in the wings), but you get a free Companion Tools CD. This contains a host of assorted third party components and utilities – according to Borland, several thousand dollars worth. Essentially, what you get is the full version of Borland C++ 5.02 together with a large number of tools, some of which are identified as ‘full’ versions, and some as ‘lite’ or ‘trial’ versions.

In practice, when performing a few random checks, I found a number of restrictions even in many of the items that were supposedly full versions. For example, the so-called full version of Shrinker 3.4 actually displays a nag message when the compressed executable is launched, indicating that it's been compressed with Shrinker. Similarly, the Wise installer setup program asks you for a serial number and, if you haven't got one, insists on getting your name, address, phone number, email information, etc, and passing it on to Wise via an online registration system.

The full version of ClassBuilder++ Lite is actually (according to the supplier's documentation) a limited working version of the Standard edition. I could go on, but you get the idea. Sadly, Borland seems to have a completely different definition of ‘full’ to that used by everyone else...

Conclusions? I've said in the past that C++Builder is the best, most productive – and indeed fun to use – C++ development system for general Windows programming. I stand by that opinion, and even more so with the new Code Insight features, dockable toolbar support,

action lists, and other goodies in this latest version. However, I'm disappointed that the company has resorted to issuing press releases that mention features that are (how can I put it politely?) somewhat fugitive in the released product. I'm equally disappointed that much of the alleged ‘full version’ software on the Companion Tools disk isn't nearly as full as it ought to be. Hopefully, there will be no more of this nonsense, my hope is that Borland has now turned a corner, and that things will only get better for the company. My fervent wish is that the day of the bean counter is over, and that Borland will now return to doing what it does best: creating exciting and innovative developer tools, and selling them at prices that guarantee the volume needed to restore the company's flagging fortunes.

You can buy the Professional and Enterprise editions of C++Builder 4 now, but – at the time of writing – the Standard edition is still some three weeks away. Presumably, it will be available by the time you read these lines. Estimated Street Prices are £449 for the Professional edition and £1,699 for the Enterprise kit. Most UK resellers offer cheaper prices though. You can get more details on C++Builder, track down product-features matrixes, etc, from the official website at <http://www.borland.com/bccpbuilder>.

Dave Jewell is a freelance consultant, programmer, and technical author specialising in low-level systems programming under Windows and DOS. He is the author of 'Instant Delphi' published by Wrox Press. You can contact Dave at Dave@HexManiac.com.



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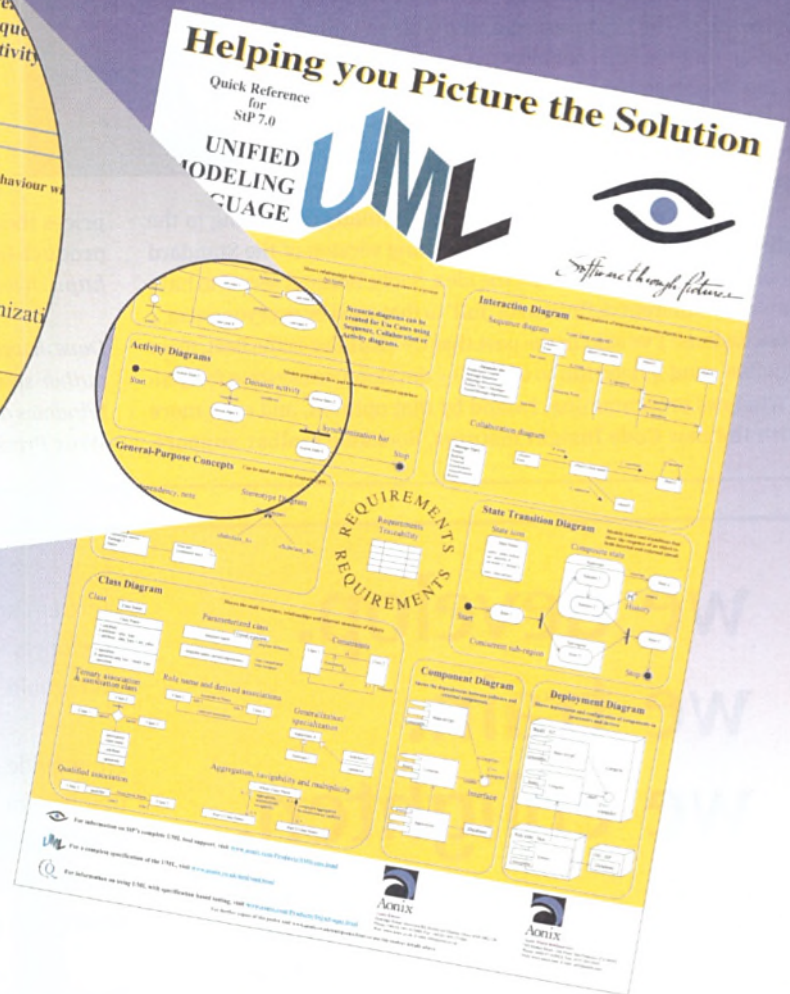
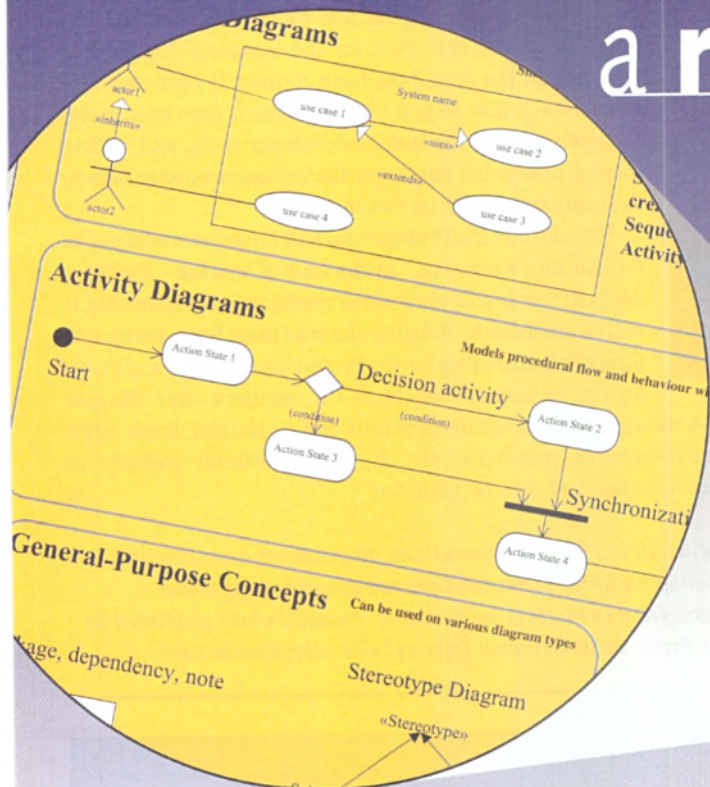
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The word of Eric S. Raymond

He is the hacker who influenced Netscape to open up source access to its browser, and he's not stopping there.

Peter Collinson hears from the Open Source man of the moment.

Eric Raymond came to London to present a keynote talk at the Open-Source '99 conference. Actually, he gave a couple of talks about what we now call 'Open Source Software' and the community that develops it. Raymond is the author of several papers that seek to understand the phenomenon of Open Source. Perhaps the most well known of these is *The Cathedral and the Bazaar*, cited by the CEO of Netscape as the reason that the company decided to open up source access to its browser. My plan was to attend the conference and interview Raymond. However, having listened to his first talk, I found that it covered most of my initial questions, and so I reproduce most of it here. I then added some further questions to which Raymond replied by email.

'The reason that we are here today is because of the successes of an engineering culture and tradition that started in 1969, which is the date of the beginnings of the Internet. The Internet was the first extremely large scale, low transaction cost, collaborative medium suitable for the development of software. An entire culture or perhaps a social machine grew up around the Internet. A tradition of how to write software and how to communicate with other developers emerged during that thirty years, but to the rest of the world it did so almost invisibly. No one outside the Internet culture was paying attention to what was going on.

It all changed a couple of years ago, primarily as a result of the development of Linux. Linus Torvalds took techniques and ideas that had been simmering in the stew of the Internet for some years, and brought them up to a new level of intensity and consciousness. There is now considerable interest in de-centralised cooperative development because those techniques displayed so much success in the creation of Linux. Just as importantly, we finally developed a language to talk about them.

Let me give you a personal view on these developments. In one sense, my involvement with this phenomenon goes back to the 1970s



Patricia Deardorff

when I first became involved with the Internet as a writer of code. But our story really starts in late 1993, when I first encountered Linux. It posed me a dilemma. At that time, I had been writing software for 15 years, and I thought I understood what it was that you needed to do to create high quality software. There is a classical prescription for software engineering that is derived from Fred Brooks' *The Mythical Man Month* (ISBN 0-201-83595-9). Brooks came up with what were apparently counter-intuitive thoughts.

He said, "adding more programmers to a project makes it later". And, more generally he predicted that "if you have n programmers on a project, the amount of work that you can get done scales with n , but because of your complexity overhead, the management overhead, and the communications overhead, it really scales with n^2 ". So the prescription that comes from classical software engineering is "keep your development group small", "have closely defined objectives so you don't wander off track", and "obsess about bugs". Typically, if you have five months development time then maybe if you are lucky you'll end up with perhaps a month or a month and a half, to innovate, think about new ways to do things, and think about architecture. All the remaining time is spent debugging.

The Cathedral and the Bazaar

This scenario was what I understood about software engineering and Linux posed me with a bit of a problem. The notions proposed by Brooks said that anything that was developed by 40,000 semi-amateur programmers with no central management should be unusably buggy, a pile of horrible digital rubble. However, when I first booted Linux, it was clear that it was far from unusable; I was in the presence of a general purpose operating system that was substantially more powerful and more robust than anything I



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had ever used. How can this be? There was some contradiction here. I decided to get involved with the Linux community and try to figure out how they were getting away with it.

The conclusions that I reached are contained in *The Cathedral and the Bazaar*. The metaphor in the title of the paper is a deliberate contrast. I wanted to suggest a contrast between the traditional centralised, vertical, pre-planned, almost authoritarian way of doing things and the decentralised model, where you have a lot of people babbling at each other, and there is an implied order that arises from that, as if by a miracle. Interestingly enough, that order turns out to be more complex and delicate than what we can achieve by pre-planning.

The first of the three tactics that are characteristic of the Bazaar style is "face outwards". Be willing to take input from outside your development group, outside your organisation, outside your culture, outside your country – from anywhere. You have to understand that other people can and will contribute: bug reports, bug characterisations, design feedback, and even patches to your precious code.

The second tactic is "release early, release often". This approach is in stark contrast to the Cathedral style that tends to encourage long release intervals with most of the period between releases spent in messing about with bugs. In the traditional mode, we all have the tendency to let the release slip a couple of months while we think "we'll fix those last four bugs on the problem list, and then we'll be perfect". In the Bazaar mode, releasing early and often seems to have the effect of speeding up and intensifying the feedback loop.

The third tactic is "when somebody does some good work for your project, say so – praise them in public". There's not much of a reward that you can give people on the Internet apart from recognition. There is no real conventional power relationship on the Internet, so forcing people to do things isn't viable. There's not much scarcity economics either. There's scarcity in the surrounding culture, but if you are on the Internet in the first place, then you have enough computing power and enough bandwidth. You could always use more, but you currently have sufficient. It's hard for me to give you more of this kind of power from someone else on the Internet, so it's no use as a reward. All that is left is reward by peer esteem.

These three tactics lead us to a management style that's enormously different from the traditional prescription, but one that's also enormously effective. As I said, these thoughts are expressed in greater detail in the paper. I'll move onto what happened after the paper came out.

Towards Open Source

When I wrote the paper, I wasn't intending to change the world; that was an accident. I wanted to give the hacker culture – the Internet developer community – a method to discuss its own methods. It seemed interesting that the tradition that had evolved was effective, powerful, and completely unconscious. Nobody in the culture was reflecting on what made the methods work. Nobody in the culture was really aware that they had a different development method from the traditional one. It was something that was passed on by folklore and osmosis. It was something that you learned to do from other people and then never think about. I thought that I might be able to provide a useful service by dragging these methods out into the light.

It was rather astonishing to me that the rest of the world actually noticed. The most dramatic development was that Netscape Communications released its browser source early last year. That was the point where I realised that my days of happy obscurity were over. It's

The press doesn't buy abstract ideas without a vivid personal story. I seemed to be the person on the spot; that's why I am here today.



a bit startling when you find out, after the fact, that the CEO of Netscape has been giving your name to the national press.

However, the world was suddenly listening. But I realised that it would be a flash in the pan unless someone stood up and became a travelling evangelist to represent the hacker community to the media. The press doesn't buy abstract ideas without a vivid personal story. I seemed to be the person on the spot; that's why I am here today.

The term "Open Source" is a result of this activity. You didn't hear that term before last year, because we hadn't invented it yet. We used to call the same code "free software", but we don't any more. The problem is that the term "free software" is inextricably tied up with the GNU project, whose public stance isn't acceptable to many people in suits.

Several people from the Linux development community realised that getting the world to use our stuff was not a matter of convincing them about our technology, or developing better technology. We already had better technology, and we'd had that for a long time. Unix has been more stable, more reliable, and more effective than its competition for 25 years. We had the technology, but we'd never had "Marketing". This is a very bad word to most hackers, so we've never done it effectively. So some friends of mine and I decided that we needed to "rebrand the product". We sat down and brainstormed labels for what we had been doing that wouldn't turn off the average IT manager. Open Source is the name that we came up with.

We then thought about marketing some more. There's a classic strategy for marketing Unix; it's the prevailing myth that the Unix world had been running on for many years. It goes like this. You think that Unix is wonderful, you want lots of people to use Unix. So you find an engineer in a corporation where you want to sell Unix, and you persuade that engineer that Unix is wonderful. The engineer comes excited and says "we need to tell our bosses". The bosses get enlightened and say "wow, we must tell our bosses", and the bosses tell their bosses and so on. Gradually, Unix enlightenment percolates the organisation and finally the strategy people at the top

Further information

Naturally, you can find out considerably more about Eric Raymond and the Open Source Foundation on the Web. His personal website is <http://www.tuxedo.org/~esr>, and the various papers can be found at <http://www.tuxedo.org/~esr/writings>. If you are interested in the Open Source movement, then visit <http://www.opensource.org>. The 'Halloween documents' can be found there. Finally, if you are interested in news and opinion on Open Source then a visit to <http://www.slashdot.org> will be illuminating. If nothing else, it allows you can find out exactly who it is that thinks that the Open Source community is a load of commies.



The developers at Netscape Communications didn't know that the browser was going to be Open Source until their CEO announced it.

wring their hands and say, "It is good". This is all a nice theory, but it doesn't work.

The Unix world can perhaps be forgiven for not realising that this bottom-up approach was a completely losing strategy (for 20 years), because there were no good examples of strategy that *did* work. That is, until the Netscape release.

We realised that if you want to change the way people do things, then you need to go in from the top. You need to reach the strategy people first, the CEOs, the CIOs, and CTOs, and whatever other alphabet soup is fashionable this week, and if you convince those people that Open Source is a wonderful idea, then they will impose that vision on all the people beneath them. That's what worked in the Netscape case. In fact, the developers at Netscape Communications didn't know that the browser was going to be Open Source until their CEO announced it. They were as surprised as I was.

We are putting a lot of energy into what's essentially a media strategy designed to persuade the people involved with strategy and decisions that "yes, you can use Open Source in your corporation, and things will be better". There are some signs that the approach is working. Linux gained market share by 212% by one measure (150% by another). We are seeing a steadily increasing stream of adoptions by companies. Significantly, many of these are from companies with no historical ties to the technology industry whatsoever.'

A conversation between Unix hackers

As a Unix hacker of considerable years, I would take exception to the Internet giving rise to Open Source. I would actually place the genesis of Open Source very precisely in time – the day that Larry Wall put out the patch program (to support the 'B' news code, I think). Suddenly, we could do what our licences allowed us to do: send our code to other people – and not include any significant Bell Labs code. So it's all really down to Larry.

My claim is that the Internet launched the tradition of open development based on published standards. Of course, we didn't have actual code continuity until Unix. Certainly, patch was an important turning point.

At the start of both talks you asked some 'service questions' intended to help you work out who was listening. 'How many of you have read The Cathedral and the Bazaar' seemed an obvious one. 'How many of you get paid to develop software', also seemed relevant. The intriguing question was: 'For how many of you does your salary value depend on the sale value of the software', to which you got quite a low answer. Could you expand on why you ask this question and what you find are typical responses?

Sure. I ask it in order to puncture a common illusion about the distribution of programming jobs. Many programmers think that the merchant-software market (the only part that would be economically hit by the move from closed-source to open) supplies most of the development jobs in the world. This isn't true. Typically when I ask these questions I get a 1:20 ratio with jobs *not* dependent on resale value dominating, and much surprise from the audience at this.

The 'group of friends' you mentioned in your talk have gone on to found the Open Source Initiative, how did that come about?

It was founded because a few key people decided to do the marketing thing right.

What are the aims of the OSI? It seems to position itself as a press-lobbying group.

OSI exists to manage the Open Source Definition and its associated certification mark, and to promote the Open Source idea. Besides doing outreach work, we offer advice on licences to people considering Open Source product releases.

What's your position in the Foundation? I seem to pick up that you are the President? How are things organised?

I am president of a board of directors. We are in the process of incorporating as a non-profit organisation.

I see from the Web that the term Open Source is to be used to characterise a set of software licences that fit a specific definition. What's the thinking here?

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The term Open Source has been registered as a certification mark. Why is this?

So that it can be defended against malicious abuse by people and corporations who see open source as a competitive threat. We intend to brand products as Open Source to reward vendors, and as a seal of the kind of quality and robustness that only open-source peer review can promote.

We seem to have several evolving models for businesses to use Open Source. We have Cygnus, who support and extend GNU products, making money from support and sales of documentation. Linux companies are also doing this. There's the Aladdin Enterprises model: giving away 'old' versions. There's the new Sendmail Inc model: selling support and proprietary ancillary software. What's your views on these models, their successes and failures?

It certainly looks like their success is increasing, which is good. I want source to be open where that makes economic success, and no further. The market will find its own equilibrium – which, I think, will be pretty much all open-source at the operating system/infra-

**I want source to be open
where that makes
economic success, and
no further.**



structure/communications level and a mix of open and closed at the applications level.

In your second talk you mentioned that it was bad to 'fork' projects, however Linux seems to be more than one release; there are different versions from different vendors. The problem for the consumer is which one to buy. This seems to be a classical Unix pitfall. What's being done to prevent it happening yet again?

Having more than one distribution doesn't equate to forking; they're a lot more like different selections from a common code base. Each has a slightly different flavour or emphasis, but actual technical incompatibilities are quite rare. Efforts like the Linux Standards Base exist to address those.

To the man in the street, ie me, Red Hat seems to be the market leader; probably because they are spending more on making themselves visible. Are there dangers in one vendor becoming predominant? Would it

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actually be a good thing when thinking about selling into businesses?

Red Hat's dominance does make some people in the community a little wary, but it's not like they can turn into Microsoft or anything; the sources are open. The perception of a big, stable market-leader certainly helps us with business types.

Red Hat Linux comes on three CDs and is complete, in the sense that it has many really usable applications bundled with it. Why does the media continue to insist that Linux is 'no good for the desktop'? What needs to be done to stop this pervading image from persisting?

Time, and repeated whacks upside the head with a clue stick! I think there's a sort of iron law of journalism that every story has to include a negative so the reporter will look judicious and balanced. This gives journalists a problem with hope, joy, idealism, and success. I see 'no good for the desktop' as a sort of empty ritual gesture in fulfilment of that law.

I suspect that the Linux world really needs to start being supplied information about hardware from the hardware manufacturers in the same way that the Windows world does. Then I should be able to turnkey the system for my screen or modem or disk. I have zero clue how to optimise

Xfree86 for my particular screen, for example. What's being done to influence the hardware vendors?

Moral persuasion. And, more to the point, we're growing our market so fast that they realise they *have* to play.

As you said in your talk, you've been thrust into the limelight. Is it fun? What's good or bad about it? What do you think is your next personal step?

Fame is weird. People fly you first class, which is okay; the food is better. On the other hand, you don't get time to hack much anymore. You get recognised on the street, and women's glandular systems instinctively tilt in your direction (yes, even scruffy hackers like me experience this). On the other hand, your private life erodes and you spend way too much time on the phone and talking with journalists. You choose your objectives and you make your choice. I'm doing this public-advocate thing out of loyalty to my tribe. Essentially, it's a dirty job but somebody's got to do it, and I've got the right brain chemistry to do it effectively. I'll stop when it's no longer necessary and go back to doing what I love best, which is solving problems and designing programs.

In the meantime, I do try to enjoy the fun parts. ■

Peter Collinson is a freelance consultant specialising in Unix. He can be reached electronically at pc@hillside.co.uk, by phone on 01227 761824, or on the Web at <http://www.hillside.co.uk>.

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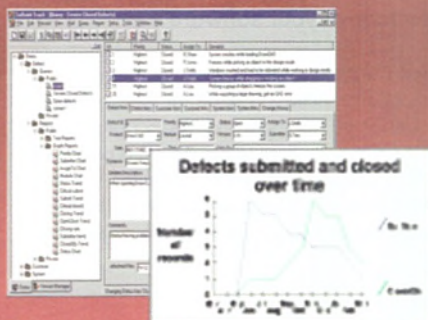
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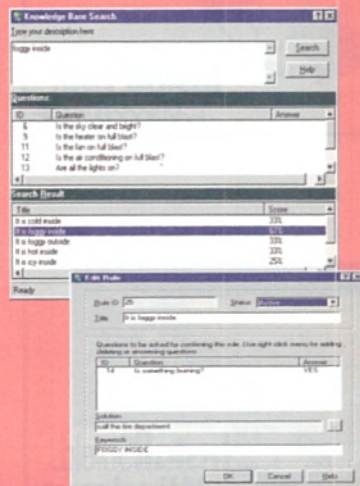
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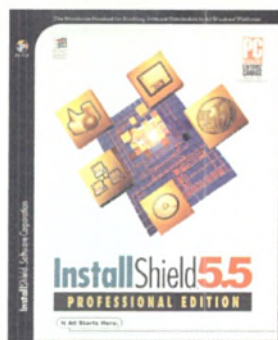
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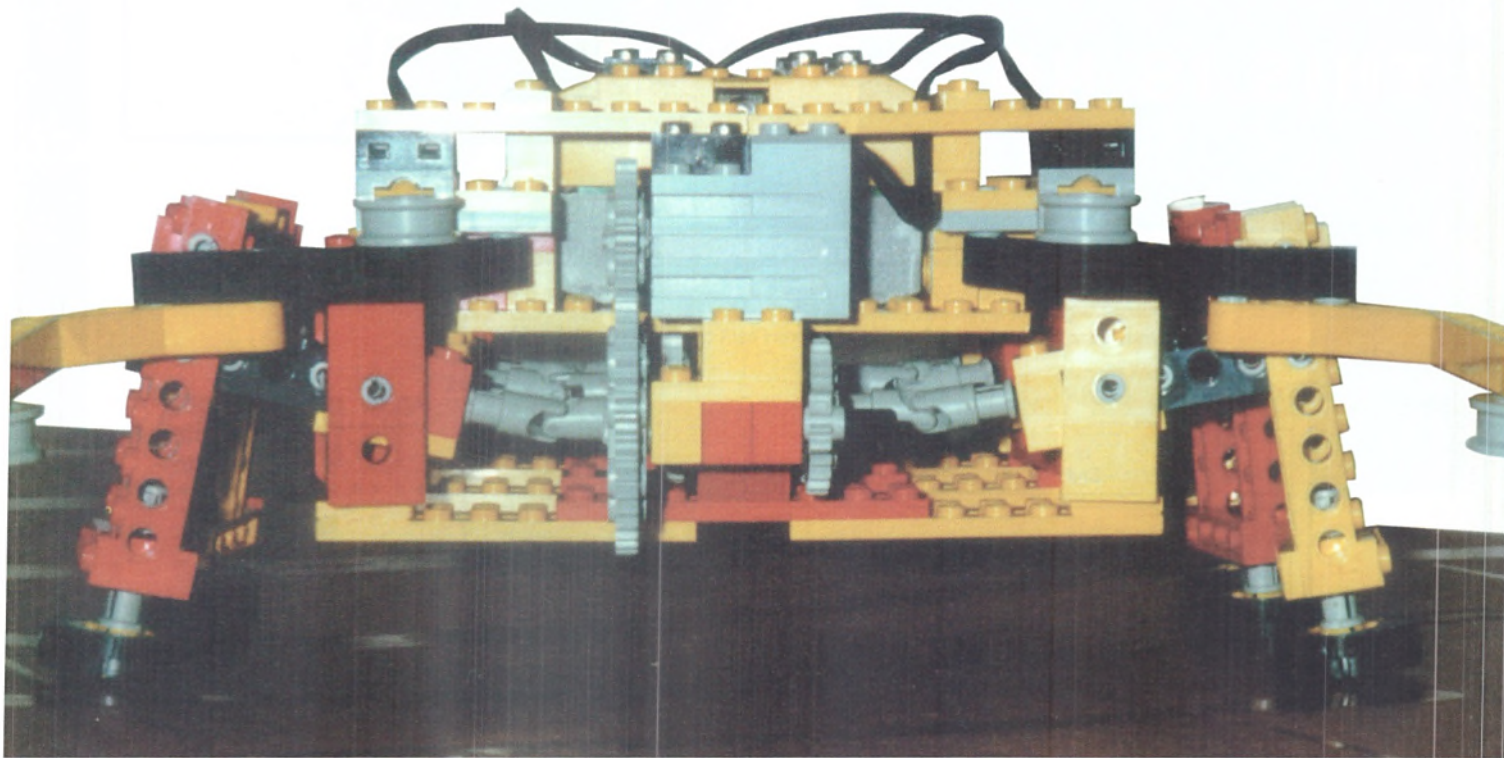
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Legoware



Young developers never grow out of their toys. They just start programming them instead, as Gavin Smyth found out when he invested in Lego's MindStorms robot kit.

Im sure many of you played with Lego as children – how many still do? Towards the end of last year Lego released MindStorms, 'robotic Lego', and the company estimates that about 50% of the initial owners are teenage boys, with the rest being adults! (One of my friends told me his two-year-old daughter wanted a set for Christmas...) Before you dismiss it as yet another plastic toy with a naff name, or leap at the chance to build robots, here's a look at what you will be getting.

For £170 you are presented with a big fat box proclaiming that it contains over 700 pieces – granted, half a dozen of these are rubber bands. However, among all the bricks, cogs, and axles are a bunch of very interesting components:

- An RCX controller (see main picture)
- Two motors
- Two touch sensors (ie switches!)
- One light sensor
- An IR 'tower' to connect to your PC
- A Windows 95 application CD

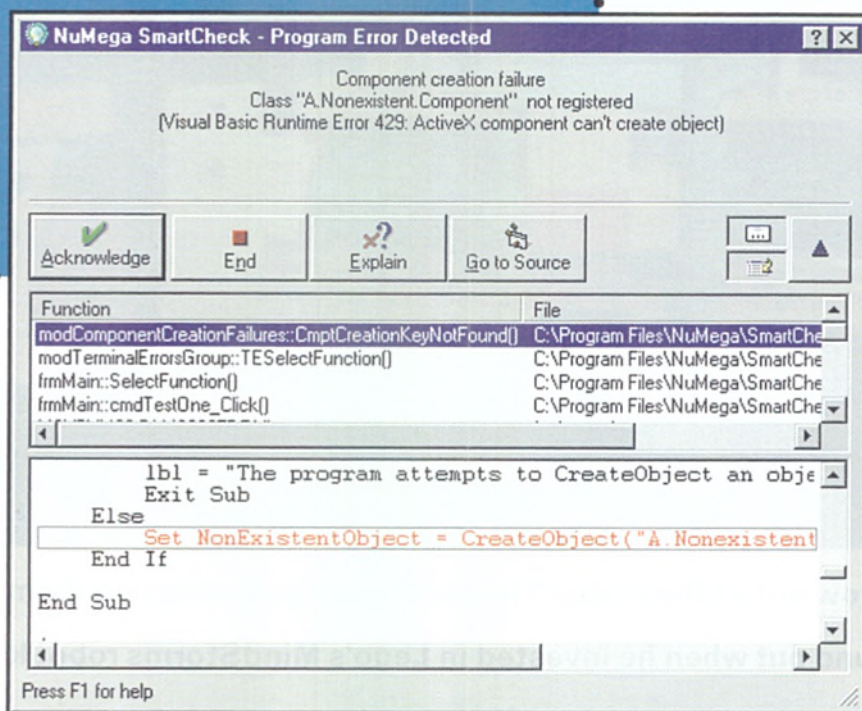
The controller is a large 'brick' (about 4 by 2.5 by 1.5 inches) with three inputs (for the sensors) and three outputs (for the motors, obviously), and a tiny brain (a Hitachi H8/300 series microprocessor). In normal use about 16 KB of firmware is downloaded to this, leaving 6 KB for operational code after the firmware steals some more working space. While this doesn't sound very much, the Lego opcodes are fairly

high-level. However, with only six inputs and outputs and various language restrictions, there's not really a lot you can do! It is possible to replace the firmware with something more interesting, such as a Forth interpreter, or even a JVM (maybe not in 16 KB) but Lego has not released the firmware specifications – more on the subject of firmware later.

The RCX communicates with your PC via an infrared link, which is usually employed for downloading the robot's application code, but it is possible to control your creation directly. Although the manual states that the operational range is quite short and IR is line of sight, it appears that in a typical room reflections are sufficient to keep in touch almost continuously. It is also possible to make one RCX communicate with another, but that seems to be the only way to extend beyond three input and three output lines. (Although the processor has many more inputs and outputs, none are accessible from outside the RCX's plastic casing). Mind you, it does offer the possibility of a sort of Lego robot wars where the losers are brain-washed by the winners...

While this claims to be robotic Lego, it is rather under-powered. The older educational toy, Lego Dacta, seems to be quite a bit more sophisticated, but Dacta does not have any form of mobile 'intelligent' controller and MindStorms is the first robotics set available to the general public. There is a similar looking Lego CyberMaster kit, which uses a radio link instead of infrared, but this is less pro-

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```

task main
{
    // Say what sort of sensor it is
    Sensor( IN_1, IN_SWITCH );

    // Engines on...
    Fwd( OUT_A + OUT_B, OUT_FULL );

    while( 1 ) {
        wait( IN_1 == 1 ); // Wait until pressed
        Reverse( OUT_A + OUT_B );
    }
}

```

Listing 1 – An NQC program to trundle forwards and backwards.

```

Do
    Dim SwitchVal As Integer

    PBrickCtrl.SetSensorMode 0, SWITCH_TYPE, 0
    PBrickCtrl.SetPower "02", CON, 7
    PBrickCtrl.SetFwd "0"
    PBrickCtrl.On "02"

    ' Wait until switch pressed
    Do
        SwitchVal = PBrickCtrl.Poll(9, 0)
    Loop While SwitchVal = 0

    PBrickCtrl.SetRwd "02"

    ' Wait until switch released
    Do
        SwitchVal = PBrickCtrl.Poll(9, 0)
    Loop While SwitchVal = 1

    ' Wait until switch pressed
    Do
        SwitchVal = PBrickCtrl.Poll(9, 0)
    Loop While SwitchVal = 0

    PBrickCtrl.SetFwd "02"

    ' Wait until switch released
    Do
        SwitchVal = PBrickCtrl.Poll(9, 0)
    Loop While SwitchVal = 1
Loop

```

Listing 2 – An equivalent VB program.

grammable. (When is someone going to create a radio to infrared and vice versa transducer – that would be very useful.)

Software opcodes

That's the hardware out of the way. What about the software? The CD contains an RCX code builder application: Lego software engineers have devised this graphical language to build robot control code. For Windows 95 only, it is a very simple language with a cute but very slow to use visual development environment, which unfortunately imposes more limitations on the already restricted opcode set. To be honest, I found it so limited and slow that I gave up trying to do anything sophisticated with it very quickly. Figure 1 gives an indication of programming in RCX code.

I've mentioned the RCX opcodes a couple of times already. These are effectively the byte code that the RCX firmware executes: RCX code maps almost directly onto (a subset of) these opcodes. They include the usual arithmetic operations, but there are also commands to start and stop the motors, to control the speed and, of course, to read the sensors. The RCX virtual machine unfortunately

has limited facilities: you can have only 32 variables, most of which are not accessible from an RCX code program; a subroutine cannot call another one; there is a similar inability to nest most control structures; and, while it supports up to ten tasks, there is no built-in inter-task synchronisation.

Outside the box

Fortunately for us programmers, there are alternatives. Apparently a C variant, 'Interactive C', is on the way but Lego has been beaten to it by Dave Baum with his 'Not Quite C' compiler (NQCC). The language in this case is a very restricted C-like language, which is rather more expressive than RCX code: for example, it permits access to all of the global variables instead of just one. It is much quicker to develop in, but still limited by the range of available RCX opcodes. An approach many may find more compelling is the ActiveX control that Lego includes on the CD. As well as letting you produce code to download to the RCX, you can drive the controller directly from the PC, just using it as a remote sensor and motor unit. This offers much more exciting possibilities: let the PC act as the brain, and hitch up a few more sophisticated external sensors such as a camera and see what happens. Lego did not originally release details of the control's interface, but has since rectified this on the MindStorms website (see *References*, and follow the link to the MindStorms SDK).

Figure 1, and Listings 1 and 2 show short programs written using three different approaches. They make a robot trundle forwards until it hits something and then reverse, and repeat. (For brevity, these listings omit initialisation steps, error checking, and proper termination of the main loop.)

```

/* Native program, using legOS services, */
/* to trundle back and forth */
#include "direct-sensor.h"
#include "direct-motor.h"

/* Routine to handle bumper press */
wakeup_t bump( wakeup_t data )
{
    return SENSOR_1 < 0x2000;
}

/* Main motor control task */
int rover_driver( void )
{
    motor_a_speed( 5 );
    motor_c_speed( 5 );

    for( ;; )
    {
        static MotorDirection m = fwd;

        motor_a_dir( m );
        motor_c_dir( m );

        wait_event( &bump, 0 );

        m = ( m == fwd ) ? rev : fwd;
    }
}

int main( void )
{
    /* Spawn driver task */
    execi( &rover_driver, 1, DEFAULT_STACK_SIZE );
    tm_start(); /* Start tasking */
    return 0;
}

```

Listing 3 – A legOS program.

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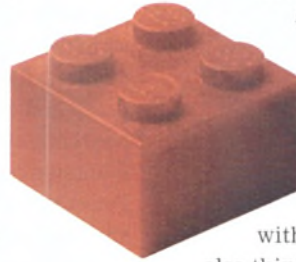
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There are further choices: you could emit opcodes directly (ie implement the back end of NQCC) or generate them as object code from some other language, such as Smalltalk (yes, that has been done). NQCC's author is one of a dedicated group of RCX reverse-engineers and hackers determined to exploit the capabilities of MindStorms. It is interesting to note that the GNU toolset already includes the H8/300 series back end for gcc – producing a cross-compiler requires not much more than building the GNU tools appropriately, and some of these folks are decoding the firmware with the goal of permitting 'real' C++ to be run on the machine. There is already a rudimentary executive and hardware driver layer called *legOS*. Listing 3 shows some code, similar to the other examples, that runs natively on the H8/300 using *legOS* services. Although this looks much more complex than the other solutions, we are no longer labouring under the restrictive limitations of the RCX firmware and can make much better use of the available RAM (more than 32 variables!) and processor.

Along with all this third party work in software, there is a fair amount of interest in the hardware issues. Initiatives include expanding the range of sensors and effectors, in particular making devices for much less than Lego's rather high prices. (All of this is, of course, thoroughly unofficial. I am quite certain that Lego would frown upon any commercial cloning or MindStorms extension industry.) And there is even a mini-CAD program, called LDraw, which is available to show off very cunning bits of Lego building.



Building a cross-compiler

GNU tools have a reputation for being portable. For the GNU compilers, you could even think of the front and back end as being portable independently – there's no reason for the target machine to be the same as the host. For that matter, the host for the compiler need not be the same as the machine on which the compiler is being built (a so-called Canadian cross).

The GNU toolset is thus a favourite for cross-compilers. You find the packages you require – typically the C compiler (gcc), assembler, and linker (part of the binary utilities package *binutils*), and maybe the C library. You unpack them (patching a few as necessary), build them individually, and install them. If you want C++ and the standard library, you repeat this with a few other packages. In addition, you need a set of GNU native tools – obviously there is the compiler (although you can build many of the GNU packages with other compilers, it is easiest to use GNU tools), but also things like *make*, *sed*, and a suitable shell (such as *bash*).

It is a nuisance to collect all these different tools and packages, and a tedious job to configure and build each. A much simpler alternative is to make use of other people's expertise. I found the easiest way to create the desired set of tools under Windows was to grab the Cygwin32 source, because it contains virtually all that you need to produce a cross-compilation environment (gcc, *binutils*, *make*, etc) and build it. It can be built with any current set of GNU binaries (such as those found on Linux systems) or, even more straightforwardly, with Cygwin itself under NT (Cygwin will not build

Hardware hacking

Okay, so why is EXE printing an article about an expensive toy? Here's something to think about...

For years, we've been told that software should be produced in a very rigid engineering environment: think a lot beforehand, produce rigid specifications, and work to them. There is a multitude of books supporting this accepted wisdom, defining software lifecycle after software lifecycle. Anyone who has looked at real world programs realises this software production paradigm is naively optimistic (the software *lie-cycle*) – most software projects are late, bug-ridden, over budget, and generally unsatisfactory. In fact, Ed Yourdon articulates this message (well, almost) in his latest book, *Death March* (ISBN 0-13748310-4). Looking in the opposite direction, it is apparent that the most productive programs are lashed together by untrained hackers (no insult intended to *trained* hackers) with little or no upfront planning. If there is any 'design' documentation, it is written at the end of the development, when the only thing more tedious than writing documentation is testing the application (assuming, of course, that the project still has time left for such endeavours). Consider the popularity of hack-it-and-run languages like Perl or Visual Basic, or the addition of 'edit and continue' debugging to Visual C++, making it easy to throw together what one might politely call 'long term prototypes'. Compare that with the popularity of secure and safe languages such as Ada!

Software engineering theoretical-best-practices have taken a lot of inspiration from hardware engineering. Hardware design has always been driven by the need to perform very rigorous planning at

the start – nailing every potential variable down – principally because it is too expensive to fix later. Software is always malleable up to and beyond release dates. By contrast, it is very costly or even impossible to recover from an error such as making windscreen glass the wrong shape for a car. Or, what if you are running out of time and over budget? I guess you could leave the electrics out of the car, with that particular feature pushed out to release 1.1! Mind you, a car crash is probably more serious than a software one.

Toys like Lego have let kids (and adults who don't get out much) build structures without the need to plan properly: an attitude of experimentation is fostered, leading to the experience required to make more efficient use of materials. Initial models tend to be bulky and fragile. In later ones, you find that many components occupy several roles, such as bracing strut, axle holder, and a bit of decoration – the models for which Lego provides instructions tend to exhibit these properties (one of the most impressive, in my opinion, is the Space Shuttle model). These 'ideals' run counter to good modern programming practice where minimising coupling is paramount. Unfortunately, these models are fairly dumb creations – the most exciting thing you can do is bung in a motor and see things go round. Lego MindStorms, with the added frisson of a bit of intelligence, makes these structures much more interesting and might create a generation of combined software and hardware hackers. This time, hardware design is taking a few ideas from software hackery. I wonder if it will lead to as many tedious books telling us how to design hardware properly.



Figure 1 – An RCX code program

under Windows 95, but once built on NT the tools can be used on any Win32 system). I downloaded the Cygwin binaries and source, installed the former, and unpacked the latter. Note that there is a minor error in `src\gcc\config\h8300\h8300.c`. Line 859 refers to a function argument called `name` when it should be `pname`. After changing it, the following short sequence of commands is all that

is necessary to build and install a cross-compilation environment targeting the H8/300 to be run on the current host:

```
./configure --target=h8300-hms --prefix=/Lego
make
```

```
make -k install
```

The `-k` on the last command is necessary because the install would otherwise fail – I have not included the documentation source in the build. After all this, you have executables like `h8300-hms-gcc.exe` and `h8300-hms-ld.exe` to use for cross-compilation.

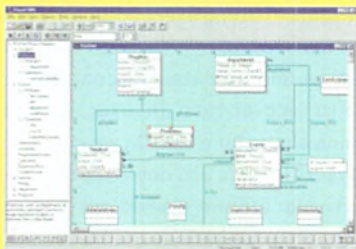
Once the commands above have completed, there will be new binaries under `C:\Lego`. You can copy them into your existing Cygwin tree, which saves a considerable amount of disk space by weeding out duplicate files (to do the build, you need an awful lot of disk space and time). You could prune out some of the executables you will never need because the whole Cygwin package includes much more than the minimum required, but I was too lazy to sort the wheat from the chaff. For example, the debugger `gdb-h8300-hms.exe` is not very useful since you cannot debug on the Lego RCX target.

There are a few points to be aware of. The Cygwin compiler is actually EGCS, not GNU C. The latter has become a very stable compiler, and therefore is slow to change. However, some folks felt that they needed an environment in which to try out leading edge language features and compiler technology, and so the open source development of EGCS started. For most of us, it makes little difference which is being used, though EGCS appears to produce tighter code than the GNU compiler.

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Many of the GNU package makefiles and scripts assume that the shell is `/bin/sh`, so you need to copy `sh.exe` from the Cygwin binary directory to `c:\bin`. In addition, you do have to use `bash` to run the commands above: `cmd.exe` is not up to the job. There are a couple of potential surprises for Windows users when confronted by `bash`. First, some command lines appear to be case-sensitive, particularly when using wild cards, and some are not. It is wise to be careful and consistent in naming files. Second, the way you reference disks other than the one on which Cygwin is installed is very similar to accessing multiple disks under Unix – you have to use a `mount` command to make them appear as subdirectories of the single root.

Finally, it is worth running `strip` on all the built executables since the makefiles default to enabling debugging information in binaries, bulking them dramatically.

There is, of course, copious information about building the GNU tools on the Cygnus website.

To infinity and beyond

Finally, I wonder how difficult it is to build GNAT (the GNU New York Ada Translator) for the RCX... Cygnus has recently announced a Java front end (`gcj`), which means maybe we can shortly have Java running on the RCX too. ■

Gavin Smyth is a real-time software engineer and part-time Windows and Linux hacker who has never really grown up. He can be contacted at gavin@beesknees.freemove.co.uk.

References

Lego MindStorms official site (www.legomindstorms.com)

As well as the expected promotional blurb, this hosts a set of 'challenges' and forums discussing aspects of MindStorms.

Lego MindStorms Internals site (www.crynwr.com/lego-robotics/)

This is a very useful site, containing basic information that Lego neglected to tell us, and linking to virtually every significant Lego hacker's resource on the Internet, including references to H8/300 processor documents.

LUGnet (www.lugnet.com)

Although there is a Lego Usenet group (news://rec.toys.lego), this site hosts a much more interesting set of discussions.

LDRAW (www.geocities.com/Athens/Parthenon/2244/ldraw.html)

The place to start if you're looking for Lego 'CAD' packages and related tools.

LegOS (www.multimania.com/legos)

Home site of the legOS operating system development.

Cygwin32 site (sourceware.cygwin.com/cygwin)

The Cygnus site for porting GNU tools to Win32.

Comparison of MindStorms and the MIT programmable brick

(fredm.www.media.mit.edu/people/fredm/mindstorms/index.html)

Fred Martin, of the MIT Media Laboratory, was one of the principal workers on the use of Lego in educational robotics and the MIT programmable brick – research that can be viewed as producing Lego MindStorms.

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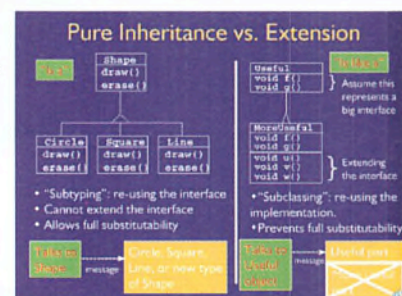
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About Bruce Eckel - (www.eckelobjects.com)

Bruce Eckel is an award-winning author, chair of the Java programming track at Software Development'98, and one of the most well known independent authorities on Java. Bruce, a 12 year veteran presenter, won the much coveted Software Development Magazine's Jolt Cola Award for programming book of the year in 1996.

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Values versus objects

To help take advantage of the value-based C++ Standard Template

Library, Francis Glassborow shows how to create value types

from non value-based classes.



I make no apology for returning once more to this subject because it is the cornerstone of modern program methodologies. If you do not have a clear understanding of the differences, you will be forever perpetrating silly designs.

Another reason for having the concepts clear in your mind is that the Standard Template Library (STL) of C++ is value-based. This is not a design error. It is a conscious and deliberate element of the design related to the need for efficiency. The first time the object-oriented fanatics come across this feature their hackles rise and they feel that they have the evidence they need to hang the designers of the C++ Standard Library (C++SL).

What makes something a value? You may have your own answer, but mine is that the type is freely copyable. In other words, it either has a compiler-generated copy constructor and copy assignment operator or it has a publicly available copy constructor and copy assignment operator that obey the semantics of copying. Such semantics should not change the state of the thing being copied and should generate a copy whose state is indistinguishable from the original. If you ever elect to break those semantics, you had better be very careful. Most of the difficulties with the `auto_ptr` template arose because it does not have (nor can it have) strict copy semantics.

Let me present you with my viewpoint on the relationship between objects and values: values are either attributes or are derived from objects.

Consider a pack of playing cards. Each card is unique in the pack and has a pair of distinguishing attributes that are permanent properties of a card. You would be deeply suspicious of someone who started copying cards while you were playing poker. In this context, a card is an object. We might code playing cards like this:

```
namespace PackOfCards {
    enum Suit {unknown, clubs, diamonds, hearts, spades};
    enum Denomination {unspecified, ace=1, jack=11,
                      knave=11, queen=12, king=13};

    class Card {
        Suit const s_m;
        Denomination const d_m;
    protected:
        Card(Card const &);
        Card & operator=(Card const &);
    public:
        Card(Suit s, Denomination d):s_m(s), d_m(d) {}
        explicit Card(istream & = cin);
        Card & const printOn(ostream & = cout) const;
        virtual ~Card();
    };
}
```

There are many other elements that I would add to complete the design of this class, but the above is enough for present purposes.

Traditionally, `enums` related to the data of a class were placed in the class definition. I am currently experimenting with the idea that

they logically belong in the enclosing namespace. I would be interested to hear readers opinions (not gut reactions please) of this idea.

The private data of the class encapsulates the two principal attributes of a card. Note how well `enums` fit the need for this kind of simple attribute (see *A floating point attribute* for an idea for providing other attribute types).

I have made the attributes of a card `const` because once a card has been created it is what it is. I have provided a constructor that takes values for the two attributes as arguments. Let me skip over the second constructor for a moment while I say something about the member function `printOn()`. Its purpose is to provide a way of sending the attribute data to an output stream. It should be a `const` member function because the process of output would not normally change the state of an object. Actually, as all the data members are `const` qualified all the member functions should be as well.

Symmetry suggests that if you have a way of writing data out there should be a way of recovering it. Normally, that recovery would be via a member function (I would call mine `getFrom()`) but in this case we can only create objects from input. We have a rather unusual constructor. If we add a couple of helper functions, we can implement that constructor to do all the relevant work at the appropriate stage. Something like:

```
Card::Card(istream & in): s_m(suit(in)), d_m(denom(in)) {}
where the helper functions are in the encapsulating namespace (or
private static member functions if that is the way your coding
rules work) and their prototypes are:
Suit suit(istream &);
Denomination denom(istream &);
```

A floating point attribute

You might wonder how you could provide a floating point attribute. Try this for an idea:

```
class Metre {
    double value;
public:
    explicit Metre(double val = 0.0):value(val) {}
    operator double () {return value;}
};
```

I think you will find that `Metre` behaves exactly like a floating point `enum`, if there was such a thing. There is an implicit conversion from `Metre` to `double` and an explicit (it requires a cast) conversion from `double` to `Metre`, so:

```
Metre len1(2.3), len2(2.5);
Metre answer;
answer = len1+len2;           // ERROR
answer = Metre(len1-len2);    // OK
```

In this particular case, you will probably want to do more so that some of the arithmetic operations are constrained. But the basic idea should be part of your programming tool kit.



We apparently do not need a destructor, but as I am going to derive from this class I think it is better to provide one so that we can add a virtual qualification. Remember that this is the signature of any class that the designer has designed for derivation. If you ever elect to derive from a class with a non-virtual destructor, you should be

using `private` inheritance even if you then reveal all the base class interface via `using` declarations. A class with a non-virtual destructor has dangerous behaviour if you use a pointer to it to point to a derived object.

The next thing to think about is the two copy facilities. As you know, if you do nothing, the compiler will attempt to generate its own copy constructor and copy assignment. In this case, because there are `const` qualified data members it cannot generate a copy assignment, but it doesn't cost much to make this explicit. As we will see in a moment, these two functions should be `protected` rather than `private`. That way they can be used by derived classes.

The card class I have designed above is definitely not a value class; it cannot be copied, and one card cannot be assigned to another. Suppose that you wanted to use a card as a model for another, how could you go about it? Actually, you already have the tools in the above design, but it requires a rather round about route. You could use the `printOn()` function to write the data out to a `stringstream` instance. Then you could use that special constructor (passing it the `stringstream` instance as a source stream) to create a new card from the data. However, if you want to do this kind of thing very often it would be worth writing a `clone` function to create a copy by calling the `protected` copy constructor.

The fatal flaw

We come to the fatal flaw: we normally deal with cards as collections (packs, hands, tricks, etc.) and the STL is value-based. Our card class cannot be used in an STL collection because it is not a value-based class. We have two choices. We can create a 'basic collection of cards' class to encapsulate the STL collection we want to use (probably a list) and make it a friend of `Card`. Or we can create a value type from `Card`. Let us look at that second option.

```
struct CardValue : public Card {
    CardValue(Suit s, Denomination d):Card(s,d) {}
    CardValue(Card & const c):Card(c){}
    CardValue & operator= (CardValue & const);
};
```

That would normally be the end of the matter. The other functions are either compiler-generated satisfactorily or are inherited. Unfortunately, we will almost certainly decide that the decision to make the data `const` qualified is a continuing irritation. Perhaps we should have been happy to have the data `private` and not have bothered with the `const` qualification.

Note how important the provision of the `protected`-copy facilities proves to be. That is the mechanism that allows us to extract the value concept from the object.

I have no doubt that many of you will want to critique the ideas in this column. Please do so. That is exactly why I bother to expose them for the paltry remuneration provided by EXE Magazine. (Only joking.)

Last month's problem

Look at the answer that was given to the previous month's problem (it was about `||` and `&&` operators and overloading them). Can you spot

a rather subtle (and frequently overlooked) requirement when you elect to provide overloaded logical operators for a type?

It is almost certainly a very bad idea to overload `&&` and `||` simply because you cannot provide the same semantics for the user-provided version as you will for the built-in versions. Remember that the latter have a sequence point between the evaluation of the first and second operands.

However, if you insist on doing so, you will need to consider what a user might expect from writing:

```
exp1 && exp2 && exp3;
```

Such an expression statement is valid and meaningful for the built-in operators. Essentially, it says 'evaluate from left to right (with side effects completed in a timely fashion) until a sub-expression evaluates as false'. Similarly:

```
exp1 || exp2 || exp3;
```

means evaluate left to right until an expression evaluates as true.

When you decide to provide your own overload for `operator&&` and `operator||` you must consider if you intend that they be chained together. Unless you are being particularly eccentric, your operators will return `bool`. This means that after evaluating the left-hand instance of a logical operator you will have a `bool` value. That means that the second logical operator will have a `bool` left operand. Unless you have thought all this out and prepared for it, it will be a matter of pure luck if the compiler issues a diagnostic. Code should not rely on luck.

This month's problem

Examine the following piece of pure C code and determine why it should not compile without a diagnostic. When you have done so, decide whether the equivalent code in C++ (using `iostream` objects) should compile and execute correctly.

```
#include <stdio.h>
#include <ctype.h>

struct char10 {
    char data[10];
};
typedef struct char10 mystring;
mystring uppercase(mystring item){
    int i;
    for (i=0; i<10; ++i) item.data[i] = toupper(item.data[i]);
    return item;
}
int main(){
    mystring hello = {"Hello"};
    printf("%s World", hello.data);
    return 0;
};
```

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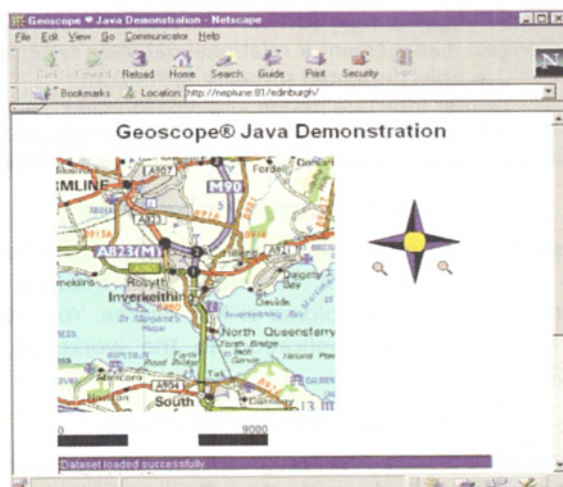
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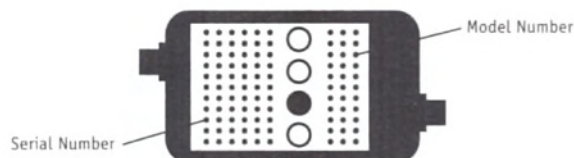
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Delphi and UML



Using UML, Mark Smith looks at some aspects of creating object models that reflect concepts and constructs unique to Delphi.

Over the past couple of years the Unified Modelling Language (UML) has become the standard way of drawing diagrams that describe object models. With the publication late last year of the *UML Reference Manual* (ISBN 0-201-30998-X) and the *UML User Guide* (ISBN 0-201-57168-4), we have both a definitive statement of the language and an excellent commentary on its use. The UML is a fairly large and comprehensive notation (though everything in UML is either a 'thing', a relationship, or a diagram) and it comes from a synthesis of several modelling techniques, notably those of Booch, Rumbaugh, and Jacobson with input from many others. The best place to get a summary of the UML is from the Rational website: <http://www.rational.com/uml/index.jhtml>, which has several useful resources, including a printable UML quick reference. If you want the full story, then the two books mentioned above give it, but *UML Distilled* (ISBN 0-201-32563-2) by Martin Fowler is a good introduction to the major highlights. Essentially, UML describes nine diagram types that help you think about your designs, document them, and communicate them to others. I'm going to restrict myself to talking about class diagrams. These show the features of the classes in your model and the relationship between classes. A class is usually represented by a three part box: the first part containing the class name, the second its attributes, and the third its methods. You represent links between classes as lines between the boxes. Figure 1 shows a UML Class diagram intended to model train timetables and the important entities associated with them.

UML tools

There are lots of tools on the market that support UML, and Ian Murphy looked at several design and UML modelling tools in the March EXE (*Simplicity by design*). Representative tools are Rose from Rational Software, Visio Professional from Visio Corporation, With Class 99 from Microgold, and Simply Objects from Adaptive Arts. Rose is a high-end expensive tool, while With Class and Simply Objects compete at a lower cost, though not necessarily lower quality. With Class and Simply Objects both offer Delphi code generation, though in this article I'm not going to look at any code build automatically. Visio uses templates and VBA customisation to provide UML modelling on top of the standard Visio diagramming tool.

UML itself is free of language-specific implementation details, but many vendors are offering UML tools with bindings for C++, Java, or Visual Basic. To me, UML seems to have a slight C++ bias – features like multiple inheritance, and C++ scope rules being examples of this. That said, I want to look at how you can use UML to design Delphi applications, focusing on how UML can be extended to cover those areas unique to Delphi. I became interested in mapping UML to Delphi as a result of playing around with Rational Rose through its OLE interface as a means to build Delphi class definitions. While the goal of getting any particular UML tool to generate perfect Delphi code is probably unattainable, we should be able to use UML to specify enough information for another programmer to be able to build exactly what we had in mind.

One of the reasons why UML is more pervasive than older modelling techniques is its extensibility. Three extension mechanisms allow UML

to cope with features unique to a problem domain or programming language: stereotypes, tagged values, and constraints.

Stereotypes

The most visible way of extending UML is through a stereotype. This is little more than a text marker that shows some deviation from what one would normally expect to see. This text marker is displayed thus: «stereotype» with the word *stereotype* replaced by whatever you are trying to indicate. See `IDomainObject` in Figure 1, a class definition showing the «interface» stereotype, with the intention of showing that `IDomainObject` is only an interface and not a class.

Tagged values

A tagged value is a pair of strings that store a piece of information about an element in the form *tag=value*. For example, you might add the tagged value `create=true` to a method declaration to indicate that it should be viewed as a constructor for the object the method is part of. You can have as many tagged values as you wish. UML defines about sixty standard elements that can be used as tag values, such as `create` mentioned previously, or `persistence` to describe if instances can outlive the process that created them. Where UML (or the tool you are using) does not have an equivalent concept already defined, you can invent your own tagged values to add new information about a design element, provided you define what the tagged value means. One disadvantage of tagged values is that most tools (and the UML itself) do not offer any means of displaying them on a diagram, and some tools do not yet support tagged values. If so, put the tagged values in a note on the diagram, headed 'Tags', and associate the note with the class you want to apply the tags to. Figure 1 shows this for the `TTrain` and `TTimeTable` classes.

Constraints

Constraints are a useful way of adding meaning or expressing restrictions. Any comment between braces is a constraint, and can be expressed in natural language, program code, or Object Constraint Language (OCL, a text language that can be used to add semantics to an element in a way that is more rigorous than natural language, yet free of implementation specifics). For example, you might use OCL to express the fact that a train's maximum speed must be less than the maximum permitted speed for the track segments that the train is timetabled to run upon. Thus: `{Train.MaxSpeed <= Timetable.TrackSegments[n].MaxSpeed}`. Constraints appear on diagrams in their own box and surrounded by braces, as shown in Figure 1 for the constraint attached to `TTimeTable`.

Delphi issues

Probably the most important aspect of UML where Delphi is concerned is class modelling. Some tools (With Class, Simply Objects) import Delphi classes, but most make a less than perfect job of it, so you cannot easily have the VCL imported as a starting point. I find that all I need to do is declare the names of the ancestor classes that I use from the VCL (`TObject`, `TPersistent`), and add collection types



(such as `TStrings`, `TList`, `TCollection`, and `TInterfacedList`) to act as ancestors for collections of objects.

While UML supports properties and methods, it does not fully capture some of the more subtle aspects of Delphi property declarations. The first real bugbear relates to Borland's categorisation of the property visibility declaration published as being a scope issue, when in reality all it does is indicate that a property is to be streamed. You can also stream non-published properties by overriding `TPersistent.DefineProperties`, but I've only ever needed to do this in a new VCL component, which is beyond the scope of what I hope to achieve with UML. Simply Objects allows you to specify a visibility beyond those defined in UML thus allowing you to specify published, but for other tools use the `persistence=persistent` tag, which is a UML standard element. You can adopt a similar tagging strategy for other directives such as `override` and `overload`.

A second issue is the use of directives to modify how Delphi implements a feature of a class. The default directive for properties translates easily since most tools include the facility to add a default value to an attribute. If the tool you are using does not support this (Visio, Rose, and With Class do, Simply Objects does not), then you will need to add it as a tagged value for the property. For indexed properties (such as `TDataset.Fields` where you need to specify the index number of the element of the `Fields` collection you want), specify a tag of `collectionName.defaultProperty=true` to indicate that this property is to be the default one. For message handler methods, you can use a tagged value of the form `message=messageType` where `messageType` is the name of the type of message you want to handle.

Associations

Objects refer to other objects, and UML defines several types of association between objects that we need to take account of when converting from UML to Delphi. In Figure 1 we have a simple association between one train and many timetables. In this particular model, the timetable knows about the kind of train that provides the service, but the train does not know what timetables it fills. In building the `TTimeTable` class, we simply add a `Train: TTrain` property and do nothing to `TTrain`. The relationship between `TTimeTable` and `TTrackSegment` is more interesting: a timetable needs to refer to a number of track segments together that the train runs on. The issue we need to address here is lifetime management. The sections of track are referred to by a timetable, but are not part of a `TTimeTable`. We cannot destroy track segment objects when we

destroy a timetable since other objects may be using the track segment. Note that track segments can exist without being referred to by any timetable. This sort of relationship is termed *aggregation* and is denoted by the white diamond at the `TTimeTable` end. In the model, I have declared the `TrackSegments` property of the `TTimeTable` as a `TList` of `TTrackSegment`, which I code by creating a `TList` descendent that can only contain `TTrackSegment` objects. By default, freeing the `TrackSegments` object in the `TTimeTable` destructor will leave the associated `TTrackSegment` objects still in memory. In contrast, a timetable is composed of stops (where the train arrives and departs). A given stop (a combination of place and time) can only appear on one timetable since no two trains can safely occupy the same place at the same time. This is *composition*, denoted by the black diamond. The VCL `TCollection` class is a good way of implementing such relationships since it manages the lifetime of the objects it owns, destroying them when the collection itself is destroyed. We can infer that the `TStop` class descends from `TCollectionItem` since it appears in the definition of `TTimeTable.Stops`.

Templates

Templates are a useful feature of class models. UML templates are similar to C++ templates in that they take a series of formal arguments and produce a new class as a result. As an example, you could define a `ListOf` template that takes a class as a parameter and produces a `TList` descendent that can only hold items of that class. I could have defined `TTimeTable.Stops` and `TrackSegments` as parameters to `ListOf` and `CollectionOf` templates that produce descendents of `TCollection` and `TList` respectively, though doing so would not have added to the clarity of the diagram. Since Object Pascal does not support templates, you need to code these descendent classes by hand, and of the four tools, only Visio and Rose support showing templates on a diagram, though With Class can designate a class as a template.

A skill in the repertoire

UML is a useful skill in any developer's repertoire, and moving from a UML model to implementation code can be made much easier if you use UML extensions to show your intent. While I've restricted myself to looking at class diagrams, you can use similar techniques with other UML diagram types.

Mark Smith is a Delphi contractor; currently playing with the world's biggest train set. You can reach him at msmitha@cix.co.uk.

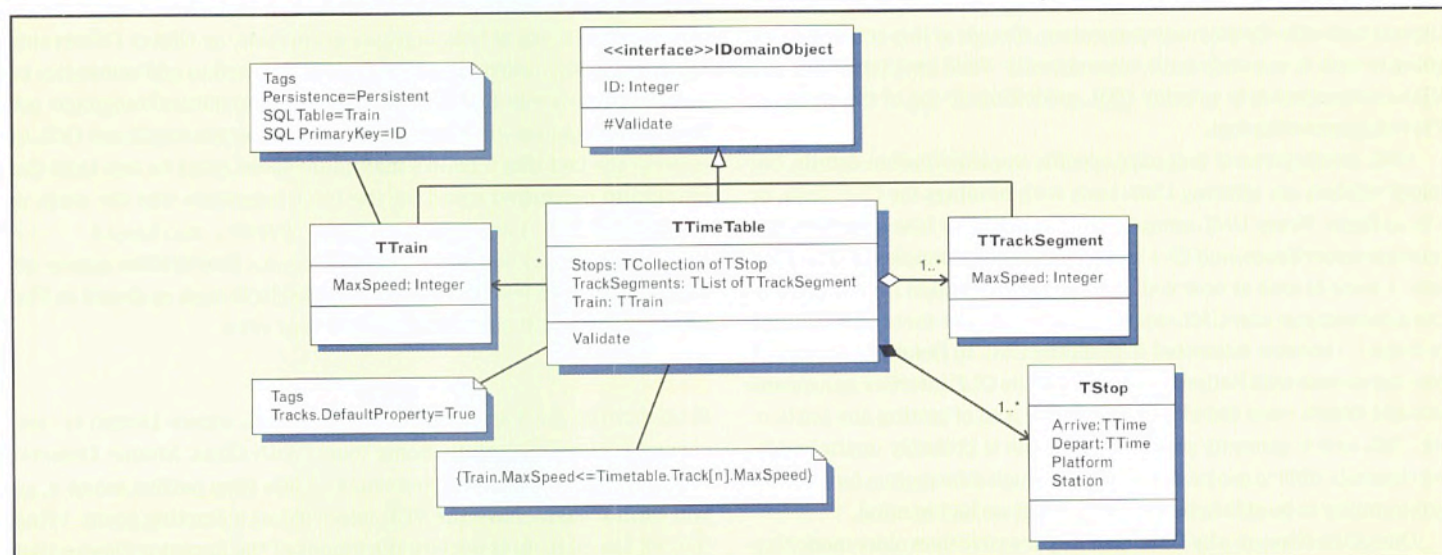
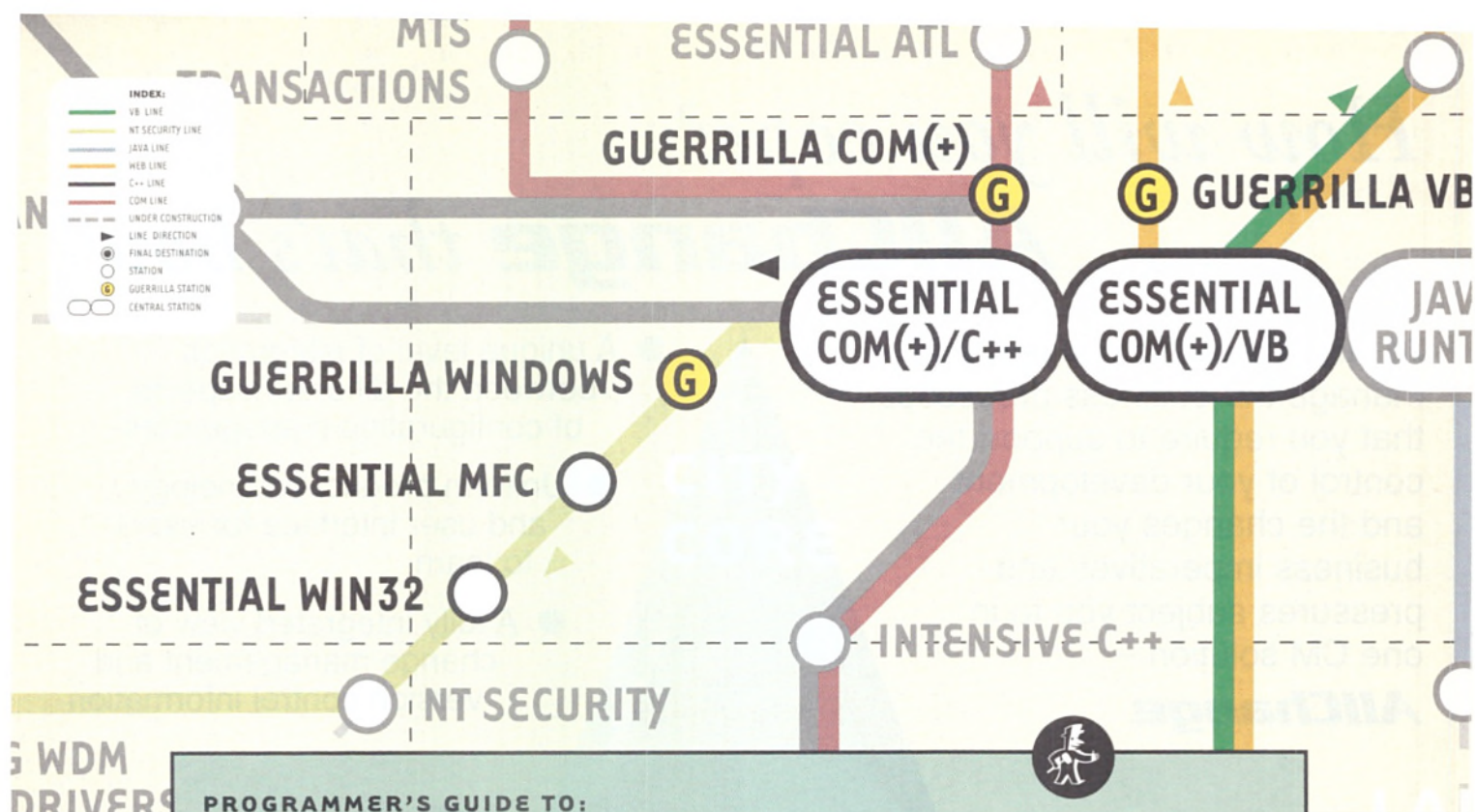


Figure 1 – The timetable class model



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Success with XML

Tom Guinther shows how to implement in Java the two basic approaches to processing XML documents.



I think it is safe to proclaim that the long glorious run that Java has had as the most over-hyped technology of modern times is finally over. Java, long exalted by the media as the giant of giant killers, and catapulted to stardom by the explosive growth of the World Wide Web, must finally relinquish this crown to a new group of hopefuls led by the likes of Jini, Linux, and XML.

While the future success or failure of Jini is currently unclear, Linux is making a strong move and has everything to win and almost nothing to lose. XML, while clearly not as sexy or cool as Jini and Linux, is my choice for the technology most likely to succeed. While the pundits declare XML as the solution to every problem plaguing the World Wide Web, the developer community is mindfully using this new technology to change how we think about web development and distributed client/server architectures.

Origins

XML has its beginnings in the document publishing world. Essentially, it is a simplified derivative of the complex Standard Generalised Markup Language (SGML). The XML specification is owned by the W3C, although many other vendors have provided backing and submitted suggested extensions. The original purpose of XML was to provide a presentation-independent mechanism to create self-describing documents. It is a tag-based format (like HTML) that allows data to be described in a hierarchical way. Using an XML parser, software is able to walk through the hierarchy of the document extracting the structure of the document, its content, or both. The following stereotypical example uses XML to describe the structure of a book.

```
<book>
  <title>The basics of XML</title>
  <chapter>
    <title>About XML</title>
  </chapter>
  <chapter>
    <title>Using XML</title>
  </chapter>
</book>
```

The title of the book is 'The basics of XML'. It has two chapters: the first 'About XML', and the second 'Using XML'. The general grammar for defining elements is relatively straightforward, following the form `<element-name>` to begin the element definition, and `</element-name>` to end the definition. There are of course many other details, but before we get into those I want to point out something that might not be obvious. The element names `book`, `title`, and `chapter` have no meaning outside the context of this particular XML file. New elements are generally defined as they are encountered and their meaning is left to interpretation by the code handling the document. This is an important point because this type of functionality makes XML a meta-language, or a language used to describe other languages. To me this is one of the primary features that makes XML so powerful, and as you work with XML you'll constantly find new and powerful ways to use it to describe and transmit your application data.

Continuing our discussion of XML elements, it is important to remember that element names are case dependent. That means that the elements `<book>`, `<Book>`, and `<BOOK>` are all different and are not related in any specific way. If you have an element that doesn't have any content, then the element tag can be abbreviated by using a slightly modified form of the start-tag (`<element-name/>`) and dropping the end-tag.

Elements can also have attributes, which are specified after the element name but before the closing `>`. Each attribute has a name and a value and they are separated by an equal sign (=). An element can have more than one attribute as the following example illustrates.

```
<datasource database="Oracle" name="Accounts">
  <!-- Add other information after this comment -->
</datasource>
```

Overall, XML syntax is slightly more complicated than the examples may portray, but they are reflective of typical XML documents. Most of the syntax issues that I didn't cover are related to dealing with white space and escaping special characters.

Logical and physical structures

An XML document has both a logical and a physical structure, with the logical representation describing the document form or the schema of an object. The physical representation has to do with content and includes not only the content of the document but references to outside entities, such as images or other XML documents. The logical representation described by the XML data is a hierarchy of elements with well-defined parent, child, and sibling relationships. This type of structure is well represented by a tree metaphor and existing documentation and software make extensive use of this type of representation.

Our original example of the book 'The basics of XML' has the following tree diagram.



When working with an XML processor your software is able to traverse the XML document using the tree metaphor, moving from parent to child and jumping from sibling to sibling as necessary. Having the tree data representation is convenient when you want to add, insert, or remove a single node or an entire branch.

Of course, XML would be a pointless endeavour if everyone had to write their own XML parser and processor, especially if each processor had a different API for accessing XML elements. That's where the W3C comes in, defining the XML grammar and the Document Object Model (DOM), a well-defined interface for manipulating XML (and HTML) documents. The URL for the DOM specification is <http://www.w3.org/DOM>. There are a variety of working documents, recommendations, and software related to XML at <http://www.w3.org/XML>. The W3C is a great resource for many things related to web technology, including all the XML technologies such as Document Type Definition (DTDs) and the XML Stylesheet Language (XSL). For now, I'll concentrate on the basic programming model for processing XML documents.



SAX and DOM

There are two basic approaches to processing XML documents. The first is an event driven model known as the Simplified API for XML (SAX). The second is the tree-based Document Object Model (DOM), which I mentioned previously. The DOM uses the tree-based approach and, while it is slightly more complicated, it allows a random-access approach that cannot be obtained using SAX. It is important to make a semantic distinction between an XML processor and an XML parser. An XML processor typically takes an XML document, gathers any external entities, and creates a representation of all the document's elements. While an XML processor does parse an XML file, the term XML parser is generally used in a context that implies that the XML document is validated, usually against a DTD that describes the legal element types and valid schema(s). An XML document may be syntactically legal, but not considered well-formed unless the content conforms to an external set of rules (specified by a DTD).

The SAX, event-driven programming model allows a user-defined document handler to process each XML node as it is encountered. As the document is processed the document handler is called for specific events that it might want to handle. Typical events are `startDocument()`, `endDocument()`, `startElement()` and `endElement()`. The Java implementation of SAX provides an interface called `DocumentHandler`, which your code should implement to process document events. Your code

passes a reference to your implementation of `DocumentHandler` to the XML processor via the `Parser.setDocumentHandler()` method.

The following code fragment defines a very basic 'echo' for each element within an XML document.

```
import org.xml.sax.* ;

class MyHandler extends HandlerBase {
    private int nesting = 0 ;
    public MyHandler() {}
    private void tabOut(int count) {
        String tabStr = newString() ;
        while(count>0) { tabStr += '\t' ; }
        System.out.print(tabStr) ;
    }
    public void startElement(java.lang.String name,
                            AttributeList atts) {
        tabOut(nesting--);
        System.out.println("<"+name+">") ;
    }
    public void endElement (java.lang.String name) {
        tabOut(++nesting) ;
        System.out.println("<"+name+"/>") ;
    }
    public static void main(String args[]) {
        // create the document handler and parser
        MyHandler docHandler = new MyHandler() ;
        Parser parser = new Parser() ;
```

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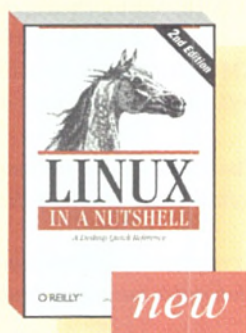
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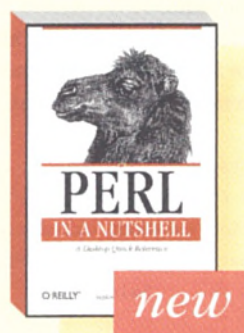
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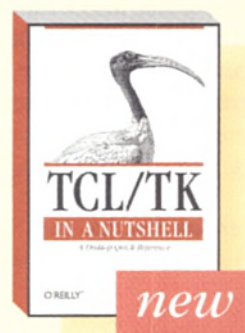
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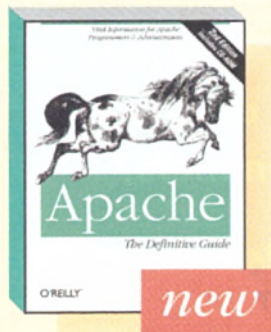
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```
// set the document handler for the parser
parser.setDocumentHandler(docHandler) ;
// parse an XML document
parser.parse("myXmlDocument.xml") ;
}}
```

The class `MyHandler` extends a default base class `HandlerBase`, which is a general implementation of the `DocumentHandler` interface provided by the SAX package. The code creates a SAX parser, sets the document handler, and finally calls the `parse()` method of class `Parser` to process the XML document. The end result is that each element within the document is displayed to the console in XML tag format.

The DOM approach is somewhat different and requires that your code drive the process much more directly. The power of this approach over SAX is that your code has full control over what is processed, and when, as well as the added ability to create new documents, or add, insert, copy, or delete elements.

The following example shows the basics of identifying an XML document to be processed, creating the image of the XML document in tree-form, and obtaining the root-element of the document.

```
// resolve the input source
File xmlFile = Resolver.createInputSource (new
    File ("myXmlDocument.xml"));
// create the XML tree representation (without validation)
Document xmlFile = XmlDocument.createXmlDocument (xmlFile,
    false);
```

```
// normalize text representation
Node root = doc.getDocumentElement ().normalize ();
// add more processing here
...
}
```

Most processing of XML documents using DOM revolves around the class `Node`, or one of the specialised subclasses such as `Element`. As you might expect, the typical operations on a `Node` are similar to any other tree implementation. You can get the type of node using `getNodeType()`, determine whether it has children using `hasChildren()`, and traverse the nodes of the tree in any manner using the methods `getFirstChild()`, `getLastChild()`, `getNextSibling()`, `getPreviousSibling()`, and `getParentNode()`. You can even obtain the XML document object to which the node belongs via `getOwnerDocument()`.

Exploring Project X

I have barely touched upon the capabilities of the DOM. The best place I can recommend to start your own exploration is Project X, the new XML initiative for Java from Sun Microsystems (<http://developer.java-soft.com/developer/earlyAccess/xml/index.html>).

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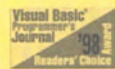
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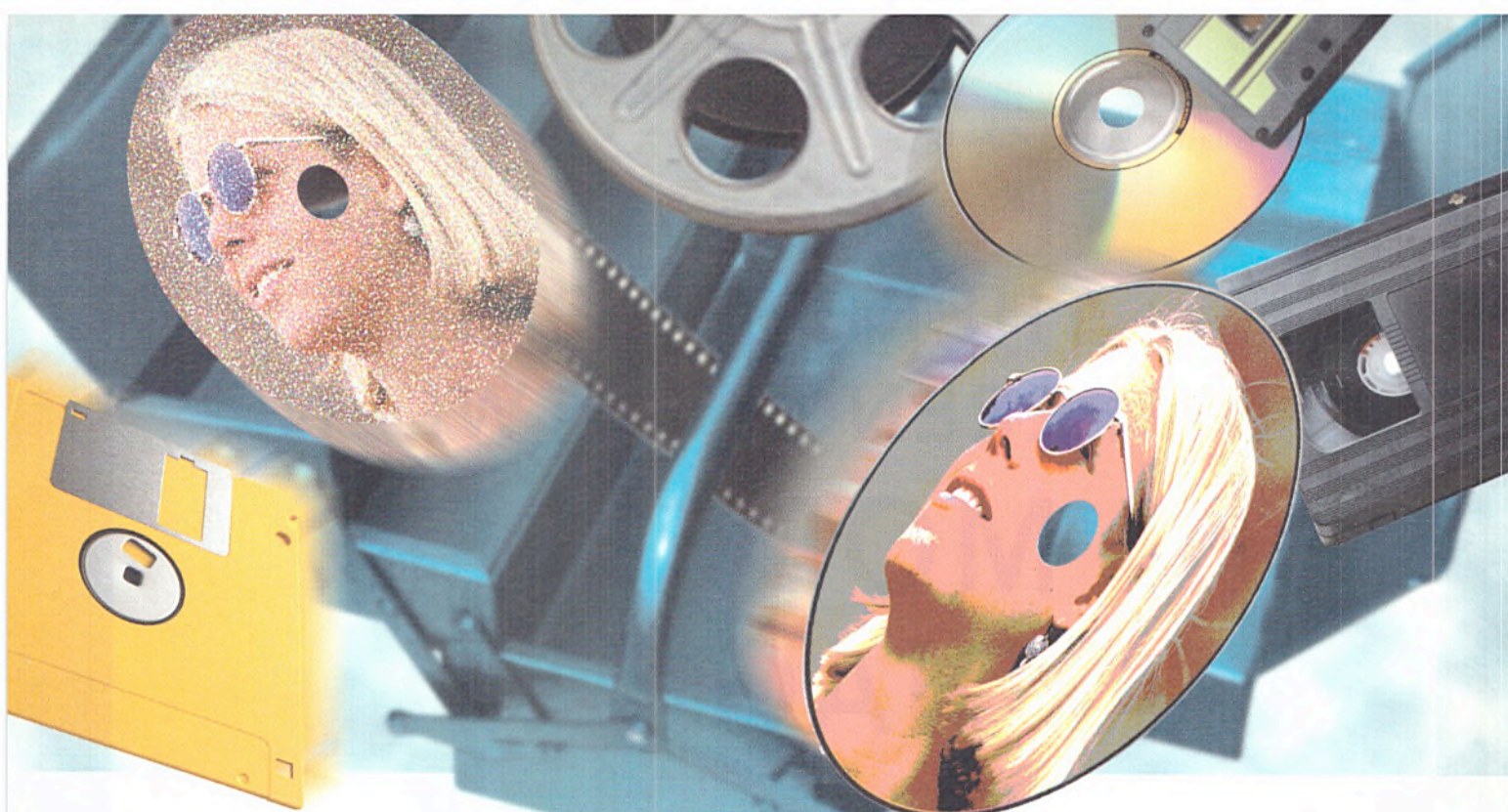


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Collections and dictionaries

Jon Perkins enumerates the Collection and Dictionary objects, and ponders over the very public defection of a top Visual Basic writer.



This month I'm going to take a look at the Collection object that was introduced as a new feature in Visual Basic 4 and the Dictionary object that was subsequently introduced with Visual Basic 6. The latter object was actually already available because it is part of the Visual Basic Scripting Edition, rather than part of the Visual Basic for Applications library, as is the case for the Collection. The VBScript library was originally introduced with Microsoft Internet Explorer 3.0, and was then superseded with version 2 as part of Microsoft IIS version 3.0. A more widespread version 3 was made available with Internet Explorer 4, IIS 4, and also with Microsoft Outlook 98. The newest edition, now running at version 4, has been shipped with Visual Studio 6.0.

Collection objects

The Visual Basic documentation defines a collection as 'an ordered set of items that can be referred to as a unit'. Essentially, this means that it's an object that can store multiple items of data. A collection is the next step up in abstraction from an array; whereas an array needs formal management by the programmer in terms of dimensioning and resizing, a collection will automatically handle its own storage requirements.

Each element within a collection has two main attributes: a key and the actual data item itself. One rule that is imposed is that the key must be a string value, and of course it must be unique so that it can be used to identify a specific element. An attempt to add a new element with a duplicate key will raise an error. The actual item of data being stored can be of any type, including variants, meaning that object references can also be stored.

A collection exposes the familiar `Count` property, and `Add`, `Item`, and `Remove` methods. Because it's an object it must be instantiated as such, using the `New` keyword:

```
Dim colTest As Collection
Set colTest = New Collection
```

To add a new element to an existing collection the formal syntax is:

```
object.Add item, key, before, after
```

The *item* and *key* values we've already discussed. The *before* and *after* parameters, which are optional, allow you to specify whether the new element is to be placed either before or after another element. For example, a line of code such as:

```
colTest.Add "gamma", "c", , "b"
```

will insert an element whose key value is "c" immediately after the element whose key value is "b". These two optional parameters do incur quite a performance penalty, so it's advisable to add data items in a pre-sorted order if at all possible.

Notice the syntax to denote the non-supplied *before* parameter. In Visual Basic, nowadays, if you are supplying only a few of an optional number of parameters, then you must observe the ordering of the list of parameters and explicitly show the comma placeholder for the other parameters that are not supplied. An alternative approach is to use the new explicit assignment operator `:=` such as

is found in languages like Pascal and Clipper. The use of this operator is currently limited; it's only for use with these *named arguments*. It can't be used in the general assignment of a value to a variable which, as a matter of personal choice, is a shame because I quite like it (along with the `==` operator for an equality test). However, in the case in point it can be used to identify explicitly which parameters you are supplying. The equivalent syntax for the `Add` operation shown above would be:

```
colTest.Add key := "c", item := "gamma", after := "b"
```

In order to access the contents of the collection a new language construct has been introduced: the `For Each...Next` loop. The old standard `For...Next` loop can still be used in association with the `Count` property if you prefer. In order to use the `For Each...Next` loop it is necessary to declare a general purpose `Variant` variable to store a reference to the element currently being accessed. This process of working through the set is known as *enumeration*. The collection logic includes a routine known as an *enumerator* that takes into account such concepts as a `Remove` operation taking place during a `For Each...Next` loop. If an element is removed, then the enumerator will ensure that the internal index is fixed

```
Dim coll As Collection
Dim curPrice As Currency
Dim vItem As Variant

' Create object instance
Set coll = New Collection

' Add test data in different ways
curPrice = 14.96
coll.Add 4, "a"
coll.Add Item:=curPrice, Key:="c"
coll.Add "hello", "b", , "a"

' Enumerate, and remove 1st element
For Each vItem In coll
    Debug.Print vItem
    If IsNumeric(vItem) Then
        If 4 = vItem Then
            coll.Remove "a"
        End If
    End If
Next vItem

' Destroy object instance
Set coll = Nothing
```

Listing 1 – Operations on a Collection.

```
4
hello
14.96
```

Listing 2 – Immediate window results of running Listing 1.



such that the next element will not be leapfrogged during the subsequent iteration.

We can wrap up all of these concepts into the general piece of code shown in Listing 1. This shows the instantiation of the collection, various forms of assignment and enumeration, and finally the release of the collection.

Dictionary objects

As already discussed, the VBScript library provides the Dictionary object. Because it doesn't exist within the default Visual Basic libraries it is necessary to create a reference via the References option under the Project menu – look for Microsoft Scripting Runtime. You will see that the underlying file for this is `scrnrun.dll`.

I tend to think of a Dictionary object as an alternative to a Collection, rather than as an enhanced collection. The Dictionary object gives you a few extra features that you don't get with the Collection, such as an `Exists` property to tell you if a certain key value can be found among the current contents. There is also a useful `RemoveAll` method to initialise the contents quickly. However, the underlying architecture is based around an array rather than a collection, the practical upshot of which is that you can't use the `For Each...Next` construct. Just as you started to get used to not having to use the standard `For...Next` syntax you find it's suddenly back in fashion again.

One other quirk that exists between the two is the syntax of the `Add` method. Whereas the Collection expects the mandatory parameters to be `Item` and then `Key`, the Dictionary expects them to be provided in the opposite order. One probable workaround to this is to remember to use named arguments. A further disparity is that the Dictionary doesn't accept the `Before` and `After` parameters, again further emphasising its array-based implementation.

The Dictionary object offers a few benefits over the collection. These include:

- A greater degree of discrimination when searching by key (for example, a comparison method allows for binary or textual comparisons).
- Methods for extracting keys or data values into an array.
- A method for changing a key value.
- Keys are not limited to being string datatypes.

Overall, the Dictionary object offers a more powerful approach. Its reliance on underlying arrays does give it a general performance increase, but opinions seem to vary on how much of an improvement there really is. One claim boasted of a five-fold increase, whereas another piece of research gave the two comparable performance. New features aside, I suspect that the real deciding factor for the developer will often be based around a preference, or otherwise, to use the `For Each...Next` syntax.

And then there's Bruce...

EXE is a magazine that is dedicated to software development, so for this reason I have never particularly contemplated writing about wider issues that might be happening within the development community itself. After all, I'm limited to two pages so I figure I've got to make them count. This time, however, I'm making an exception. Bruce McKinney, who authored the first two editions of the best-selling Microsoft Press book *Hardcore Visual Basic* has posted a rather lengthy diatribe on the Internet stating that he is ending his involvement with Visual Basic. The full text of his argument can be found at www.devx.com/upload/free/features/vbpbj/1999/mckinney/mckinneytoc.asp.

In an attempt to condense his main points, he is accusing Microsoft of adding too many 'doodads' to a product that is built on

a 'weak foundation'. Is his attack on Visual Basic justified? I've had quite a bit of discussion with various people over this issue and I still find Visual Basic to be a very worthy tool, but perhaps Bruce McKinney has raised some valid points.

Those who have read his book will know that it is concerned with trying to extend the power of Visual Basic applications by diving quite deeply into Windows itself. Not that there's anything wrong with this; the Windows API offers a very rich set of routines. It's just that, well, you need to be kind of careful using some of them. For example, I occasionally see articles explaining how to create and manipulate threads from Visual Basic. Threads are an integral and fundamental feature of all 32-bit versions of Windows, and yet Visual Basic doesn't provide any direct programming support for them. You can write code to use them, but it means delving into the Windows API and frankly it's very easy to screw up if you don't know how threads actually work at the system level.

In his books McKinney demonstrated ways in which the Windows API could be accessed through type libraries with Visual Basic 5 as a step towards more powerful programming. But when Visual Basic 6 appeared he found that his solution was broken, which of course troubled him greatly. The whole point here though is that much of his involvement with the product seems to have been with 'pushing the limits' of Visual Basic (as the back cover of his book states). The focus of the Visual Basic design team has obviously been to create a product that is primarily suitable for constructing business-type applications, for example the various tiers of a sales ordering system. The high availability of third-party products such as sophisticated map-rendering engines has opened up the potential use of the product through clearly defined means of extension, namely the ActiveX automation interface. However, I think that what McKinney has expended so much effort on is trying to expand the product through avenues that the VB developers haven't yet provided much direct support for. This chiefly entails the kind of integration with the Win32 API that can be achieved with other languages such as Visual C++.

Whether he is right to be able to expect to do this is very much a matter of opinion, and I expect that this is the type of issue that could easily generate wildly differing opinions. The last couple of releases of the tool have focused on the ability to develop applications and components that fit in with corporate-style applications. The recent added support for Microsoft Transaction Server and Microsoft Message Queue Server is indicative of this. McKinney isn't wrong to try to extend the product into new territories, but I'm sure that we would all hope that the natural evolution of the product will eventually address these issues in an architecturally stable manner. I say eventually, although of course we would like it *now*!

I'm genuinely sorry that he's become so disappointed with Visual Basic, and perhaps I can understand his reasoning for wanting to walk away from the product when I consider what his own expectations of it were. However, most of us use it for features that, by his own admission, he has no interest in – namely database access and/or Internet development – so I don't foresee his statement leading the masses away to another tool. The last I heard on the issue was that he hadn't actually decided what his new development tool would be. Goodbye Bruce, and good luck. ■

Jon Perkins is a freelance Visual Basic developer and a Microsoft Certified Solution Developer. He is a contributing author of Advanced Microsoft Visual Basic 6.0 by The Mandelbrot Set, published by Microsoft Press. Contact him at www.jonperkins.com.

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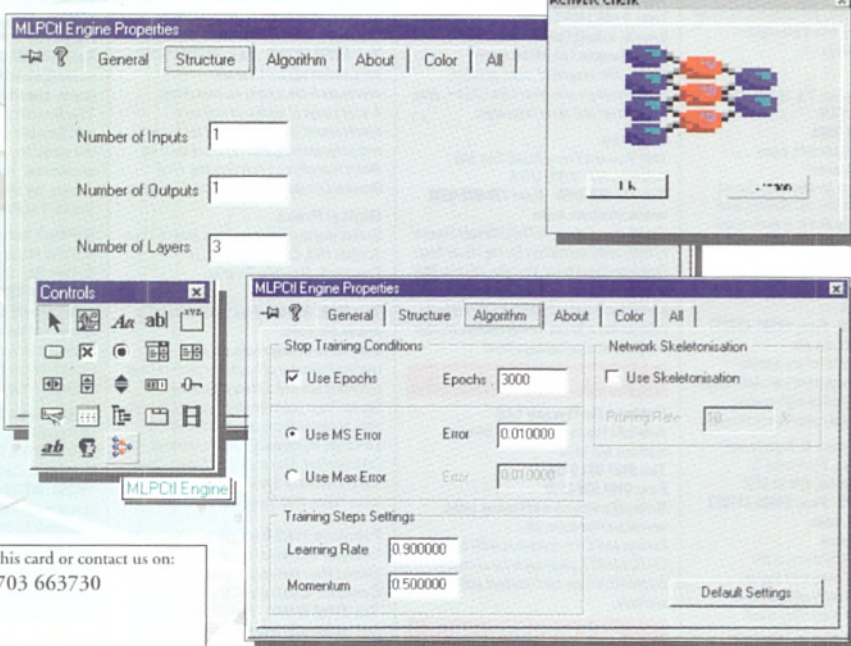
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A Y2K bedtime story

Once upon a time (well, 1997 if you must know), there was a Cobol programmer named Jack. After years of being taken for granted and treated as a technological dinosaur by all the Windows programmers and client/server programmers and website developers, Jack was finally getting some respect. He'd become a private consultant specializing in Year 2000 conversions. He was working short-term contracts for prestige companies, travelling all over the world on different assignments. He was working 70- and 80- and even 90-hour weeks, but it was worth it.

Several years of this relentless, mind-numbing work had taken its toll on Jack. He had problems sleeping and began having anxiety dreams about the Year 2000. It had reached a point where even the thought of Y2K made him violently angry. He must have suffered some sort of breakdown, because all he could think about was how he could avoid the year 2000 and all that came with it.

Jack decided to contact a company that specialised in cryogenics. He made a deal to have himself frozen until March 15th, 2000. This was a very expensive process and totally automated. He was thrilled. The next thing he would know is he'd wake up in the year 2000; after the New Year celebrations and computer debacles; after the leap day. Nothing else to worry about except getting on with his life.

He was put into his cryogenic receptacle, the technicians set the revive date, he was given injections to slow his heartbeat to a bare minimum, and that was that. The next thing that Jack saw was an enormous and very modern room filled with excited people. They were all shouting 'I can't believe it!' and 'It's a miracle' and 'He's alive!' There were cameras (unlike any he'd ever seen) and equipment that looked like it came out of a science fiction movie.

Someone who was obviously a spokesperson for the group stepped forward.

Jack couldn't contain his enthusiasm. 'It is over?' he asked. 'Is 2000 already here? Are the millennial parties and commotions and crises all over and done with?' The spokesman explained that there had been a problem with the programming of the timer on Jack's cryogenic receptacle, it hadn't been year 2000 compliant. It was actually eight thousand years later. But the spokesman told Jack that he shouldn't get excited; someone important wanted to speak to him. Suddenly a wall-sized projection screen displayed the image of a man. It was the Prime Minister of Earth.

He told Jack not to be upset. That this was a wonderful time to be alive. That there was world peace and no more poverty or starvation. That the space program had been reinstated and there were colonies on the moon and all over the Solar System. That technology had advanced to such a degree that everyone had virtual reality interfaces which allowed them to contact anyone else on the planet or to watch any entertainment or to hear any music recorded anywhere.

'That sounds terrific,' said Jack. 'But I'm curious. Why is everybody so interested in me?'

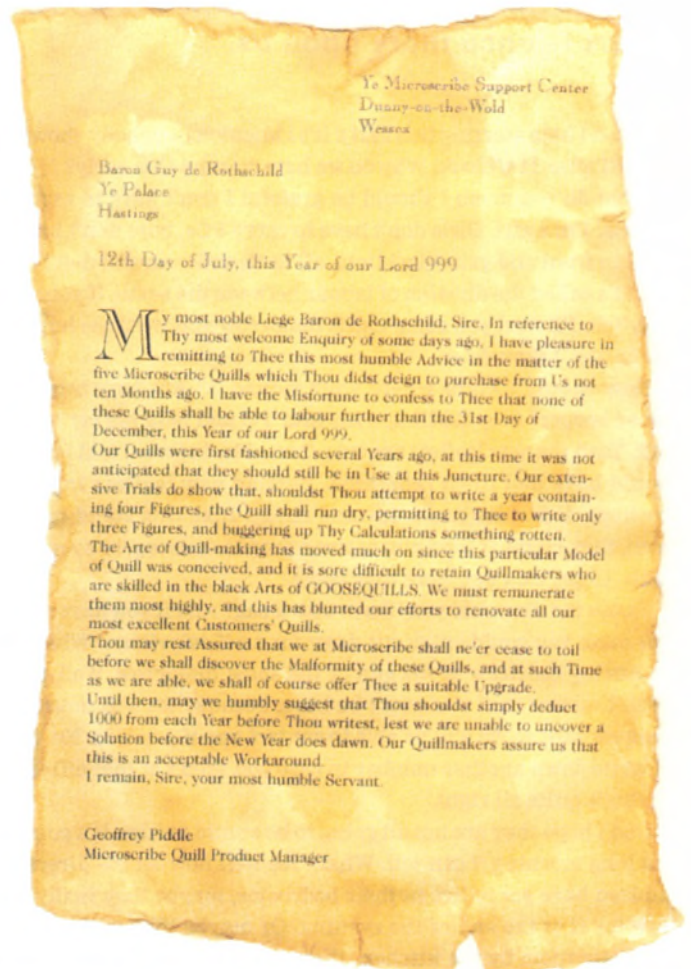
'Well,' said the Prime Minister. 'The year 10000 is just around the corner, and it says in your file that you know Cobol...'

Thanks to Dave Dorrell for this one.



Y1K

All this worrying about the Year 2000 is nothing new. Way back in 999, our Ancestors were equally worried about what the transition to a four-figure year might do to their carefully-implemented information systems...



Start 'em young

Have you seen those frankly weird ads on TV recently for Haribo, the gum sweets, where one touch from a sweet packet is enough to turn sane adults into red-and-yellow cartoon-dungaree wearing freaks? Well, those crafty confectioners have come up with an ideal way to sell the tooth-pulling stuff to geeks. Haribo Millenium Bugs are a tasty snack for the discerning Y2K professional. The packet comes with reassuring images of keys popping off keyboards, and some rather dodgy-looking computer 'icons' on the back.

But perhaps the most chucklesome aspect of the Haribo Millenium Bugs (apart from the bit that says 'ERROR! Beep' on the front) is the best-before date. Shouldn't that have been December 1999?



Trading places

It is Spring; the birds are nesting, the lambs are lambing, and the season of trade shows is once more upon us.

Oh God I hate starting this early. It's ridiculous – nobody shows up until after 11 o'clock. Why do we have to start this early?

What do you mean I should be grateful I don't have to carry in the PCs? I'm a girl. Girls don't have to carry PCs, boys don't have to stand in front and grin like idiots, all teeth and – careful don't drop that. It's called the division of labour between the sexes. If you want to switch, I'll lend you some tights tomorrow and we'll see how you get on. Yes, I thought so.

How should I know where your mouse is? Am I my brother's mouse keeper? Stop fiddling with your PC and help me lay out the stuff. Yeah the new leaflets are over there. No, I agree. I told Ian they should have had them reprinted. Putting new leaflets in an old brochure, it just looks shoddy and cheap. Like this stand really. I mean, they might at least run to some proper shelving, or even some stools. Oops, look out, here they come.

'Scuse me sir would you like to take a bag? And if you have a business card, you could enter our draw for a 14" television. What? We are having the draw at the end of the show tomorrow. Well, no, it doesn't matter that you won't be here, because we will have your business card so we will be able to contact you if you win. No, okay, I'll write down another number in case you aren't at that office. No sir, that's quite all right.

God I hope they are not all going to be stupid as him. It's going to be a long morning, I can tell. What? Yes well now all the directors' children have got tellies in their bedrooms, maybe they really will draw for it at the end of the evening. Or maybe they will put it in that little room by the kitchen, that would be nice, I haven't seen *Neighbours* for years.

Thank God it's not Birmingham. We have got that to be grateful for. I'm trying to hang on to that thought. No it's not the Brummies. I think they are cute, even if their accent does make them sound thick. No it's the NEC, it's such a horrid place. Like a desert. It's so big, you start off for the exit and by the time you get there your break is over. If they go to the Birmingham show again, I'm definitely pulling a sickie and that's final.

What's the time? God is that all? No, only until lunchtime. Les said that she would come down and take over. That's assuming she doesn't pull one of her famous sickies, the saucy cow. Yeah I love Les too really, she's great isn't she?

Yes of course you can take a carrier bag, sir. Would you like to see a demonstration? Richard here could show you... Oh why not walk away while I am talking to you, you fat rude old creep and I hope you get clamped. Honestly, they get worse.

Sorry sir, I was just talking to my colleague. Yes we are showing a new release of the software today, which Richard here can demonstrate to you... You haven't received your upgrade? Oh dear. No, I'm not surprised there was nobody to help you when you rang earlier today; our technicians are here at the show. Well I don't think they

will really be able to... If I could just take a note of your details I'll make sure that Eric... Temper, temper my good man. Huffing off in a storm won't get you anywhere.

See that man over there? No not him, the other old one with the jacket from 1974. Dave says he is a journalist for one of the freebies, but I think he is just an old perv. Still, at least he doesn't smell like that one that comes and stares at Les. No really, it's not funny. He's not just a little bit stinky, you can literally smell him coming a mile off. Were you here last year? Honestly, Les began to giggle and then of course so did I and then he leaned close to me and I thought I was going to be sick, so I, hold on.

Excuse me sir. You can't take that. No it is not a free sample. No, you can't buy it from this stand now I'm afraid. We can accept your order if you like. Yes you go and look at some of the others and come back when you've made up your mind. The lying toad – he was just going to half-inch it with us standing there. Amazing! Some people!

Anyway I was telling you about Les and Mister Stinky the Perv. So he was right up close to me and I could really smell him so I was pretty much gagging – no *gagging*. Oh haha. Do you want to hear this story or not? So then Les, who was pretty much in hysterics – uh oh it's that bossy show organiser woman. Quick! Quick! Stand in front of that light. Not that one fool, the other one. Too late she's seen it.

Hello! Yes it's going very well isn't it? Oh aren't we? Of course, I understand fire regulations are important. Yes, okay we'll turn it off now. Yes of course I'll make sure everybody knows. Sorry about that.

Don't turn it on yet, Richard! I know her ditzy little ways. She'll be back in five minutes to check up on us. Best give it half an hour, let her go find somebody else to bother.

God my feet are killing me. I wish we had some stools to sit on. Come to that I wish we had a decent stand, like... like Microsoft's. Have you had a look at it? Well apparently it's all hollow inside. Les told me that last year she got chatting to one of the Microsoft guys and he took her inside and she said it was amazing. They have a conference room and a proper computer room and a TV and drinks and loos and everything! Well obviously they couldn't fit all that in there. I s'pose the stand was bigger last year.

Yeah, okay. Don't be too long will you? I don't want to be here on my own if Mr Stinky turns up.


Hello sir, would you like one of these? There that's nice, and you can put all that stuff in one bag. And if I could have your business card, you'll go into the draw for this colour telly. What's that? No, of course it's a real prize. Haha of course the directors wouldn't do that. No I can't give you a demo, but if you hang on a moment Richard will be back.

Um, I don't suppose you happen to have the time? Thanks.

Yes. It always does when you are enjoying yourself. ■

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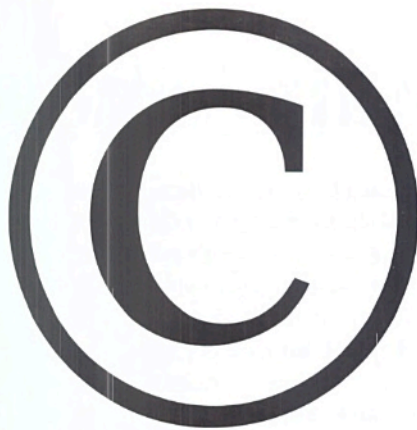
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