Novell
Visual AppBuilder

White Paper

July 1993

NOVELL

Since the first computer was envisioned, computer programmers have played the role of problem solvers. Usually, computer users in a large company communicate their needs to in-house developers, who then create applications to solve the specified business problems. Although developers work closely with the users to understand their needs and provide the appropriate solutions, users often find themselves with an application that does not completely meet their requirements. Frequently, by the time the developer finishes writing the application, the business need has changed.

Medium to small companies play out this same scenario with off-the-shelf software. Rather than having a development team on staff, the organization relies on an independent software vendor's (ISV's) attempts to anticipate users' needs and write an application that addresses them. The result is broadly written, general software that offers a company no competitive edge.

Writing applications requires specialized skills such as knowledge of programming languages, syntax and operating systems. These skill requirements have limited the number of people who can successfully create today's business applications. Novell recognizes the backlog of network applications and in response has designed AppWare, a system for developing network applications. The Novell Visual AppBuilder™, one of the components of AppWare, enables business application developers to construct applications without programming or system knowledge.

What Is Novell Visual AppBuilder?

Novell's Visual AppBuilder is a high-level programming tool based on technology Novell acquired with the purchase of Serius Corporation. Tightly integrated with AppWare, Novell's Visual AppBuilder allows developers to graphically design and implement the business solutions users need to be productive — without writing a single line of code or syntax.

Visual AppBuilder gives business application developers the ability to leverage their computing environment to gain a strategic advantage. It empowers them to solve problems efficiently and effectively, without having to worry about the complexities or inner-workings of a heterogeneous computing system. In fact, business application developers have no need to learn the topology of the network, the platform on which their application will be implemented, or whether the services being used are provided by mainframes or PCs. The result is a more productive workplace.

AppWare Loadable Modules (ALMs)

Visual AppBuilder enables the business application developer to quickly build portable software applications by linking software components called AppWare Loadable Modules™ (ALMs). An ALM is composed of an object and its associated functions. ALMs can range from simple graphic utilities, spreadsheet modules, multimedia engines and structured query language (SQL) client–server connections, to services provided by NetWare® and other

network platforms, such as file, print, electronic mail, imaging, telephony and directory services.

Applications created with Visual AppBuilder are built on the AppWare Bus™ technology, a software engine that manages and coordinates the interaction of ALMs (see Figure 1). The AppWare Bus allows an application to access the functionality provided by ALMs and it enables the ALMs to communicate with each other. Each ALM's object and function is represented by icons. Developers do not have to know whether a service is located in a local operating system or at the network level, or how these services interoperate. Instead, an application is simply constructed by combining different ALM icons. Just as people purchase separate stereo and home entertainment components to build a stereo system that accommodates their specific needs and tastes, Visual AppBuilder interfaces different ALMs to build an application that meets specific business objectives. This makes Visual AppBuilder an ideal tool for developing applications that keep pace with today's rapidly changing business environment. For example, a marketing department now can build a multimedia presentation using sound, video and imaging ALMs.

Figure 1 AppWare architecture
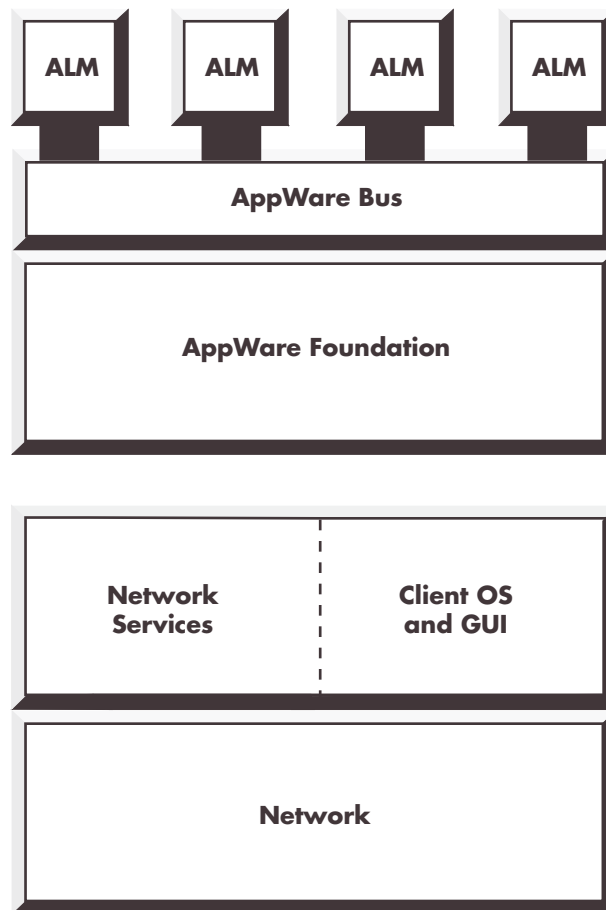
Building and Using ALMs

Novell provides developers the necessary tools for creating ALMs. These tools include:

- The ALM Construction Kit, which provides the interfaces necessary to support the AppWare Bus's object interaction protocol (OIP). OIP is the protocol for passing information and flow of control from applications to ALM components.

- The AppWare Foundation™, which provides a consistent set of APIs that allows developers to access the services provided by both the network and local operating systems.

Using the ALM Construction Kit and the AppWare Foundation, developers can write and compile ALMs using 3GLs, including C, COBOL and Pascal. Novell is actively working with a number of third-party vendors to ensure the availability of a wide variety of ALMs.

Instead of trying to constantly adjust to changing user needs, traditional developers can now concentrate on creating general purpose ALMs that deliver customizable computing and networking services that extend the AppWare environment. Business application developers throughout an organization can then use these ALMs to build applications that solve specific business needs. For example, a banking organization could have three ALMs to provide key functionalities: a loan ALM, a daily deposit ALM and a certificate of deposit ALM. These ALMs could be used to build applications that allow the loan department to perform loan transactions.

ISVs can follow the same line. Instead of building an off-the-shelf application that attempts to meet all customers' needs, they can build ALMs and let companies create the customized applications they desire.

Desktop Portability

A major benefit of Visual AppBuilder applications is their portability between desktop platforms. A recent Forrester Research report indicates that companies are currently facing the challenge of a heterogeneous computing environment and therefore need a heterogeneous solution. ALM functionality extends across multiple platforms because it takes advantage of the AppWare Foundation, which spans both local operating systems and distributed services provided by the network (see Figure 1). For example, an application may access a file on the local data storage disk with one read; on a subsequent read, it may access a file on a network server. Since the AppWare Foundation provides Visual AppBuilder with one consistent interface, developers no longer have to worry about platform compatibility.

For example, projects built with Visual AppBuilder for Macintosh can be recompiled as an MS Windows application using Visual AppBuilder for Windows, and vice versa. Porting projects between Macintosh and MS Windows platforms becomes seamless and virtually instantaneous. Visual AppBuilder includes a core set of ALMs supporting all aspects of the

Macintosh and MS Windows graphical user interfaces (GUIs), such as menus, windows, window items/controls, window items/fields, window items/pictures, cursors and keyboard. Operations include application operations, repeating operations, manipulating numbers and text, grouping ALMs, alerts, file manipulation, printer setup and control, and a full-function database ALM for building multiuser, relational databases.

Building Applications with Visual AppBuilder

Applications are built with Visual AppBuilder by connecting graphical icons representing ALM objects and functions to indicate sequences of operations and data flow (see Figure 2). ALMs can be connected in almost unlimited combinations to create programs more quickly and cost-effectively than currently possible through the use of conventional programming tools or even 4GLs. Applications can be modified easily by removing ALMs or adding new ALMs as they become available.

Current ALM Sets

Serial Communication—For custom communications software, such as service bureaus, bulletin boards and terminal emulation. This set includes basic connectivity tools such as modem, serial, ADSP, TTY, VT102, text and XMODEM. The Connection ALM in this set facilitates serial communication with a variety of peripheral devices. Additional communication tools are available from third parties.

Figure 2. Visual AppBuilder session on a Macintosh
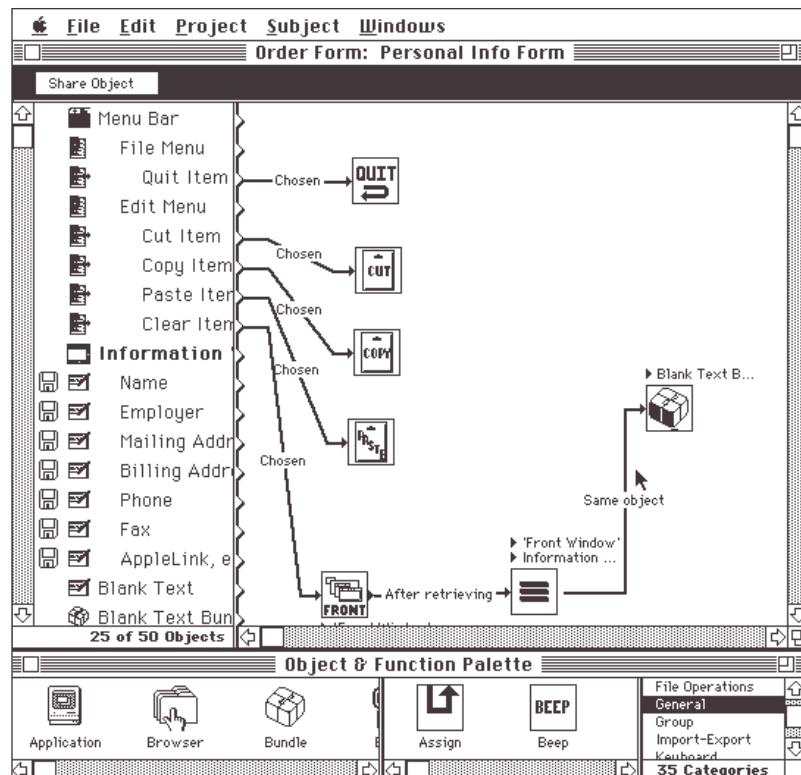
InterApp Communication—For custom electronic mail, office automation, network administration and application scripting and control. ALMs in this set enable applications to send and receive text, pictures, numbers, sounds and other data.

Multimedia—For presentation, interactive training, education and multimedia databases. ALMs in this set support animation, QuickTime movies and sound.

XMCD—Provides the ability to incorporate HyperCard XCMDs and XFCNs. This ALM set provides the most powerful third-party XCMD extension available, and supports the original HyperCard XCMD format, as well as the extended XCMD interface for HyperCard 2.0 XCMDs.

SQL—Provides various client-server SQL access including Oracle, Sybase, Btrieve and Data Access Manager.

Debugging Applications

Visual AppBuilder includes an integrated debugger that helps test the data flow of the application. The tool allows a "breakpoint" or stopping point to be placed on any link connecting ALM objects and functions. When running in delay mode, the application stops at each breakpoint, allowing the developer to examine object contents before and after various functions execute. If the function being examined is at the end of a chain, dummy functions can be inserted for testing values or field contents.

Creating Reusable Subprojects

Business application developers can create separate subprojects within an application and reuse them by simply copying and pasting them between applications like a picture or paragraph of text. Subprojects reduce workgroup development design time considerably by allowing the developer to focus on a discrete application segment and create subprojects for it. These subprojects can be copied and pasted together into a final design that works as a single application. An example of this is an edit menu with pull-down functions such as copy, cut, paste, delete and insert. Once this edit menu is created, it can be named and reused repeatedly.

Facilitating Code Reuse

While low-level object classes are reusable, working with them requires greater expertise as well as much more effort on the developer's part. ALMs are completely encapsulated or "black-boxed," making them easier to use and reuse. And a Visual AppBuilder user never needs to know how an ALM was implemented in order to use it.

The complete encapsulation that characterizes ALMs makes them easier to update and/or replace. Updating ALMs in a Visual AppBuilder project is as simple as copying an ALM file to the ALM folder or replacing a Dynamic Link Library (DLL) in a directory. No reprogramming need be done. In many cases, no recompilation is necessary.

Raising the Level of Application Development

ALMs eliminate the need for line-by-line programming, which greatly reduces time to market, cost of maintenance and the learning curve required to

become proficient with the tool. And Visual AppBuilder's rapid development cycle makes possible a more responsive and direct interaction between developer and user, with consequent benefits in application look and feel.

Reducing the Learning Curve

Conventional programmers must not only master the constructs of given programming languages, but also those of the operating systems, GUIs, and network operating systems and services. Although some basic understanding of programming logic is necessary, at no point is a Visual AppBuilder programmer required to know anything about the operating system calls required to make ALMs functional.

Creating Small, Fast, and Efficient Applications

All applications built with AppWare are compiled, not interpreted. Code overhead imported from the Visual AppBuilder environment is just 25KB. Furthermore, ALMs take full advantage of the operating systems for which they were designed. As a result, applications are smaller and faster than their counterparts developed in other systems which rely only marginally on operating system services. Further, applications have the standard look and feel of their respective platforms because the underlying ALMs are created using the AppWare Foundation.

Porting Applications Across Different Platforms

Because Visual AppBuilder projects contain no source code, they are easily ported from one platform to another — for example, from MS Windows to Macintosh. Projects are simply symbolic representations that indicate how source code segments will be combined when the project is compiled. Creating cross-platform applications, therefore, involves translating the project file (a comparatively simple task) and then recompiling it on the destination platform using that platform's ALM components. The object code for each platform is designed specifically for that platform, so ported applications look and work like any other software on that platform.

Summary

As a key component of AppWare, Visual AppBuilder enables business application developers to build reusable, extendible, cross-platform applications without having to deal with low-level programming issues. By using Visual AppBuilder, graphical interface and services can be interlaced to build the logic and flow of new applications, representing thousands of lines of code. Using the ALM Construction Kit, a programmer can take existing source code and fashion a reusable ALM that can be shared across platforms.

By leveraging NetWare's rich set of services within a highly productive, rapid application development environment which requires no networking knowledge, Novell continues its steadfast mission to expand the network computing industry.

Novell International
Sales Headquarters
2180 Fortune Drive
San Jose, CA 95131
USA
Phone: 1-408-434-8684
Fax: 1-408-473-8697

Novell Corporate Headquarters
122 East 1700 South
Provo, UH 84606
USA
Phone: 1-801-429-7000

Novell Australia
Level 2
2 Help Street
Chatswood NSW 2067
Australia
Phone: (61) (2) 4133077
Fax: (61) (2) 4133116

Novell Benelux
Excelsiorlaan 13, Keiberg
1930 Zaventem
Belgium
Phone: (32) 2-725-0200
Fax: (32) 2-725-0311

Novell do Brazil
Av. Ribeirao Preto 130 12
Sao Paulo
Brazil
Phone: 55 11 284 4866
Fax: 55 11 285 4847

Novell France
Tour Anjou
33 Quai De Dion-Bouton
92814 Puteaux Cedex
France
Phone: (33) (1) 47 62 63 64
Fax: (33) (1) 47 78 94 72

Novell Germany
Willstätter Str. 13
4000 Düsseldorf 11
Germany
Phone: (49) (211) 59730
Fax: (49) (211) 5973 250

Novell Hong Kong
Room 4601-5 46th Floor
China Resources Building
26 Harbour Road
Wanchai
Hong Kong
Phone: (852) 8272223
Fax: (852) 8276555

Onward Novell Software India
Krislon House
Second Floor
Saki Vihar Road
Saki Naka, Bombay 400072
India
Phone: 91-22 836 2097

Novell Italy
Via San Vettore, 40
20123 Milano
Italy
Phone: (39) (2) 48013554
Fax: (39) (2) 48013594

Novell Japan Ltd.
Tohei Mishuku Bldg.
1-13-1 Mishuku
Setagaya-Ku, Tokyo 154
Japan
Phone: (81) (3) 5481-1141
Fax: (81) (3) 5481-1855

Novell Korea
Donghwo Bldg. 13F-5, 25-5
Youido-dong, Youngdeungpo-ku
Seoul, 110-140
Korea
Phone: (822) 786 1141-3
Fax: (822) 786 1140

Novell Latin America
122 East 1700 South
Provo, Utah 84606
USA
Phone: 801-429-7738
Fax: 801-429-3944

Novell de Mexico S.A. de C.V.
Insurgentes Sur, 1160-8
Mexico D.F. 03100
Phone: (525) 575 5998
Fax: (525) 575 6578

Novell Munich
AM Westpark 1-3
8000 Munich 70
Germany
Phone: (49) (89) 7 43 1320
Fax: (49) (89) 7 43 13210

Novell Singapore
Level 36
Hong Leong Building
16 Raffles Quay
Singapore 0140
Phone: (65) 322-8503
Fax: (65) 321-8966

Novell Spain
Paseo De La Castellana, 40 (BIS)-5a
28046 Madrid
Spain
Phone: (34) 1 577 49 41
Fax: (34) 1 577 90 53

Novell Sweden
Färögatan 7
S-164 40 KISTA
Sweden
Phone: (46) (870) 32350
Fax: (46) (870) 39434

Novell Switzerland
vor Ort 21
CH-8105 Weiningen+Zürich
Switzerland
Phone: (41) 1 750 05 04
Fax: (41) 1 750 09 57

Novell Taiwan
2F2, 383 Jen AI Road
Section 4
Taipei
Taiwan, R.O.C.
Phone: (886) 2775 3183
Fax: (886) 2731 2284

Novell United Kingdom
Novell House, London Road
Bracknell
Berkshire RG 12 2UY
United Kingdom
Phone: (44) (344) 724 000
Fax: (44) (344) 724 001

Novell United Kingdom–DR
Oxford House, 12/20 Oxford Street
Newbury, Berkshire
RG13 1JB
United Kingdom
Phone: (44) (635) 35304
Fax: (44) (635) 35834

Novell Wiesbaden
Sonnenberger Str. 20
D-6200 Wiesbaden
Germany
Phone: (49) (611) 527034
Fax: (49) (611) 527006

NOVELL