

The Promise and the Reality of AD/Cycle

IBM's AD/Cycle applications development platform is slowly emerging. Whether IBM's dream of using multiple vendors and tools will revolutionize software development or collapse under its own weight remains to be seen.

BY GEORGE SCHUSSEL

Like any new software project, AD/Cycle is fraught with risk. IBM's integrated approach to computer-aided software engineering (CASE) promises a dramatic improvement in productivity across the application development life cycle, but much of the technology is unproven and untested. The amount of up-front investment required by users is unknown, but large. Companies may invest millions of dollars in staff, software and hardware, only to find no significant improvement over more conventional development approaches using tools such as relational database managers and fourth-generation languages. But competitors may adopt AD/Cycle and achieve significant success, thereby gaining a competitive business advantage.

While even AD/Cycle critics agree that IBM's strategy will bring much-needed standardization to what has so far been a fragmented industry, many risks and uncertainties remain. Foremost among them is AD/Cycle's vision of integrating separate CASE tools from a variety of vendors. Calling upon competitive software companies to work together is a tall order; nothing like it has been done before. For it to work, third-party CASE vendors must accept the IBM Information Model and Common Programming Interface (CPI) and build complex tools that work in concert as one.

AD/Cycle's Goals

Although uncertainty remains over IBM's "plug-in-and-play" approach to integrated CASE, Big Blue was driven by customer demand to respond to the need for vastly improved productivity in the applications development process. An important goal for AD/Cycle is to achieve a 10-fold improvement in programmer productivity. The only way to achieve

this, in IBM's view, is to automate code generation through the use of models rather than through conventional programming. IBM wants AD/Cycle to completely automate code generation for simple applications within one year of implementation and to approach 100% automation for many customer applications within five years.

Another goal for AD/Cycle is to define new standards for repository storage of development objects and to mesh with existing standards whenever that makes sense. For that reason, IBM wants AD/

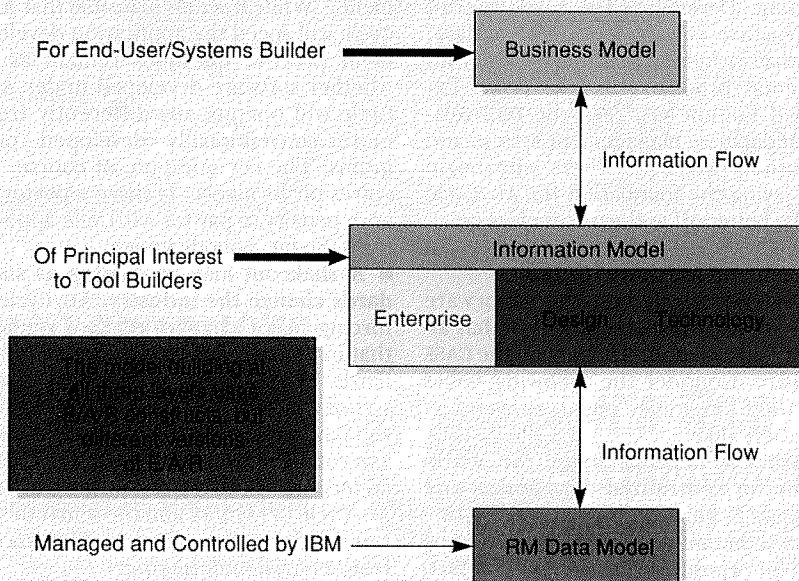
Cycle to comply with its own developing standards, particularly Systems Application Architecture (SAA) and the IBM standard human interface, Common User Access (CUA). IBM will not attempt to create standards in the methodologies themselves, however, leaving this choice open to users and tool suppliers.

Key Management Issues

As with many areas of technology in which it competes, IBM hardly pioneered the CASE market. Significant CASE products have been available for a number of

AD/Cycle's Three-Layer Approach

AD/Cycle defines a central role for enterprise and data modeling. Most end users will approach the model through the top level, where they access and view the AD/Cycle world through vendor tools. The tools are defined mostly in the middle level. The bottom level encompasses DB2 tables not normally accessed directly by users.



Source: Digital Consulting Inc.

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years, and many users benefit from them. Yet IS managers have been reluctant to commit themselves significantly to CASE without IBM's blessing and without some centralized control over applications development. AD/Cycle seems to address many of these concerns on paper; however, a lack of key components from IBM causes some to wonder if AD/Cycle is more smoke than fire.

At least some of the skepticism lifted last June, when release 1 of AD/Cycle became generally available. Still, the complete Information Model, especially the design submodel, is still not defined. Thus, it will be difficult over the next 12 months for CASE vendors to fully use Repository Manager, IBM's centralized storage facility for CASE information.

Should potential users wait for a more complete set of AD/Cycle tools before using CASE? Probably not. Although IBM may be slow in getting its Repository Manager out the door, CASE tools from third-party suppliers now available have satisfied plenty of users. Many of these tools will be made AD/Cycle-compatible as IBM further defines its direction.

Another reason for not waiting is the large amount of interim work that needs

□ GETTING COMPETING SOFTWARE COMPANIES TO WORK TOGETHER IS A TALL ORDER.

to be done before beginning any CASE program, including recruiting and training personnel into the world of model building. Developing the corporate infrastructure is a time-consuming task, one that includes the installation of fundamental products such as OS/2 Extended Edition (OS/2EE), the DB2 relational database management system and Repository Manager. Users who begin now laying the foundation for AD/Cycle will be better off as the pieces emerge.

A Profound Industry Impact

Although barely past the vaporware stage in many respects, AD/Cycle has already had a profound impact on the CASE industry. Consider the following issues and their long-range impact on vendors and users alike:

■ **AD/Cycle depends upon the mainframe for centralized data access and control.** Nothing inherent in CASE theory says that only a mainframe should be used for repository management; in fact, a number of AD/Cycle competitors contend that the repository should be dis-

The Seven Sirens of AD/Cycle

Assuming AD/Cycle comes together as planned, the following seven promises could become reality.

1. A 10-fold improvement in programmer productivity.
2. A standard approach to CASE.
3. A world that's methodology-neutral.
4. Applications that run on any SAA platform.
5. Centralized control over the development process.
6. Support of DOS/VSE through the VM development environment.
7. Support of UNIX/AIX.

tributed and not centralized at all, as it is in the IBM model. Nevertheless, IBM specifies that mainframes be used to house the Entity/Attribute/Relationship (E/A/R) models that play such an essential role in AD/Cycle. Knowledge about an application is captured and stored in graphical terms that embody E/A/R models. The IBM Enterprise Model is defined in E/A/R terms and must be used by the Repository administrator.

CASE tools supporting various methodologies use the services of Repository Manager to store user-defined application knowledge. The information contained in these models is stored in standard format within Repository Manager, from which it will be ultimately used to drive a code generation technology. To take advantage of AD/Cycle technology, users must commit to the data-modeling approach and a central role for the data administration function.

■ **The run time performance of applications developed using AD/Cycle is unknown.** IBM describes AD/Cycle as an "application development time environment." While it seems plausible that AD/Cycle will speed the application development process, questions remain as to whether software developed under AD/Cycle will operate any differently from more conventionally developed programs. The key question, of course, involves performance. Is there a performance penalty to pay for AD/Cycle applications? So far, nobody knows.

■ **A shakeout may be coming as standards change the industry.** AD/Cycle is forcing major changes on tool vendors that expect to comply with the IBM standards. Many vendors with products designed for MS-DOS or UNIX environments will have to rewrite them for OS/2EE and SAA compliance. Others will have to rearchitect their products to conform to IBM's AD/Cycle CPI syntax and the semantics of IBM's Information Model. This is far from a trivial undertaking.

The point is that AD/Cycle may set de facto standards for all CASE tools. In

much the same way that the IBM PC architecture set standards for personal computers or that Structured Query Language (SQL) set standards in the database world, AD/Cycle will define the way CASE products are positioned. A PC shakeout followed soon after the IBM PC debuted. Similarly, not all CASE tools will survive, and those that do will look more alike.

In the PC field, the reduction in the number of architectures brought customers a variety of benefits, including the emergence of PC clones with more capabilities and lower prices than IBM itself could offer. It will be interesting to see if the same thing happens with CASE.

■ **IBM's business partners play a critical role.** IBM is designing a new role for its software business partners—Bachman Information Systems Inc. and Index Technology Corp., both of Cambridge, Mass., and Atlanta-based KnowledgeWare Inc. These companies now operate in a gray area somewhere between independence and IBM's control. The fact that IBM has purchased a minority interest in each company increases the likelihood that individual products will work together under AD/Cycle, although this is by no means assured.

■ **AD/Cycle probably will not cause the establishment of a single repository model standard.** A primary benefit of the repository-based environment is that users should be able to plug tools developed by CASE vendors complying with the repository standard into the environment and then use them together. While the IBM approach will undoubtedly become a standard for the 370 mainframe world, other repository standards are emerging that make it unlikely that IBM's Information Model will enjoy the same hegemony in the CASE world as, say, SQL has in the database world.

Digital Equipment Corp., for example, is following a more distributed path toward standards based on ATIS (A Tool Integration Standard) and CDD/Repository as the basis for integrated CASE in the VAX/VMS and ULTRIX environments.

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Other repository efforts are based on the American National Standards Institute's Information Resource Directory System (IRDS) and the International Standards Organization's IRDS standards. These efforts are significantly different from each other and from AD/Cycle or ATIS, especially in terms of their information models and service interfaces.

ANSI's current IRDS standard targets data administration and offers an information model that experts regard as inferior to IBM's. Last May, ANSI adopted a programming interface nearly identical to IBM's service interface for Repository Manager/MVS. This should make it much easier for CASE tool vendors to create products that adhere to both the ANSI and IBM standards, a plus particularly in the federal government market.

But meanwhile, ANSI's current statement of direction toward IRDS2—which will target integrated CASE—is based on Digital's ATIS approach, not IBM's AD/Cycle. Clearly, the final cards in this game have yet to be played. It's very possible that many different standards for information model representation may lie ahead for CASE in the 1990s.

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The productivity improvements promised by AD/Cycle are certainly enticing. But a lot of software and procedures have to be made workable before these promises can be kept. Potential users should be aware of the potential pitfalls.

The Wait for Delivery

Uncertain delivery schedules rank at the top of the list. Delivery of both IBM and third-party software for AD/Cycle will be a multiyear process. To date, IBM has promised AD/Cycle for the AIX, AS/400, MVS and VM environments. Repository Manager software, however, has been delivered only for the 3090/MVS/DB2 mainframe environment.

The fact that IBM has stated that AD/Cycle is intended for building only new applications should also set off a few red flares. What, if any, reengineering capacity will emerge for existing applications is not clear. So here we go again with another new technology that requires the complete reeducation of your staff. For example, beta site users of AD/Cycle report that no one should attempt AD/Cycle implementation without significant DB2

expertise. In other words, don't try AD/Cycle as your first DB2 project.

In the AD/Cycle shop there is little need for mainstream COBOL, Customer Information Control Systems (CICS) or Information Manager System (IMS) expertise. Instead, most staffers will require complete technical retraining in CASE, data modeling and E/A/R approaches to programming. Most sites will have to invest at least six months in training before benefits are realized.

In addition to the time involved in retraining, consider the cost, which will be considerable. And add to that the sticker shock connected to the hardware and software. Just for starters, be prepared to make a large, up-front investment in very expensive PS/2s. IBM recommends model 70s with 12 megabytes of random access memory; 115MB of disk storage; and OS/2EE with Presentation Manager, Database Manager and Communications Manager. On the mainframe side, MVS and DB2 must be installed.

Users aren't the only ones making large investments. Software developers are literally betting their companies, shelling out enormous sums to make their CASE tools compatible with AD/Cycle. Not everyone is going to win. Changing to an OS/2EE and CUA support environment is tough, and reformulating repository interfaces to comply with IBM's Information Model and repository interface languages (API and CPI) is an expensive proposition.

A Matter for Mainframes

And then there is the matter of the centralization of data that AD/Cycle requires. AD/Cycle's centralized data ap-

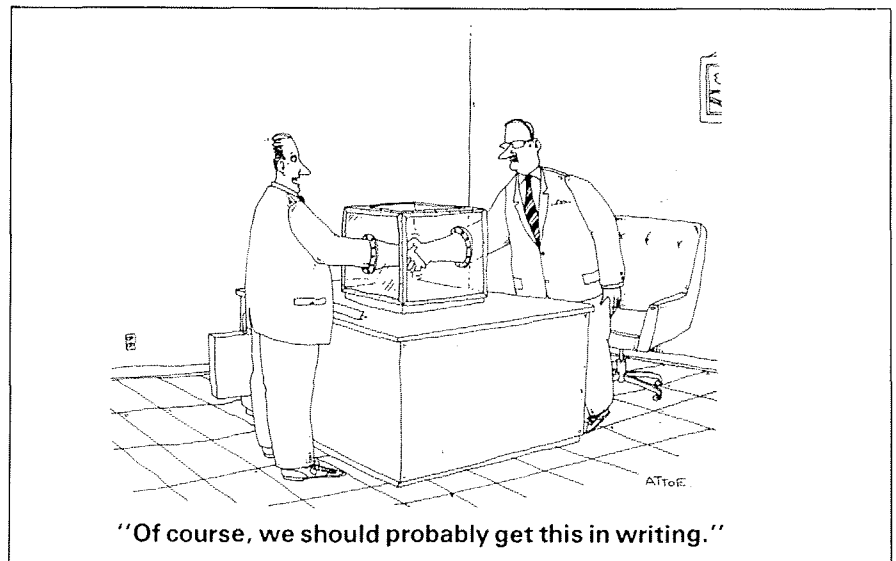
proach allows users to check out development objects from the repository, work with them in solo fashion and then put them back from time to time. Digital's CDD/Repository uses a more distributed approach, taking advantage of the networked VMS architecture. IBM has said nothing about developing a comparable distributed capability. But there is hope. Once IBM's distributed SQL support is generally available for all SAA platforms—1992 or 1993 is a good guess—it could be a straightforward task to reimplement the physical storage view of DB2's Repository Manager into distributed SQL.

HERE IS ANOTHER NEW TECHNOLOGY THAT REQUIRES COMPLETE STAFF REEDUCATION.

The mainframe orientation raises questions for users in DOS/VSE environments. Because DOS/VSE is not supported by SAA, many forthcoming SAA services will not be available for VSE. The many IBM customers who do run VSE, however, may still be able to use AD/Cycle by installing and using VM to run AD/Cycle for development only. In other words, build it in VM, run it in VSE.

Additional questions arise over AD/Cycle's future PC orientation. Because there is no current plan for a repository on the PS/2 platform, it's likely that a need will arise for localized storage at the PS/2 level that users or independent software vendors will have to fill.

Help from third parties will also be needed if AD/Cycle is to reach beyond the



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IBM world. AD/Cycle won't help users running non-IBM hardware. Support for Apple, Digital, UNIX and other platforms is not in today's definition of AD/Cycle. Since very few customers use purely IBM equipment anymore, clearly some products other than AD/Cycle will be needed.

Support for a heterogeneous execution environment is likely to come from independent software vendors, probably in the form of products that work in much the same way that cross-compilers do. Independent tool vendors have always supported multivendor environments; that's not likely to change under AD/Cycle. But don't look for solutions anytime soon. Critical components of the development environment are pure IBM, and in the past IBM has not been willing to support alternative vendors.

The Popularity Polls

Dependence on unpopular products like OS/2EE may hurt AD/Cycle's chances for success. OS/2 has been a slow seller so far. And now with Windows 3.0 coming on strong, widespread use of OS/2 is not likely to develop for the next two

years. This hurts AD/Cycle's chances for success since today it forces users into a new and unfamiliar operating environment.

Similarly, Cross System Product (CSP), IBM's fourth-generation language, turns up on the bottom of the list on most customer satisfaction surveys. CSP is the IBM-

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designated AD/Cycle product for code generation. Its low acceptance seems to offer third-party suppliers a clear opportunity to expand market share by offering alternatives; but it won't be easy. The reason: Big Blue controls the underlying AD/Cycle architecture, so it's a safe bet that IBM's CSP developers in Cary, N.C., will have a head start over outside competitors by keeping CSP closely tied to future AD/Cycle developments.

In any case, unless user satisfaction with CSP and OS/2EE improves, the low

ratings of these items will hamper widespread acceptance of AD/Cycle.

Plug-in-and-become-compatible CASE is an unproven concept. Many observers feel that the vendors' need to differentiate themselves from one another in the market in order to gain some sort of competitive edge will result in custom, non-standard extensions to the Information Model IBM supplies. If this happens on a significant scale, the dream of plug-in CASE tools is likely to become a nightmare.

However, if a high level of tool integration is achieved and compliance by independent software vendors is extensive, AD/Cycle may well represent the most significant new technology for application developers since COBOL. One definite fact about AD/Cycle is this: it's likely to keep the consulting community extremely busy over the next few years. □

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