



> Programming *eBusiness*

Corporate eBusiness strategies and application development architectures



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> **IDC** *Opinion*

Four J's highly innovative Business Development Suite constitutes a major advance in the application development tools market in eBusiness environments. By combining the abstract benefits of a 4GL with Four J's Application Generator capabilities, Four J's Business Development Suite opens the way to improved programmer productivity and fast deployment of new applications in diverse environments.

It is clear today that the explosive growth of eBusiness technologies has provoked a crisis in application development activity. These technologies are imposing compelling new business requirements in terms of productivity and the complexity of the applications to be deployed.

The complexity lies in the rapid deployment of sophisticated but robust, high-performance transaction-based applications in an eBusiness economy competing 24 hours a day and 7 days a week. Applications are being deployed in a more complex distributed environment with heterogeneous platforms, software and services. eBusiness requires not only the real-time processing of transactions but also the ability to respond simultaneously to millions of users who may be online all the time and located throughout the world.

Furthermore, while eBusiness technologies impose profound technological changes on information systems architecture, these changes are occurring at an increasingly faster pace. Indeed, most businesses experience constant pressure to deliver Web-based solutions in record time (a few months, even a few weeks). In other words, developers must deliver applications faster than at any time in the past 30 years. This inevitably changes the ways of developing and deploying applications; from now on, enterprises must search for tools that help developers work smarter and faster.

It is not difficult to understand that the Web application and construction market will experience dramatic change over the next several years. IDC foresees that tools like 4GLs, which approach software development at a higher level of abstraction, will become the preferred medium for application development in the near future. Abstraction is a powerful concept that identifies and presents the key attributes and methods of a particular process while hiding or minimizing the programming tasks necessary to perform the process. The ability to perform application development at a high level of abstraction is desirable because it enables developers to focus more energy on solving domain-specific business problems.

In this context, Four J's technology appears as one of the most interesting new development tools for eBusiness applications. Indeed, this company's ambition is to become a leader in the worldwide Rapid Application Development (RAD) market, and it relies on partnerships with strong added value. Four J's Business Development Suite integrates several important notions concerning the current mutation of the eBusiness applications programming market. By rendering an application's business logic independent of peripheral technologies, such as the choice of database or user interface, Four J's Business Development Suite removes the risk for software authors of being "locked-in" when new standards and trends emerge. This freedom enables an enterprise's information system to keep pace with shifting models that are necessary for it to maintain a competitive edge. Four J's Business Development Suite also protects enterprises' future software investments from obsolescence.



> *The need for a new approach to development*

The new application programming approach integrates several important notions associated with the present mutation of enterprise activities.

The accelerated evolution of enterprise organization models

Underlying the shock of the development of what we shall henceforth term the eBusiness economy is an accelerated evolution of enterprise organization and process models (see Figure 1). This movement took place well before the advent of eBusiness. It arose from the very strong trend, observed over the past ten years, of enterprises adopting a network model of organization to better concentrate internal resources on their core value-creating business. This model is the response given to rapidly changing markets and to the internationalization of business and competition.

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Figure 1 : The new enterprise stakes faced with application programming

Enterprise	Before 2000	After 2000
Vision	<ul style="list-style-type: none"> • Mass Production • Product focused 	<ul style="list-style-type: none"> • Mass personalization • Customer focused
Organization	<ul style="list-style-type: none"> • Hierarchical structure • Enterprise focused on its internal processes • Control of the information 	<ul style="list-style-type: none"> • Enterprise focused on its core business • Delegation outside the company of a part of the added value • Network organization
IT environment	<ul style="list-style-type: none"> • Centralized • Monolithic and/or proprietary development environment 	<ul style="list-style-type: none"> • Distributed • Heterogeneous platforms • Varied interfaces • Complexity of business logic
Programming optimization	<ul style="list-style-type: none"> • Numerous skills • Costs, Quality, Delays 	<ul style="list-style-type: none"> • Skills increasingly difficult to find and retain • High cost, quality and delays from performances in a more complex context

Source: IDC, 2001



In this fast-changing environment, companies are pursuing operational productivity objectives to maintain competitiveness. Objectives such as improving the differentiation of products and services from those of competitors have become parameters of the competitiveness being sought. Today, organizations must respond quickly to competitors' products, prices and services, or risk losing customers. In other words, it is more important than ever for companies to conduct business anytime, anywhere.

It is in this context of increasingly intensive competition that new information technologies, in particular those of eBusiness, have enabled enterprises to find new ways of improving performance. But eBusiness technologies and their deeper integration with enterprise applications generate new challenges for the enterprise information system.

Naturally, they impose profound technological changes on information systems architecture. But what is important to note here is that these changes are occurring at an increasingly faster pace. Developers must deliver new applications operating in complex environments, with higher levels of performance and within shorter time frames.

Thus, from now on, enterprises must search for tools that help developers work smarter... and faster.

Work smarter and faster

The explosive growth of the Web has created a crisis in the development community, resulting in a compelling business requirement in terms of productivity and the complexity of applications to be deployed. Application developers face a dilemma today that can be summarized as follows:

- First, they must deliver applications faster than at any time in the past 30 years.
- Furthermore, applications must be deployed in a more complex distributed environment with heterogeneous platforms, software and services.

Moreover, the applications that empower companies to conduct successful transactions (eBusiness or not) are often more sophisticated than older applications: they contain complex logic constructs that make these applications more difficult to write than the business applications of previous years.

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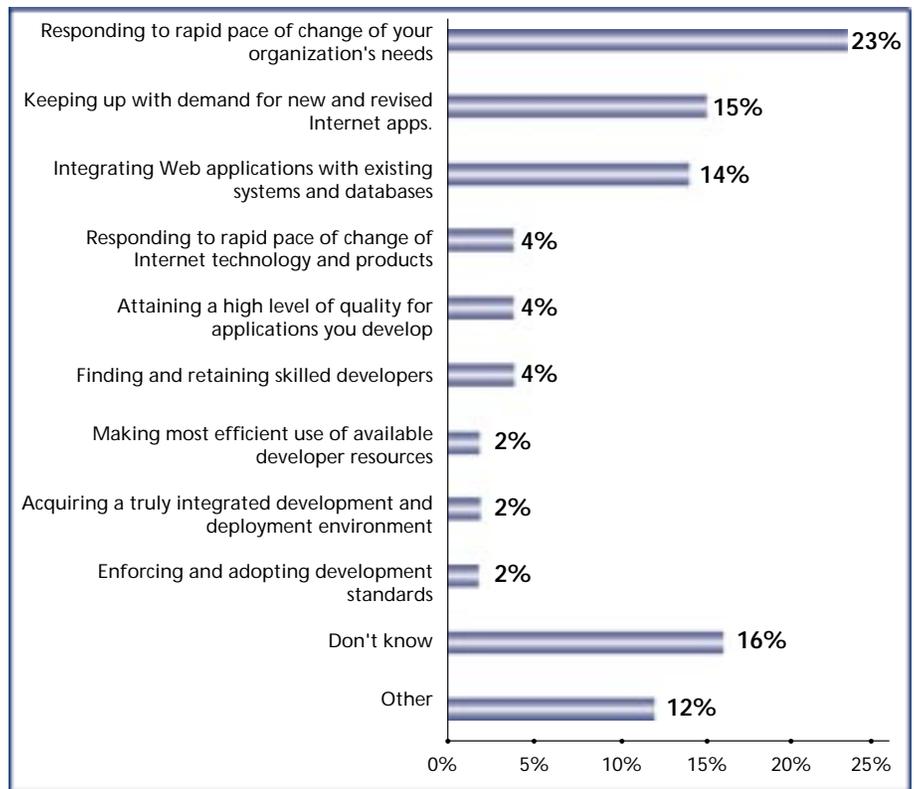




The results of an IDC end-user survey of 300 European companies can be used to illustrate this phenomenon. The survey results show that for these European companies, the eBusiness evolution has brought forth critical challenges for development tools (see Figure 2).

Figure 2 : Web application development challenges/needs

Question: At your site, what is the greatest Web application challenge/need?



Source: IDC, 2001

When asked about the greatest Web application challenge they faced, European IT executives stressed the need to respond to rapid changes in their organizations' requirements and to keep up to date with the demand for new Web applications. The ability to keep pace with new application requirements topped the list of challenges.

The IDC end-user survey conducted in late 2000 is based on in-depth interviews with 300 European companies in Germany, France, Italy and the United Kingdom. The objective of the study was to examine the current and future trends regarding application development and deployment in Europe.

The success of the Web as a platform on which to conduct business has annihilated the old concept of what constituted a reasonable time to market (several dozen months). There is now unending pressure on most businesses to deliver Web-based solutions in record time (a few months, even a few weeks), which has changed the way in which applications must be developed.

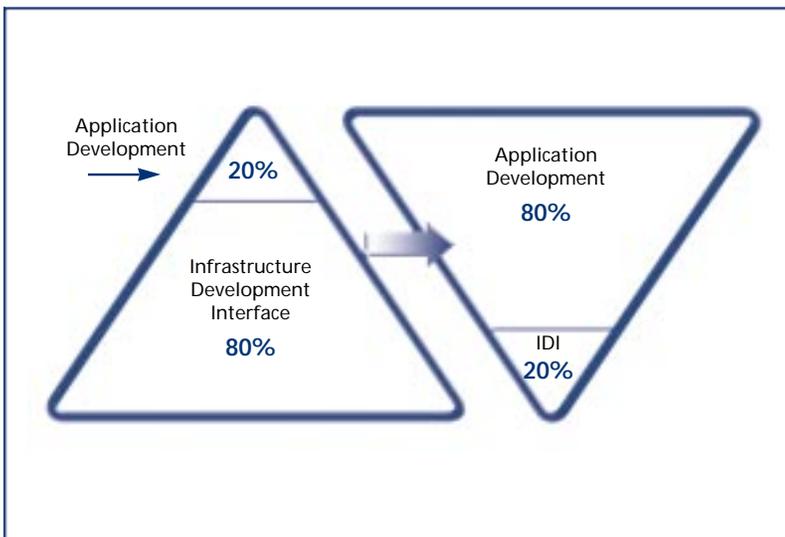
We modeled these changes in Figure 3. According to IDC, what should take place in programming activity is a reduction of the development effort and a focus on the business rules of the applications, not the infrastructure or the interfaces. These new constraints do not go without questioning the culture of the developer community within companies or at least without a fundamental change of their organization model.

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Figure 3 : What needs to occur

" Developers need to focus on business rules rather than infrastructure & Interfaces which bring low value to business "



Source: IDC, 2001



> *Two major stakes for enterprises*



IDC survey results reveal a strong need for the integration of databases that store operational or transactional data as well as data of online business applications.

The challenges posed by the rapid deployment of high-performance, sophisticated transactional applications in an eBusiness environment become all the more delicate to face today in light of the striking skills shortage of highly qualified developers.

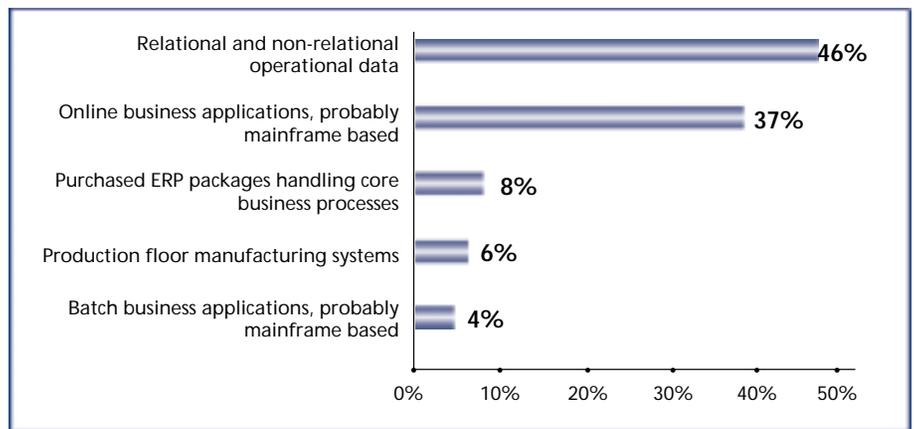
Application integration in an open world

The rapid deployment of sophisticated but robust, high-performance transaction-based applications is essential for companies that compete in today's 24/7 global economy.

One major challenge that companies face is integrating Web applications with existing information systems. IDC survey results reflect this explicitly. They reveal that the need for integration is most prevalent for databases that store operational or transactional data as well as data for online business applications (see Figure 4).

Figure 4 : Web application integration in information systems

Question: What are the major IT systems with which your new Web applications need to be integrated?



Source: IDC, 2001

How is this need for integration translated in reality? Actually, at the time the survey was conducted, very few companies had Web access to large amounts of their relational data. In fact, the starting point was quite low, with 90% of respondents saying that less than 10% of their relational database storage was accessible via the Web. However this picture, which is a view of the situation at the end of 2000, will evolve rapidly. According to the IDC survey, 90% of companies claimed that more than 45% of their relational DBMS storage would be accessible via the Web by the end of 2001. So, clearly, there is a very strong trend toward integrating applications with a Web access to the data stored in relational bases.

Another major challenge stems from the fact that eBusiness demands not only the real-time processing of transactions but also responding simultaneously to millions of users who may be online all the time and throughout the world. Indeed, one can understand that the information system's ability to support such constraints depends on the development of tools that can handle rapid market changes and on the delivery of applications faster than traditional coding methodologies have allowed.

Facing up to the skills shortage

The challenges associated with application integration and the opening of information systems are already difficult enough to solve without the added problem of skills shortage. It is becoming increasingly difficult for enterprises to find and retain skilled workers who understand the complexities of an application and its business logic. In this regard, enterprises are also faced with very expensive competition.

To give an idea of the extent of this phenomenon we quote here some numbers derived from the latest studies and IDC research concerning IT resources in Western Europe and in the United States. The skills shortage in these two regions amounted to about 2 million IT professionals in 2000. The shortage will become even more acute over the next few years: the forecasts anticipate a deficit of about 2.7 million people by the 2003 time horizon.

As the complexities and varieties of systems increase, there is a growing shortage of developers who know all of the network communication protocols; the technologies of heterogeneous, distributed environments; the interfaces to the hardware, software and applications; and the complexities of the system software.

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Figure 5 : Worldwide developer seat growth

	2000	2001	2002	2003
Visual Basic	7 527 004	7 702 541	7 752 762	7 422 080
HTML	6 363 030	7 437 541	8 602 486	9 805 558
C & C++	4050 646	4 445 755	4812 824	5 169 535
Java	1 892 373	2 622 381	3 367857	4 358 484
IRAD	564 566	726 620	880 088	1 019 644
Cobol	1 808 798	1 750 295	1 629 194	1 467 327

Source: IDC, 2001

Few individuals possess all the skill sets required to produce a complex eBusiness application from concept to deployment. Large, complex development projects are at high risk of introducing major design errors and bugs, which are often difficult - if not impossible - to extract once they are embedded in the code. What is more, the integration, maintenance, and training costs required to keep complex, distributed eBusiness systems functioning correctly continue to escalate.

> *The market mutation under way*

The Web application and construction market will experience some dramatic changes over the next several years. IDC believes that both third- and fourth-generation languages will emerge as the primary vehicle for building applications.

Key factors contributing to the growth of the tools market

The Web application and construction market will experience some dramatic change over the next several years. As the market matures, IDC believes that both third- and fourth-generation languages will emerge as the primary vehicle for building applications (see Figure 6).

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Figure 6 : 4GLs lead the market for Web application development

Worldwide Web application design & construction tools revenue (\$M)					
	2000	2001	2002	2003	2000-2003 CAGR %
4GLs	\$ 557	\$ 995	\$ 1 574	\$ 2 394	62,6%
3GLs	\$ 638	\$ 874	\$ 1 125	\$ 1 405	30,1%
Web professional development tools	\$ 634	\$ 839	\$ 1 034	\$ 1 225	24,6%
Software Components	\$ 225	\$ 356	\$ 571	\$ 803	52,8%

Source: IDC, 2001

The above table shows that, according to IDC, most of the anticipated growth of the Rapid Application Development (RAD) tools market will come from Java tools and 4GL/IRAD (Internet RAD). This hypothesis is based on the rapidly increasing diversity and complexity of Web applications that will demand far more sophistication in development environments.





Key factors contributing to increasing revenues include:

- The demands of eBusiness on the Web will drive enterprises to acknowledge that they require efficient tools to meet the enormous programming demands for creating and deploying eBusiness applications.
- The market will adopt Enterprise Java Beans (EJB) and RAD tools solutions as a means of increasing programmer productivity.
- Better RAD and 4GL tools will make adoption of these tools and languages easier to justify.
- Web-based applications and eBusiness applications will require more sophisticated RAD tools and processes and will create a new demand for 4GL tools and technologies.
- Products that provide standards-compliant services on top of an application server platform or that facilitate easy Web-development front-end to back-end environments will increase the market demand for 4GL and RAD technologies.

The indisputable place of 4GL tools

Tools like 4GLs, which approach software development at a higher level of abstraction, will become the preferred medium for application development in the near future. Abstraction is a powerful concept that identifies and presents the key attributes and methods of a particular process while hiding or minimizing the programming tasks necessary to perform the process. The ability to develop applications at a high level of abstraction is desirable because it enables developers to focus on solving domain-specific business problems.

> *Four J's answer*

Present on all the five continents, Four J's is an international company of french origin that offers tools for the rapid generation and development of Internet and eBusiness applications through its Business Development Suite.

Four J's Business Development Suite

Four J's Business Development Suite is an innovative technology that combines the abstract benefits of a 4GL with Application Generator capabilities to improve programmer productivity and allow fast deployment of new applications. Its key features may be summarized as follows:

- An integrated development environment, including an Application Generator that designs screen layouts and creates 80% of the code.
- The separation of business logic from presentation logic.
- Developers do not need to understand the graphical representation of the application. As a result, the developer can focus on the business logic of the application, leaving the graphic layout to design specialists.
- By insulating the developer from screen presentation, the same application may run across a variety of client technologies (dumb terminal, Windows 95/98/2K, X.11, HTML, Java, WAP, XML) without re-coding or recompilation.
- Security and scalability, a business critical issue.
- Business logic and database transactions sit on the application server and are separated from the Web server. The Web server merely fulfills a static role of forwarding data streams and presentation information to the browser.
- Data streams designed for the Web server are directed to a unique data component, which can be encrypted with any standard or 'home-grown' methodology such as tunneling or SSL, providing a very high level of security for data transactions across the network.
- This architecture greatly reduces the network traffic and thus improves throughput and scalability.
- An efficient thin-client technology that saves bandwidth, an important criterion for the geographic reach and scalability of the application.
- An XML publication system.

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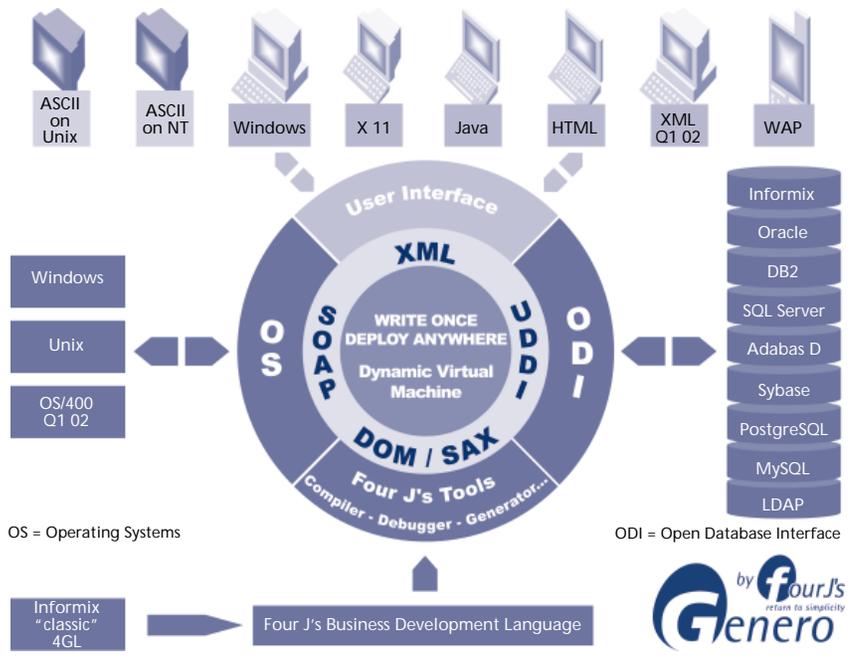
Business Development Suite technology independence

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This freedom enables an enterprise's information system to keep pace with shifting models, which is necessary for it to maintain a competitive edge. These new business models may require support for new hand-held devices, such as mobile telephones and PDAs running WAP, Epoch or Symbian operating systems. They may require thin clients such as HTML and Java or the publication of data. Alternatively, they may require concurrent access and integration of information from multiple databases built with competing vendor technology.

In other words, the Four J's Business Development Suite provides an environment where the programmer need only worry about the application's business logic, in the knowledge that the application being developed will support today's and tomorrow's predominant standards.

Figure 7 : Four J's Business Development Suite - offering technology independence



The advantages

Four J's summarizes the advantages of its technology with the slogan "Write once, deploy anywhere." Indeed, with Four J's Business Development Suite, enterprises and Independent Software Vendors can improve developer productivity and shorten time-to-market for new applications, which will differentiate them in the marketplace.

An application developed on MS Windows NT can be deployed across other operating systems, such as AIX, HP-UX, Solaris or Linux, without recompilation. The converse is also the case.

In summary, Four J's combines what few vendors are able to—a broad set of features and benefits responding to key end-user requirements, including:

- Rapid application development and deployment.
- A powerful Applications server based on a Dynamic Virtual Machine capable to serve 1.800 concurrent users on a single system.
- Multi-database concurrent access (Adabas, DB2, Informix, My SQL, Oracle, PostgreSQL, Sybase).
- Multi-client user interface (dumb terminal, Windows 95/98/2K, X.11, HTML, Java, WAP, XML).
- Multi-platform support (Windows NT/2000, Unix (HP, IBM, Linux, Sun...)).
- Scalability and reliability for Internet B2B business-critical applications.
- Usability of generated code.

Four J's Business Development Suite enables the enterprise to keep pace with the rate of change and to maintain competitive advantage by taking advantage of new business opportunities. Four J's Business Development Suite protects an enterprise's future software investments from obsolescence.



