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## INFORMATION ENGINEERING FOR INTRANETS AND THE INTERNET Methodologies for a Connected World

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*By Clive Finkelstein, Managing Director*  
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## Synopsis

*We are all used to working in an environment of change, but the pace of change in the IT industry today is unprecedented! It affects all areas and in turn - other industries. The catalyst of this change is the Internet and Corporate Intranets, and the new opportunities that they present. What does this mean to organizations that must still operate in this period of rapid change? How can you plan? What direction should you take? What technologies and products will survive, and which ones will disappear? What impact does Information Engineering have in this environment? How can it help you?*

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## Introduction

In the IT industry many managers look for the next silver bullet to help them overcome the impact of technology change. Does the answer lie with GUIs, or CASE tools, or Open Systems, or Standards, or High-Speed Networks? Is the answer Client/Server, or Data Warehouse, or BPR, or Repositories, or Business Rules? Or is it O-O (whether O-O analysis, or design or programming - take your choice)?

The answer is all of these ... and none of them! There is no silver bullet! For we are now seeing a fundamental change in the rules that we have previously relied upon to plan our future directions. I refer of course to the Internet and its internal corporate counterpart, the Intranet.

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***We are now seeing a fundamental change in the rules that we have previously relied upon to plan our future directions.***

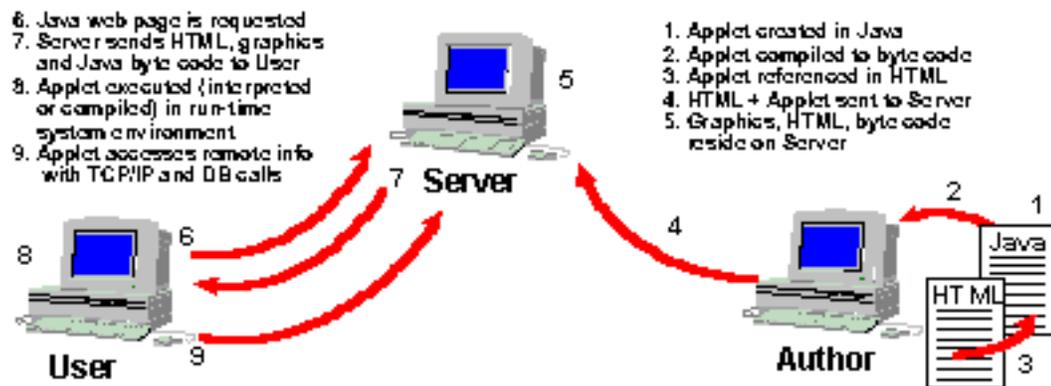
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## A Status-Update on the Internet and Intranet

Consider the changes that the Internet has wrought since early 1995, and particularly in the last few months.

- Web browsers are now available for any platform and operating system, based on an open architecture interface using HyperText Markup Language (HTML).
- The release of the Java language by Sun, with Java code (as applets) now able to be automatically downloaded from Web servers to execute on a browser running as a Web client. Java is a platform-independent language which is interpreted as byte code by the browser, so providing an open architecture environment for the execution of Java applets (see Figure 1).



**Figure 1: Java applets are compiled to byte code and are referenced by the HTML web pages that use them. Both reside on the web server, ready to be downloaded when requested by a web client. The Java code is executed as interpreted code on the client, or instead as compiled code using a "just-in-time" compiler operating as the Java byte code is downloaded to the client.**

*(Diagram © 1996 IDG Communications, Inc from an article in Infoworld.)*

- The growing acceptance by the industry of Java as a mainstream language: not just for applets on web clients but also for web servers, data base servers; and soon also as a complete development language in the operating system - coming to Windows, OS/2, Apple Harmony (System 7.5 upgrade with OpenDoc) and Copland (System 8). Many development tools are emerging for Java with "just-in-time" compilers to improve execution performance, such as: Borland Latte, Symantec Cafe and Visual Café.
- Microsoft attempted to use their dominant desktop market share to establish Visual Basic (VB) Script as a competitor to Java. A similar attempt was made by Netscape, with their share of the browser market, to achieve standardisation by the IT industry on Javascript (a subset of Java) in Netscape Navigator 2.0. Both companies have now realised that the impetus behind Java gives them no alternative but to provide interoperability between Java, Javascript and VB Script. *This benefits all the industry.*
- Most DBMS products are now moving to use Java and HTML: to accept input as HTML direct from Web forms, then carry out relevant DBMS queries and generate dynamic HTML Web pages to provide output in response. DBMS products to provide this capability include: DB2, Oracle, Sybase, SQL Server, SQLBase, CA-OpenIngres and Informix. Their focus is on the Internet, but more particularly on the Intranet.
- Client/Server development tools are also moving to Java, with transparent access to the Internet and corporate Intranets by applications built using these tools: generating dynamic HTML output to display transaction results. Vendors are developing new tools to provide this capability, with backward compatibility for applications using their earlier tools. Products include: Powersoft Optima++ (with compatibility for Powerbuilder); Centura (previously Gupta - with compatibility for SQLWindows); and Borland Latte (with backward compatibility also for

Delphi and C++). Their market is the Internet, but also more particularly the Intranet.

- Data Warehouse products are emerging with an internet interface, accepting HTML input and generating HTML output. Data Mining products, and Screen Scraper tools providing GUI interfaces for Legacy Systems, will also become internet-aware. These latter tools accept 3270 I/O data streams and dynamically translate them to, or from, HTML to display on the screen; thus they provide a transparent HTML interface for easy migration also of 3270 mainframe legacy systems to the Internet and corporate Intranets.
- The Internet is based on the TCP/IP communications protocol and Domain Naming System (DNS). Novell, Microsoft and other network vendors now realise TCP/IP is also becoming the network protocol standard for the corporate Intranet and Dynamic Domain Naming System (DDNS) will be a transparent Internet / Intranet Network Directory Services standard. The communications standards used for the Internet thus also will become part of the corporate Intranet. This enables low-cost Virtual Private Networks to be established using the Internet as the backbone, or high bandwidth will continue to be provided using dedicated private networks as part of the Intranet.

The pace of change over the last few months, brought about by the Internet, has been unprecedented in our industry. In turn, the Internet and the IT industry are bringing change to many other industries.

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## **Business Process Reengineering**

Consider now BPR and the percentage of BPR projects that have failed: generally acknowledged to be 60% - 70% !!! (Of course, an optimist might say that 30% - 40% have succeeded!)

In my article: "*Business Re-Engineering: Three Steps to Success*" - in part published by Data Base Newsletter (*Jan-Feb, 1994*) - I discussed reasons for this high failure rate. These are summarised next.

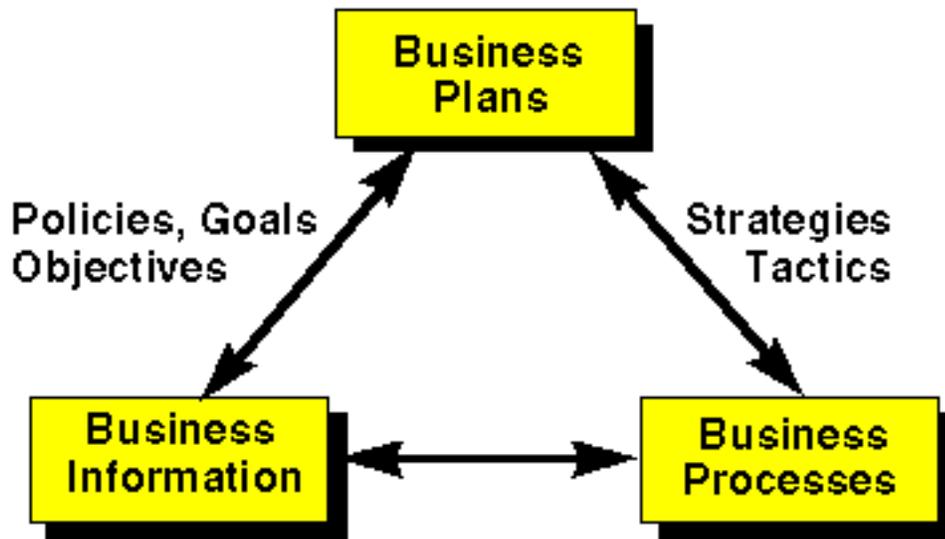
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***The complete article: "Business Re-Engineering: Three Steps to Success" is on our Web Site. Read it online, or download it as a Word document from our White Papers section.***

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One reason why many BPR projects fail is that they do not have sufficient senior management support to allocate resources that are essential for project success, and to keep those resources allocated to the project until it completes. However the major reason for failure is that many BPR projects focus only on processes - ignoring business plans on which those processes depend, and the business information needed to support decision-making. To re-engineer business processes no longer required because of changed strategic plans is an exercise in futility! In the article I discussed the three steps to BPR success: ensuring that Business Processes and Business Information both support the Business Plans set for the organisation (see Figure 2).

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**Figure 2: Business Processes and Business Information must both support the Business Plans that are set for the organisation. This is achieved using Business-driven Information Engineering.**

Business Re-Engineering (BRE) is a superset of Business Process Reengineering (BPR). It structures Business Plans, Business Information and Business Processes so that they are mutually supportive. Business-driven Information Engineering helps you achieve this.

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***Close alignment of business plans, business information and business processes will be vital for survival in the years ahead.***

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## **Using Information Engineering to Migrate to the Internet and Intranets**

Business-driven Information Engineering (IE), together with the *Visible Advantage* Universal CASE tool, *Visible Advisor* Methodology product and the *Visible Universal Model*, help enterprises to align their information systems and business

processes with strategic business plans at all management levels. Visible Advantage supports data base generation for any SQL-dialect RDBMS, providing interfaces for many Client/Server development tools. The Universal Model offers a fast-start development capability, easily tailored to an enterprise's unique business strategies. Organisations can thus leave all options open: selecting the DBMS products and development tools most appropriate to their development directions; and rapidly building data bases and systems that address current and future business needs.

All areas of an organization must follow the plans set by management. This has always been an important goal - but the competitive, rapid-change environment of tomorrow will accept nothing less: *close alignment of business plans, business information and business processes will be vital for survival in the years ahead.*

The only thing stable today ... is CHANGE itself. Organizations must therefore structure themselves to respond rapidly to change. They must above all change to a market-driven and customer-driven focus, rather than be organization-driven or product-driven as in the past. These customers may be external to the business, or they may be internal customers who use products or services provided by business areas elsewhere in the enterprise. New business process opportunities can emerge from this customer-oriented focus, with new processes crossing previous functional boundaries. These cross-functional processes lead to dramatic breakthroughs with re-engineered business processes. They are automatically identified by Visible Advantage, through data dependency Cluster Analysis.

Many business processes have evolved from manual processes where required data was provided separately for each relevant business area. Thus redundant data versions have evolved with each process that needed that data, dissipated through the enterprise. And when the data changed, every redundant data version had to be updated so all versions were up-to-date. When these manual processes were automated, our legacy systems also implemented the redundant data versions, using Data Flow Diagrams to document and implement the data flows also needed to keep the redundant data up-to-date.

But if you have redundant data, you also have redundant processes to maintain each of those redundant data versions. In fact when data is structured non-redundantly, many of these redundant processes disappear. Data continues to flow between the organization and the outside world; but it no longer flows inside the enterprise to update redundant data versions - as they no longer need to exist. The way an organization has to operate when data must flow to keep redundant data up-to-date and consistent is quite different from the more efficient way it can operate with only one valid version of data: which, when updated, is then available to all who are authorized to access it.

IE also results in the development of Object-Oriented logic, building reusable business processes as business objects: such as Customer, Product, Order, or Market. These can be implemented using Client/Server development tools, or they can be coded using O-O languages such as C++ or Java, or using traditional languages such as COBOL or C.

Information Engineering enables business experts and systems experts to work together in a design partnership. Using the strategic, tactical and operational business plans set by management, IE defines integrated, non-redundant data bases that are shared throughout the enterprise. This in turn leads to simpler business processes: with re-engineered cross-functional processes that use the Internet and Intranet, focus on customers and benefit from new business opportunities emerging from a cross-functional process emphasis.

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***Incompatibilities between operating systems, DBMS and client/server products will disappear: transparently replaced by an open architecture environment based on HTML and Java, but continuing to use those DBMS and Client/Server tools on which our applications depend.***

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What does this mean, when we also consider the Internet and Intranet? Most DBMS and Client/Server Development tools are moving to interface directly and transparently with the Internet and Intranet. Web browsers, Java, HTML, the Internet and Intranet will all provide an open-architecture interface for most operating system platforms. The previous incompatibilities between operating systems, DBMS products, client/server tools, LANs, WANs and EDI will disappear: replaced by an open architecture environment based on HTML and Java, but transparently continuing to use the DBMS and Client/Server tools on which our applications depend.

The open-architecture environment enjoyed by the audio industry - where any CD or tape will run on any player, which can be connected to any amplifier and speakers - has long been the holy grail of the IT industry. *Finally, once the industry has made the transition over the next few years to the open-architecture environment brought about by Internet and Intranet technologies, we will be close to achieving that holy grail !!!*

The client software will be the web browser, operating as a "fat" client by automatically downloading Java code when needed. Client/server tools will typically offer two options, each able to be executed by any terminal which can run browsers or HTML-aware code:

1. Transaction processing using client input via web forms, with dynamic HTML web pages presenting output results in a standard web browser format, or
2. Transaction processing using client input via client/server screens, with designed application-specific output screens built by client/server development tools. This optional client environment will recognise HTML, and will dynamically translate and present that output using the designed application-specific screens.

These client/server development tools will provide transparent access to data base servers using HTML-access requests, whether accessing operational data or Data Warehouses. In turn the data base servers will process these requests - transparently using conventional languages, or Java, to access new or legacy data bases as relevant. These may be separate servers, or instead may be mainframes executing legacy

systems.

Web servers will then operate as application servers, executing Java code or conventional code as part of the middle-tier of three-tier client/server logic distribution, with data base servers also executing Java code or conventional code as the third logic tier.

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## So What of the Future?

Development will be easier: many of the incompatibilities we previously had to deal with will be a thing of the past. Open architecture development using the technologies of the Internet will also be part of the Intranet: able to use any PC and any hardware, operating system, DBMS, network, client/server tool or Data Warehouse. *This will be the direction that the IT industry will take for the foreseeable future.*

New reengineering opportunities will emerge from immediate access to customers and suppliers via the Internet. But this also means that - unless corrected - *the chaos of redundant data that exists in most enterprises ... will now be visible to the world!* This will be apparent from the front window of each organization's web site. Not by what can be done, but rather by what they cannot do when compared with their competitors.

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***With the Internet, unless corrected - the chaos of redundant data that exists in most enterprises ... will now be visible to the world!***

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So how should your organization operate when your customers have immediate access with the click of a mouse to you ... and to your competitors? If your organization cannot meet the needs

of those customers, they will leave you just as fast - also with a click of a mouse ... and go to your competitors!

Hardware, software, networks and the IT industry are all rushing to embrace the Internet and Intranets. What is the next silver bullet? Is it an: Object-Oriented, BPR, Open, CASE, GUI, Client / Server, Repository of Networked Business Rules Data Warehouse ???

Or instead should we use Information Engineering to develop integrated, well-managed, non-redundant data bases and object-oriented systems that ensure business information and business processes are all closely aligned with business plans - able to be delivered seamlessly across the Intranet and the Internet? If so, we had better start getting our organizational house in order NOW !!!

*The benefits that Information Engineering offers have never been clearer. IE helps organisations achieve corporate business and systems flexibility, with the rapid-change capability that is vital for enterprise success in the coming competitive Armageddon.*

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## More Information

For more information on Information Engineering tools and services in this paper, contact:

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