Realizing e-Business with Components

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Introduction

A Strategy for e-Business transition

Components in the e-Business transition

What happens in the World?

QnA
Introduction
Environments

- It’s still a change economy. It always will be. Change means greater opportunity and higher profits, but it also means a new set of challenges and higher risk. It means you have to get it right.

- Agility is needed both in rapid adoption of new technologies and in timely response to business change.

“It is cliché to say that the Internet changes everything, the challenge now is to guess what, how and how quickly.”

\textit{new Economist, 26 June 1999}
Eras of IT Topology

• Mainframe centric
• Monolithic

• Client/Server
• N-Tier
• Local Intranets

• Global Internet
• Componentised

CORBA

Microsoft

JavaBeans

XML
# Eras of Business Organization

<table>
<thead>
<tr>
<th>Eras of Business Organization</th>
<th>1980’s and earlier</th>
<th>1980’s-90’s</th>
<th>New Millennium</th>
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</thead>
<tbody>
<tr>
<td>Organisation Focus</td>
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<tr>
<td>Internal use</td>
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<td>Business Process Focus</td>
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<tr>
<td>Business-to-business</td>
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<tr>
<td>via EDI - file transfer</td>
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<td>Virtual organisations</td>
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<tr>
<td>e-commerce direct to customers - real-time transactions</td>
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<tr>
<td>e-Business</td>
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*Butler Group*
Some Figures

81% of organizations surveyed were already implementing or making plans to conduct business on the Web. Within this group:

- 88% will use the Internet to communicate with suppliers, customers, and employees.
- 69% will purchase services or products from suppliers electronically.
- 69% will provide customer service and support.
- 58% will sell products and services.
- 57% will process orders and transactions.

February, 2000, PC Magazine
Examples of e-Business in action:

- Dell Computer Corporation now generates 43% of its revenue through web transactions. Dell Computer Corporation embraced the ideas of e-Business long before the term was even coined.

- Cisco Systems, whose television commercials claim the Internet now brings 7 new people on line every second, is currently processing 80% of its orders through the Web.

- J.P. Morgan & Co.’s Synfo application for loan syndication saves an estimated $30,000 to $50,000 in paper costs per loan. Their Federal Express expenditures have also reportedly dropped up to $30,000 per loan. Facsimile costs associated with the repeated issuance of 300-page loan agreements to 160 potential investors have been eliminated as well.

- The Robert Stevens Research Center estimates that the $670 billion dollar insurance industry spends in excess of $54 billion dollars on “inefficient, paper-intensive systems.”
A Strategy for e-Business transition
e-Business in brief

- **e-business** - any net-enabled business activity that transforms internal and external relationships to create value and exploit market opportunities driven by new rules of the connected economy.

- **e-commerce** - the subset of e-business that focuses on enabling the buying and selling process through the use of the Internet, IT applications and other technologies.

*Gartner Group*
The challenges of e-Business

- Time to market
- Business fit
- Quality
- Cost saving
- Adaptability
- Consistency
- Integration
The e-Business spectrum

Increasing Sophistication and Alignment of Business and IT
How to Survive in the Internet Age

Keywords: rapid changes in technology integration component-based architecture

How to Survive

Integrated approaches to business analysis and software design

Plan to have a solution easy to adapt to rapidly changing technologies

CBD: Model based
CBD Approach

- Software design for e-business is pictured as a network of business components delivering business capabilities
- Enable software to be changed in timing responses to business changes
- Allow existing systems and software packages to be integrated where needed
- Abstract the business logic, rules and information free from technology constraints; EAI tools and code generators deal with implementation issues
Components in the e-Business transition
Component in brief

A component is a unit of composition with contractually specified interfaces and explicit context dependencies only. Context dependencies are specified by stating the required interfaces and the acceptable execution platform(s). A component is subject to composition by third parties. For the purposes of independent deployment, a component needs to be a binary unit.

Szyperski, 1998
Characteristics of Component

- Package of reusable services
- Executable without additional effort
  - in binary form or
  - in compilable spec
- Composable with other component through predefined interface
  - separated interface from its internals
  - conforms to component model
- Provides description of its semantics
Characteristics of Component (cont.)

- Repository
- Component
  - Composable
- System Under Assemble
  - Executable
- System
- Reusable Service
  - Select
  - Understand
  - Assembly
  - Compile

- Semantics
Business components

- User interface and technical components
  - GUI widgets, database connectivity module, …
  - Success!

- Business components
  - Customer relationship, product catalog, payment, order, …
  - Start to emerge!

**Business Component** A particular type of component that offers services that provide business capability through its interfaces.
Power of Business Components

- Allow architects and analysts to concentrate on specifying business components without regard to the environment in which these components will run
  - Container technology can be used to host them in run-time environments
- Allow reuse of analysis and design knowledge rather than code
- Allow reuse of business knowledge

Increase Productivity/Quality: Goal of SE
Component-based development

What is the most important consideration when you are buying some building blocks for your personal computer system at one-stop market? Interface

- The market supplies products
- Select products are qualified to be "fit for use" as components
- Qualified products are adapted to be components that can be integrated
- Adapted components are assembled by using architecture, infrastructure, or middleware
- Upgrades to the system occur as needed and are facilitated by preceding steps
Component-based development (cont.)

- How we can assemble software together by developed at different times by different people, possibly from different organizations? **Contract**

- in real world,

- in software,
**CBD Process**

**Typical CBD Process**

- is an approach to application development in which ready-made pieces of software are assembled together to enable the rapid construction of applications.

**General CBD approach**

- decide on the scope of the application to be developed;
- specify the components that will form the application;
- acquire, reuse, or build the component implementations; and
- assemble, test, and field the application

[Alan Brown, “Moving from Components to CBD: Supporting distributed computing paradigms”, Component Strategies, April 1999]
Overall CBD Process (Sterling’s Advisor™)

Application Engineering Track

Component Engineering Track
# Meeting the challenges of e-Business

<table>
<thead>
<tr>
<th>Factor</th>
<th>e-Business challenge</th>
<th>Main CBD feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to market</td>
<td>There are rapidly shrinking windows of opportunity.</td>
<td>Assembly process provides time to market of e-business solutions.</td>
</tr>
<tr>
<td>Business fit</td>
<td>There is a need to reflect, integrate and rethink business processes.</td>
<td>Architectures are used that mirror business needs and establish business fit. Techniques integrate business and software modeling.</td>
</tr>
<tr>
<td>Cost saving</td>
<td>There is a need to reduce costs, be competitive and exploit niche markets.</td>
<td>Techniques for component reuse result in long-term cost savings.</td>
</tr>
<tr>
<td>Adaptability</td>
<td>Subject to rapid changes in business processes.</td>
<td>Components can be reused in ‘plug and play’ fashion in different business contexts.</td>
</tr>
<tr>
<td>Consistency</td>
<td>Greatly increases the need for consistency of services presented to the global village.</td>
<td>Interface-based approach that encourages consistency.</td>
</tr>
<tr>
<td>Integration</td>
<td>Pressure increases to purchase treadmill software and leverage previous IT investments.</td>
<td>Evolutionary process helps in legacy migration.</td>
</tr>
</tbody>
</table>
The relevance of CBD to e-Business

<table>
<thead>
<tr>
<th>TOP DOWN</th>
<th>BOTTOM UP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TO BE</strong></td>
<td><strong>AS IS</strong></td>
</tr>
<tr>
<td>Business Modeling</td>
<td>Solution Requirements</td>
</tr>
<tr>
<td>Domain Analysis</td>
<td>Commercial Components and Packages</td>
</tr>
<tr>
<td>Object or Structured Analysis</td>
<td>Existing Systems (Legacy)</td>
</tr>
</tbody>
</table>
Components in themselves do not guarantee successful business solutions. Coupled with an effective e-business process improvement plan, CBD makes it possible to achieve a range of business benefits that have always eluded the software industry.
e-Business process improvement (cont.)

- Envisioning: business opportunities and structures
- Reflection: ‘as is’
  - Business scope of existing asset
- Conception: ‘to be’
- Organizing: identifies and plans to the ‘to be’ model
The Business Implications of Software Change

When it takes longer to change the software than to change the business, the business is at risk.

When software changes faster than the business, the business creates strategic opportunities.
What happens in the World?
## World Component Market

(Unit: $ 10 billion)

<table>
<thead>
<tr>
<th>Year</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>Annual growth rate (%)</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business application component</td>
<td>1.76</td>
<td>4.48</td>
<td>7.65</td>
<td>13.80</td>
<td>100</td>
<td>21.5</td>
</tr>
<tr>
<td>Component development tool</td>
<td>1.10</td>
<td>2.60</td>
<td>4.40</td>
<td>5.60</td>
<td>80</td>
<td>8.7</td>
</tr>
<tr>
<td>Component architecture</td>
<td>0.07</td>
<td>0.50</td>
<td>1.30</td>
<td>3.30</td>
<td>310</td>
<td>5.2</td>
</tr>
<tr>
<td>Component based SI</td>
<td>5.28</td>
<td>13.40</td>
<td>23.00</td>
<td>41.40</td>
<td>104</td>
<td>64.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8.21</strong></td>
<td><strong>21.02</strong></td>
<td><strong>36.35</strong></td>
<td><strong>64.10</strong></td>
<td><strong>160</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

*Componentware, Ovum 1998*
CBD Strategy in the World - USA

"PITAC (Presidential Information Technology Advisory Committee) Report"
- R&D investment for CBD: design, basic research
- Construction of s/w component library

NIST (National Institute of Standard and Technology) : CBD Project
- CASE and Methodology for CBD
- Technology for promoting component reuse
- Expansion of market for component s/w

Industry
- MS, Sun, IBM, Sterling Software, Castek, CaseMaster, MTW etc.
CBD Strategy in the World - Europe

- Software Component for the Industry (SCI) project
  - Improving productivity & quality of IT industry by software component policy
  - Application domain: information & communication, energy, etc,...
  - Technology and CASE for component registration & maintenance, component search & assemble
  - Component quality evaluation & certification

- NATO's component technology standardization
  - Standard for component development process
CBD Strategy in the World - Japan

- CBOP (Consortium for Business Object Promotion)
  - 115 companies (as of Oct. 31, 1999)
    - Sterling Software (currently CA), Hitachi, NEC, Toshiba Information Systems, NTT Data, ...
  - Goal
    - To change software development paradigm,
    - Information sharing on network computing,
    - Easy installation of integrated application packages
    - Provide infrastructure for EDI, EC

- Pascal Consortium
  - Provide application solution using PASCAL standard components
  - Pattern-based development: Sterling Software’s COOL:PLEX™
CBD Strategy in the World - Korea

Software Industry in Korea
- stay behind the leading country (approximately level 1 or 2 in CMM)
- emerging industry (about 35% growth per year)
- try to provide software products into the world market

Korean Economic Environment
- focused on manufacturing
- have success story in IT industry
- have consensus on fostering software industry (potential, wide spread effect, etc.)

Starting National Project
Project Overview

Objectives
- Construction of component bank (3,000 components)
- Development of CBD technology
- Development of infrastructure supporting CBD technology (distribution, pricing, etc.)

Period
- 1999. 7 ~ 2002. 6 (3 years)

Budget
- Total 34 million US $
  - MIC: 26 million US $
  - Company: 8 million US $

MIC: 26 million US $
Company: 8 million US $
Project Conceptual Model

- Paradigm Shift
- Productivity & Quality
- Competitive Edge

Fostering Component Industry

Component Development
- Standardize Component Interface Specification
- Develop Business Application Components
- Build Public Component Bank

CBD Related Technologies
- Component Production Technology
- Component Assembly Technology
- Component Extraction Technology
- Testing & Quality Evaluation Technology
- Component Distribution Technology

CBD Infrastructure
- Distribution & Billing
- Certification
- Regulation
Project Scope - Technology

- Component Creation & Composition Technologies
  - component-based development methodology
    - modeling technology
    - creation technology
    - wrapping technology
  - composition & assembly technology
  - extraction technology

- Development of Public Component Bank
  - public component
    - business core component
    - business common component
    - base component
  - application component
    - manufacturing, finance, banking, telecommunication, etc...
Project Scope – Technology (cont.)

- Testing and Quality Evaluation Technologies by Certification Institution
  - testing technology
  - quality evaluation technology
  - authorization technology

- Component Distribution Technology by Distribution Companies
  - repository construction technology
  - registration and search technologies
  - subscription and billing technologies
Domain Selection

- Criteria for Selecting Component Domains
  - Stabilization of Business Processes
  - Expected Number of Component Uses
  - Impacts of Developed Components on S/W Industry
  - Conformance to International Standards

Finance  Telecom  Manufacturing  Government Administration

Business Common Component
Development Strategies

- User-Oriented Development
  - KCSC
  - role allocation between research institutes & industries

- Global-Oriented Development
  - conformance to international standard
  - link to OMG standard
  - cooperate with CBOP in Japan

- Mid-Entry Strategy
  - adopting existing architecture
  - strategic cooperation with CBD solution vendors
  - fully utilization of results & products developed in Korea
Project Organization - History

- ‘99. 1. : Planning for Component Industry Promotion (MIC)
- ‘99. 4. : Basic Plan for Component Industry Promotion (MIC/ETRI)
- ‘99. 7. : 3-year National Project “Component-Based S/W Development Technology”
- ‘99. 11. : General Meeting for KCSC Foundation
- ‘00. 5. : Platform Selection
- ‘00. 7. : RFP for Components Development
  - Business Common Component Development by ETRI
Organization of KCSC

- General Assembly
  - Chairman
  - Vice Chairman

- Board of Directors
  - Directors
  - International Relations...

- Executive Office
  - Manager of Executive Office

- Domain Sub-committee
  - Common Business
  - Manufacturing
  - Finance
  - Telecommunication
  - Transportation

- Functional Sub-committee
  - Training
  - Distribution
  - Standardization
  - User Group
Plan

Phase I
Establishment
KCSC establishment
1999. 7 ~ 2000. 6

Phase II
Development
Component development
2000. 7 ~ 2002. 6

Phase III
Operation
Component Bank operation
2002. 7 ~
We have done

Phase I (1999. 7. - 2000. 6)
- Foundation of consortium
- Develop component system architecture
- Develop domain component specifications
  - 3 domains
- Analyze component utilization requirement
  - component cost model
  - component distribution
  - related regulation
- Mainly sponsored by government (80%)
Current Phase

Phase II (2000. 7 - 2002. 6)
- Construction of public component bank
- Implementation of component utilization environments
- Extend component domain
  - 5 domains
- Promote user group
- Increase number of consortium members
- Sponsored by government & members (50:50)
Future Plan

- Phase III (2002. 7 ~)
  - Technology transfer
  - Commercialize component bank
  - Extend component domain
    - 9 domains
  - Independently operated by KCSC
    - Fully sponsored by members
Layered Architecture for Public Components
QnA

- Contact
  - namkyu_cho@hotmail.com

- More CBD materials
  - http://ww5.introcom.net/~nkcho

- Do you want to meet the Enterprise Component Solution?
  - http://www.componentvision.com

- Happy?