Realizing e-Business with Components

September 8, 2001

Namkyu Cho

namkyu_cho@hotmail.com

Component Vision Inc.

Topic

- 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.
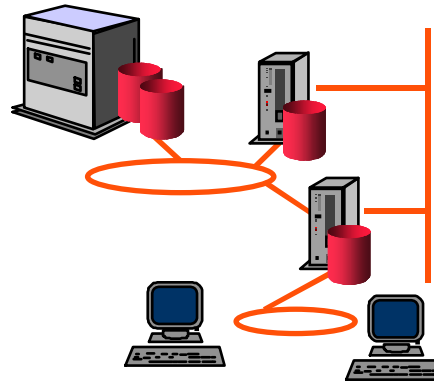

"It is cliché to say that the Internet changes everything, the challenge now is to guess what, how and how quickly."
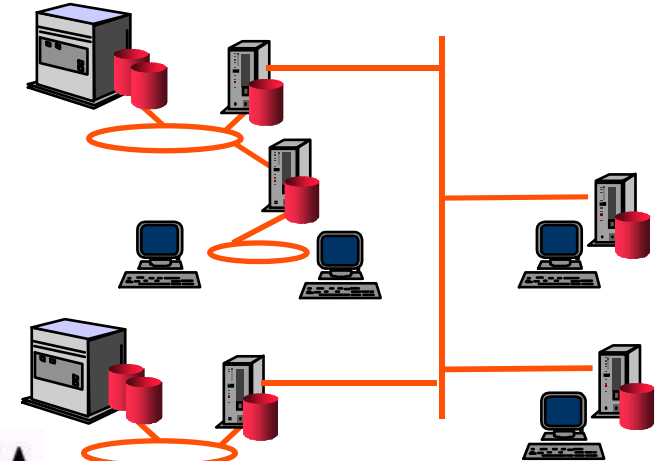
Eras of IT Topology
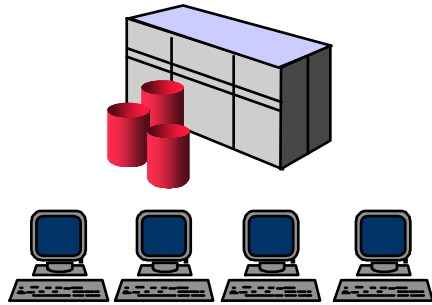
- Mainframe centric
- Monolithic

- Client/Server
- N-Tier
- Local Intranets

- Global Internet
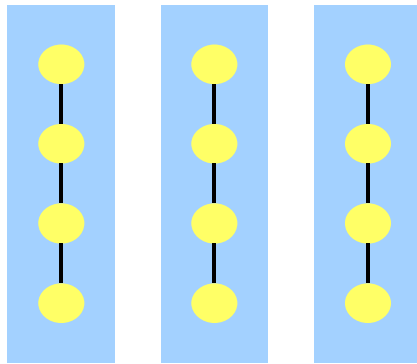- Componentised

CORBA

Microsoft COM+

JAVA

Enterprise JavaBeans

XML

Eras of Business Organization

1980´s and earlier

1980´s-90's

New Millennium

3rd party service providers

Extranet

Internet

customers

▪Organisation Focus

▪Internal use
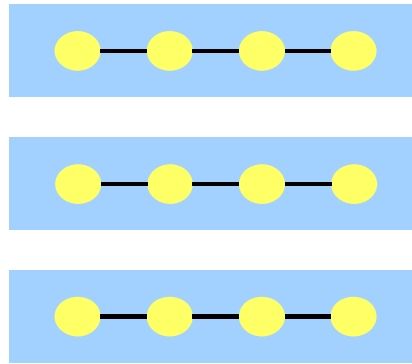
▪Business Process Focus

▪Business-to-business via EDI - *file transfer*
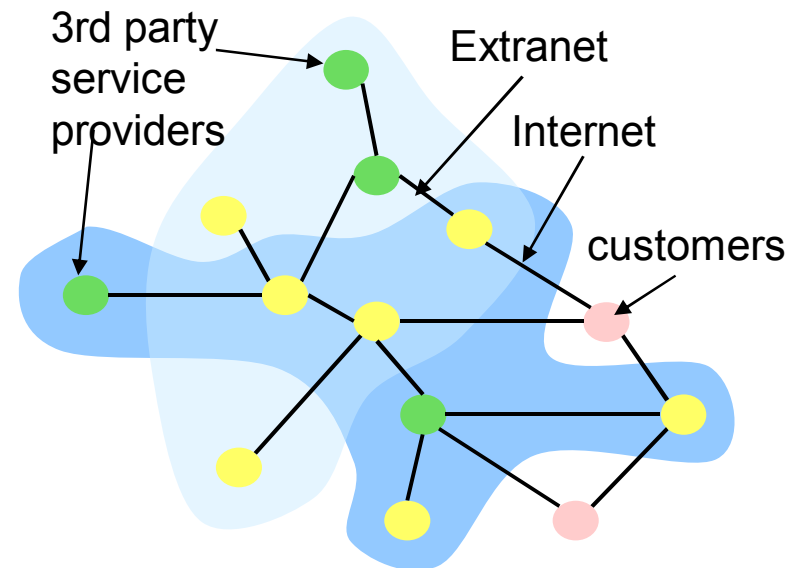
▪Virtual organisations

▪e-commerce direct to customers - *real-time transactions*

▪e-Business

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

Some Figures(cont.)

- 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.
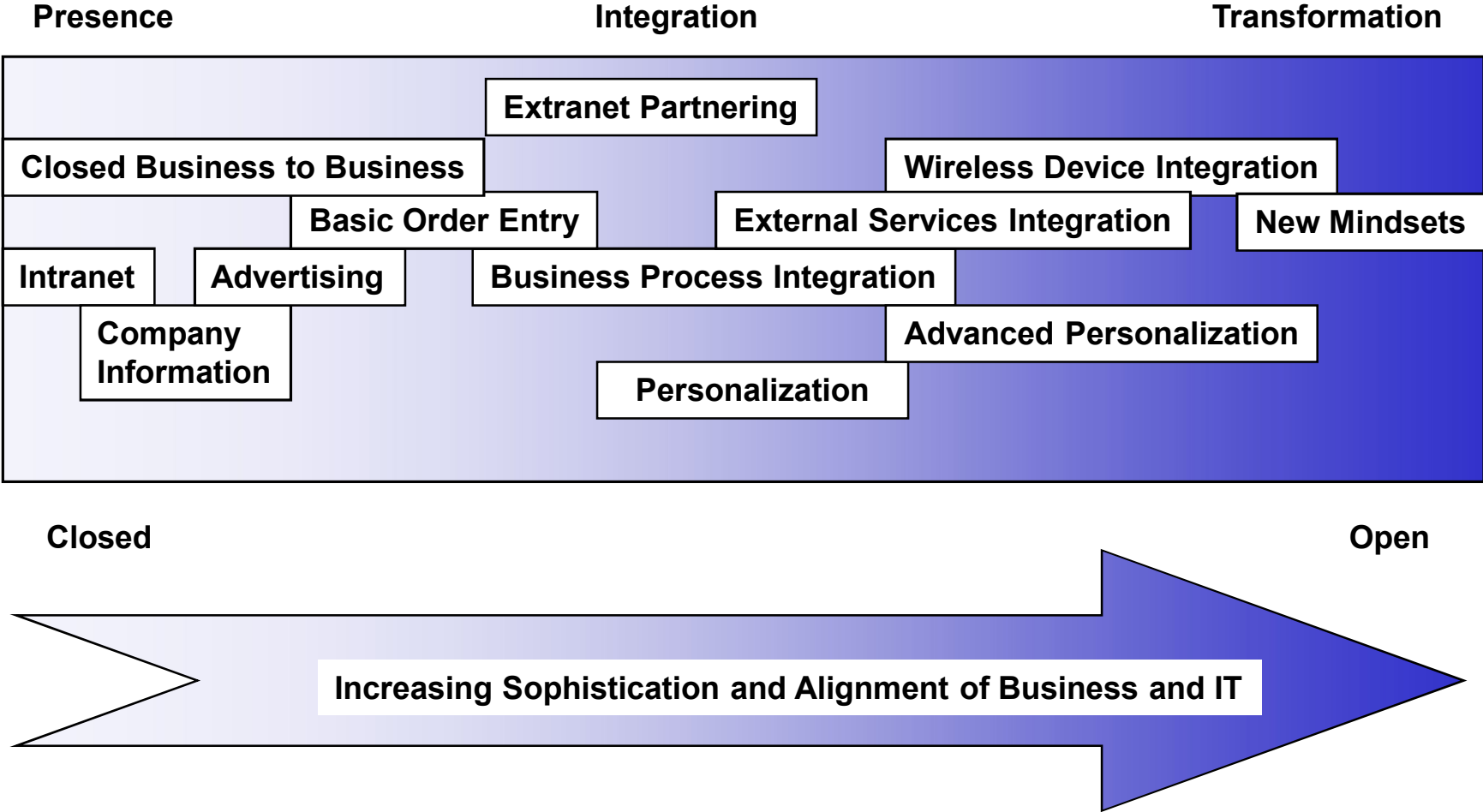
Gartner Group

The challenges of *e*-Business

- Time to market

- Business fit

- Quality

- Cost saving

- Adaptability

- Consistency

- Integration

The *e*-Business spectrum

Presence   Integration   Transformation

Extranet Partnering

Closed Business to Business   Wireless Device Integration

Basic Order Entry   External Services Integration   New Mindsets

Intranet   Advertising   Business Process Integration

Company
Information   Advanced Personalization

Personalization

Closed   Open
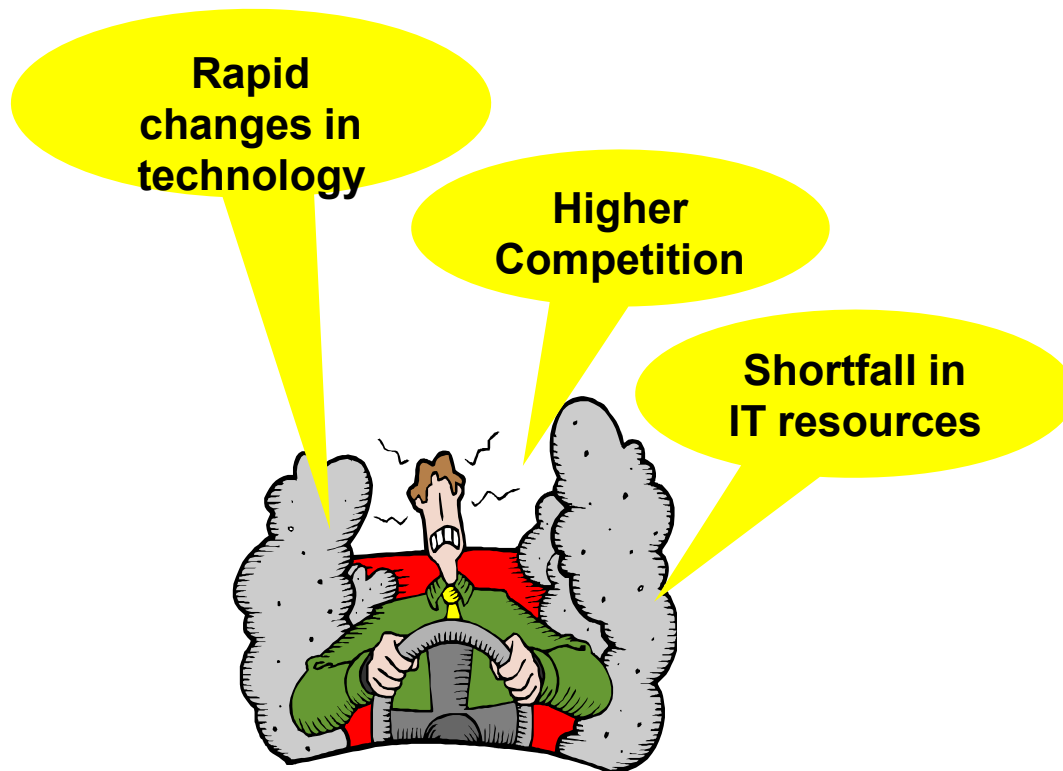
Increasing Sophistication and Alignment of Business and IT

How to Survive in the Internet Age

Keywords: **rapid changes in technology**
integration
component-based architecture

Rapid changes in technology

Higher Competition

Shortfall in IT resources

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
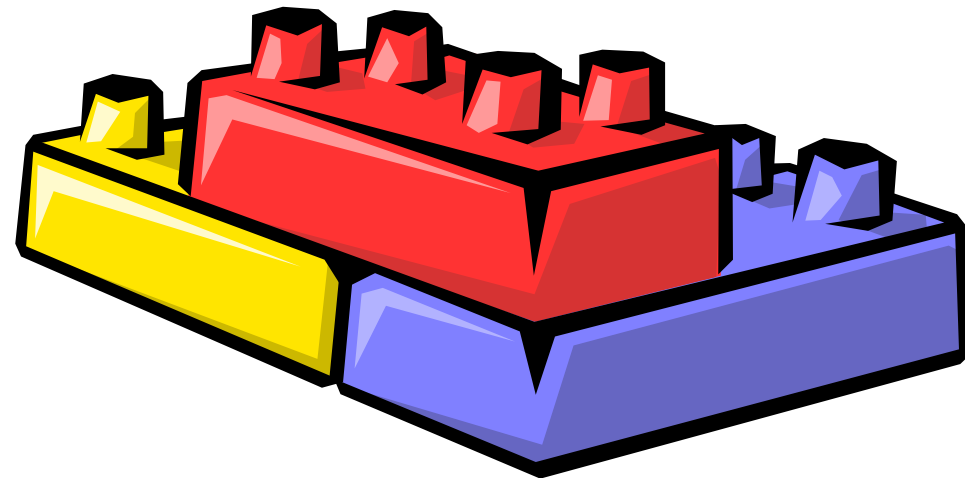
Component in brief

- 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
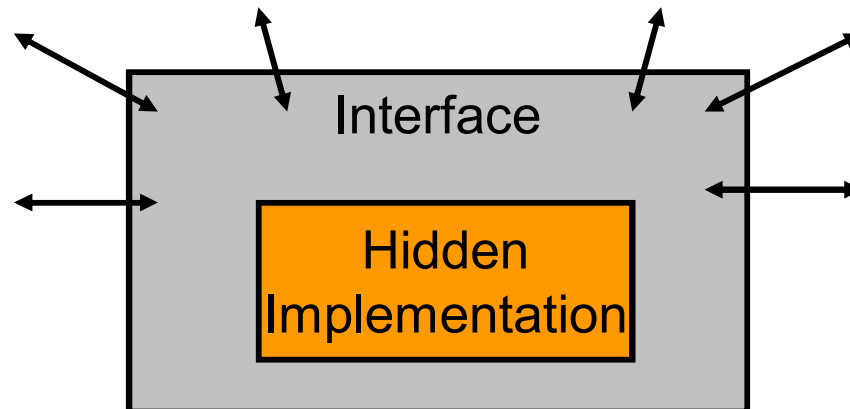
Characteristics of Component

- Package of reusable services

- Executable without additional effort
  - in binary form or
  - in compilable spec

- Composible with other component through predefined interface
  - separated interface from its internals
  - conforms to component model

- Provides description of its semantics

Characteristics of Component(cont.)
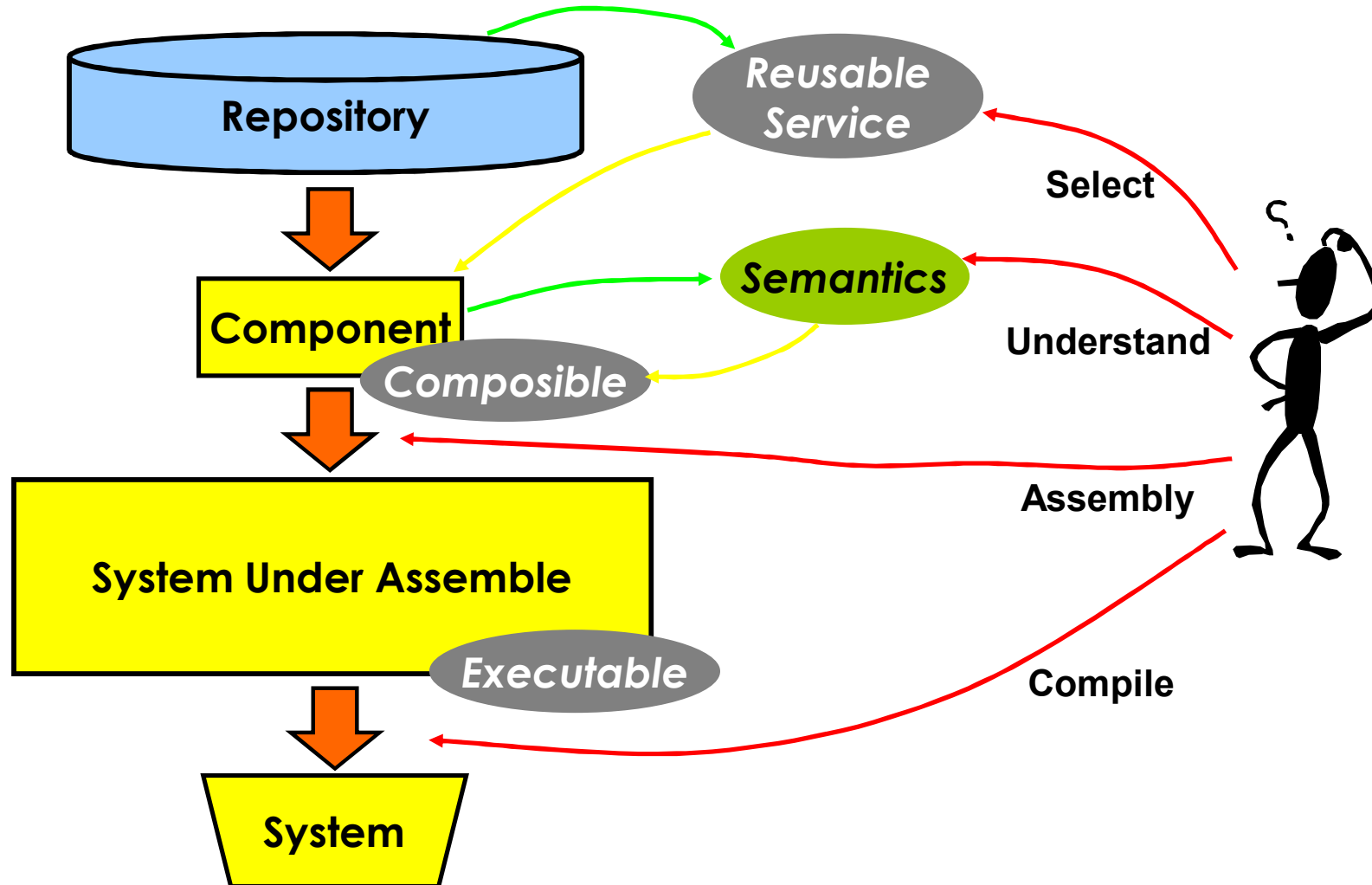
Business components

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

CMU/SEI COTS Process
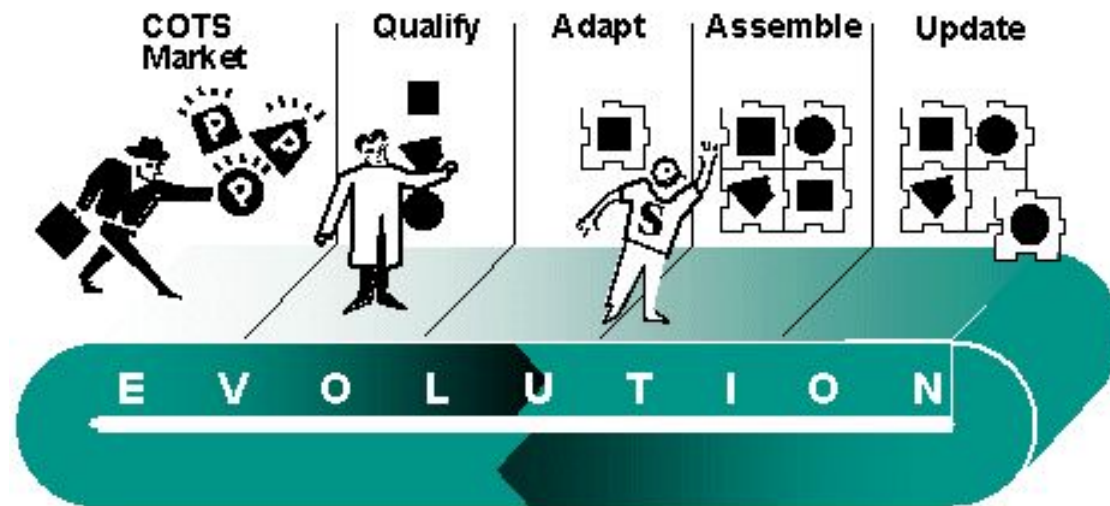
| COTS Market	Qualify	Adapt	Assemble	Update
The market supplies products	Select products are qualified to be "fit for use" as components	Qualified products are adapted to be components that can be integrated	Adapted components are assembled by using architecture, infrastructure, or middleware	Upgrades 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,
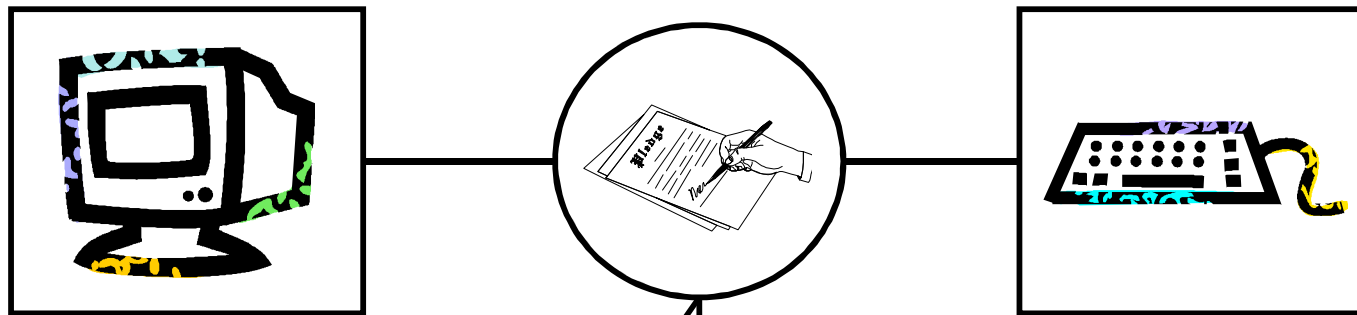
- in software,
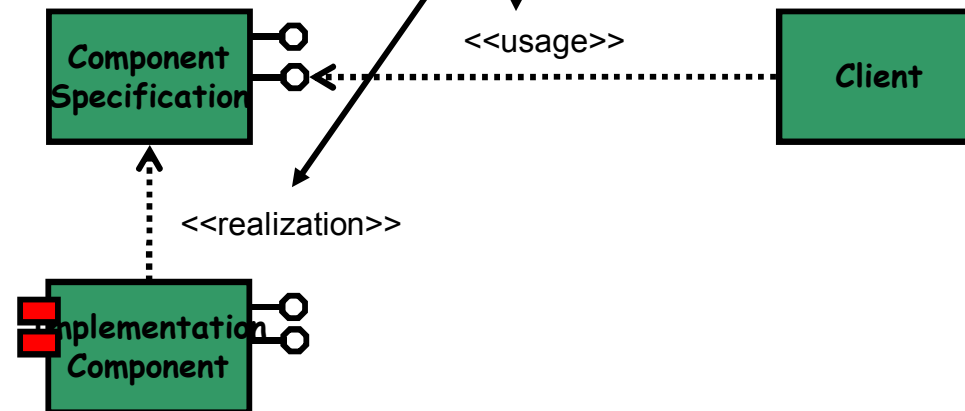
CBD Process

- 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 form Components to CBD: Supporting distributed computing paradigms", Component Strategies, April 1999]

System

New Components

External Components
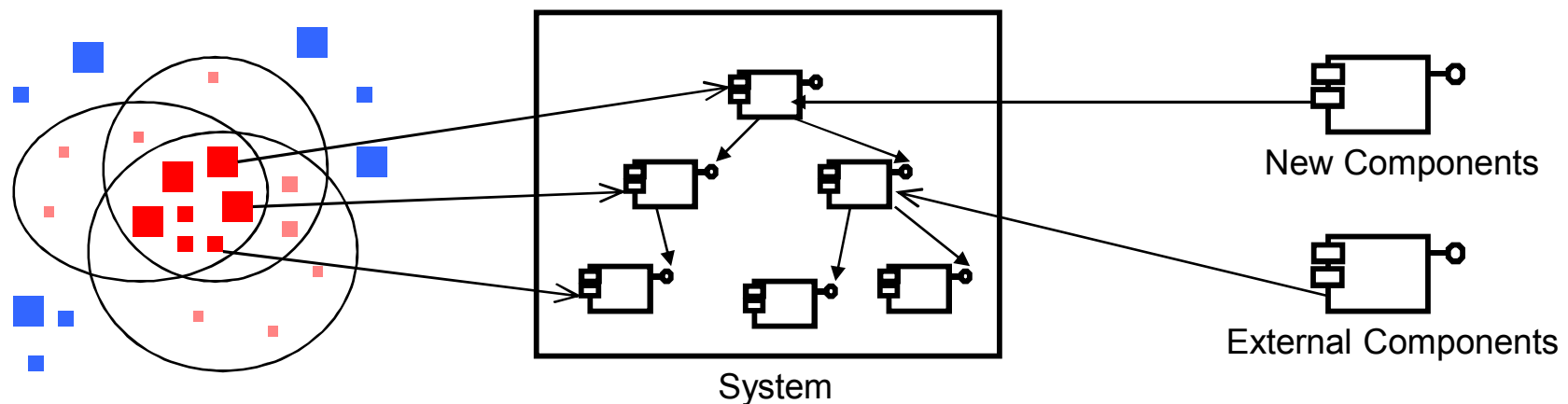
Overall CBD Process(Sterling's Advisor™)
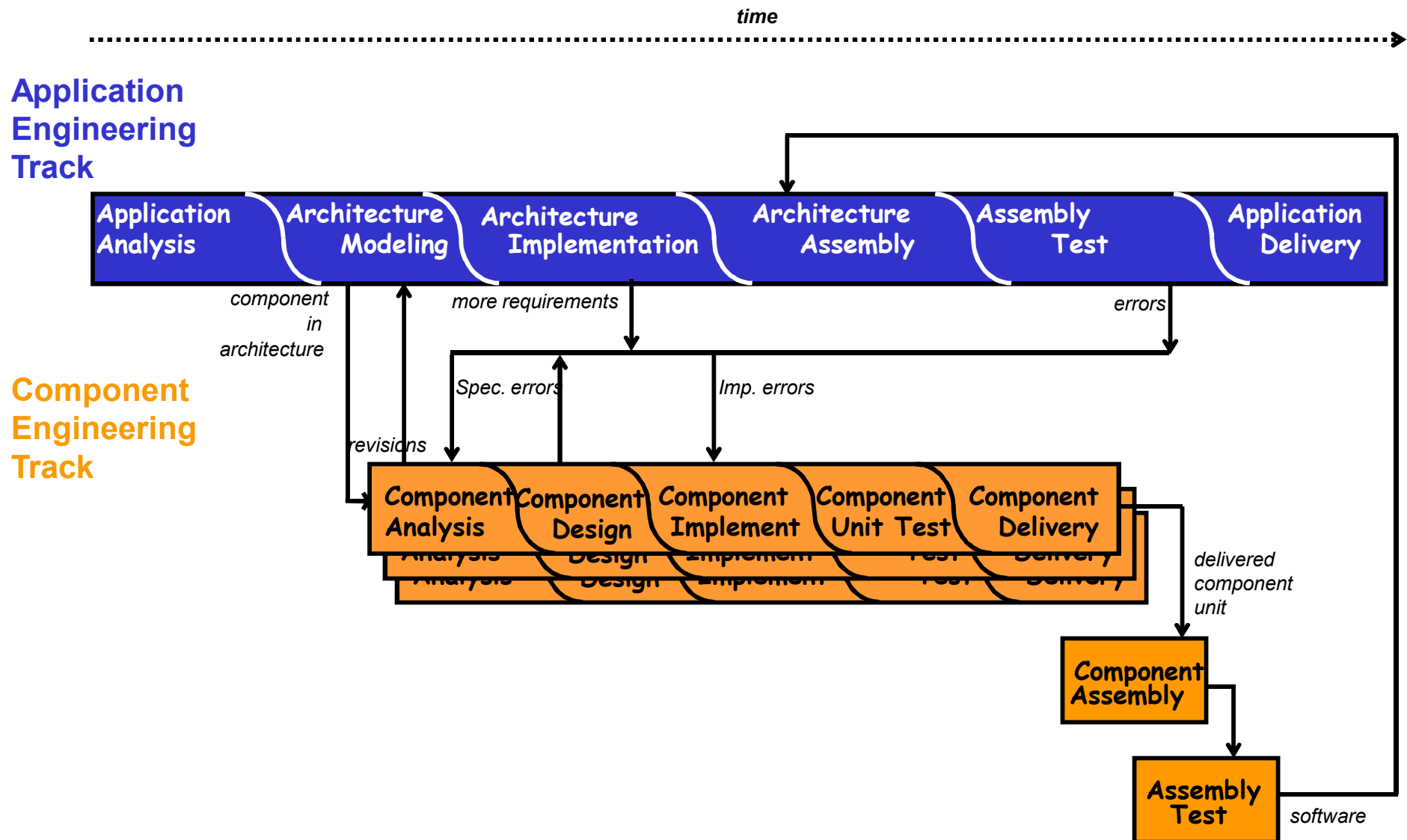
Meeting the challenges of e-Business

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

The relevance of CBD to e-Business

TOP DOWN

TO BE

Business Modeling
Domain Analysis
Object or Structured Analysis

BOTTOM UP

AS IS

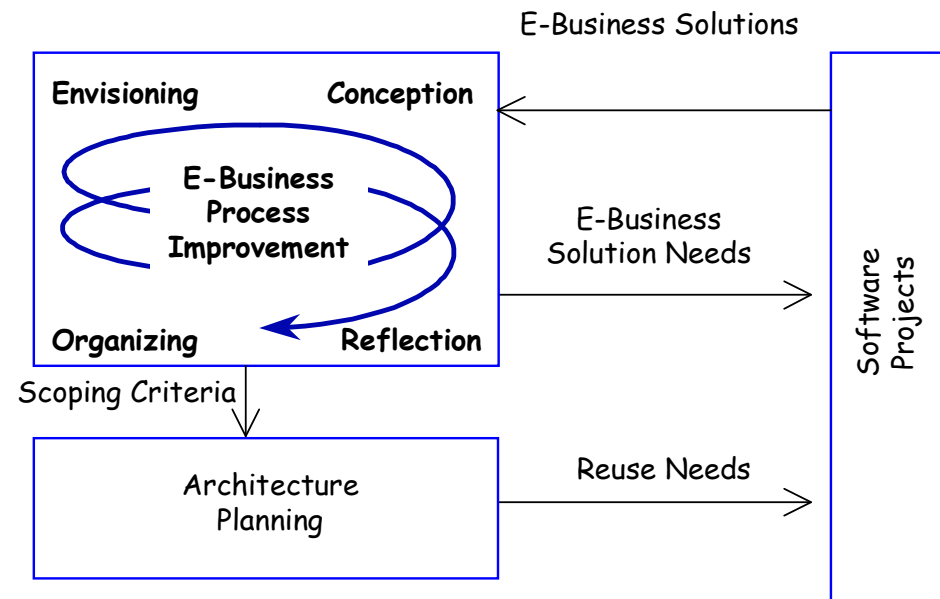| Solution Requirements |
|---|
| Commercial Components and Packages |
| Existing Systems (Legacy) |
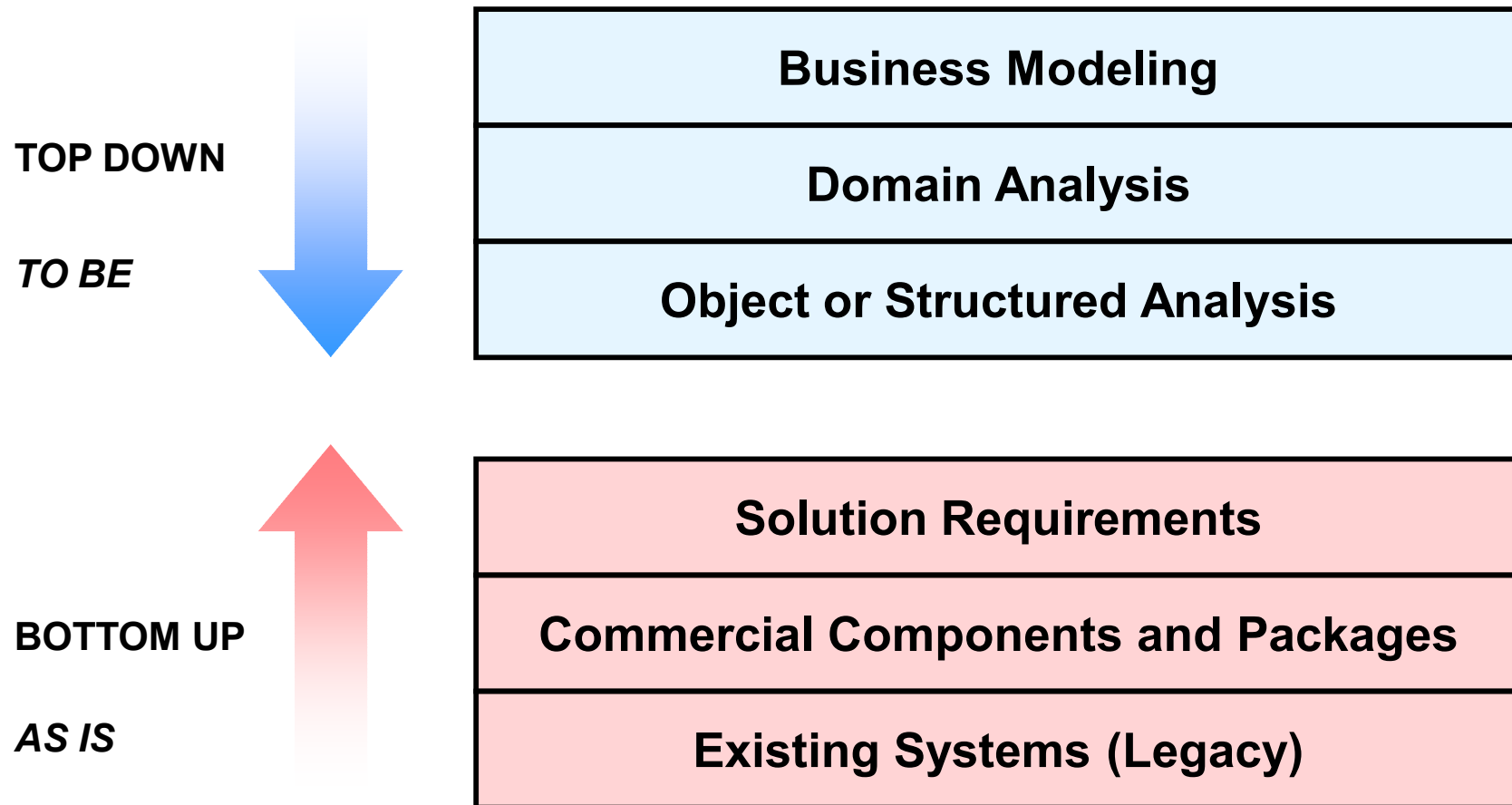
e-Business process improvement

■ 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 Solutions

Envisioning   Conception

E-Business
Process
Improvement

Organizing   Reflection

E-Business
Solution Needs

Scoping Criteria

Architecture
Planning

Reuse Needs

Software Projects

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
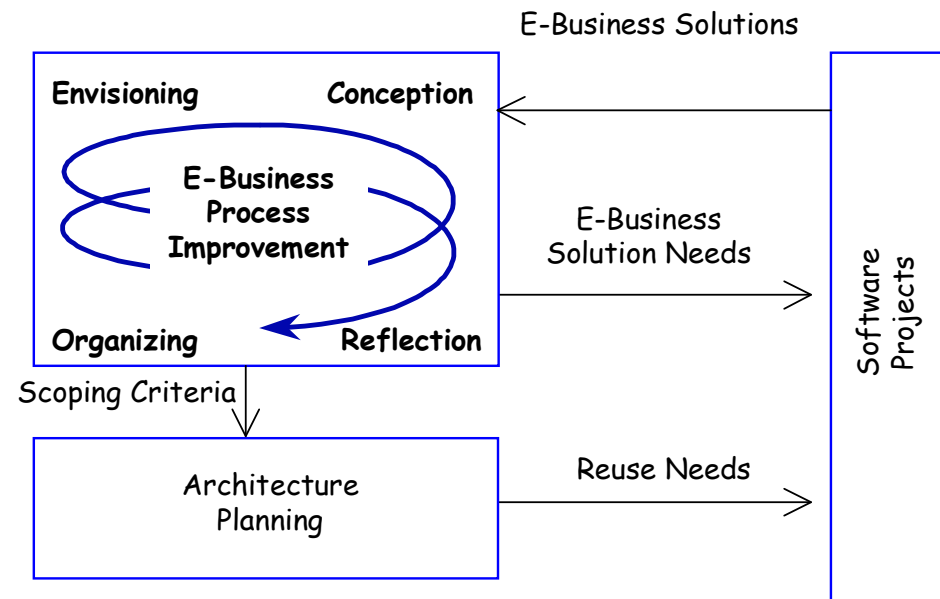
The Business Implications of Software Change
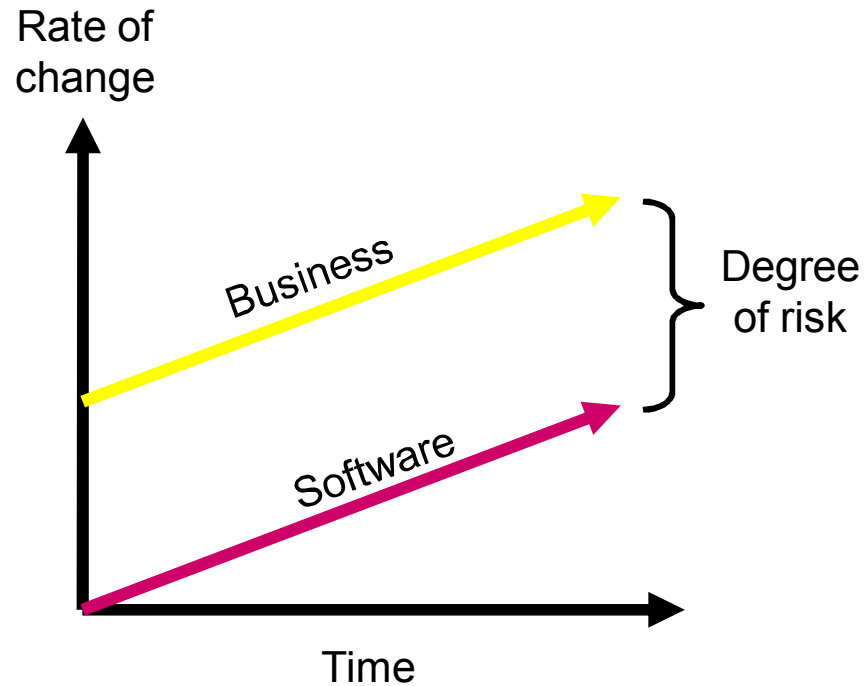
When it takes longer to change the software than to change the business, the business is at risk

When software changes faster than the business, the business creates strategic opportunities

What happens in the World?
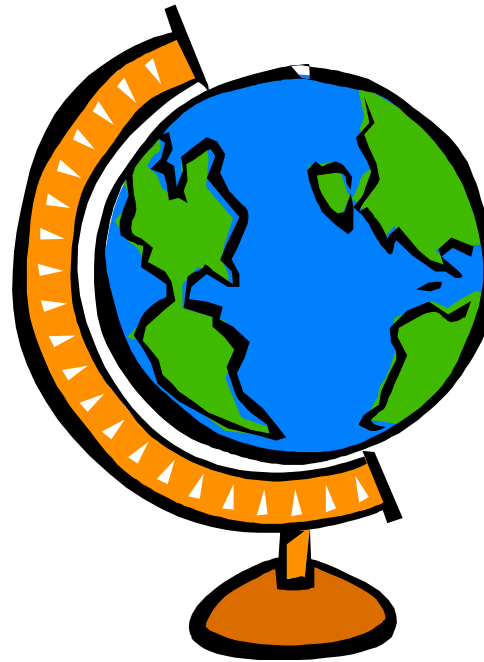
World Component Market

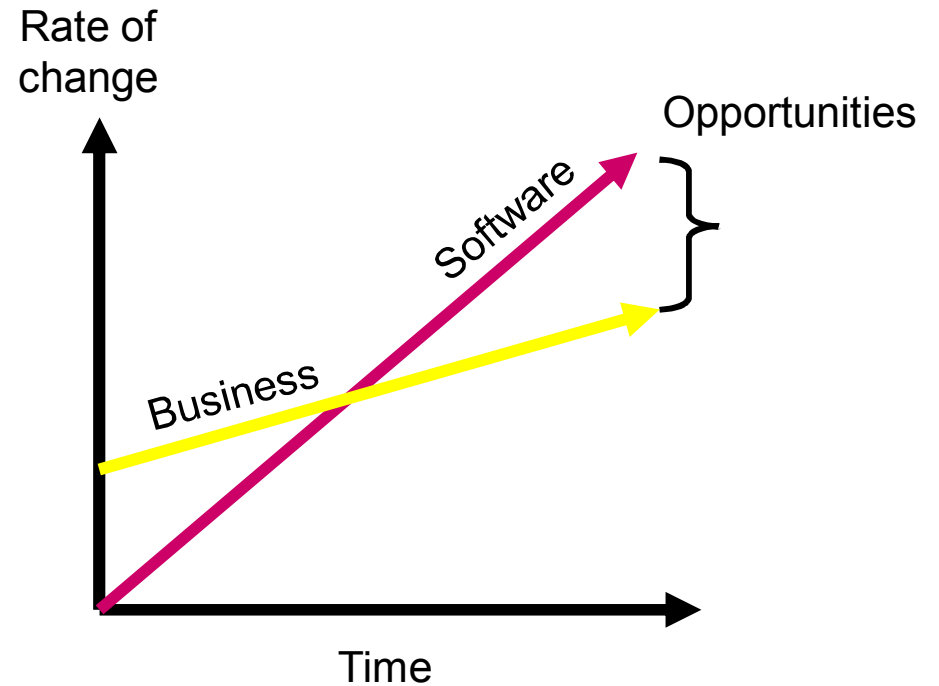(Unit : $ 10 billion)

year / area	1999	2000	2001	2002	Annual growth rate(%)	2002
Business application component	1.76	4.48	7.65	13.80	100	21.5
Component development tool	1.10	2.60	4.40	5.60	80	8.7
Component architecture	0.07	0.50	1.30	3.30	310	5.2
Component based SI	5.28	13.40	23.00	41.40	104	64.6
Total	8.21	21.02	36.35	**64.10**	160	100.0

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.)
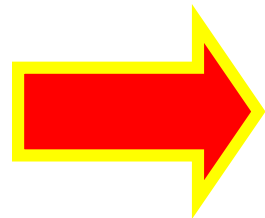
➡ *Starting National Project*

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 $

Project Conceptual Model

Fostering Component Industry

- Paradigm Shift
- Productivity & Quality
- Competitive Edge

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   Telecomm   Manufacturing   Government Administration

Business Common Component
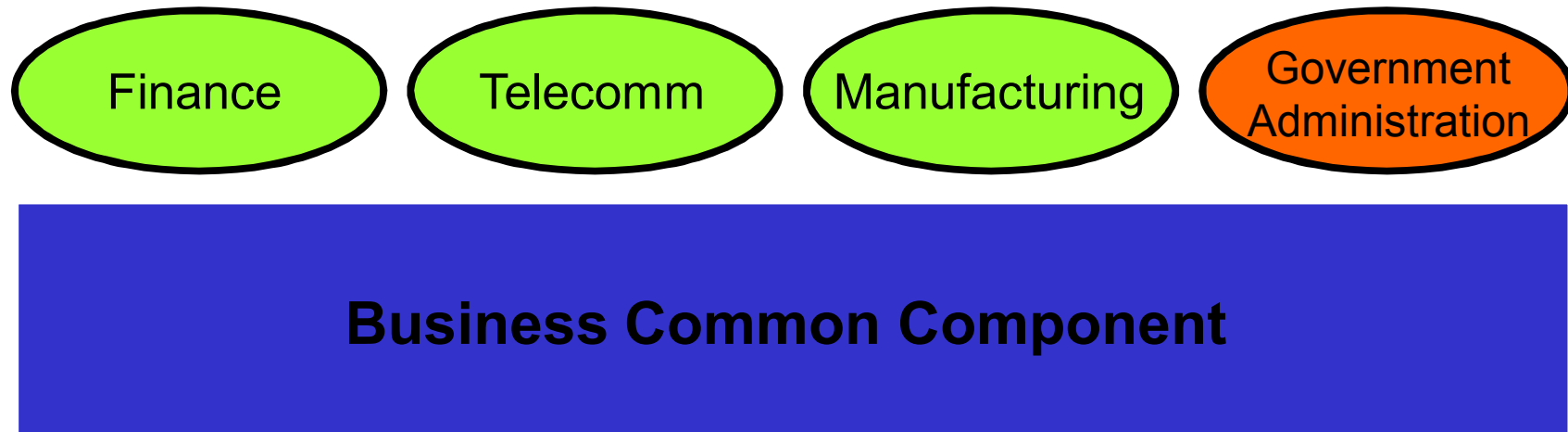
Development Strategies

- 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
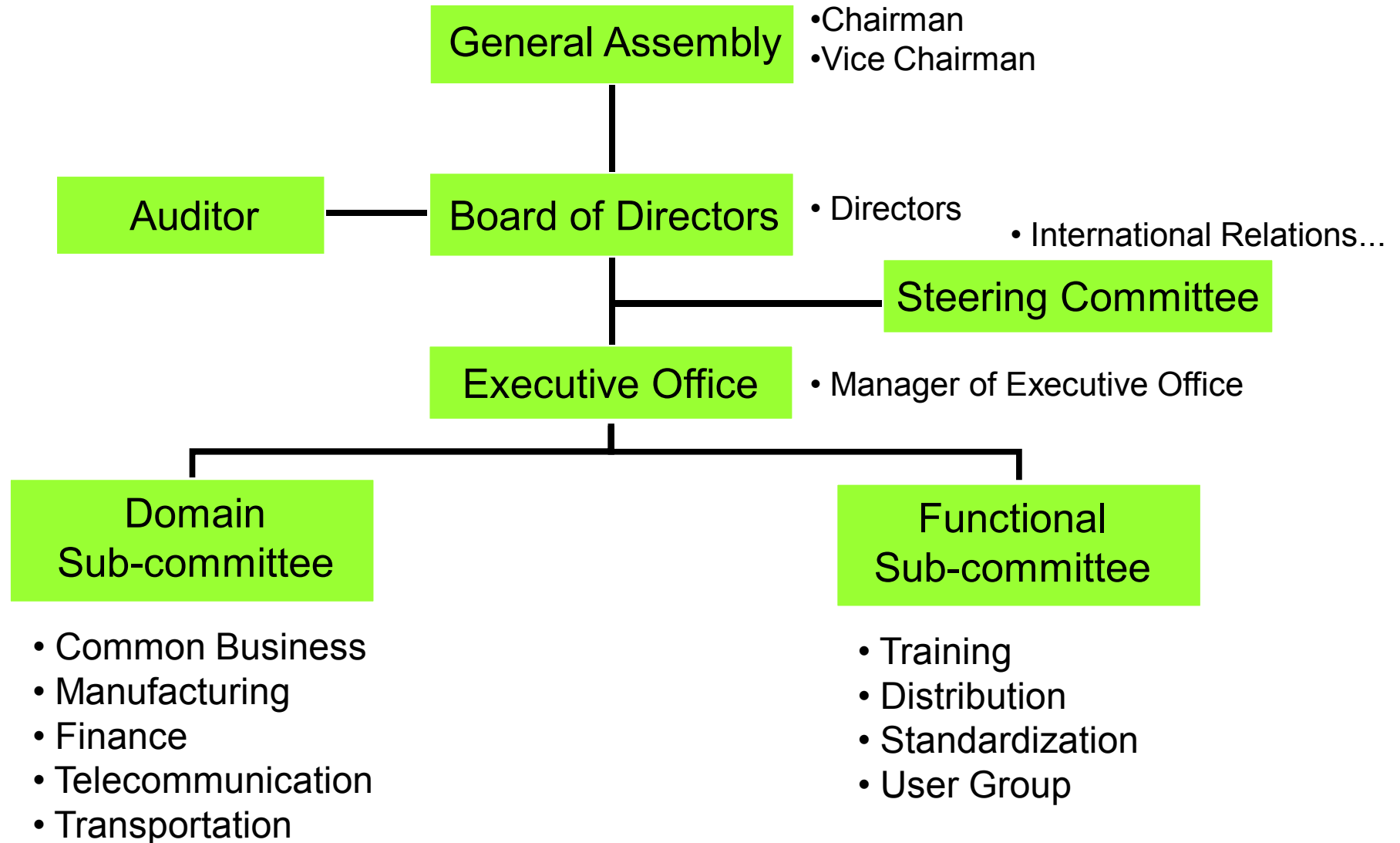 - fully utilization of results & products developed in Korea

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

Auditor — **Board of Directors**
- Directors

• International Relations...

Steering Committee

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

Phase II
Development

Phase III
Operation

KCSC
establishment
1999. 7 ~ 2000. 6

Component
development
2000. 7 ~ 2002. 6

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

1st KCSC – CBOP Joint Conference on Software Components, 2000
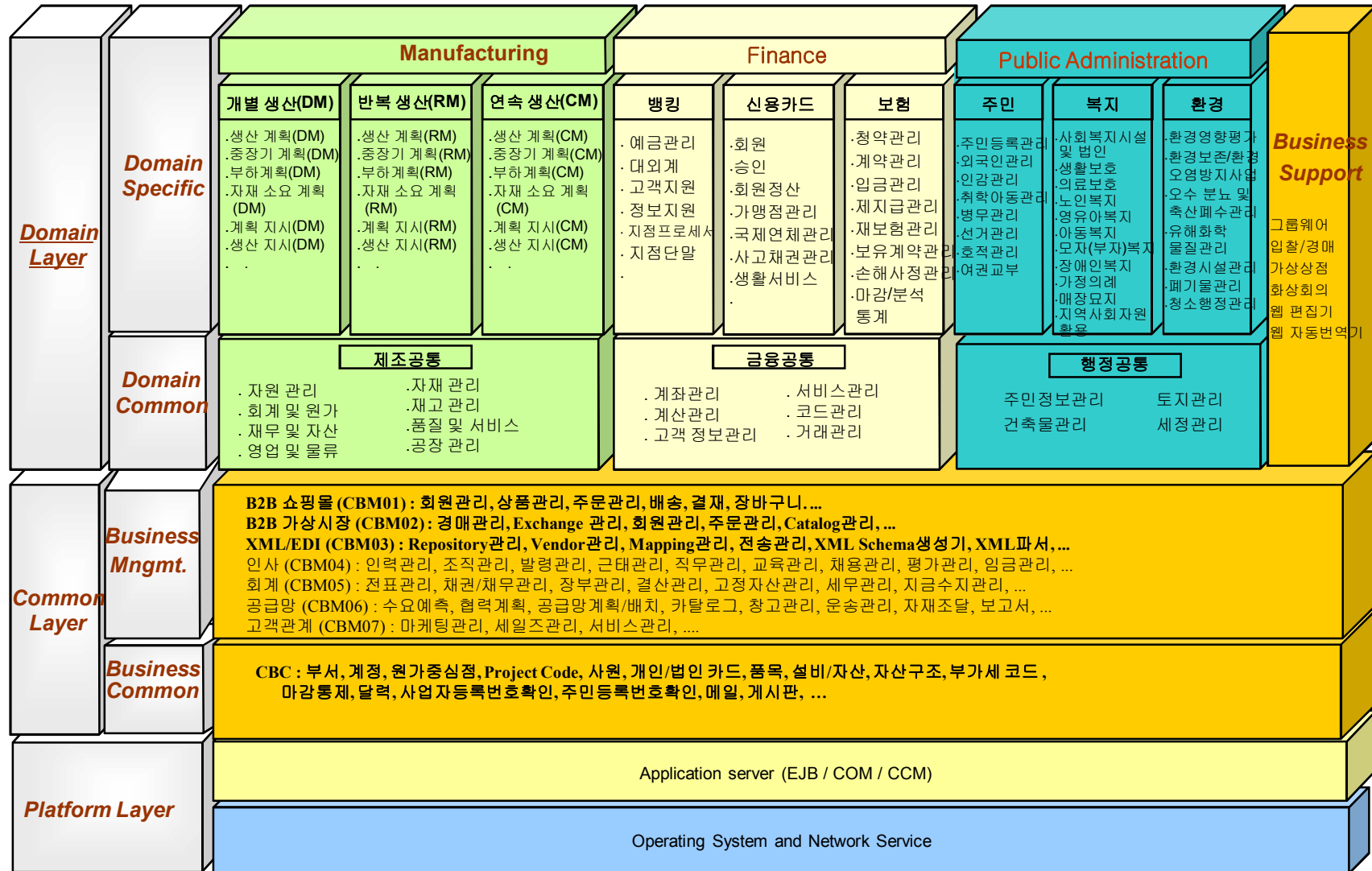
QnA

- 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?