

Development of Component Framework for Supply-Chain Management

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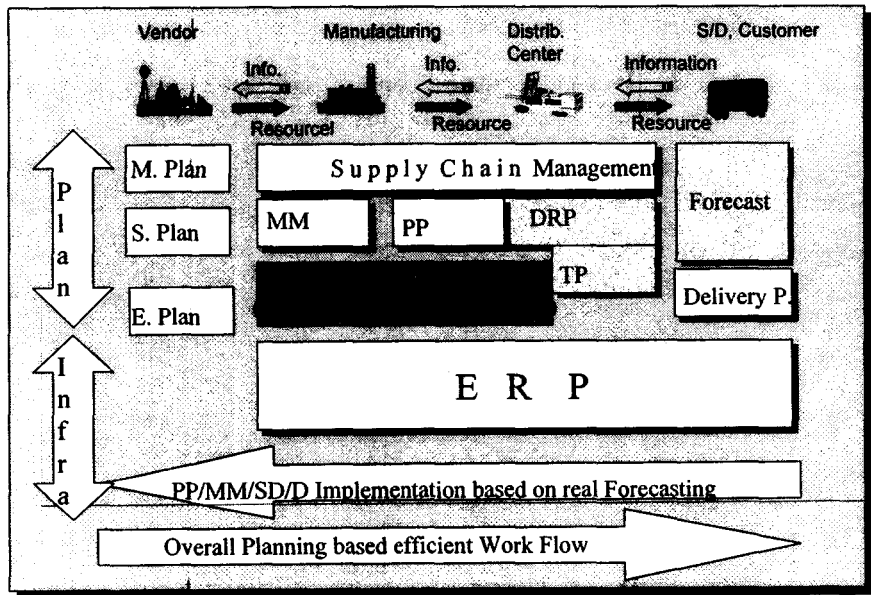
Abstract

This paper introduces a development of component based framework of supply-chain management. The existing legacy system, which is not designed for object-oriented paradigm, is re-modeled using unified modeling language. Components are extracted from the legacy application, and frameworks are also designed in order to increase productivities of software development. Design issues concerning component and framework development are discussed with real situation. Performance and development productivity issue are also discussed with discussing component size and scope. A real case is presented in connection with the discussed issues.

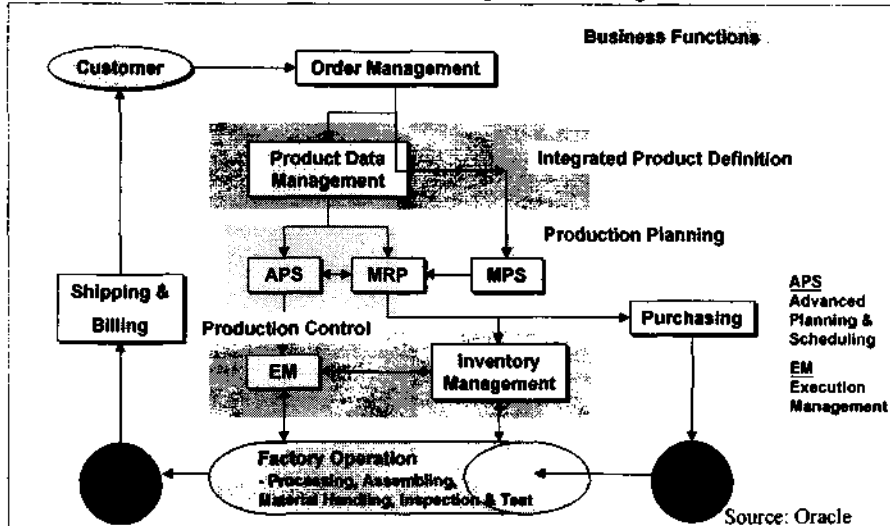
Presentation Content

1. Definition & Role of SCM
2. SCM Market Trend
3. Component/Pattern/Framework
4. Implementation
5. Conclusion

1. Domain Role of SCM & ERP



Advanced Planning/Scheduling System : Synchronization of Planning and Execution Process by Advanced Planning & Scheduling



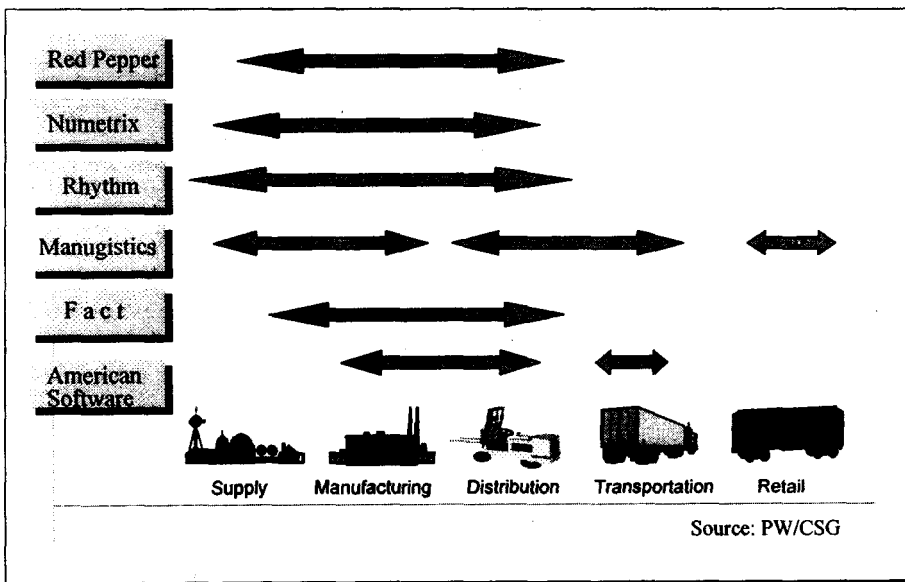
Source: Gartner Group

- ✓ ERP applications historically have connected back-office operation such as manufacturing, financials, and human resources into one system. Some ERP companies are developing broader SCM capabilities & sales force automation (SFA), which manage aspects of the sales process such as contact management, sales forecasting, and order management
- ✓ SCM applications enables companies to coordinate the entire logistics, production, and distribution process, from acquiring raw materials from suppliers to scheduling and shipping products to customers on time.
- ✓ Another emerging technology is enterprise middle-ware-software that helps integrates different vendor's applications, sometimes by linking ERP packages to previous installed applications

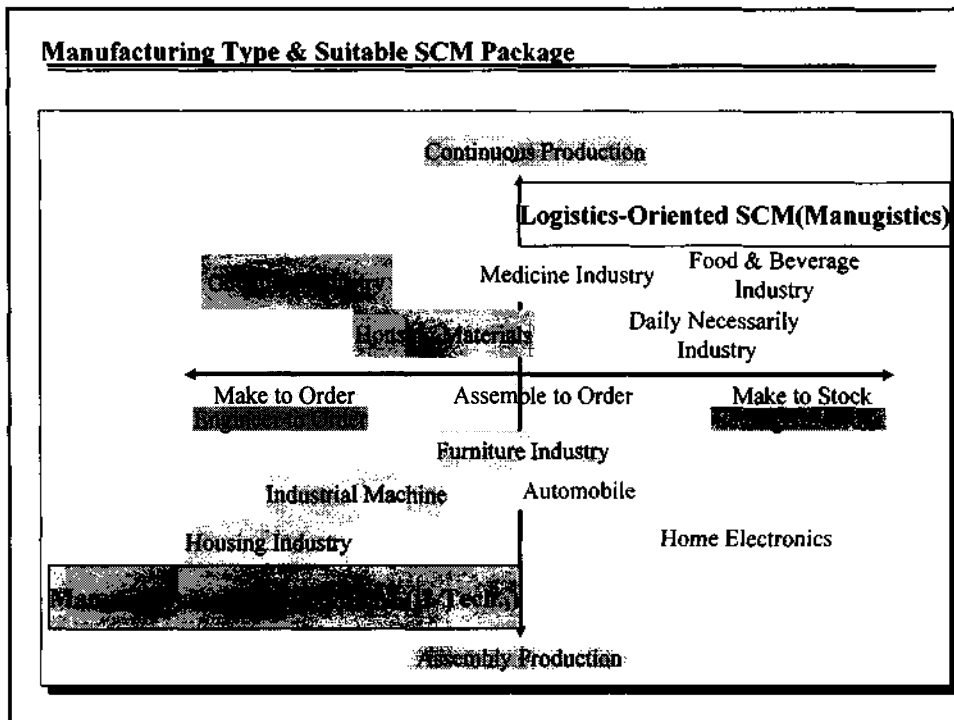
2. Big Supplier of SCM

- ✓ Numetrix
- ✓ Manugistics
- ✓ Rhythm, iZ Technologies
- ✓ ResponseAgent, RedPepper, PeopleSoft
- ✓ OptiPlan
- ✓ Chesapeake Decision Sciences
- ✓ CAPS Logistics, Supply Chain Designer
- ✓ Supply Chain Optimization, PINGMODEL
- ✓ R/3 APO (Advanced Planner and Optimizer), SAP
- ✓ Memory-Resident Real-Time Planning/Optimization Algorithms

2-1. Commercial Big Product's Scope



Manufacturing Type & Suitable SCM Package



SCM International Market Trend

- ✓ From 4 or 5 years ago, American leading companies begun to introduce SCM package into their business operation system, and it's substantial effectiveness is highly evaluated.
- ✓ From 2 years ago, Japanese leading companies also begun to review SCM package, and started to introduce into business solution from 1998. It is expected to be a peak time during 1999 that leading companies adopt SCM as their operational solution.
- ✓ Most companies rely on one commercial SCM package.
- ✓ Implementation cost is extremely high. Key successful factors are the business process infrastructure and implementation consulting capability. Consideration SCM as a tool will be a critical failure reason.
- ✓ I2 Tech. (Rhythm) is leading vendor in the production type of assemble to order.
- ✓ Manugistics is leading vendor in the production type of make to stock.

Korean Market Trend

- ✓ Korean Market Dealing: I2 Technology by PriceWaterHouseCoupers
- ✓ Real Site: Samsung Elect.'s I2 Tech. (Rhythm): After SAP R/3 implementation, the company has a good environment for introducing SCM package. Only planning module is successfully running.
- ✓ Samsung Motor starts setting up I2 Tech. Rhythm.
- ✓ Hyundai Motor, POSCO, and etc., Leading companies are actively reviewing

A new wave of component based design approach

Definition

"Components are defined as independently deliverable piece of functionality providing the access to their service through interface"

--by Alan W. Brown Staffing Software ADD--

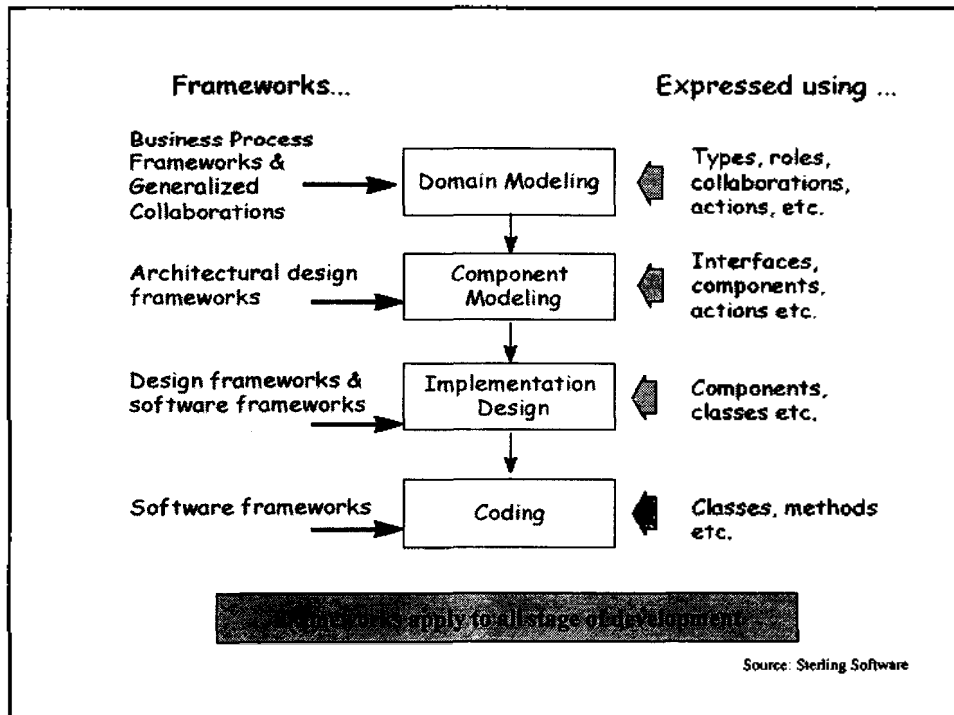
A new wave

1. Distributed
2. Web-based
3. Reuse of Legacy System
4. Packaged Application
6. Best practice solution oriented approach for developing enterprise scale system from component
7. Component-oriented approach is differ in many details
8. Component-based design is fundamentally the same

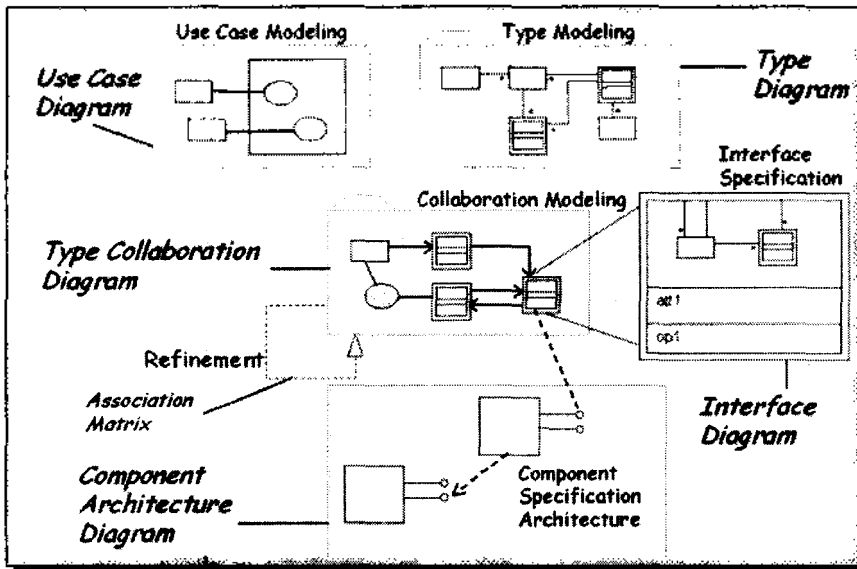
Definition of Pattern & Framework

- ✓ Patterns describe a solution to a problem that recurs, and can be adapted to each new usage.
 - Describes the core of the solution to that problem
 - You can use this solution a million times over without doing it the same way
 - Design patterns are smart, generic, well-proven, simple, reusable design solution
- ✓ Frameworks are a way of delivering application development patterns to, support best practice sharing during application- not just within one company but across many companies through an emerging framework market
- ✓ A framework is formalized definition of best practice. It is a way of presenting generic solution to a problem which can be applied to variety of domain.
- ✓ Best practice sharing is way to ensure that solution to process and organization problem
 - Best practice sharing eliminates duplication of problem solving

Source: Sterling Software

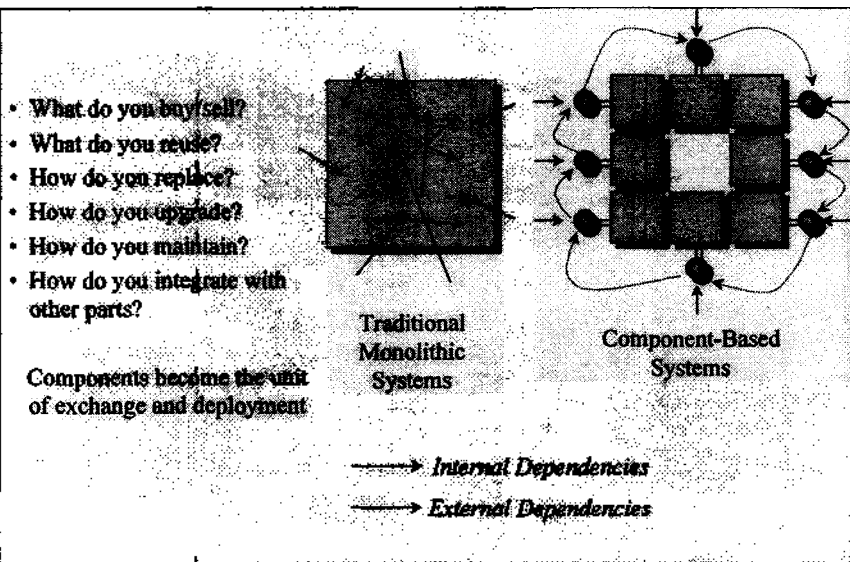


Component Modeling using COOL:SPEX



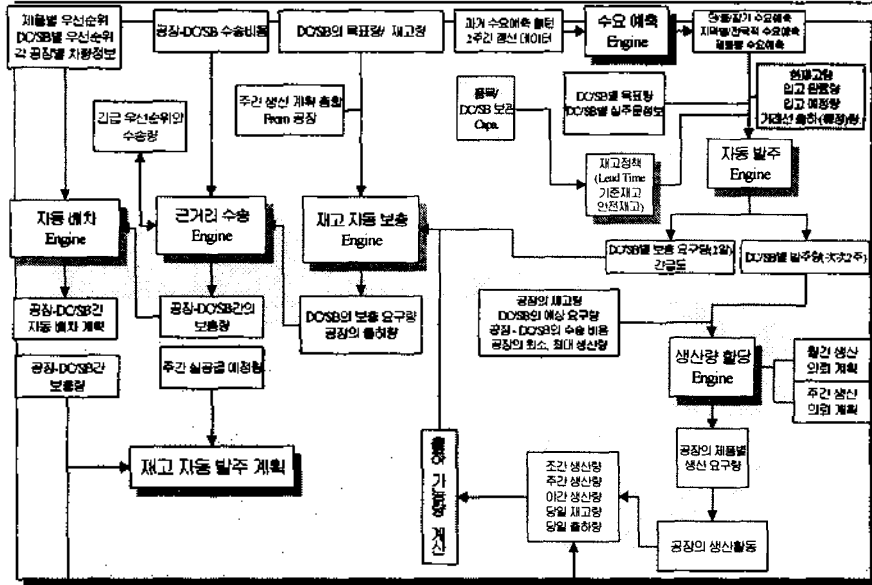
Source: Sterling Software

Component-Based Systems vs. Monolithic Systems

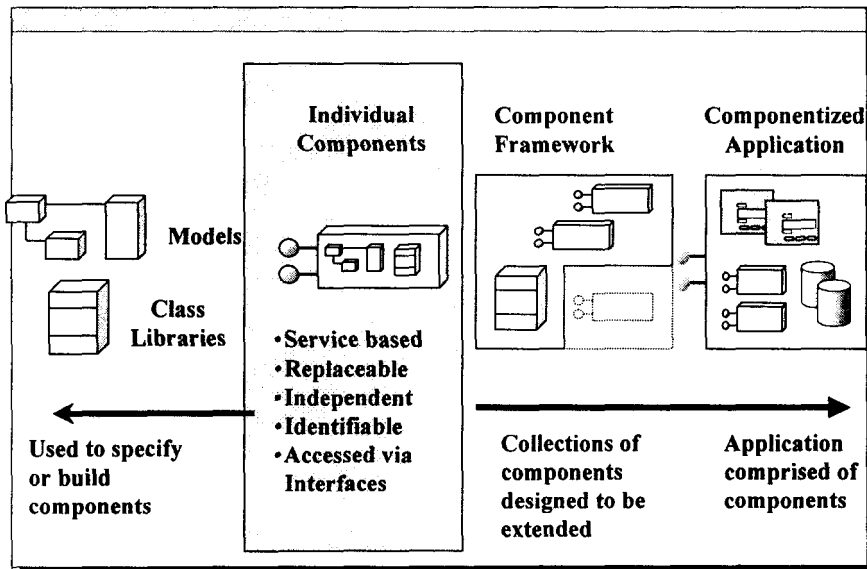


Source: Butler Group

4. Implementation: Monolithic SCM System

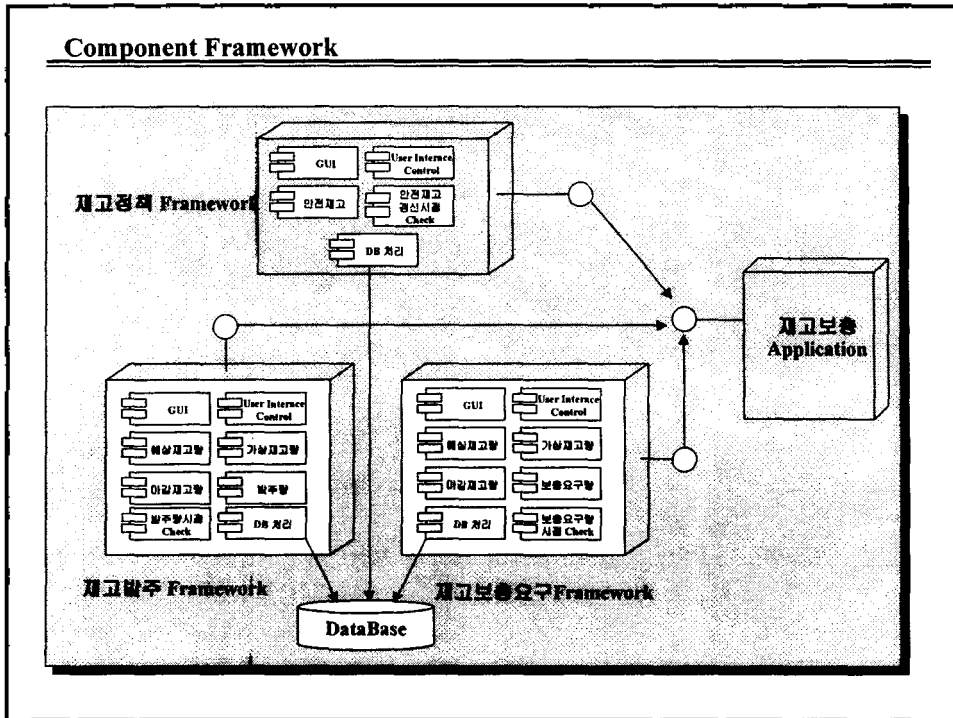


Software Components - Delivery Unit

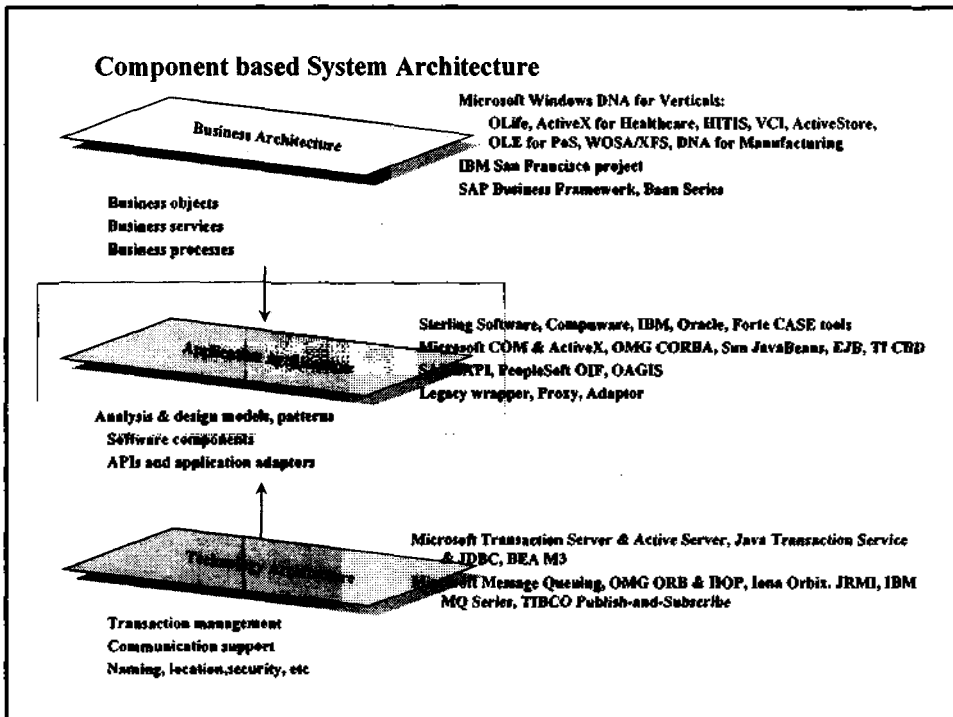


Source: SDS(Samsung Data Systems)

Component Framework



Component based System Architecture



Component Preview

• Component의 종류

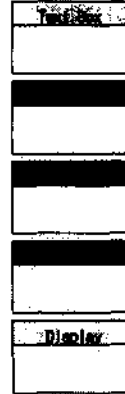
1. User Interface Control Component
: Basic GUI

2. Technical Infrastructure Component

3. Business Infrastructure Component

4. Business Process Component
: Business Process Component

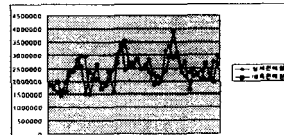
5. Application/System Component



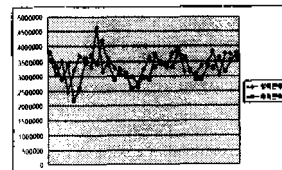
Source: Sterling Software

Implementation: Simulation

번호	종류	계고명	T+1 출력액	T+1 출력	T+1 출력기부	T+2 출력액	T+2 출력	T+2 출력기부
98-3-2	A	31392	59627	64803	0			
98-3-3		72407	68891	373788	1028300	68891	373788	1028300
98-3-4		98482	72089	0	125295	72089	9828	141476
98-3-5						72114	0	213581
98-3-2	B	7507	17183	17590	0			
98-3-3		16025	18900	29484	29553	18900	29484	29553
98-3-4		8788	18875	28188	28300	18875	27044	27123
98-3-5						18516	26028	27570
98-3-2	C	4143	5511	0	0			
98-3-3		10	3197	5832	5902	3197	5832	5902
98-3-4		0	0	12832	12869	0	3132	3207
98-3-5						2214	0	0
98-3-2	D	42194	37830	14254	0			
98-3-3		37528	41499	27864	27971	41499	27864	27971
98-3-4		54855	47862	72900	119434	47862	90504	111192
98-3-5						41869	80228	80158

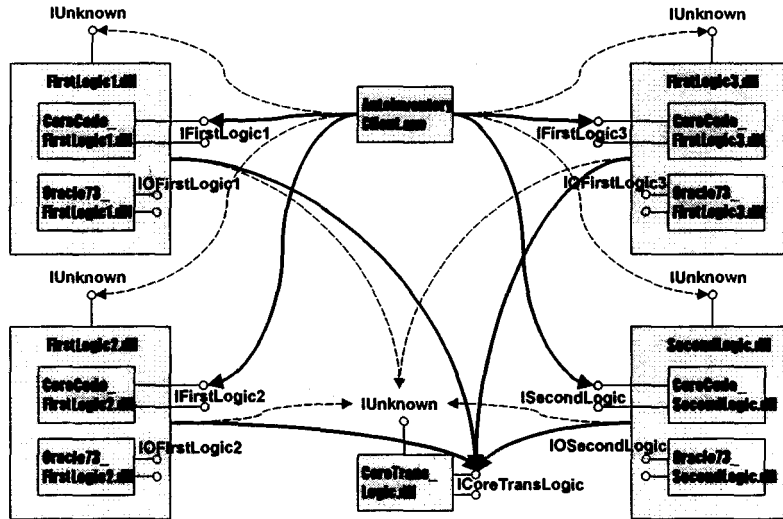


번호 (T+1)	종류	DC	수출량 (P)	수출량 (B)	번호 (T+2)	종류	DC	수출량 (P)	수출량 (B)
98-3-3	A	111	414	44712	98-3-4				
		121	282	21876					
		122	415	46250					
		123	435	46764					
		124	722	83276					
A		125	213	53204					
B			11	1188					
A		211	411	44388					
		261	162	11076					
B		321	12	1494	D	331	33	2484	
A		532	7	756					
B			3	340	B	333	3	324	
					D	333	6	648	

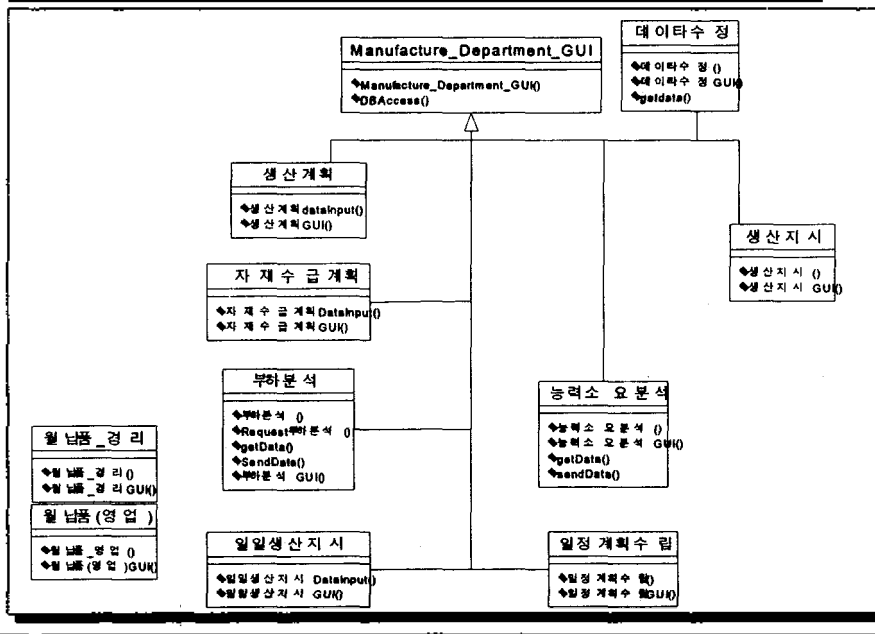


Component Specification Architecture

Component Architecture Diagram

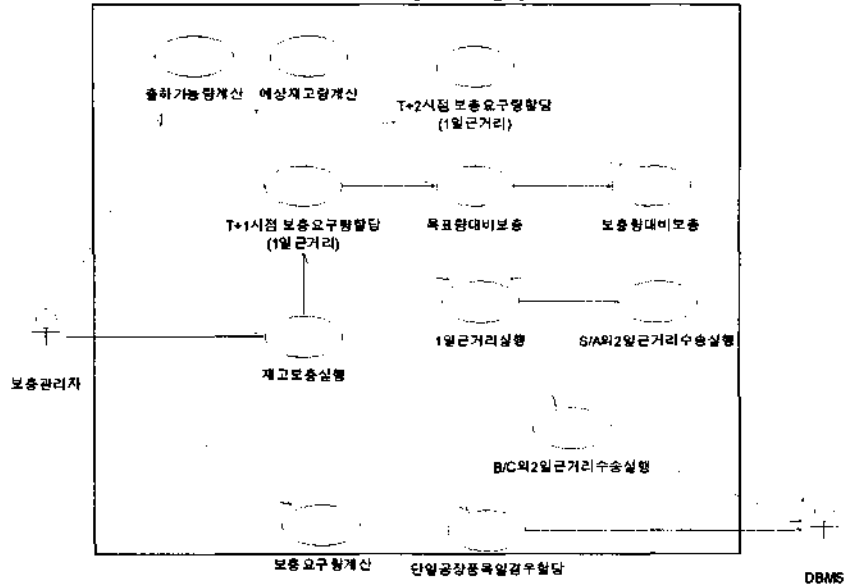


Class Diagram(APS)



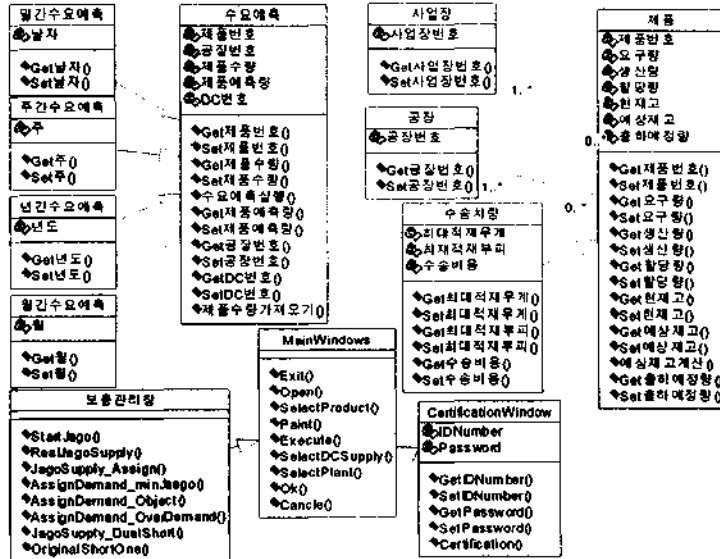
Use Case Modeling

Automatic Inventory Planning System



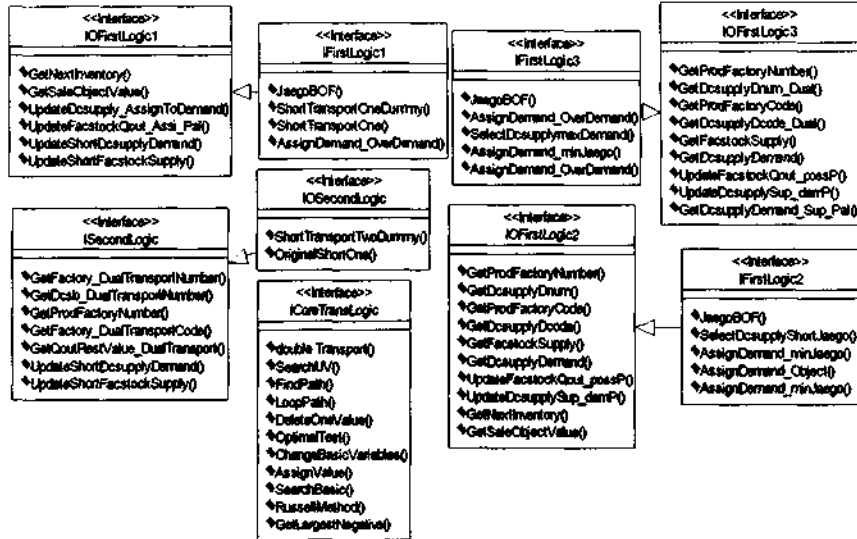
Type Modeling

Type Diagram



Interface Specification

Interface Diagram



Conclusion

- ✓ Logistics-Oriented SCM Development
- ✓ Componentization
- ✓ Pattern/Frameworks Design
- ✓ Further Study: Performance Metrics

발표방법 : OHP

[발표자소개]



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IEEE Trans. On Neural Networks

IEEE Trans. On Information Theory

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(The Institute of Control, Automation, and Systems Engineers)

시뮬레이션 학회

연구분야

Intelligent Manufacturing System:

Manufacturing Process Monitoring, Control, and Diagnosis

Neural Network, 예측시스템(Prediction System)

System Integration & Automation