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Enterprise Architecture
기반의 품질관리 방안
Design, Manage, and Communicate
an Enterprise Architecture
2004.10
한더정보시스템㈜
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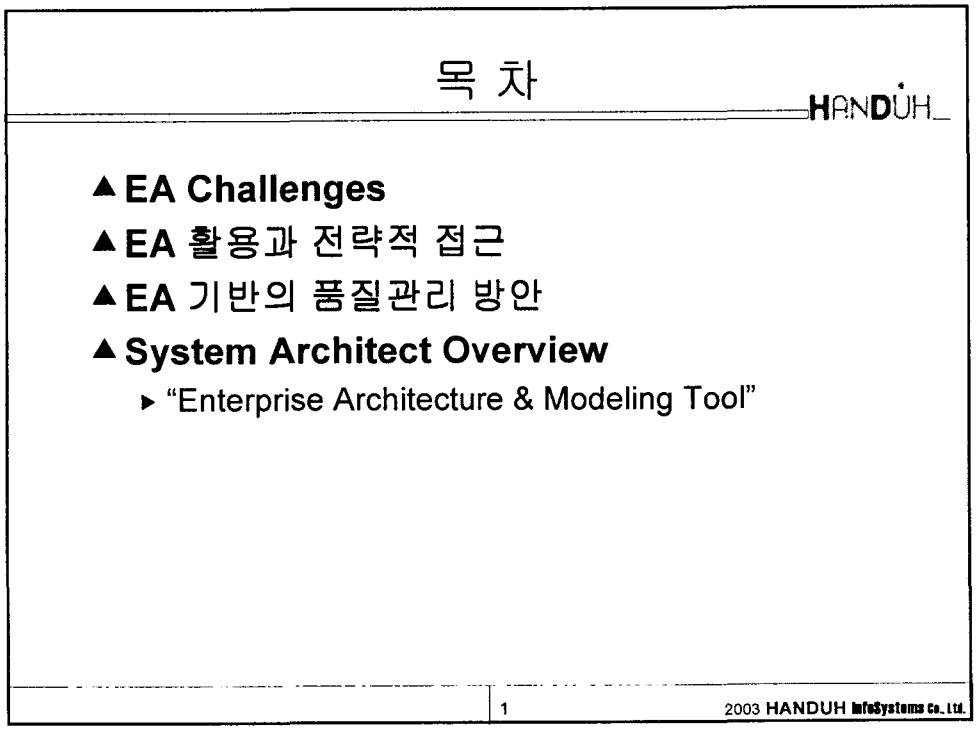
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▲EA Challenges
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▲System Architect Overview
▸ "Enterprise Architecture & Modeling Tool"
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EA Challenges

Key issues of IT World ?

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- ▲ **Enterprise Architecting**
  - ▸ Aligning IT with the Business
  - ▸ CBA, SOA
- ▲ **Business Process Management**
  - ▸ Enabling Business Change & Exposing Yourself on the Web
  - ▸ BI,BPM,BAM →Web Services , Business-driven SOA
- ▲ **IT 조직의 통합.관리**
  - ▸ How do you know your infrastructure supporting your business(People,Process,Technology)
  - ▸ Improving Software Quality(CMM/CMMI,ISO/Spice)
  - ▸ ***"Managing The Business of IT" (e.g., ITIL)***

EA Challenges

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Architectural Perspectives

- ▲ **A Structure for Governance**
  - ▸ Common interests(infrastructure and application) in a city ?
- ▲ **Architecting for Agility**
  - ▸ Web Services and SOA
- ▲ **Why Semantics Metter**
- ▲ **Negotiating Business Alignment**
  - ▸ Aligning with IS and Business Leadership
- ▲ **Modeling Future Architectures**
- ▲ **Integrating the Enterprise**
  - ▸ B2B,B2C,B2E and EAI(CRM.ERP.SCM)- SOA

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Strategies for Agile IT

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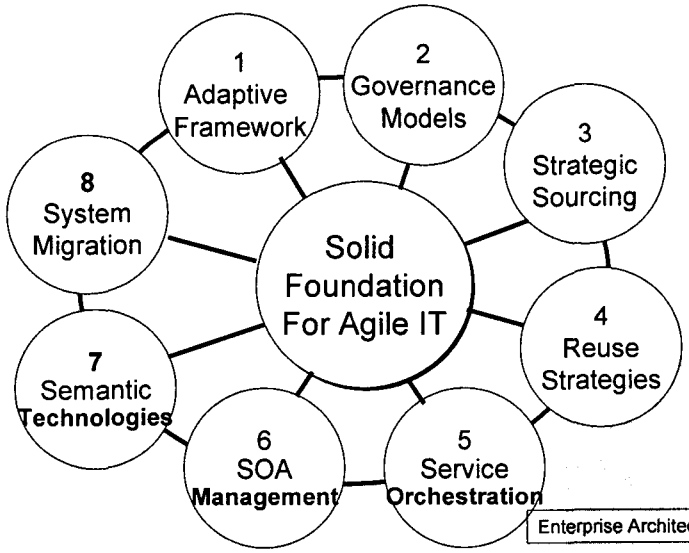

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Role of the Chief Architect

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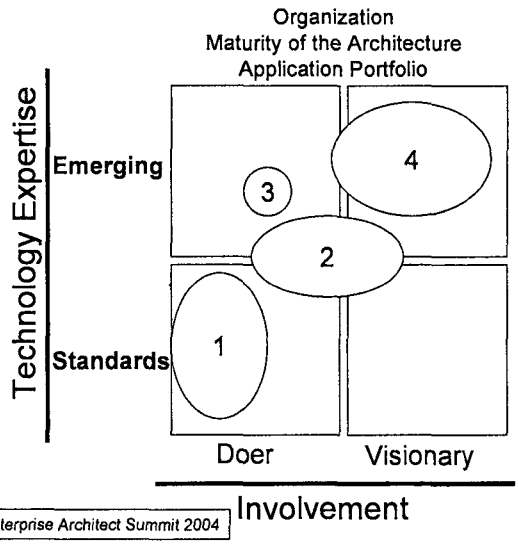

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Models

① **Standard Enforcer**
- ▲ 기술 표준과 아키텍쳐를 정의하는 데에 중점
- ▲ 아키텍쳐 표준 교육, 프로젝트 승인 절차를 정의, 구매활동
- ▲ 개발과 유지를 위한 소프트웨어 재사용 방법 제시
- ▲ IT투자에 대한 효과 반영

② **Project Architect**
- ▲ 프로젝트개발에 활동적참여
- ▲ 컴포넌트 재사용과 아키텍쳐의 유연성, 설계솔루션

③ **Middleware Believer**
- ▲ 전략적 시스템통합 중점
- ▲ 미들웨어 기반 아키텍쳐

④ **Emerging Technologist**
- ▲ 비즈니스와 경쟁우위를 위해 최신 기술
- ▲ 특정 비즈니스 영역의 기술 솔루션들과 지침
- ▲ 산업 표준 단체/협회에 참여, 전사적 광범위한 표준 채택

Emerging Themes

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▲ **Business Process Enablement**
- ▸ 무엇이 핵심적인 비즈니스 프로세스를 지원하는 적절한 IT 아키텍처인가?
- ▸ 비즈니스 프로세스를 지원하기 위한 기술과 툴에서의 적절한 투자의 수준은 무엇인가?
- ▸ 어플리케이션이 바뀌어 져야 하는지 어떻게 증명할 수 있으며, 무엇이 비즈니스 혼란을 최소화하는 마이그레이션 전략인가?
- ▸ 어떻게 아키텍처가 변화하는 제품라인, 스케일, 그리고 시장상황의 불확실함을 가진 비즈니스 유연성을 지원할 수 있는가?

▲ **Architectural Implication of outsourcing**
- ▸ 솔루션에서 어떻게 비즈니스 프로세스 외주업체의 아키텍처에서 당신이 필요로 하는 것의 유사/차이를 평가할 수 있는가?
- ▸ 아웃소싱된 프로세스가 제공하는 경영 유연성을 보장해주는 아키텍처의 핵심은 무엇인가?
- ▸ 무엇이 아키텍처를 외부로부터 비즈니스 유연성을 지키며 안내하는 것인가?
- ▸ 프로세스가 외주 제작 되어짐으로써 비즈니스 유연성을 지키는 것을 안내하는 아키텍처는 무엇인가?

▲ **Performance Measurement and Management**
- ▸ 어떤 정보/데이터 아키텍처가 지리적 요소들과 비즈니스적 요소들에 걸쳐서 비즈니스 퍼포먼스를 측정하는데 도움을 주는가?
- ▸ 어떤 정보/데이터 아키텍처가 비즈니스 도메인들에 걸쳐서 공유되어질 필요가 있으며 이는 얼마나 자주 필요한가? 우엇이 데이터 저장소를 위해 적합한 주제영역인가?
- ▸ 무엇이 적절한 보고서, 매트릭스, 그리고 핵심적인 퍼포먼스 지표인가?

▲ **Business Impact of Architecture**
- ▸ 아키텍처의 비즈니스 영향을 비즈니스나 기술적 매트릭스 혹은 모두를 가지고 어떻게 측정할 수 있는가?
- ▸ 현재 아키텍처의 성숙도 상태는 무엇인가?

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활용과 전략적 접근

EA Pyramid

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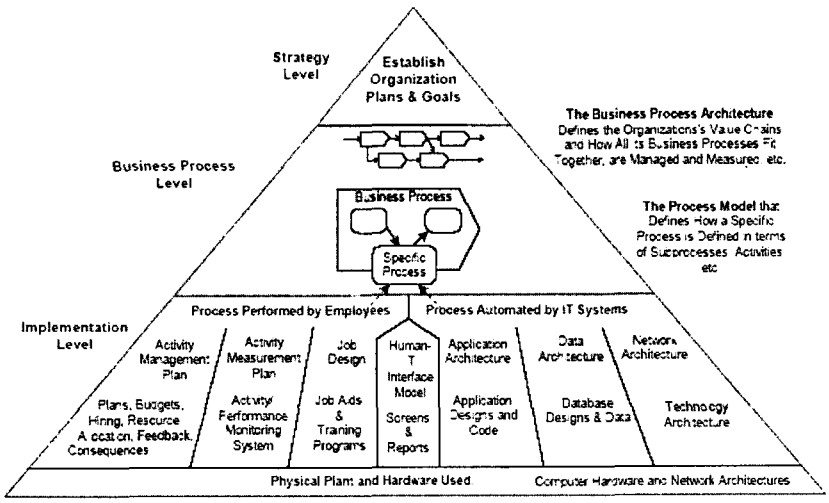

The BPTrends(Paul Harmon) Enterprise Architecture Pyramid

The Two Uses of EA

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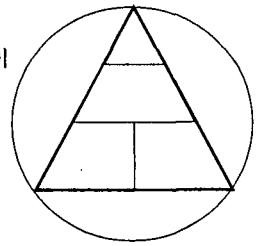
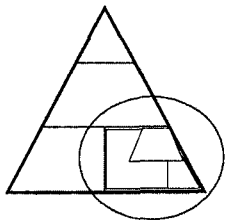
▲ **A Process-Centric EA**

- ▸ 업무 프로세스의 실행, 소프트웨어 시스템이 작업의 특정 부문에서 어떻게 실행되고 사용되는지를 강조하여 설계
- ▸ 가치사슬(Value-Chain)의 세분화 노력
- ▸ 프로세스 성공도의 측정 프로세스관리 및 비용분석
- ▸ 비즈니스 변화에 대한 의사결정



▲ **An IT-Centric EA**

- ▸ 조직 내에서 다양한 IT모델과 자원이 어떻게 함께 작업하는지에 대한 개요를 제공
- ▸ 소프트웨어 어플리케이션,데이터베이스, 미들웨어와 네트워크 프로토콜의 복잡한 구조



An IT-Centric EA

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▲ **The Zachman Framework**

- ▸ 1987년 IBM Journal "A Framework for Information Systems Architecture"

▲ **EAP (Steven H Spewark's)**

- ▸ Enterprise Architecture Planning ; 1992
- ▸ "Developing a Blueprint for Data,Applications and Technology"

▲ **Model Driven Architecture (MDA; OMG's)**

▲ **FEAF/TEAF,C4ISR/DoDAF**

- ▸ 실제적으로 미 연방정부나 국방성의 EA는 프로세스 중심적 엔터프라이즈 아키텍처가 되려고 노력하는 IT 중심적 EA
  - 진정한 프로세스 중심의 아키텍처 지향
  - 프로세스 중심적 아키텍처로 향하는 단계

A Process-Centric EA

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▲ eTOM and NGOSS Architecture

- ▸ **TeleManagement Forum's**
  - eTOM (eBusiness Telecom Operations Map)
  - New Generation Operations Systems and Software (NGOSS) Framework

▲ Supply-Chain Operations Reference-model (SCOR)

- ▸ HP's SCOR-Drived EA
- ▸ Supply Chain Council (SCC)(www.supply-chain.com)

Executive Level Version of eTOM

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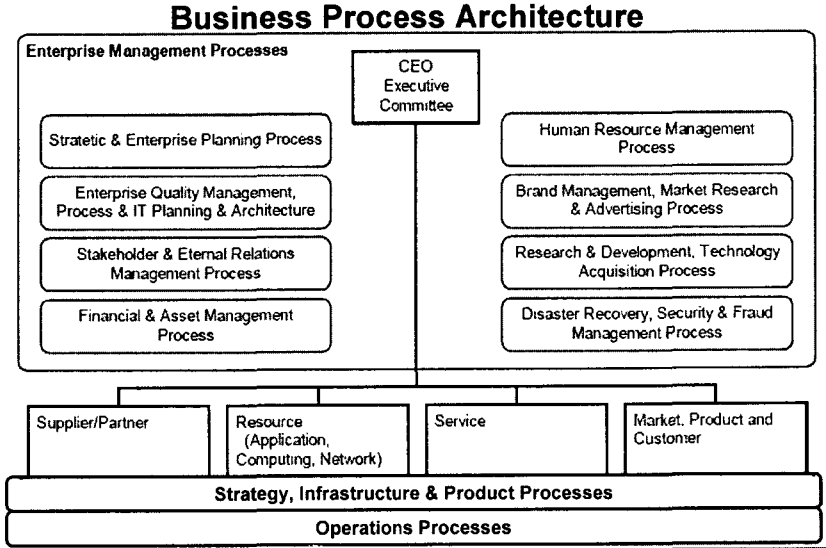
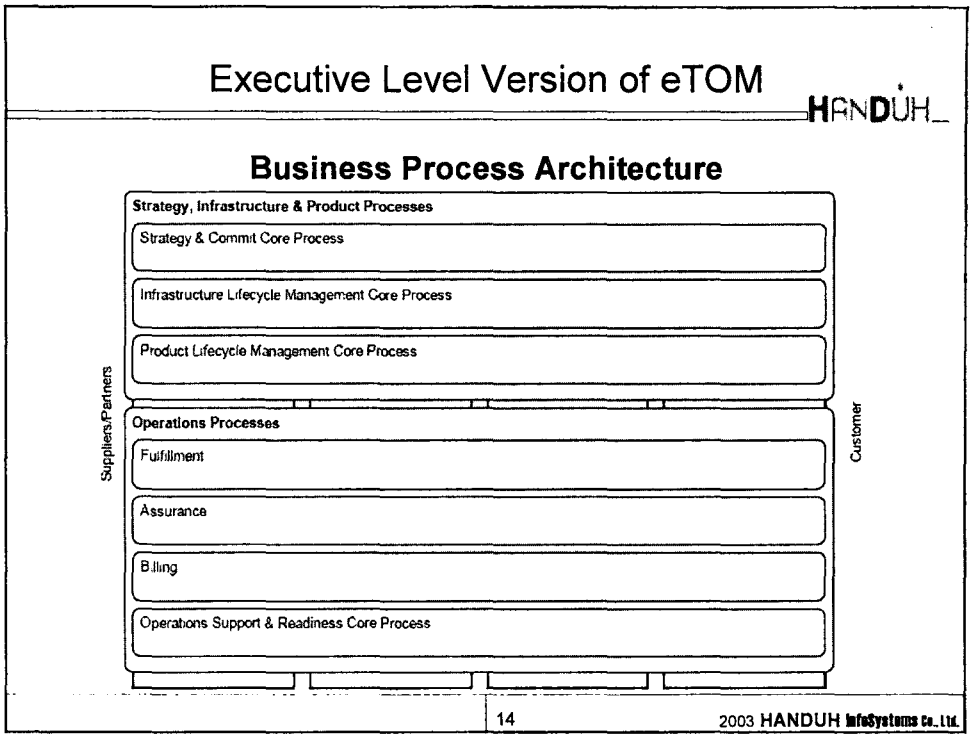
Business Process Architecture




Executive Level Version of eTOM
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Business Process Architecture
Strategy, Infrastructure & Product Processes
Strategy & Commit Core Process
Infrastructure Lifecycle Management Core Process
Product Lifecycle Management Core Process
Operations Processes
Fulfillment
Assurance
Billing
Operations Support & Readiness Core Process
Suppliers/Partners
Customer
14
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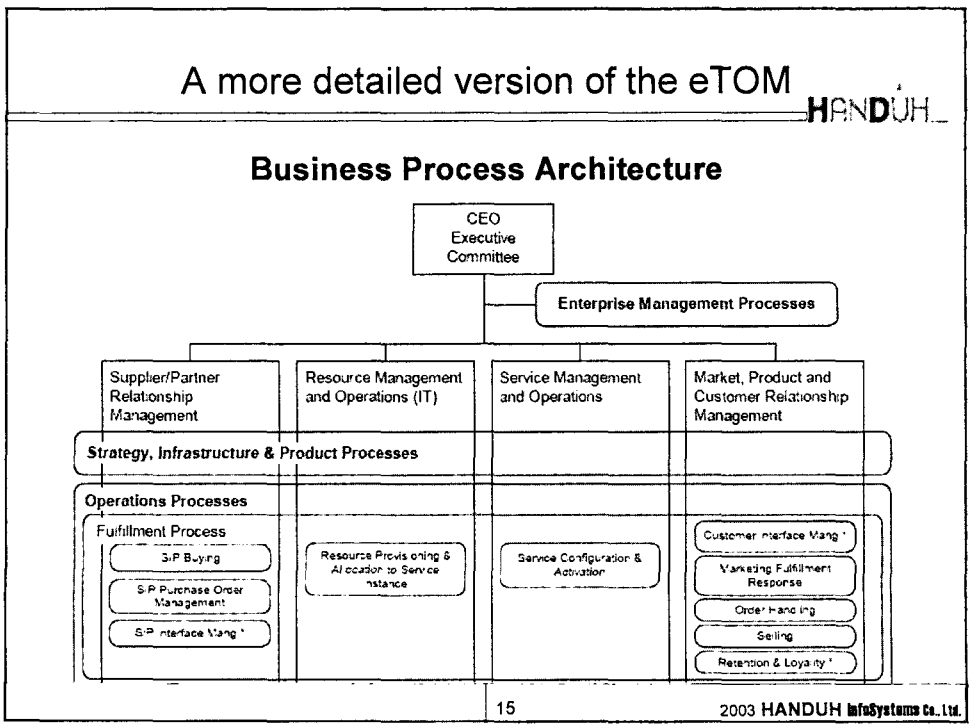
A more detailed version of the eTOM
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Business Process Architecture
CEO
Executive
Committee
Enterprise Management Processes
Supplier/Partner Relationship Management
Resource Management and Operations (IT)
Service Management and Operations
Market, Product and Customer Relationship Management
Strategy, Infrastructure & Product Processes
Operations Processes
Fulfillment Process
S/P Buying
S/P Purchase Order Management
Resource Provisioning & Allocation to Service Instance
Service Configuration & Activation
Marketing Fulfillment Response
Order Handling
Selling
Retention & Loyalty
15
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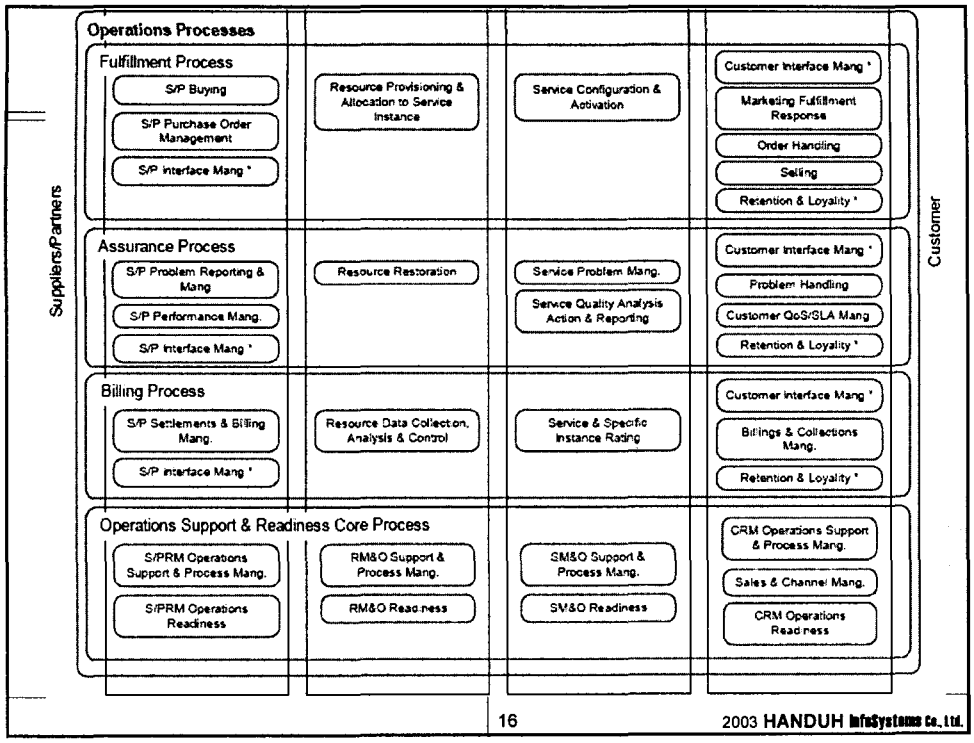
Operations Processes
Suppliers/Partners
Customer
Fulfillment Process
S/P Buying
S/P Purchase Order Management
S/P Interface Mang *
Resource Provisioning & Allocation to Service Instance
Service Configuration & Activation
Customer Interface Mang *
Marketing Fulfillment Response
Order Handling
Selling
Retention & Loyality *
Assurance Process
S/P Problem Reporting & Mang
S/P Performance Mang.
S/P Interface Mang *
Resource Restoration
Service Problem Mang.
Service Quality Analysis Action & Reporting
Customer Interface Mang *
Problem Handling
Customer QoS/SLA Mang
Retention & Loyality *
Billing Process
S/P Settlements & Billing Mang.
S/P Interface Mang *
Resource Data Collection, Analysis & Control
Service & Specific Instance Rating
Customer Interface Mang *
Billings & Collections Mang.
Retention & Loyality *
Operations Support & Readiness Core Process
S/PRM Operations Support & Process Mang.
S/PRM Operations Readiness
RM&O Support & Process Mang.
RM&O Readiness
SM&O Support & Process Mang.
SM&O Readiness
CRM Operations Support & Process Mang.
Sales & Channel Mang.
CRM Operations Readiness
16
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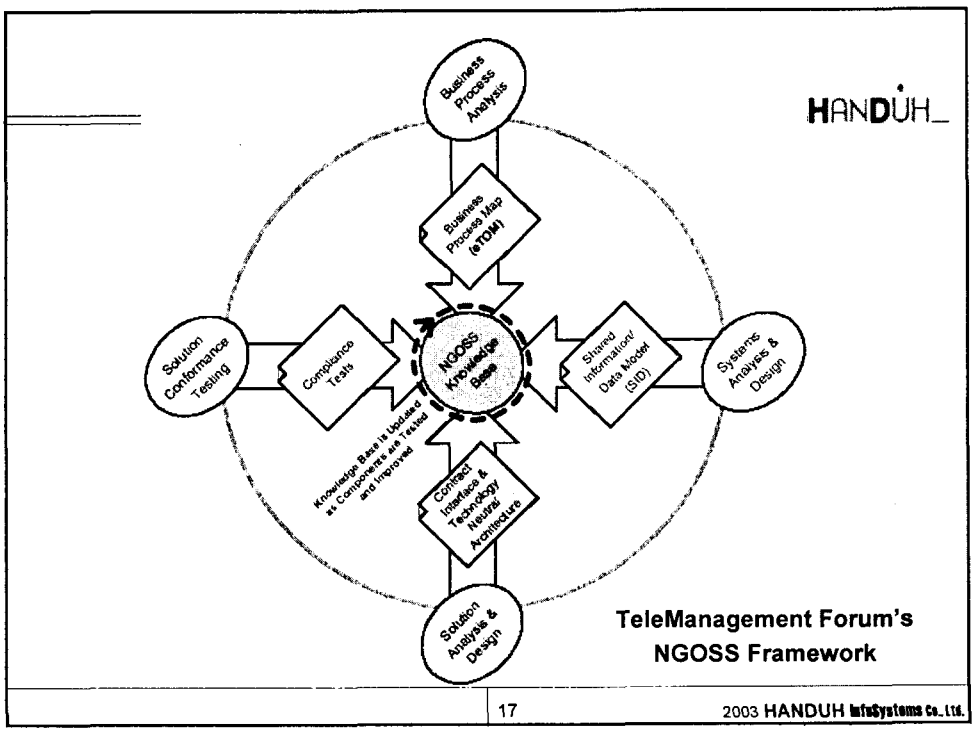
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Business Process Analysis
Business Process Map (eTOM)
Solution Conformance Testing
Compliance Tests
NGOSS Knowledge Base
Shared Information/ Data Model (SID)
Systems Analysis & Design
Knowledge Base is Updated as Components are Tested and Improved
Contract Interface & Technology Neutral Architecture
Solution Analysis & Design
TeleManagement Forum's NGOSS Framework
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NGOSS Framework

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- ▲ eTOM : 상위수준의 통신 프로세스의 비즈니스 프로세스 아키텍처
  - ▸ 모든 통신업체가 사용할 수 있는 공통어휘와 비즈니스 프로세스모델
  - ▸ 증가하는 주요 프로세스의 수를 위해 프로세스 흐름 계획 제공
- ▲ SID : Shared Information/Data Model (SID)
  - ▸ 소프트웨어 제공자들과 통합자들이 데이타베이스에 저장될 엘리먼트나 엔터티들을 만들고 관리 정보를 설명하기 위해 찾을 때 공통 언어를 제공
- ▲ Interface와 Architecture
  - ▸ 소프트웨어 컴포넌트를 생성하는 방법을 정의
  - ▸ 플랫폼 중립 아키텍처와 API 인터페이스 모델은 개발자들이 분할 통신 환경에서 사용될 수 잇는 OSS 컴포넌트를 생성하도록 승인하는 원칙들을 정의
- ▲ Compliance Tests
  - ▸ eTOM, SID, NGOSS 아키텍처와 인터페이스 명세서
  - ▸ 벤더들이 단일 혹은 다중 NGOSS를 받아들이기 위한 인증

The NGOSS methodology

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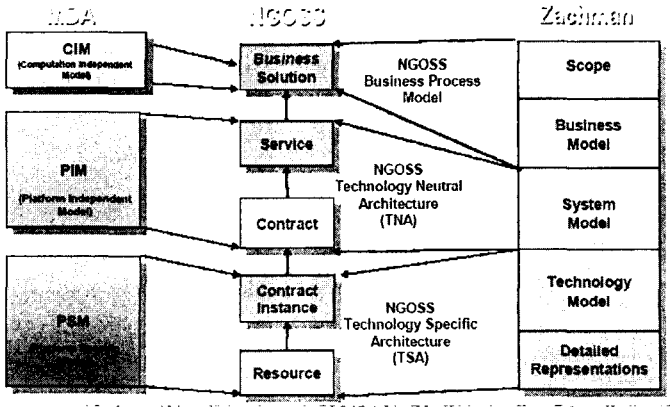
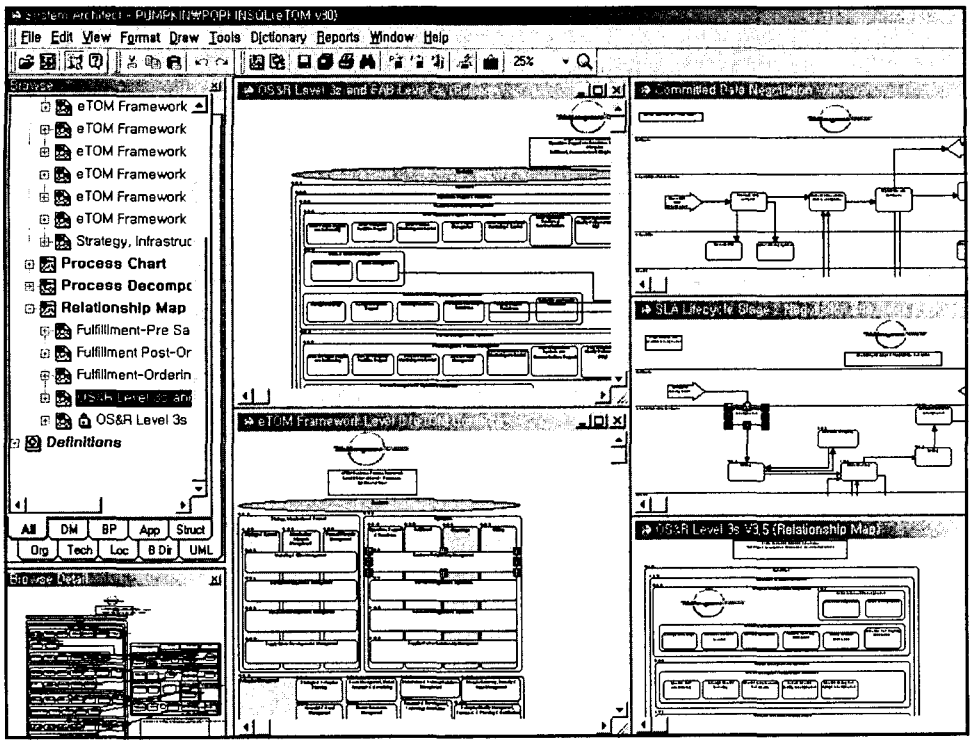
- ▲ currently in development, showing its relationships to the OMG's MDA and the Zachman Framework
- ▲ 수직 정렬된 분석, 설계, 컴포넌트 기반의 어플리케이션 생성
- ▲ A True Process-Centric Enterprise Architecture





Real Test in EA Development

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- ▲ **Line Manager**가 엔터프라이즈 아키텍처의 개발에 참여 ?
- ▲ 아키텍처가 수동 액티비티들 이나 자동화되지 않은 프로세스들, 혹은 자동화된 것들을 설계하는지 ?

- ▲ 포괄적인 IT 아키텍처들은 중요하고 필요하지만 문제가 발생하면 사람들은 IT 자원으로 설명된 엔터프라이즈 아키텍처(IT-Centric EA)와 회사의 모든 자원이 비즈니스 프로세스에 의해 어떻게 통합되는지에 초점을 맞춘 엔터프라이즈 아키텍처 (Process-Centric EA)와 구별 하지 못한다.
- ▲ IT-Centric EA 는 비즈니스 프로세스 요소와 심지어 전략적 요소까지 포함한다고 주장할 수 있지만, 그들의 실제 모델과 업무를 본다면 그들이 주로 소프트웨어 개발을 진행할 수 있는 시스템 요구사항의 소스로써의 프로세스를 본다는 것을 알 수 있다.

EA의 전략적 접근

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- ▲ "엔터프라이즈 아키텍처"에 대한 질문 ;
  - ▸ 그것은 무엇처럼 보일까? 또한 어떻게 사용할 것인가?
  - ▸ 우리의 '엔터프라이즈 아키텍처'의 결과물은 무엇인가?
- ▲ 비즈니스 관리자, 프로세스 분석가
  - ▸ 비즈니스가 전체적으로 어떻게 조직화 되는지를 이해하는 방법에 대해 언급
  - ▸ EA의 핵심 요소는 해당 조직의 비즈니스 프로세스를 높은 수준으로 분석하는 것
  - ▸ 작업, 사람들, 소프트웨어가 어떻게 명시되는지, 프로세스의 변경이 어떻게 변화를 요구하는지, 사람들이 무슨 작업을 하는지, 어떠한 소프트웨어나 자료가 생성되고 사용되는지를 볼 수 있도록 하는 것
- ▲ IT 관리자, IT 분석가/개발자
  - ▸ EA : 비즈니스가 의존하는 모든 IT자원 (하드웨어와 소프트웨어)
  - ▸ "엔터프라이즈 아키텍처"는 자동화된 프로세스와 소프트웨어 요구사항으로 확장하지만, 관리자들이 인식하는 만큼 비즈니스 프로세스를 진정으로 포함할 수는 없다.
  - ▸ Application Architecture, Data Architecture,Technology/Network Architecture (←→ Web Service Architecture/SOA ?)

EA Tool 활용

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- ▲ 모델링 툴은 미 정부 기관들의 아키텍처를 정리정돈 하는 것을 돕고, 상당한 이득을 보여주기 시작한다 (***EA Repository***와 ***Enterprise Architecture Modeling***의 중요성 강조 !)
  - ▸ 조직(Business)과 시스템이 어떻게 돌아가는지(연계,활용,운용)에 대한 더욱 더 정확한 견해를 얻는다.(CIO, IT조직의 리더들, 비즈니스 분석가들)
  - ▸ 모델링 프로세스에서 얻어진 정보는 그들이 보다 바람직하고 빠른 경영결정을 내리는 것을 돕는다. (FEAMS 내의 BRM)
  - ▸ EA *Repository(e.g. Popkin's SA)*내의 기존 시스템을 약간만 수정하여 새로운 비즈니스 프로세스-군대의 세계적 수준의 운동 프로그램-를 위한 요구사항을 결정하는데 도움을 주었다. 부서가 예산과 직원이 새로운 소프트웨어를 개발하는데 소요되는 시간을 낭비하는 것을 방지했다.그리고 이 같은 조처는 EA데이터 없이는 명백하지 않다. (MRW(Army Morale,Welfare and Recreation))
  - ▸ Architecture Model Viewing, Reporting 하는 것이 EA tools의 제일 중요한 일 중의 하나
- ▲ **Business Process Modeling(**프로세스 서술과 모델링 언어들**)** 하는 것과 실제 그것을 **Deploy**하는 것 사이의 갭을 메워주는 역할
  - ▸ 가장 최신의 논쟁은 웹 서비스를 위한 BPEL(Business Process Execution Language)
  - ▸ BPEL은 Web Service나 Service-Oriented Architecture를 위한 XML 기반의 언어(BPEL4WS/IBM)
  - ▸ EA모델로부터 기술적 정보와 관련된 정보를 얻는 방법을 제공하고, 만약 추후 거의 소프트웨어 개발이 없다면 이를 Workflow나 Web Service 이행으로 변환
- ▲ 조직이 좀 더 잘 협력된 엔터프라이즈 아키텍처들을 찾기 시작할수록, 그리고 서비스위주의 설계와 웹서비스가 그들에게 적용될수록, 그들이 이미 가지고 있는 도구의 힘은 무시할 수 없게 될 것이다

Source by 07,2004 GCN

EA Tools Selecting

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- ▲ 초기 (**EA 필요요구 ; USA Government)**
  - ▸ 기술적인 투자제안을 위한 Business processes or Requirements의 Maps
    - Office Automation Tool(e.g., MS Office),Diagramming Tools(e.g., MS Visio),Knowledge management Tools(e.g. Lotus Notes)
- ▲ 현재: 투자 가치를 극대화 하기위해 보다 강력한 아키텍처 모델링 툴 요구.사용
- ▲ **Trends**
  - ▸ Through 2004 : Global 2000 enterprise
    - Business,Information Architecture 포함 EA 확장노력
    - Adopt process improvement methods(e.g, Six Sigma,lean,BPR,BPI,BPM)
    - 조직화, 통합화하고 체계화 (연방정부와 같은 EA) : though 2004/2005
  - ▸ By 2006 :Practicing holistic EA (50% 기업)
    - pure IT Architecture focus를 넘어 EBA,EIA,ESA 포함
    - Rapid decision making and change automation support
  - ▸ Through 2006 : Vendor-supplied modeling tools and techniques
    - Information,solutions,technical 환경과 관련된 Enterprise Business Process의 논리적으로 결합된 모델 개발을 위해 지속적인 진화와 더 나은 지원
    - Business/IT alignment를 위해 Technical models(e.g., UML,ERD)과 Business-oriented approaches(e.g., swim-lane diagrams,BPMN)의 통합
    - By 2005/2006 : Model to machine-executable instruction,leveraging pi calculus-based modeling languages(e.g., BPML,BPEL4WS)
    - In 2004 : 표준화된 modeling languages개발 (e.g., BPMN with BPEL)
  - ▸ By 2007/08 : EA 시장의 안정화
    - EA Maturity, Impact of standards, 시스템화(EAMS)

EA Tool 사용 기대효과

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- ▲ **IT조직의 개발.관리 프로세스 표준화 (경쟁력 향상)**
  - 방법론, 프로젝트관리,품질관리(CMM,Spice)
- ▲ **IT 아웃소싱의 체계적인 관리.통제**
- ▲ **기업 모든 시스템의 체계적인 개발관리(품질 및 생산성 향상)**
  - 요구에 따른 정확한 업무분석 및 설계(Modeling)를 통한 시스템 구축
  - 업무관리자 및 IT개발자들의 원활한 의사소통
  - 효율적인 프로젝트 관리 및 시스템 품질 향상
  - 통합 정보관리 및 재활용성
- ▲ **업무관리자 및 개발자의 분석/설계(Modeling)능력 향상**
  - Software Engineering 기반의 체계적인 접근
  - Modeling(Business,Data, Object/Component,Structured)능력 향상
- ▲ **Enterprise Architecture 구축 및 BPM 통합 활용**
  - Industry Standard EA Framework 지원(미 공공기관 최다 사용 툴)
  - Industry Standard BPM 지원(BPMN,IDEF,Catalyst/CSC)
  - Industry full Standard Enterprise Modeling지원(BPM,Data Model,UML,XML)
- ▲ **Industry Focused Solution 활용**
  - Six Sigma/Balanced Scorecard, RM-Basel-II. Sarbanes-Oxley. CobiT

Integrated *eCycle* Solution
&
Enterprise Architecture Company

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EA 기반의 품질관리 방안

EA Role and View in the IT world

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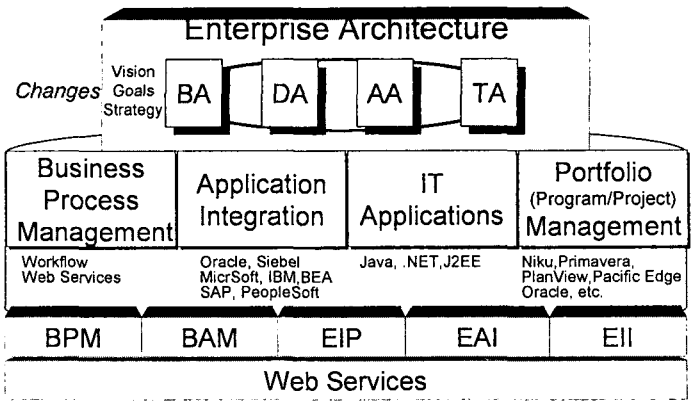
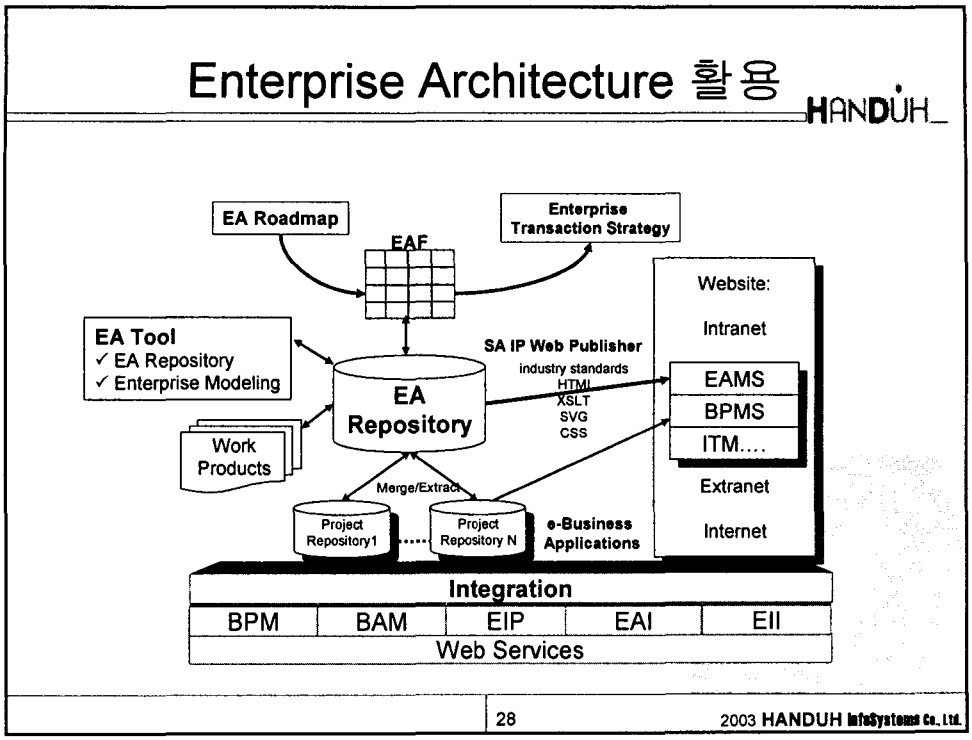
- ▲ EA는 임원(Executives)이 조직을 총괄적으로 생각하도록 돕는 도구
- ▲ EA는 조직이 변화(Change)를 관리하기 위해 의존하는 중요한 툴로 발전
- ▲ EA는 실시간으로 응답할 수 있는 기업을 향한 첫 단계




Enterprise Architecture 활용
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EA Roadmap
EAF
Enterprise Transaction Strategy
Website:
Intranet
EA Tool
✓ EA Repository
✓ Enterprise Modeling
SA IP Web Publisher
industry standards
HTML
XSLT
SVG
CSS
EA Repository
EAMS
BPMS
ITM....
Work Products
Merge/Extract
Extranet
Project Repository1
Project Repository N
e-Business Applications
Internet
Integration
BPM
BAM
EIP
EAI
EII
Web Services
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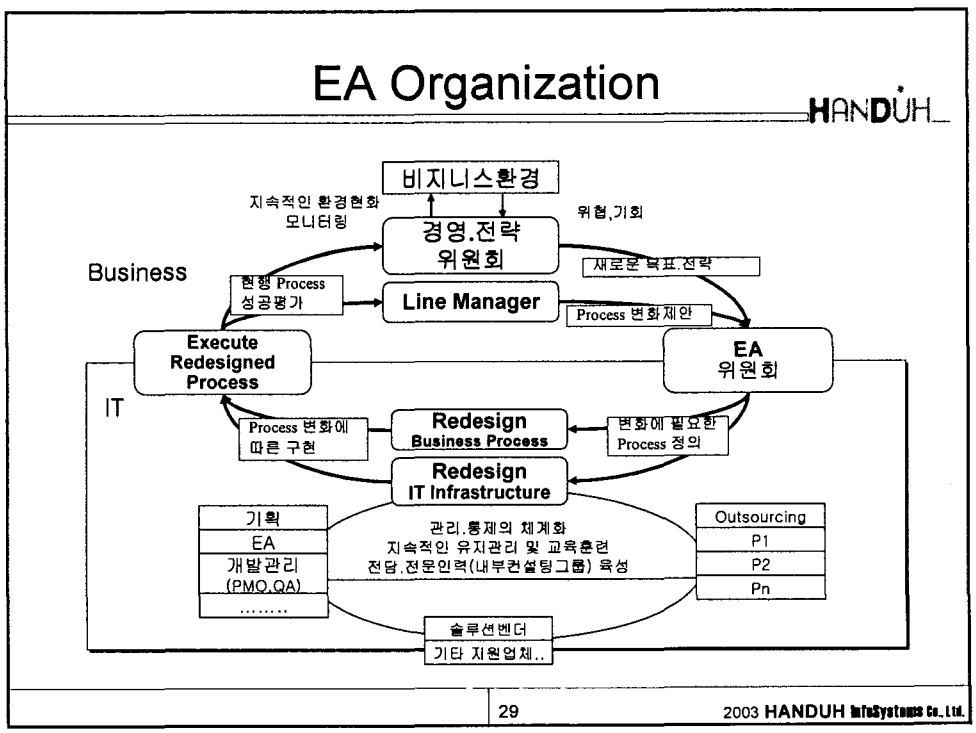
EA Organization
HANDUH_
비지니스환경
지속적인 환경변화 모니터링
위협,기회
경영.전략 위원회
Business
재로운 목표.전략
현행 Process 성공평가
Line Manager
Process 변화제안
Execute Redesigned Process
EA 위원회
IT
Process 변화에 따른 구현
Redesign Business Process
변화에 필요한 Process 정의
Redesign IT Infrastructure
기획
EA
개발관리 (PMO,QA)
.....
관리,통제의 체계화
지속적인 유지관리 및 교육훈련
전담,전문인력(내부컨설팅그룹) 육성
Outsourcing
P1
P2
Pn
솔루션벤더
기타 지원업체..
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EA Maturity Process

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The 5 Steps of the EA Maturity Process

Capture → Analyze → Comply → Make Decisions → Take Action

Enterprise Architecture Process

Business and Organization -Vision & Strategies EA Road Map, Principles Architecture Framework Enterprise Architecture & Modeling	**Industry Standards:** – 용어 표준,공유 – 개발물의 표준,통합운용 – 협업(Better collaboration) – 향상된 레포팅과 분석 – 경영진,관리자의 숙련 극대화 – 산업표준의 Software Engineering – BPMN,XML,UML,FEAF, ER,C4ISR/DoDAF – FEAF Reference Models, OMB Exhibit 300, HTML/Web	**Make decisions** -자원 할당과 효율성 향상 -**Governance**: 의사결정을 위한 정보사용공유 **Take action** -Service levels 증대 -비용절감 -기술투자의 정당화 -협업 향상

CMM/SEI, ISO, GAO Maturity Model, IFEAD E2AMM

ELC & EA Process

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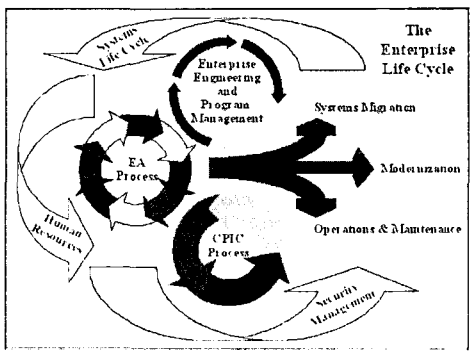

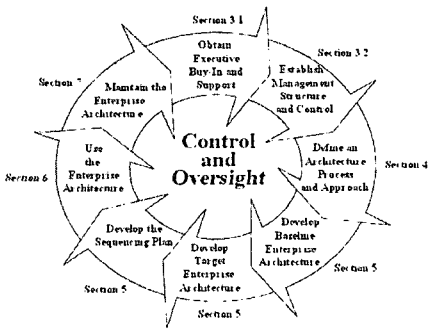

Integrating the EA

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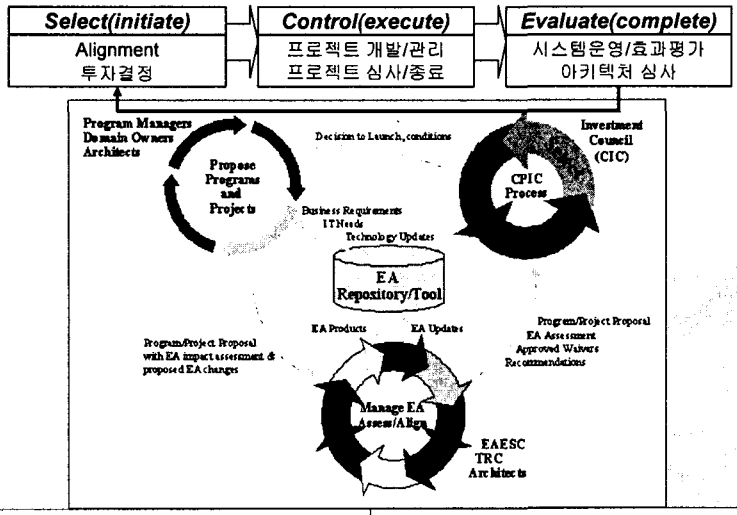
Integrate the EA with CPIC and SLC Processes



INSTITUTE FOR ENTERPRISE ARCHITECTURE DEVELOPMENTS

IFEAD E2AMM

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Extended Enterprise Architecture maturity Model

Improved and refined version based on best-practices(by Jaap Schekkerman)

E2AMM	Level 0: No Enterprise Architecture	Level 1: Initial	Level 2 Under Development	Level 3: Defined	Level 4: Managed	Level 5: Optimizing
Business Technology Strategy Linkage	No linkage between business strategies, business drivers & principles and IT strategies, drivers & principles.	Minimal or implicit linkage between business strategies, business drivers & principles and IT strategies, drivers & principles.	Explicit linkage between business strategies, drivers & principles and IT strategies, drivers & principles.	Explicit linkage between business strategy, drivers, principles & information requirements and IT strategies, drivers, principles and requirements.	Periodic re-examination of business drivers & principles. End- to- end value chain examination (traceability of business drivers to IT support) is measured.	Business cost/benefits validation metrics for end-to-end value chain examination.
Extended Enterprise Involvement	No involvement of Extended parties. No collaboration agreements.	Incidental involvement of Extended parties.	Awareness of collaboration with extended parties. First initiatives to involve extended parties in the E2A program.	Extended parties involved in E2A program. Definition of collaboration levels and information exchange standards.	Extended Enterprise management & governance structure in place.	Measurement structure in place to manage Extended Enterprise environment.
Top- Management Involvement	We do not need it. That won't work here. Everything is fine the way it is.	What is Enterprise Architecture? Why do we need it?	Management awareness of Enterprise Architecture effort. Much nodding of heads. Some resistance to implications of having Enterprise Architecture.	Management aware of Enterprise Architecture effort and supportive. Management actively supports Extended Enterprise Architectural standards.	Top management reviews Extended Enterprise Architecture program and variances.	Management involvement in optimizing process improvements in Extended Enterprise Architecture development and strategic governance.
Operating Units Participation	No part of Operating Unit participates or is involved with Business & IT Architecture processes.	"We support the Enterprise Architecture process as long as it represents the standards we have already chosen." Standards will only inhibit our ability to deliver business value.	Recognition that it is painful supporting too many kinds of complex technologies in an ever-changing business. Enabling technologies for the business.	Recognition that Enterprise Architectural standards can reduce integration complexity and enhance overall ability to Operating Unit. IT to achieve business goals. Most of Operating Unit participates actively in Enterprise Architecture definition.	Entire Operating Unit participates actively in Enterprise Architecture definition.	Feedback from all elements of Operating Unit on Enterprise Architecture Process is used to drive Enterprise Architecture process improvements.

Based on the Meta Group "Enterprise Process Maturity Model" and the SEI "CMM" concept. E2AMM = SM of IFEAD

http://www.enterprise-architecture.info

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IFEAD E2AMM

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Enterprise Architecture Program Definition	Does not exist.	Exists in ad- hoc or informa form. Early draft form may exist	Being actively developed. Program definition not widely communicated.	Defined and communicated to IT staff and business management with LOB or Operating Unit responsibilities.	Enterprise Architecture program is part of the culture, with strong linkages to other core IT and business processes	Concerted efforts to optimize and continuously improve Enterprise Architecture program definition. Modeling of proposed program changes before implementation
Enterprise Architecture Development	No Enterprise Architecture at all	No Enterprise Architecture to speak of. Some standards established by a variety of ad hoc means.	Enterprise Architecture standards exist, but not necessarily linked to overarching System Architecture. Technical Reference Model and Standards Profile framework.	Enterprise Architecture standards development linked to business drivers and System Architecture based on principles and best practices. Partially completed Systems Reference Model and Standards Profile established.	Enterprise Architectures defined by appropriate de- jure and de- facto standards, principles & Quality factors. Reference Model and Standards Profile. Enterprise Architecture reflected in deployed systems.	Same as Level 4, with process exceptions (standards waivers) used to improve Enterprise Architecture definition process.
Enterprise Architecture Communication	None.	The "notebook" documenting the last version of the Enterprise Architecture. May have been handed out to some staff. New staff may not automatically get copies.	The "notebook" is updated periodically or a Web site is used to document Enterprise Architecture deliverables. Few tools (e. g., office suite, graphics packages) are used to document the Enterprise Architecture. Communication about the Enterprise Architecture process via meetings, etc., may happen, but sporadic.	Enterprise Architecture documents updated and expanded regularly. "Live" documentation of the Enterprise Architecture, via internal Web sites. Tools are used to support maintaining Enterprise Architecture documentation. Periodic presentations to top management on Enterprise Architecture process content. Likely a part of new- hire training.	Enterprise Architecture documents are updated regularly, and frequency monitored across Enterprise Architecture content. Regular presentations to top management on Enterprise Architecture. Process coverage in new- hire training. Tracking and reporting of Enterprise Architecture training to management (who took it, when).	Same as Level 4, with process exceptions (standards waivers) used to improve Enterprise Architecture Communication process improvements.
Strategic Governance	None. Everyone does their own thing.	No explicit governance of Enterprise Architectural results.	Explicit governance of a few Enterprise Architectural results (e. g. B, I, IS or TI aspect areas). Variances may go undetected in the design and transformation phases	Explicit strategic governance of the bulk of business & IT investments. Formal processes for managing variances.	Explicit strategic governance of business & IT investments. Formal processes for managing variances feed back into Enterprise Architecture definition.	Same as Level 4, with process exceptions (standards waivers) used to improve Enterprise Architecture governance process.

INSTITUTE FOR ENTERPRISE ARCHITECTURE DEVELOPMENTS

IFEAD E2AMM

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Enterprise Program Management	No formal program / project management discipline or skills.	Little program / project management discipline or skills. Lack of formal priority-setting mechanism for mission plans.	Planning and scheduling activities linked to time-based Enterprise Architecture development. Enterprise Program / Project risk and impact assessment conducted by the Enterprise Architecture Office	Future IT staffing requirements based on target IS/TI architecture. Change management procedures exist and are linked to formal Enterprise Architecture review. Adhere to formal Enterprise program / project management methodology and conduct design review with the Enterprise Architecture Office	Development of enterprise program initiatives includes participation by the Enterprise Architecture Office representatives. Contingency planning requirements are fed into the Enterprise Architecture planning cycle.	Value assurance program in effect. Mission continuity planning is a core competency and plans are refreshed based on target Enterprise Architecture and transition planning activities
Holistic Enterprise Architecture	No formal modeling techniques and documentation. No inventory of mission, vision, strategy, processes, information entities or information-systems.	Mission, vision, strategy, information and information-systems requirements exist only within the IS/TI architecture	Basic business processes and information-systems inventory exists and is maintained. Business models exist of parts of the organization.	Information-systems inventory is linked to the organization & business processes. Information-systems are classified within a basic portfolio of technical condition and business value. Enterprise business models exist and are used during design and development.	Information-systems portfolio planning and business modeling manifest within the Enterprise Architecture process models. Modeling techniques and methods are re-examined periodically to ensure content is well understood and communicated. Model use is measured. Results are stored in a single repository.	Metrics gathered at Level 4 drive process improvements. Enterprise portfolio replaces information-systems portfolio. Enterprise portfolio encompasses business, information, information-systems, technology infrastructure, and security changes. Enterprise modeling is an automated competency with a single repository. Models are kept current.
Business & IT Investment, and Procurement Strategy	No strategic Business & IT procurement strategy	Little or no adherence to existing Standards Profile. Little or no involvement of strategic planning and procurement personnel in Enterprise Architecture process	Some adherence to existing Standards Profile. Little or no formal governance of purchasing and order content.	Business & IT procurement strategy exists and includes compliance measures to *Enterprise Architecture*. Adherence to existing Standards Profile. The Enterprise Architecture influences RFQ, RFI and RFP content. Acquisition personnel are actively involved in Enterprise Architecture governance structure	All planned acquisitions and purchases are guided and governed by the Enterprise *Architecture*. RFI and RFP evaluations are integrated into the Enterprise Architecture planning activities. Technology and application portfolio scan are constructed and integrated into current baseline inventories	No unplanned business & IT procurement activity.

Trends; Integrating BPM with UML

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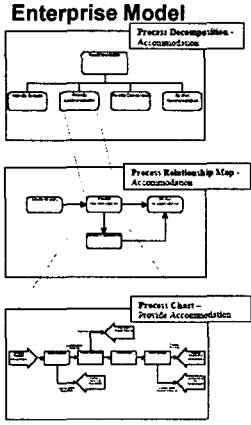
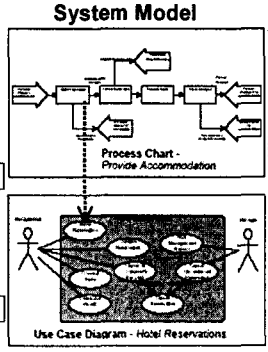
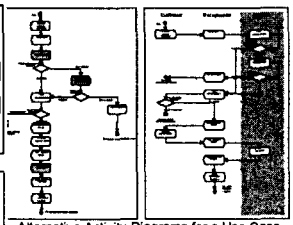
Enterprise Model

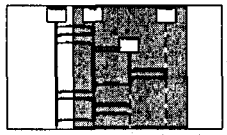


System Model





Alternative Activity Diagrams for a Use Case



Sequence Diagram for one scenario of the Use Case

Technology Model
: define using standard UML

detailed Sequence and Collaboration Diagrams (Interaction Diagrams)
Statechart Diagrams to show internal object behaviour,
Activity Diagrams at the Class and Operation implementation level,
and (from the structural perspective)
Implementation Diagrams to show software and hardware partitioning.

Enterprise Architecture & Modeling

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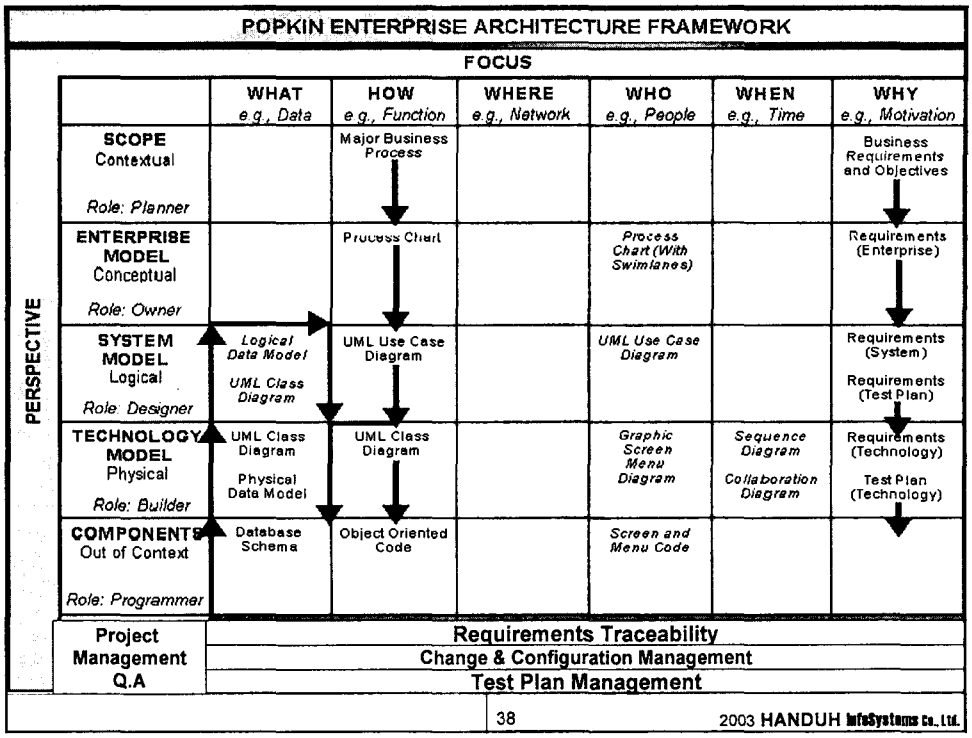
POPKIN PERIODIC TABLE

Popkin offers a complete perspective for Enterprise Architecture

	What	How	Where	Who	When	Why
Scope					Event Result	Business Goal Mission-Statement
Enterprise Model					Internal-Event Internal-Result	Critical-Success-Factor Business-Objective Organisational-Goal
System Model					State UML-Node	ERD-Relation UML-Relationships
Technology Model					UML-Event	Requirement Relationship Test Plan Change-Request
Detailed Representations					Code Structure	Code Structure


POPKIN ENTERPRISE ARCHITECTURE FRAMEWORK
FOCUS
PERSPECTIVE
WHAT e.g., Data
HOW e.g., Function
WHERE e.g., Network
WHO e.g., People
WHEN e.g., Time
WHY e.g., Motivation
SCOPE Contextual
Role: Planner
Major Business Process
Business Requirements and Objectives
ENTERPRISE MODEL Conceptual
Role: Owner
Process Chart
Process Chart (With Swimlanes)
Requirements (Enterprise)
SYSTEM MODEL Logical
Role: Designer
Logical Data Model
UML Class Diagram
UML Use Case Diagram
UML Use Case Diagram
Requirements (System)
Requirements (Test Plan)
TECHNOLOGY MODEL Physical
Role: Builder
UML Class Diagram
Physical Data Model
UML Class Diagram
Graphic Screen Menu Diagram
Sequence Diagram
Collaboration Diagram
Requirements (Technology)
Test Plan (Technology)
COMPONENTS Out of Context
Role: Programmer
Database Schema
Object Oriented Code
Screen and Menu Code
Project Management Q.A
Requirements Traceability
Change & Configuration Management
Test Plan Management
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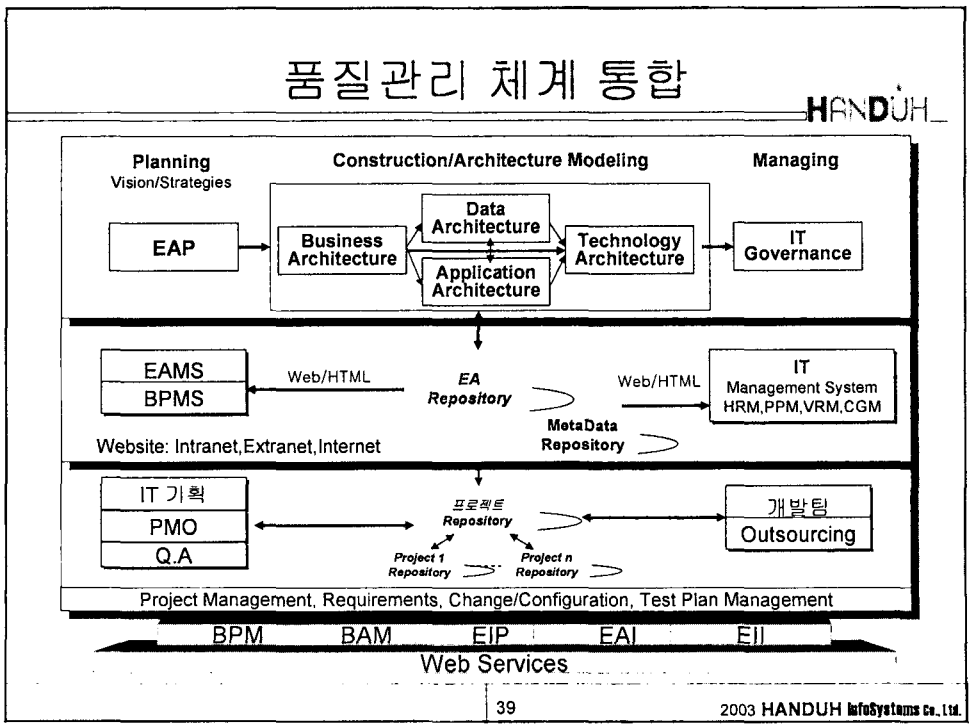
품질관리 체계 통합
HANDUH
Planning
Vision/Strategies
Construction/Architecture Modeling
Managing
EAP
Business Architecture
Data Architecture
Application Architecture
Technology Architecture
IT Governance
EAMS
BPMS
Web/HTML
EA Repository
Web/HTML
IT Management System HRM,PPM,VRM,CGM
MetaData Repository
Website: Intranet,Extranet,Internet
IT 기획
PMO
Q.A
프로젝트 Repository
Project 1 Repository
Project n Repository
개발팀
Outsourcing
Project Management, Requirements, Change/Configuration, Test Plan Management
BPM
BAM
EIP
EAI
EII
Web Services
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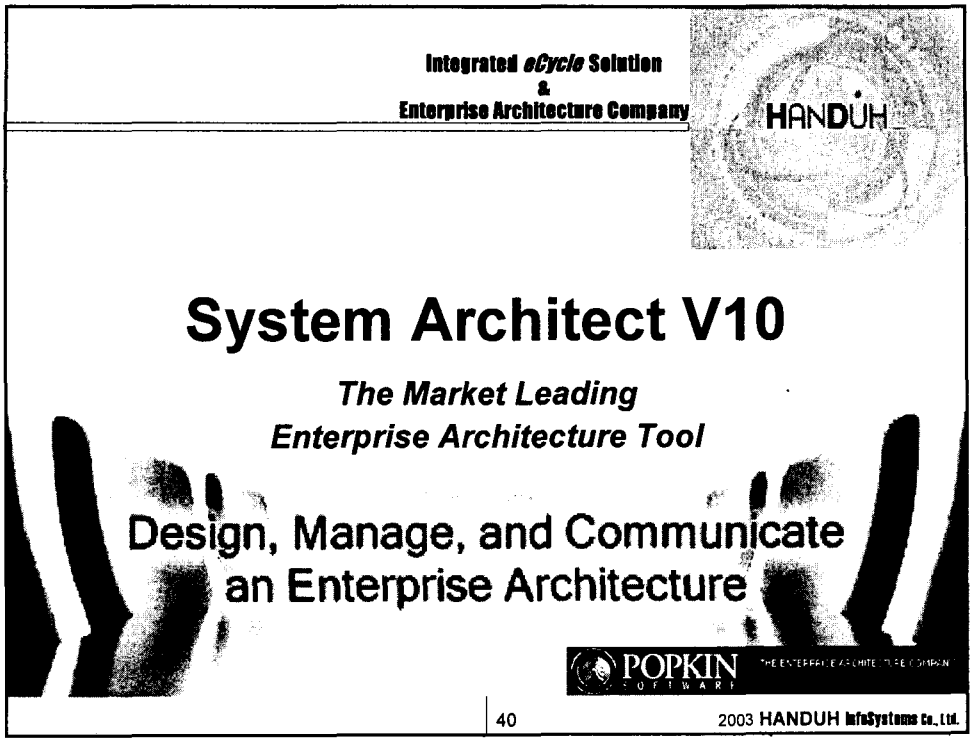

System Architect Overview

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- ▲ **1989년 : PC based and Multi-user environment CASE Tool**
  - ▸ Multiple Structured Methods and Information Engineering
  - ▸ Repository based, Flexible & Affordable, Customizable
- ▲ **1990년대 : BPR, Data Model,Object-Oriented 기반의 CASE/Modeling Tool**
- ▲ **1990년대 말: Zachman Framework 기반의 Enterprise Modeling Tool**
  - ▸ Business Process Modeling/BPR, Data Modeling
  - ▸ Object-Oriented Modeling, Structured Modeling
- ▲ **2000년대 : Enterprise Architecture & Modeling Tool**
  - ▸ 미 정부기관 중심의 Enterprise Architecture, Industry Standard EA Framework 지원 (Zachman, FEAF/TEAF, C4ISR/DoDAF, TOGAF)
  - ▸ Customizable MetaModel/Repository, BPM과 Simulation, UML과의 통합
- ▲ **2003년 : BPM을 위한 최초 BPMN(BPMI.org) 표준Diagram 지원**
  - ▸ 확장성 있는 RDBMS(MS/SQL Server) Repository
  - ▸ eTOM/NGOSS Framework 지원
- ▲ **2004년 현재 : SA v10 (9,2004)**
  - ▸ The Market Leading Enterprise Architecture and Modeling Tool
  - ▸ The Leader of BPM Tool
  - ▸ SA Info Web Publisher Module추가
  - ▸ Web Service를 위한 BPMN과 XML기반의 BPEL 통합

SA Architecture/Technology

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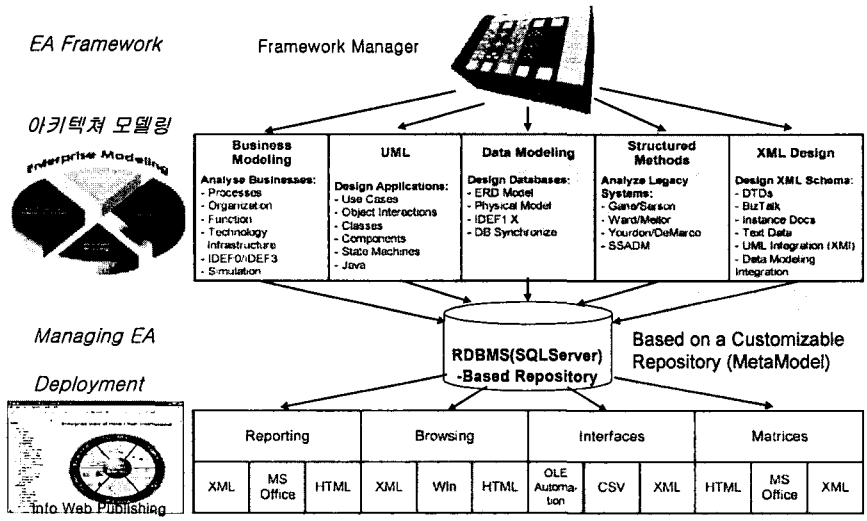

System Architect 제품군

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Product	내 용
System Architect®	▪ Enterprise Architecture/Modeling Tool - Industry Standard Framework - Business Process Modeling ,Data Modeling - Object Modeling/UML, Structured Modeling ▪ RDBMS Repository
Add-on Modules	
XML Architect™	XML Modeling
SA Simulator II™	▪ Process Simulation - Witness(Lanner Group) interface - ABC 생성, Utilization,Costing 보고서, 꺾계그래프, DashBoard
SA C4ISR Support	▪ 미국방성 표준 프레임워크(C4ISR/DoDAF with ABM)
SA Info Web Publisher™	▪ HTML 생성 및 사용자 정의 디자인 기능
Access Control	▪ Repository 접근 권한 설정 기능 - Partitioning, Catalog Manager 기능
SA Compare	▪ Architecture/Model 의 Configuration Management - 서로 다른 리파지토리간의 데이터 비교 검토, 관리
Doors Interface	▪ 요구사항 관리 도구(Doors)와 연계

Framework Manager

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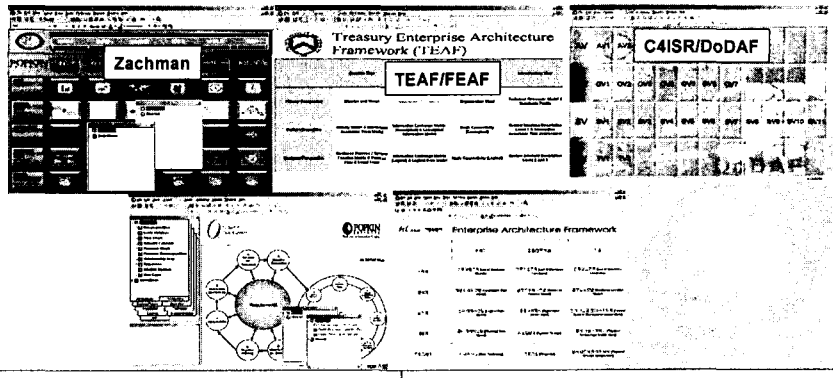
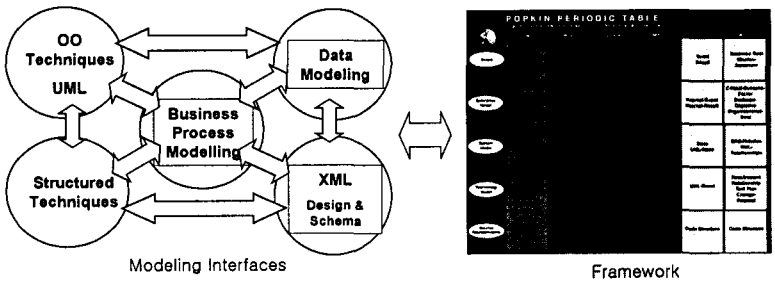
- ▲ Navigating & Viewing in Framework Browser
- ▲ View & Access
- ▲ Predefined Industry Accepted Frameworks
- ▲ Build Owen Framework(Customizable)



Enterprise Modeling

HANDUH_

- ▲ **Enterprise Architecture** 구축을 위한 **Enterprise Modeling** 제공
- ▲ 다양한 **Enterprise Modeling** 방법 제공
  - ▸ Business Process Modeling : BPMN(BPMI.org),CSC/Catalyst, IDEF0/3
  - ▸ Data Modeling : Entity Relation Diagram, IDEF1X, Physical Data Model
  - ▸ UML Modeling : UML 1.4 이상
  - ▸ Structured Modeling
  - ▸ XML Modeling : XML Diagram, XML Schema



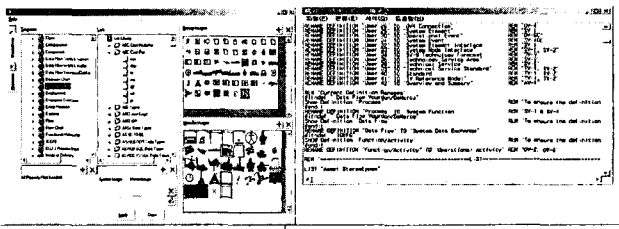
Modeling Interfaces

Framework

Customizing

HANDUH_

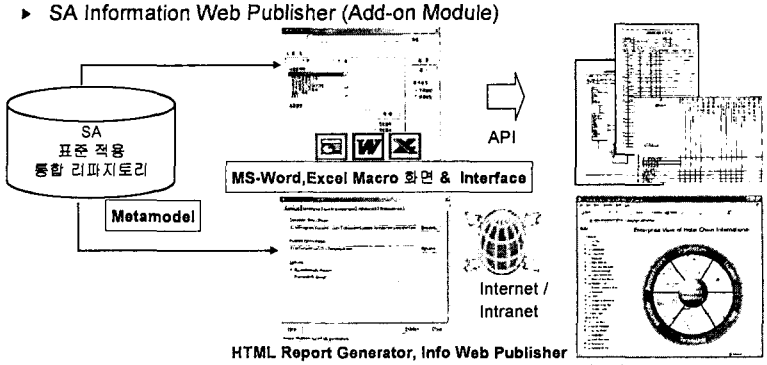
- ▲ 확장성과 유연성이 있는 Metamodel 및 Repository Customization
- ▲ Script 또는 GUI 기반의 User-defined Customization
  - ▸ Framework Browser 및 Dialogs,Diagrams, Dialogs,Defines/Properties의 사용자 정의
- ▲ IT조직의 표준화수립 활용(based on CMM/CMMI,Spice)
  - ▸ IT조직의 표준에 맞는 사용자 중심의 적합화(*Customization*)
  - ▸ 개발방법론,프로젝트관리,품질관리에 따른 프로세스/산출물 표준화
  - ▸ Extensive Standard Report Mechanism
    - VBA/API 를 통한 표준 서식에 맞는 리포트 Customizing
- ▲ **Depiction Manager**



Reporting & Publishing

HANDUH_

- ▲ **Pre-defined & Use-defined Custom Reporting**
  - ▸ 사용자정의 메뉴, 표준 템플릿 정의, 표준산출물 Reporting
  - ▸ MS-Word,Excel과 Auto Interface
  - ▸ HTML Report , 분석과 참조를 위한 다양한Matrices Report
- ▲ **Web published and browsed on the Corporate Intranet with HTML Report**
  - ▸ SA Information Web Publisher (Add-on Module)



Enterprise Direction Model

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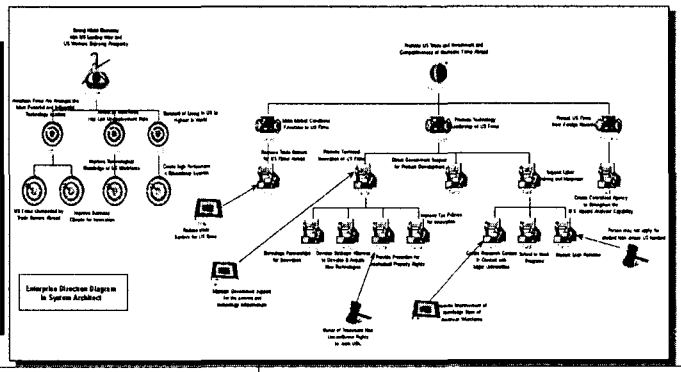
Enterprise Direction Diagram

- ▲ 상위수준의 **Business Direction** 와 그들이 필요로 하는 비즈니스 정책 및 요구사항들에 대한 관계를 시각적으로 설계하기 위한 기능 제공
- ▲ **Zachman Framework** 의 행과 열이 **1**인 **'why'** 에 대해 그들의 조직을 묘사
- ▲ **Business Rules Group (www.bpmi.org)**의 작업에 기초한 그래픽모델링

·Means;
Mission
Strategy
Tactics

·Ends;
Vision
Goals
Objectives

·Guidance;
Policy
Business Rules



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Architecture/Model 상호 연계성

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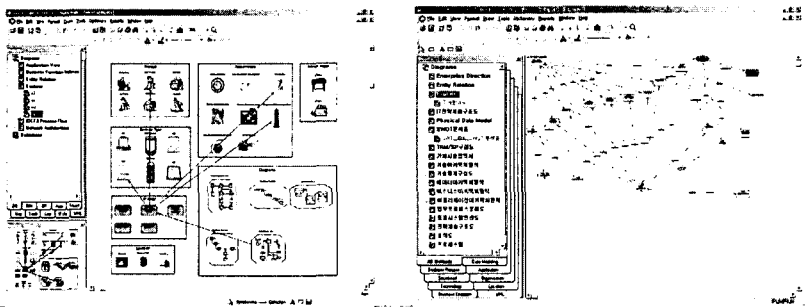
Enterprise Explorer Diagram

- ▲ **Enterprise Architecture**의 효과적인 분석을 위한 강력한 도구
- ▲ **Encyclopedia**의 내용을 그래픽으로 탐색할 수 있고, 모델들의 다양한 객체와 그들 간의 관계, 방향성 경로를 보여주는 **spider** 타입의 다이어그램
- ▲ 다양한 경로의 상관관계를 역동적으로 탐색하거나, 되돌리거나, 원하는 경로로 이동
  - ▸ 예, 데이터베이스에 관계된 모든 어플리케이션, 비즈니스 프로세스, 요구사항 등을 자동으로 표현
- ▲ 비즈니스를 대표하는 모델들의 인과관계를 보기 위해 활용 (관리자 View)



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Business Architecture 구축

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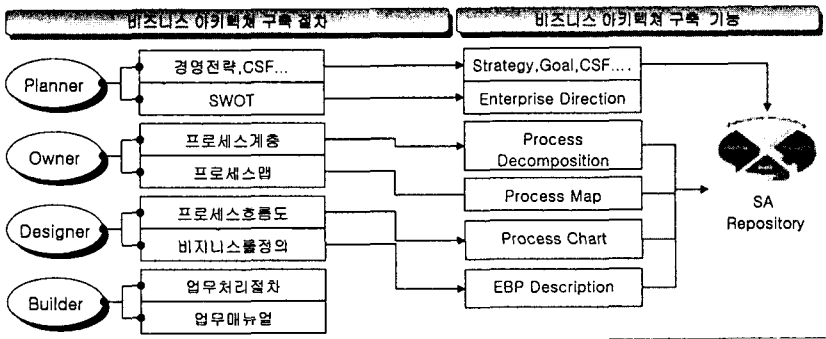
- ▲ EA의 핵심 아키텍처로 Business Process Modeling 기반의 아키텍처를 구축
- ▲ 기업의 전략(비전,목표,정책 등 포함)과 변화요구에 대응할 수 있는 유연성과 확장성 있는 아키텍처 모델
- ▲ Reference Model(BRM)활용 및 Data.Application.Technology아키텍처와 연계
- ▲ BPM 및 Web Service/SOA를 위한 핵심 아키텍처 모델
  - ▸ SCM,BI,BPM/PI(Simulation,6Sigma, KPI),BAM,RM(Basel II,Sarbanes-Oxley),CPIC 활용
  - ▸ BPMN/BPEL, Catalyst/CSC,IDEF0/3 - Mega Process, Process, EBP



Business Architecture : Sample

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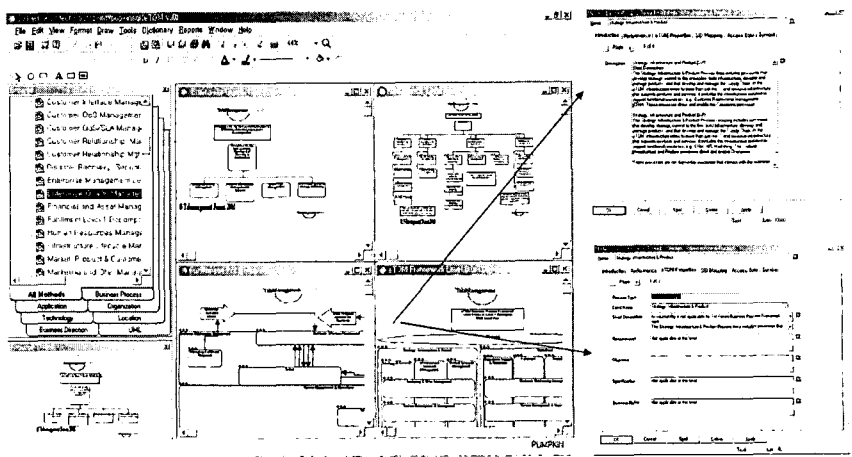
- ▲ TeleManagement Forum의 Business Reference Model (eTOM)



Data Architecture 구축

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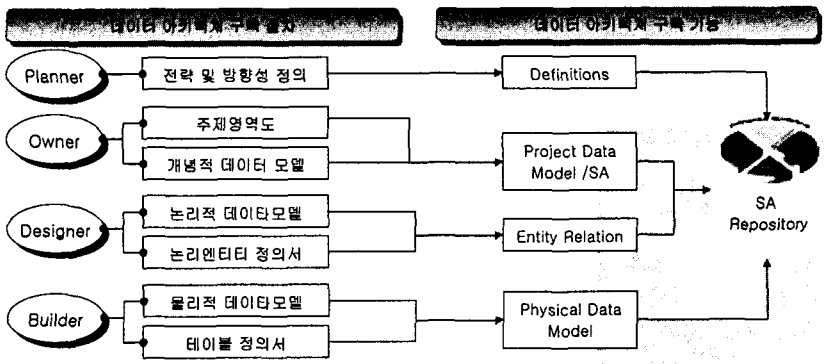
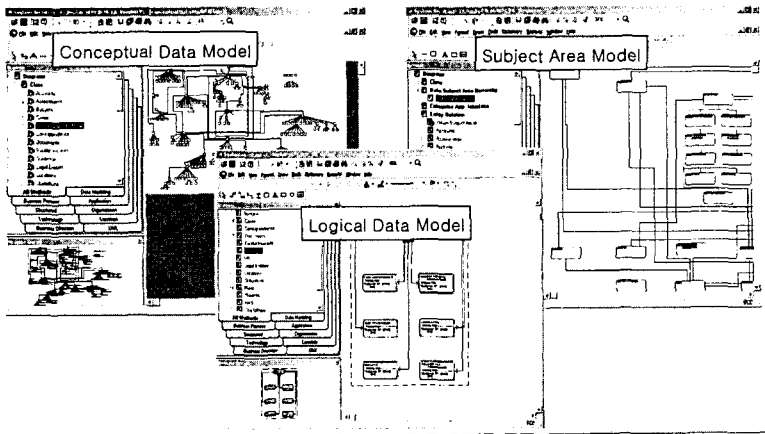
- ▲ 기업의 모든 정보를 기술하고 아키텍처 모델 구축
  - ▸ 메타모델(표준화) 및 Data Cleansing
  - ▸ Business,Application,Technology 아키텍처와의 연계, DW/CRM 활용
- ▲ **Enterprise Conceptual,Project/Subject Area,Logical/Physical Model**
- ▲ **Schema Generation/Reversing, DBMS sync**
- ▲ **Data** 품질, 정합성 및 일관성 유지.보장



Data Architecture : Sample

HANDUH

- ▲ BLM(Bureau Land Management) 의 데이터 아키텍쳐 사례

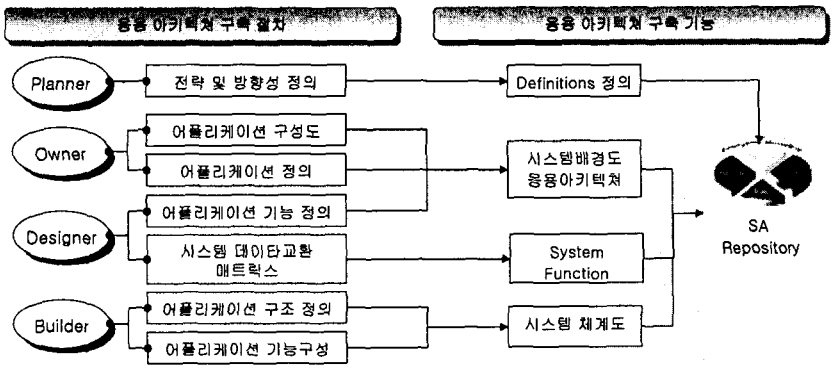


Application Architecture

HANDUH_

▲ 기업 비즈니스의 변화에 대한 포트폴리오 전략과 IT 변화요구에 대응할 수 있는 유연성과 확장성 있는 애플리케이션 아키텍처모델 구축
  - E-Business Application, EAI(SCM,ERP,CRM) 등 활용

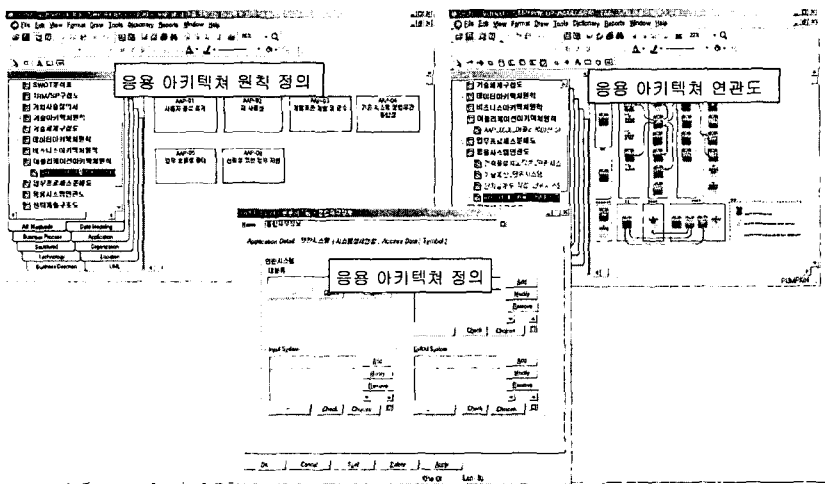
▲ Business,Data,Technology 아키텍처와의 연계 및 기업 비지니스의 전략에 따른 장.단기 계획을 포함하여 아키텍처 수립



Application Architecture : Sample

HANDUH_

▲ SA 적용 사례 – K 사(공공기관)의 구축 사례



Technical Architecture

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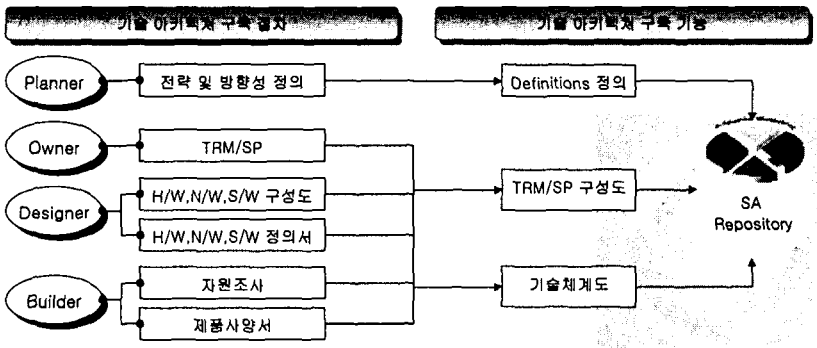
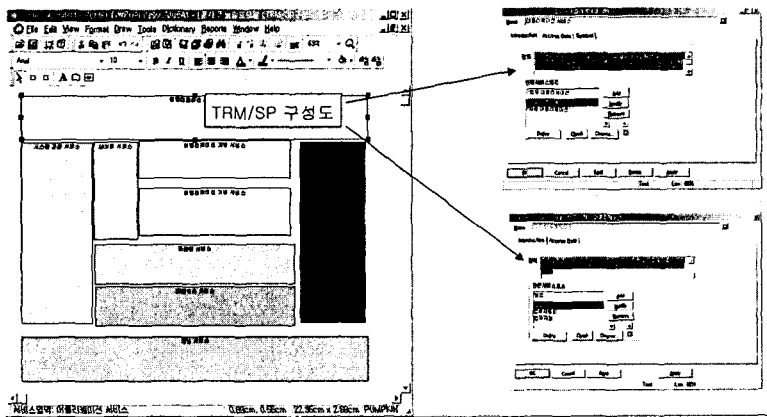
- ▲ 기업의 정보기술아키텍처를 구성하는 정보기술원칙, 표준, 제품, 기술에 대한 정의와 이를 관리.활용하는 기업의 **Infrastructure Architecture**
- ▲ 서비스 영역에 맞는 **TRM/SP**를 활용하여 향 후 IT사업관리에 활용
  - ▸ 자산관리,프로젝트 포트폴리오 관리,인력관리,벤더관리,투자관리,Governance/Compliance관리
- ▲ **SA**의 **EA Repository** 내에 효율적으로 정의.관리
  - ▸ 다양한 다이아그램을 사용해 TRM/SP를 정의하고 연관된 Definition 정보를 통해서 세부항목 정의



Technical Architecture : Sample

HANDUH_

- ▲ **TRM/SP** 구축 사례 – **K** 사(공공기관) 의 구축 사례
- ▲ SA 리파지토리의 *Database* 정보를 사용자 요구에 따라 *Customizing* 하고, 최적의 환경에서 TRM/SP 및 기술아키텍처 데이타를 정의



SA 기타 기능

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- ▲ Business와 System의 요구 분석/관리
- ▲ Full Traceability & Impact of Change
- ▲ Integrating with Business Process and UML
- ▲ UML to Data Model Mapping
- ▲ Cross-Reference 3 Dimensional Matrices(Editing/Reporting)
- ▲ Power of Data Dictionary and Data Integration
- ▲ Models and Subject Areas, Separate of logical & Physical Design
- ▲ Generating the Database & Reverse(round-trip) Engineering
- ▲ Synchronize Models with Databases

Integrated *eCycle* Solution
&
Enterprise Architecture Company

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