Introduction to Enterprise Architecture
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Telelogic – “An IBM Company”
Contents

• Why EA?
• Current Challenges.
• Enterprise Architecture definition.
• Introduction to Repository based Enterprise Architecture.
• Enterprise Architecture Maturing.
• Enterprise Architecture and System Architect ®
• Demo
Large Size & Complexity

See Where You’ve Been
Know Where You are Going
Get There with Confidence
Why EA!

**Business Focus**

**Today**
- Business Problems & Opportunities
- Inefficient Processes
- Systems spaghetti, duplicate data
- Complex

**IT Focus**

**Today**
- Transform Business
- Rationalise Systems
- Adopt/Remove Technologies

**Tomorrow**
- One vision, motivated people
- Streamlined processes
- Seamless systems, sharing data
- Lean infrastructure

**Reason for being**
- Evolving model of the enterprise
- Effective programme mgt
Modern day challenges

- Managing IT Investment
- Mergers & Acquisitions
- Legacy System/App Integration
- Risk Reduction
- Regulatory Compliance
- Alignment of Business & IT
- Hyperactive Market
- Stakeholder Buy-In
- Sarbanes-Oxley
In 2008, Decisions will be focused heavily on Key Corporate Initiatives

- Improve Overall Agility, thru delivery rate and quality of solutions implemented
- Making and supporting technology decisions
- Advancing the role of collaboration tools
- Shifting from tactical, project level architecture to strategic architecture development
- Adopting BPM
- Determining the role of EA and Architects in improving overall IT Governance
- Pursuing information visualization or information-as-a-service

Need for:

Connected Thinking
Repository-based EA

Point-tools based EA

Repository-based EA
Enterprise Architecture: The analysis and documentation of an enterprise in its current and future states from a strategy, business, and technology perspective.  

\[ EA = S + B + T \]

* © 2005 Dr. Scott A. Bernard, An Introduction to Enterprise Architecture (2nd Ed.), AuthorHouse
Stand-alone documents often mix model elements and viewpoints in different ways.
Stand-alone documents often mix model elements and viewpoints in different ways
With a tool & Framework provides a standard way of categorising model elements and their interrelationship.
Common Repository and Framework

- Helps to identify overlaps, gaps, conflicts
- Encourages re-use
Capture Data Through Industry Standards

### Data Models
- E/R Diagrams
- Logical Models
- Physical Models
- IDEF1X
- Reverse Engineering
- Model/Database

### UML
- All UML Diagrams
- Class
- Sequence
- Activity
- Deployment
- Reverse Engineering

### Business Objectives
- Goals
- Objectives
- Strategies
- Tactics

### Structured Analysis & Design
- Gane & Sarson
- Yourdon/DeMarco
- Ward & Mellor
- SSADM

### Process Flows
- BPMN
- Catalyst
- IDEF0/3
- Process Decomposition
- Simulation

### Import / Export
- XML
- MS Excel
- MS Visio
- XMI (UML)
- IDL (IDEF)

### Central Repository

![Central Repository Diagram](image_url)
Visualize the Entire Enterprise

**Network Topologies**

**Organizational Charts**

**Data Models**

**Behavior Models**

**Process Models**

**Goals**

**Objectives**

**Matrix Views**

**Application Models**

**Class Diagrams**

**Credit Card Company Accounts**

**Hotel Reservation System**

**Traveler**

**Potential Guest**

**Check Customer Credit**

**Provide Client with Reservation Number**

**Notify Customer of Credit Problem**

**Customer Agrees to Terms**

**Customer Rejects Terms**

**Advise Customer**

**Calculate Room Price**

**Notify Customer of Credit Rejection**

**Reservation Number Granted**

**Cancel Reservation**

**Room Booked Provisionally**

**Credit OK**

**Credit Not OK**

**Customer Credit Details**

**Quote Price**

**Process Models**

**Organizational Unit**

**Chelsea Hotels and Resorts**

**Mission**

Serve the Needs of the Business and Leisure Traveler

**Vision**

To Be Regarded as the Finest Hotel Chain in the World

**Goal**

Increase Revenues

**Objective**

Number of Complaints received in 2Q 2006 Should Be 20 percent less than 2Q 2004

**Objective**

Host 12 Conferences and Seminars per year in 6 Largest Markets by Sept 1, 2008

**Objective**

Add Conference Facilities to Hotels in 6 Largest Markets by Sept 1, 2008

**Objective**

Earn 5-Star Rating from hotels.com by Sept 1, 2006

**Business Rule**

Customer’s Rewards Points Never Expire

**Business Rule**

Every Customer Making Reservation Gets Auto-Enrolled in Program

**Tactic**

Establish a Frequent Guest Rewards Program

**Tactic**

Reservation Services Over the Web

**Policy**

Rewards Program Must Be Attractive to Customers

**Strategy**

Provide Vacation Packages with Theme Parks

**Strategy**

Improve Existing Reservation Experience

**Strategy**

Modernize Hotels
Analyze Change to any entity

What Happens If....?

Discover the Impact of Change
How does EA Initiatives start?

- Six Sigma Process Consulting
- Optimization/ Business Transformation
- Portfolio Simplification, Application Rationalization/ End to End

Enterprise Architecture

- SOA
- ITIL
- COBIT
- BPM
Enterprise Architecture Gets You There With Confidence

- SOA
- BPM
- Governance
- Compliance
- Mergers
- IT Planning
- Disaster Recovery
- Etc.

- Time Phased Visual Analysis
- Enterprise Collaboration
- Impact Analysis
- Relationship and Enterprise Reporting
- Decision Support

- Risk Avoidance
- Empowered Decisions
- Successful Projects
- Streamlined Processes
- Business and IT Alignment
Uses of Architecture

Financial Controls
Financial Controls

- Systematic approach to choosing, managing, and evaluating IT investments
  - Common elements for each phase ensure a consistent and predictable flow of information
- Allocating infrastructure cost against business case
- Investments areas
  - Major systems development projects
  - Infrastructure upgrades
- Enterprise architecture provides executive information
Uses of Architecture

- Financial Controls
- Portfolio Management
Better decisions
Better value from IT investments | Better business cases for technology investments

Repository

Add process, infrastructure, data flows, projects, etc.

Graphical representation of relationships in repository

Model review for knowledgeable decision making

Generation of compliance reports.

Publish architecture

Query repository; change date to see investment impact
Enterprise portfolio

- Set of managed IT assets. *Do you know what you have, what they do and where they are?*
- Uses assumptions about future performance. *Do you know if and how systems fit into your technology strategy?*
- Balances tradeoff of value and risk. *Does the technology’s value deliver the service level you require?*
## Uses of Architecture

<table>
<thead>
<tr>
<th>Financial Controls</th>
<th>Portfolio Management</th>
<th>Communication</th>
</tr>
</thead>
</table>
• Communication is key component of analysis and collaboration
• Establishes a common vocabulary for better collaboration
• Information shared in understandable format for analysis
• Publishing and distributing information are important
Publishing

EA Tools & Framework

Applications
Processes
Data
Systems

CIO
Internal
Other entities
Programmer
OMB
## Uses of Architecture

<table>
<thead>
<tr>
<th>Financial Controls</th>
<th>Configuration/Process Transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio Management</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td></td>
</tr>
</tbody>
</table>
• Use architecture information to configure the application
• Transfer the process knowledge directly into the application
• Commonly done via business process modeling
# Uses of Architecture

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<tr>
<th>Financial Controls</th>
<th>Configuration/Process Transfer</th>
</tr>
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<tr>
<td>Portfolio Management</td>
<td>Regulatory Compliance</td>
</tr>
<tr>
<td>Communication</td>
<td></td>
</tr>
</tbody>
</table>
• Strategic-level understand of how technology is supporting financial processes goals and understand the business case for technology investments and process improvements
• Extract discrete pieces from within the repository into and assemble into a compliance view
• Effort to
  – Consolidate architecture and compliance efforts into one place
  – Automate the gathering and generation of information
• Examples: Sarbanes-Oxley, Basel II, OMB 300
Uses of Architecture

- Financial Controls
- Portfolio Management
- Communication
- Configuration/Process Transfer
- Regulatory Compliance
- IT Architecture
• Information System Architecture
  – Data Architecture. Describes the structure of an organization's logical and physical data assets and data management resources
  – Application Architecture. Blueprint for the individual application systems to be deployed, their interactions, and their relationships to the core business processes of the organization

• Business Architecture
  – Defines the business strategy, governance, organization, and key business processes

• Technology Architecture
  – Describes the software infrastructure intended to support the deployment of core, mission-critical applications

Source: TOGAF
Framework & Reference Models
Architecture frameworks

• Architecture framework provides:
  – Integration
  – Organisation
  – Classification

• Window on the underlying repository
• Shows how it all fits together
• Gives you the view you want to see, appropriate to your purpose

• “A place for everything and everything in its place”
  – Knowing where to put things
  – Knowing where to find them

• “Static” and “dynamic” frameworks
  – Content-focused frameworks (eg: Zachman)
  – Process-focused frameworks (eg: TOGAF)
SA for Telecom

- In-built eTOM, SID and TAM reference models within the same repository, enabling the cross connectivity.
SA for Retail/Automotive/Manufacturing

- In-built SCOR and VRM reference models
Enterprise Architecture at the Base level

• Enterprise Architecture is already at the intersection point of business and technology.
• It is already a well recognized standard for the IT governance.
• It is already used as a well recognized way to document the entire enterprise information of the organization with its cross relationships

• So what’s next?
Action is Driving the Need for Enterprise Architecture

• EA is now evolving into a new practice: beyond process improvement, IT governance and regulatory compliance
• Enterprise architecture programs are maturing as they deliver information for action
  – Enterprise architecture is emerging as a core component of the management tool box for decision-making & strategy Implementation.
  – Defined EA development process is in place: architecture, investment, implementation
  – EA stakeholders now extend beyond the organizational boundaries (e.g. CIOs, vendors, etc.)
• Organizations are looking to maximize the potential of their enterprise architecture programs by using it from multiple angles e.g. Business Agility, Portfolio Simplification etc
Who consumes Enterprise Architecture

Shared Information Supporting Many Perspectives = Enterprise Architecture
Usage of EA

Strategic Plan, Strategy Initiative, SWOT, Operating Scenarios

Enterprise Architecture

Business Model, Engagement Model, Operational Model

IT Governance, Standardization, IT Alignment, Portfolio Simplification
Telelogic System Architect® is the first and only Full Enterprise Architecture Tool.
Three (3) Classes of Objects in SA

Diagram

Symbol

Definition

Property

Property

Property

Property

Property
**Approach Explanation.**

- **Chelsea Hotels and Resorts**
- Serve the Needs of the Business and Leisure Traveler
- Rewards Program Must Be Attractive to Customers
- To Be Regarded as the Finest Hotel Chain in the World

**Model Object - Business Objective - 5 or Less of Employees Leaving Company with rating over 4 in FY05**

- **Description**
  - Turnover amongst high-performing employees shall be minimized in order to improve operational efficiency and quality of service. Minimizing turnover will also reduce recruiting and training costs, a major component of current HR budgets.
- **Target Date**
  - 1/1/2006
- **Achievement (%)**
  - 100

- **Owner**
  - Human Resources

**Goal**

- Improve Quality of Service

**Objectives**

- 5 or Less of Employees Leaving Company with rating over 3 in FY05
- Number of Complaints received in 2004 should be 20 percent less than 2003
- Earn 5-Star Rating from hotels.com by Sept 1, 2006
Approach Explanation
Support for New Symbols
Business Modeling
- Analyze Business:
  - Processes
  - Organization
  - Functions
  - Technology
  - Infrastructure
  - IDEF0/IDEF3
- BPMN
- Simulation

UML
- Design Applications:
  - Use Cases
  - Object Interactions
  - Classes
  - Components
  - State Machines
  - Java
- BPMN
- Simulation

Data Modeling
- Design Databases:
  - ERD Model
  - Physical Model
  - IDEF1X
  - DB Synchronize™
- Java

Structured Methods
- Analyze Legacy Systems:
  - Gane/Sarson
  - Ward/Mellor
  - Yourdon/DeMarco
  - SSADM

XML Design
- Design XML Schemas:
  - DTDs
  - BizTalk
  - Instance Docs
  - Test Data
  - UML Integration
  - Data Modeling

Repository
- Customizable Repository Metamodel

Reporting
- MS Office
- HTML

Browsing
- OLE Automation
- CSV
- XML
- Schema / OO Code

Interfaces

Matrices
Visualize the Entire Enterprise

Network Topologies

Organizational Charts

Data Models

Behavior Models

Process Models

Goals

Objectives

Matrix Views

Application Models

Class Diagrams
Analyze Change to Processes...

Discover the Impact of Change

What Happens If....?
Business Process Code Generation

BPEL Generation
BPM Simulation
‘What if’ Analysis
Business Modeling
OO Modeling with UML
Data Modeling
Structured Methods
System Architect Repository
Code Generation

- Business Modeling
- OO Modeling with UML
- Data Modeling
- Structured Methods

Forward & Rev Code Eng’g

Java
C++

Encyclopedia
SA support for Database Design

Encyclopedia

Forward & Rev Data Eng’g

Oracle
SQL Server
DB2
Sybase ...

Structured Methods

Business Modeling

OO Modeling with UML

Data Modeling
Support for Standard and Custom Frameworks

Zachman and TOGAF Framework
- Navigates the process
- Delivers the architecture

<table>
<thead>
<tr>
<th>Planner</th>
<th>Owner</th>
<th>Designer</th>
<th>Builder</th>
<th>Subcontractor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOGAF 8 Tool Support
“How have we aligned technology investment with our business objectives?”

“If we change our technology stack, what applications and organizations will be effected?”
Use Matrixes to View Relationships...

<table>
<thead>
<tr>
<th>Application</th>
<th>Bid Server</th>
<th>Credit Card Booking</th>
<th>Customer Maintenance</th>
<th>Hotel Maintenance</th>
<th>Order Entry</th>
<th>Reservations</th>
<th>Vendor Connection</th>
<th>New Application</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Reserve Room</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Store Customer Details</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take Payment Details</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Perform Gap Analyses

**What Processes are not Automated?**
The Simulation Window

Parent Diagram

Child Diagram

Summary Dashboard
The Simulation Window

Detailed ‘dashboard’ reporting

### PROFIT / LOSS STATEMENT

<table>
<thead>
<tr>
<th>Item</th>
<th>Fixed Values (by qty)</th>
<th>Variable (by use)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>0.00</td>
<td>29000.00</td>
<td>29000.00</td>
</tr>
<tr>
<td>Entity Costs</td>
<td>3000.00</td>
<td>34000.00</td>
<td>34000.00</td>
</tr>
<tr>
<td>Activity Costs</td>
<td>790.00</td>
<td>870.00</td>
<td>1670.00</td>
</tr>
<tr>
<td>Resource Costs</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Overheads</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>TOTAL Costs</strong></td>
<td><strong>700.00</strong></td>
<td><strong>870.00</strong></td>
<td><strong>8570.00</strong></td>
</tr>
</tbody>
</table>

### Entity Statistics

<table>
<thead>
<tr>
<th>Item</th>
<th>Number Completed</th>
<th>Average Time</th>
<th>Within Target</th>
<th>Target</th>
<th>Quality</th>
<th>Sigma</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Loans</td>
<td>29</td>
<td>0</td>
<td>15.22</td>
<td>0.51</td>
<td>6.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Resource Statistics

<table>
<thead>
<tr>
<th>Item</th>
<th>Average</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Additional Reports**

- Throughput Per Day
- Queue Stats
- Activity Utilization
- Service Levels
- Resource Utilization
- 6 Sigma Chart
Explorer Diagram can be used to view impact relationships.
• Model service infrastructure and relate:
  – Services that Support Processes
  – Services that are provided by what applications,
  – Applications are hosted by what network.
Portfolio Analysis

- Executive-level, color-coded reports that display service-related information for a large business unit
- Communicate a project executive summary
  - e.g. What level of work is involved in implementing SOA in this business unit?
  - e.g. Are supporting applications service enabled?
Impact Analysis of Service Implementation

- Visualize relationships across the organization
- Communicate the impact of deploying services on the organization to improve decision making
- Explore how new services are going to fit into the organization
- Perform Impact analysis of the removal of existing services.
**Application Landscaping**

- Auto-populate via report with Physical Apps providing services to a certain Business Unit
- Simplify SOA landscape reporting and display business unit data
  - Color coding provides easy interpretation
- Communicate a variety of SOA project information
  - e.g. What services can be reused across multiple business units?
Report clearly how services are supported over time by applications and the projects that change them

- Compare the current and future state of IT service environments
Publish Your Discoveries to the Entire Organization!

---

### Measures

**Measure - Production Quota**

<table>
<thead>
<tr>
<th>Owner</th>
<th>Update Frequency</th>
<th>Unit</th>
<th>Achievement (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fred McDonald</td>
<td>Monthly</td>
<td>units</td>
<td>55</td>
</tr>
</tbody>
</table>

### Targets

<table>
<thead>
<tr>
<th>Name</th>
<th>ID</th>
<th>Owner</th>
<th>Update Frequency</th>
<th>Target Value</th>
<th>Actual Value</th>
<th>Achievement (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Widget A</td>
<td></td>
<td>Bill Jones</td>
<td>Weekly</td>
<td>1000</td>
<td>300</td>
<td>45</td>
</tr>
<tr>
<td>Widget B</td>
<td></td>
<td>Ivor Davies</td>
<td>Weekly</td>
<td>10000</td>
<td>90000</td>
<td>60</td>
</tr>
<tr>
<td>Widget C</td>
<td></td>
<td>John Smith</td>
<td>Weekly</td>
<td>100000</td>
<td>90000</td>
<td>60</td>
</tr>
</tbody>
</table>
QUESTIONS
Learn more at:

- IBM Rational software
- IBM Rational Software Delivery Platform
- Process and portfolio management
- Change and release management
- Quality management
- Rational trial downloads
- Leading Innovation Web site
- developerWorks Rational
- IBM Rational TV
- IBM Rational Business Partners
- Architecture management