Organization Structure Requires Integration

• Organization theory prescribes decomposing the complex organization into smaller units that are easier to manage.

• Give rise to two problems:
  • *INFORMATION PROBLEM*
    Units naturally erect barriers to flow of information.
  • *COORDINATION PROBLEM*
    The unit’s work must be coordinated with other units in order to meet overall organization goals.

• The *functional differentiation* must be accompanied by appropriate *integration.*
The Result of Traditional System Implementation Approaches

Corporate Data

Corporate Networks & Infrastructure Services

Data
Applications
Technology Platforms

Enterprise Chaos

Client/Server Application
Packaged application
Oracle
E-commerce applications
Batch data
Legacy Applications
DB2
Field Applications

January 18, 2011
Why We Have Heterogeneity

- Systems are designed for local needs. Outside needs are extraneous.
  - Locally optimal hardware, software applications, and networks.
- Each distinct domain has its own ontology.
  - A set of well-defined terms, which delimit the domain of discourse
  - Relationships among those terms, chosen from a limited set
  - The ontology may be formal (KIF, KQML) or not (XML)

Needed: The Horizontal View

Optimize the Enterprise

Drives the need to suboptimize some business units for the success of the business portfolio

Business Value

- Business Process
- App System
- Information
- Interfaces
- Relationships
- Infrastructure
Just connecting not sufficient

Exchanging XML messages is the easy part.

Common semantics is the hard part.

Getting from ‘as-is’ to ideal state

Strategic Initiative
- Defines strategic limits

Enterprise Architecture
- Establishes priorities

Operating Model
- Defines integration and standardization requirements

Engagement Model
- Defines core capabilities

Foundation for Execution
- Core Business processes
- IT infrastructure

Corporate Data

Corporate Networks & Infrastructure Services

Product Catalog

Common Semantic Model

Carrier Selection

Ordering

Prices and Freight Charges

Learning and exploitation
Benefits of Integration

- Integration leads to improved enterprise performance
  - Decreasing delivery time (30-60%)
  - Product design time (20-50%)
  - Product design cost (15-30%)
  - Space (25-40%)
  - Inventory cost of raw materials (30-60%)
  - Direct manpower costs (20-35%)
  - Indirect manpower costs (30-35%)

ERP to the rescue!

- Integrates the entire business process.
  - Integrates Process (standard processes)
  - Integrates Application (a single application, i.e., the ERP package)
  - Integrates Data (standard common data)
- A single-vendor solution (thus avoid interoperability issues).
  - SAP, PeopleSoft, SSA (Baan), JD Edwards, Manugistics, others.

ERP & the Reality of eliminating need for integration

- ERP lacks 100% coverage
- ERP versioning problems due to size and complexity
- Legacy applications are still around
- Mergers and acquisitions change organization and come with new systems.
- Still have integration problem with suppliers, partners, and customers.
EAI

- *Enterprise Application Integration* is the unrestricted sharing of data and business processes among any connected applications and data sources in the enterprise.
- To do this you should not have to make changes to the data structures or applications.
- Note, ERP has these properties within the ERP package but not necessarily with applications external to ERP (e.g. legacy systems).

EAI Market

- EAI in industry refers largely to the middleware market.
- This market is the software infrastructure to connect various applications.
- Some estimates put up to 70% of all code consisting of interfaces, protocols, and other procedures to establish linkages between systems.
EAI Vendors

Year 2000 data for a total market of $1.15 Billion.

IBM 14%
Tibco 11%
Sybase 9%
Vitria 9%
webMethods 9%
Mercator 7%
SeeBeyond 6%
BEA Systems 4%
Other 31%

Cognitive Map of CIS 8670

IS Architectures as Strategy
Weill, Ross & Robertson, "Enterprise Architecture as Strategy"

Software and systems Architectures
"Lower level" architectures

IS architectural components and development
Mid-Range Modeling

ERP as instantiation of Architectures

Architectural Modeling options
ERP

• A packaged application that supports and automates business processes and manages data.

• Characteristics of ERP are:
  – Modules are integrated, application designed based on business process.
  – Reflect ‘best business’ processes.
  – Large and complex.

ERP Drives Business Change

• Enables high levels of integration across business functions and units → new way of business for many organizations.

• Provides for widespread sharing of data from a single information repository

• Drives extensive business transformation and change management efforts → since organization must change to match processes supported by ERP

• Requires high levels of implementation effort and support
ERP Functionality

Finance
- General Ledger
- Accounts Receivable
- Accounts Payable
- Procurement
- Fixed Assets
- Treasury Mgmt
- Cost Control
- Grant Management

Human Resources
- HR/Benefits Administration
- Payroll
- Self-service HR

e-Business
- eProcurement
- Employee Self Service
- e-Recruiting/e-Hiring
- e-Filing
- Citizen Access
- Web-enabled transactions
- e-Commerce

Transaction Engine
Core software that manages transaction flow among applications and handles tasks like security and data integrity

Data Analysis
Decision support software that lets senior executives and other users analyze transaction data to track business performance

Supply Chain Mgmt
Planning, scheduling and fulfillment applications that address all procurement requirements across the enterprise

Customer Relationship Mgt
- Consistent user experience
- Personalization of services
- Real-time access-enterprise info

Evolution of ERP

- 1960s: software packages with inventory control
- 1970s: MRP systems
  - Production schedule with materials management
- 1980s: MRPII systems
  - Adds financial accounting system
- 1990s: MRPII
  - Integrated systems for manufacturing execution
- Late 1990s: ERP
  - Integrated manufacturing with supply chain
Enterprise System Software

- Enterprise Resource Planning (ERP)
- Customer Relationship Management (CRM) (SAP now market leading, 6% sales from CRM).
- Supply Chain Management (SCM)
- Product Data Management (PDM)
- Enterprise Application Integration (EAI)
- Data Warehousing (DW)
- eMarketplace / eProcurement

Definitions

- **Enterprise:** a complex set of business processes that can be designed to accomplish a specific set of objectives.
- **Architecture:**
  - A description (often graphical) of the structure of something.
  - A structured plan, a framework on the basis of which a product or an organization of an enterprise can be constructed
- **Reference model:** a general model that can be used as a base to derive other models from.
- **Reference Architecture:** is a structured set of models which represent the building blocks of the system.
Why we need ERP Reference Architectures

- ERP systems are complex and difficult to understand how they operate.
- A reference architecture is a model that describes ERP systems – helps people understand how they work.
- Use of reference architectures for:
  - Business Process Reengineering (both ‘AS-IS’ and ‘TO-BE’ modeling)
  - Training
  - Configuration
- Reference architectures capture, standardize, and represent the commonalities found in business process reengineering and enterprise integration projects (Vernadat 1996).
- Characterize the best-in-class management practices and software solutions; i.e. knowledge management.
- Inclusion of all elements.
- Leverage the previous work done in enterprise engineering; i.e., learning.

The Result of Traditional System Implementation Approaches

Corporate Data

Data

Applications

Technology Platforms

Corporate Networks & Infrastructure Services
Getting from ‘as-is’ to ideal state

Operating Model
- Defines integration and standardization requirements
- Defines core competencies
- Uses an evolving architecture
- Establishes priorities

Enterprise Architecture

Engagement Model

Foundation for Execution
- Core Business processes
- IT infrastructure

Companies gradually mature enterprise architecture and build out their platforms.

<table>
<thead>
<tr>
<th>Business Silos</th>
<th>Standardized Technology</th>
<th>Optimized Core</th>
<th>Business Modularity</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>46%</td>
<td>27%</td>
<td>2%</td>
</tr>
</tbody>
</table>


Percentage of firms in each stage is updated based on a 2007 survey of 1508 IT executives.
IT Engagement Model

From Figure 6-1 Ross, Weill & Robertson, "Enterprise Architecture as Strategy", 2006

IT Engagement Model-Types of linking mechanisms

From Figure 6-1 Ross, Weill & Robertson, "Enterprise Architecture as Strategy", 2006
Definition of enterprise architecture

- The enterprise architecture is the organizing logic for business process and IT capabilities reflecting the integration and standardization requirements of the firm’s operating model.
- Enterprise architecture is not just the sum of the technology architecture, applications architecture, and data architecture.

There Are Four Operating Models

<table>
<thead>
<tr>
<th>Coordination</th>
<th>Unification</th>
</tr>
</thead>
<tbody>
<tr>
<td>- High Coordination: Unique business units with a need to know each other’s transactions</td>
<td>- Single business with global process standards and global data access</td>
</tr>
<tr>
<td>- Examples: Merrill Lynch GPC, PepsiAmericas, MetLife</td>
<td>- Examples: Southwest Airlines, Dow Chemical, UPS Package Delivery</td>
</tr>
<tr>
<td>- Key IT capability: access to shared data, through standard technology interfaces</td>
<td>- Key IT capability: enterprise systems reinforcing standard processes and providing global data access</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Low Diversification</th>
<th>Replication</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Low Diversification: Independent business units with different customers and expertise</td>
<td>- Independent but similar business units</td>
</tr>
<tr>
<td>- Examples: Johnson &amp; Johnson, GE, ING</td>
<td>- Examples: Marriott, CEMEX, DIRECT</td>
</tr>
<tr>
<td>- Key IT capability: provide economies of scale without limiting independence</td>
<td>- Key IT capability: provide standard infrastructure and application components for global efficiencies</td>
</tr>
</tbody>
</table>
Different Standardization Requirements of the Four Operating Models

<table>
<thead>
<tr>
<th>Business Process Integration</th>
<th>Coordination</th>
<th>Unification</th>
</tr>
</thead>
</table>
| High                        | - Customer and product data  
- Shared services  
- Infrastructure, portal, and middleware technology | - Operational and decision making processes  
- Customer and product data  
- Shared services  
- Infrastructure technology and application systems |
| Low                         | - Shared services  
- Infrastructure technology | - Operational processes  
- Shared services  
- Infrastructure technology and application systems |

How UPS delivers business agility

- Proprietary Delivery Apps
- Internet Apps
- Middleware
- Package Data
- Package Tracking App
- DIAD/Handheld Device
- Links to Partners

Global Networks & Centralized Infrastructure Services
**Delta’s Unification Operating Model**

**Operational Pipeline**

- Allocate Resources
- Prepare for Flight
- Load Aircraft
- Flight
- Departure
- and Closeout
- Monitor Flight
- Flight
- Arrival
- and Closeout
- Unload Aircraft
- Clean/Service Aircraft

**Delta’s Nervous System**

- Location
- Flight
- Schedule
- Maintain
- Employee
- Customer
- Aircraft
- Ticket
- Baggage
- Check/Service
- Aircraft
- Unload Aircraft
- Flight
- Arrival and Closeout
- Load Aircraft
- Flight
- Departure and Closeout
- Allocate Resources
- Prepare for Flight

**Customer Experience**

- Video
- Phone
- Page

**Nine Core Databases**

- Equipment
- Employee
- Aircraft
- Customer

**Electronic Events**

- Delta
- GBS

**P&G’s Diversification Operating Model**

- 250 Brands

- **GBS Shared Solutions**

- **Strong marketing and customer focus**
- Ownership of unique business processes
- Product and service innovation and delivery

- Catalogue of services—some mandatory, some optional
- Marketing approach to build “brand” awareness and loyalty to GBS services
- Ownership of shared solution business processes
- Unit price management with guaranteed reductions over time
- Scorecard of GBS performance with variable compensation
- Architecture interconnecting the different solutions to be building blocks for innovation
- New product development group to add new solutions
- Management of outsourcing partners

Source: Adapted from Delta Air Lines documents. Used with permission.

Source: MIT CISR Briefing by Peter Weill, Christina Soh, and Siew Kien.
Carlson’s Diversification Operating Model

Customer Requirements
- Business Initiatives
  - Travel Management
  - Loyalty
  - Hotel Distribution
  - CRM
- Enterprise Portal
- Presentation
- Application
- Data Trust
- Middleware
- Data Object
- Platform
- Network

IT Resilience

Common Infrastructure

Business Process

Security

MetLife’s Coordination Operating Model

Application Presentation Tier
- Portal Presentation Integration
- Screen Entry & Validation
- Illustrations
- Order Entry
- Underwriting
- Billing/Payment
- Service
- Eligibility
- Claims

Application Business Logic and Data Tier
- Security & Entitlements
- Licensing
- Rates & Calcs
- Suitability
- Forms & Requirements
- Business Rules
- Party Management
- Underwriting & Issue
- Product Admin
- Events
- Service Recording
- Workflow
- Partner Portals

Integration Hub
ING DIRECT’s Replication Operating Model

External Services
- Prospect Fulfillment
- Statement Fulfillment
- Payments
- Checks
- Reports Local/HQ/Tax

Customer Relationship Services
- CIF
- CRM
- Contact History
- Product Info

Core Banking Services
- Mutual Funds
- Brokerage
- Banking Engine
- Credit Score

Common Business Services
- Transactions
- Customers
- Products
- Services

Channel Services
- IVR/CTI Server
- Imaging Server
- E-mail Server
- Web Server
- Gateway Server

Customer Contact: Call Center, IVR, E-mail, Direct Mail
Self-Service: Internet, MinTel, ATM, WAP, (WebTV)

Companies gradually mature enterprise architecture and build out their platforms.

<table>
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<th>Standardized Technology</th>
<th>Optimized Core</th>
<th>Business Modularity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locally Optimal Business Solutions</td>
<td>Enterprise-Wide Technology Standards</td>
<td>Standardized Enterprise Processes/Data</td>
<td>Business Agility</td>
</tr>
<tr>
<td>25%</td>
<td>46%</td>
<td>27%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Percentage of firms in each stage is updated based on a 2007 survey of 1508 IT executives.
Architecture maturity increases global agility.

IT spending changes as architecture matures.

Enterprise architecture benefits by stages

![Graph showing benefits by stages](image)

1. Development time.
2. Business risk, security breaches and disaster tolerance.
3. Senior management and business unit management satisfaction.

Architecture maturity is a learning process.

<table>
<thead>
<tr>
<th>Architecture Stage</th>
<th>Business Silos</th>
<th>Standardized Technology</th>
<th>Optimized Core</th>
<th>Business Modularity</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT Capability</td>
<td>Local IT applications</td>
<td>Shared technical platforms</td>
<td>Enterprise-wide hardwired processes or databases</td>
<td>Plug and play business process modules</td>
</tr>
<tr>
<td>Business Objectives</td>
<td>ROI of local business initiatives</td>
<td>Reduced IT costs</td>
<td>Cost and quality of business operations</td>
<td>Speed to market; strategic agility</td>
</tr>
<tr>
<td>Funding Priorities</td>
<td>Individual applications</td>
<td>Shared infrastructure services</td>
<td>Enterprise applications and data stores</td>
<td>Reusable business process components</td>
</tr>
<tr>
<td>Who Defines Applications</td>
<td>Local business leaders</td>
<td>IT and business unit leaders</td>
<td>Senior management and process leaders</td>
<td>IT, business and industry leaders</td>
</tr>
<tr>
<td>Leadership Tasks</td>
<td>Measure and communicate value</td>
<td>Lead change</td>
<td>Design and fund shared IT services</td>
<td>Define digitized platform</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Monitor standards and exceptions</td>
<td>Align project priorities with enterprise objectives</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Define, source and fund business and IT modules</td>
</tr>
</tbody>
</table>

Firms learn by building management competencies.

**Architecture Planning and Design**
- Senior executive oversight
- Enterprise architecture guiding principles
- Enterprise architecture graphic
- Process owners
- Full-time enterprise architecture team

**Project Management**
- Project methodology
- Post-implementation assessment
- IT program managers
- Business leadership of project teams

**IT Funding**
- Business cases
- Centralized funding of enterprise apps
- Infrastructure renewal process
- IT Steering Committee

**Standards Management**
- Architects on project teams
- Technology research & adoption process
- Architecture exception process
- Formal compliance process
- Centralized standards team

Management practices within each practice set are statistically significantly correlated with each other. All four competencies are significantly correlated with architecture benefits.

---

Firms build competencies in stages.

<table>
<thead>
<tr>
<th>Business Silos</th>
<th>Standardized Technology</th>
<th>Optimized Core</th>
<th>Business Modularity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Cases</td>
<td>Architects on Project Teams</td>
<td>IT Steering Committee</td>
<td>Process Owners*</td>
</tr>
<tr>
<td>Project Methodology</td>
<td>IT Architecture</td>
<td>Architecture Exception Process*</td>
<td>Enterprise Architecture Guiding Principles*</td>
</tr>
<tr>
<td></td>
<td>Formal Compliance Process*</td>
<td>Infrastructure Renewal Process*</td>
<td>Business Leadership of Project Teams*</td>
</tr>
<tr>
<td></td>
<td>Centralized Funding of Enterprise Applications*</td>
<td>Centralized Standards Team</td>
<td>Senior Executive Oversight*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IT Program Managers</td>
</tr>
</tbody>
</table>

Legend:
- Architecture Planning & Design
- Project Management
- IT Funding
- Standards Management

*In a survey of 120 IT executives, items are statistically significantly related to architecture maturity—they are associated with greater value in later stages.

---

Top performing companies do three things better.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Low Strategic Effectiveness (n=78 firms)</th>
<th>High Strategic Effectiveness (n=25 firms)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Senior Management Involvement</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Senior management explicitly defined architecture requirements</td>
<td>25% (of firms)</td>
<td>44% (of firms)</td>
</tr>
<tr>
<td>• Senior management oversees architecture initiatives</td>
<td>45% (of firms)</td>
<td>60% (of firms)</td>
</tr>
<tr>
<td>• Percentage of senior managers who can describe high level architecture</td>
<td>19% (of mgrs)</td>
<td>39% (of mgrs)</td>
</tr>
<tr>
<td><strong>Architecture Built into Project Methodology</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Percentage of project teams with architects assigned</td>
<td>49% (of projects)</td>
<td>81% (of projects)</td>
</tr>
<tr>
<td>• Percentage of projects subjected to architecture compliance review</td>
<td>60% (of projects)</td>
<td>80% (of projects)</td>
</tr>
<tr>
<td><strong>Architecture Maturity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Median Stage (1–4)</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

* Statistically significant difference between the responses of top 25% of firms on strategic effectiveness. Strategic effectiveness is measured as strategic outcomes (operational excellence, customer intimacy, product innovation, and strategic agility) of architecture initiatives weighted by their relative importance to each firm. The top 25% of firms on strategic effectiveness reported significantly higher profitability which correlated with industry adjusted measures of firm-wide profitability.

As the Company's Architecture Matures, the CIO Role Evolves

<table>
<thead>
<tr>
<th>Key Skills of the CIO</th>
<th>Business Silos</th>
<th>Standardized Technology</th>
<th>Optimized Core/ Business Modularity</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Technical knowledge to help with standards decisions</td>
<td>• Detailed knowledge of how the business functions - could potentially run a business unit if necessary</td>
<td>• Ability to facilitate innovation off new platform</td>
<td></td>
</tr>
<tr>
<td>• Project management expertise to put in place a standard project methodology and ensure its use</td>
<td>• Ability to manage large organizational change efforts/staff professionalism</td>
<td>• Ownership of platform and ability to define IT investment priorities for delivering it</td>
<td></td>
</tr>
<tr>
<td>• Ability to work with top management team to establish basic governance structure</td>
<td>• Credibility with business heads that he/she knows how the business works and will manage it well</td>
<td>• Detailed knowledge of supply and demand chain to begin process of changing overall value chain architecture</td>
<td></td>
</tr>
<tr>
<td>• Ability to make business case for standardization</td>
<td>• Ability to manage large central budget</td>
<td>• Ability to delegate ownership of key process and data modules, while still ensuring adherence to standards</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Understanding of architecture as a business enabler</td>
<td>• Understanding of strategic benefits of architecture</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reports to</th>
<th>CEO or CFO</th>
<th>CEO</th>
<th>CEO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of IT Heads with Second Title*</td>
<td>0%</td>
<td>26%</td>
<td>50%</td>
</tr>
</tbody>
</table>

* Percentage of CIOs having second VP titles, from samples of 25 CIOs in the United States and Europe.
Roles and responsibilities change as firms transition from transformation to driving value from a digitized platform.

**Governance**

**Build the Platform:** Set priorities and provide focus on critical processes

**Use the Platform:** Establish compliance and exception processes

**Process Ownership Roles**

**Build the Platform:** Create high-powered, full-time team to design and implement transformed processes

**Use the Platform:** Assign high-level process owners; establish centers of excellence and shared services

**People Development**

**Build the Platform:** Provide training required for new roles, new mindset, and unlearning of habits

**Use the Platform:** Develop incentives and accountability for using data and services

---

**How to make IT a strategic competency**

- **Build platforms not solutions.**
  This is the only way to avoid silos and create a powerful foundation for execution.

- **Put someone in charge of the platform.**
  Implementing a horizontal process platform requires significant investment and even more significant organizational change. Someone must take charge of this effort. We recommend a strategy execution officer.

- **Allow time for learning.**
  It does not pay to skip stages. Management learns how to drive benefits from IT by adopting and formalizing effective governance and introducing a culture of disciplined business processes.

- **Put senior business leaders in charge of the architecture effort.**
  Firms getting strategic business benefits from an operating model have senior business leaders who are actively involved in its design, management and implementation.
Wikipedia says... (May 25, 2009)

- The term **enterprise architecture** refers to many things.
- Like architecture in general, it can refer to a description, a process or a profession.
  - To some, “enterprise architecture” refers either to the **structure of a business**, or the documents and diagrams that describe that structure.
  - To others, "enterprise architecture" refers to the **business methods** that seek to understand and document that structure.
  - A third use of "enterprise architecture" is a reference to a business team that uses EA methods to produce architectural descriptions of the structure of an enterprise.

- A **formal definition** (from the MIT Center for Information Systems Research)
  - “Enterprise Architecture is the organizing logic for business processes and IT infrastructure reflecting the integration and standardization requirements of the firm’s operating model.”

Architectural Definitions...

- “**Mental forms**”
  - A plastic concept
  - A complex metaphorical idea that shapes the categories, discourse and language used. ([Densai 2001 in Coneliussen 2008](#))

- **Four metaphors** ([Smolander, 2002 in Coneliussen 2008](#))
  - As literature
    - The documentation of an existing artifact
  - As language
    - A vehicle for communication and creating common understanding about some artefact
  - As decision
    - Basis of a rational decision-making process
  - As blueprint
    - The structure of an extant system
Ross says... (MISQ Executive, 2003)

• “The term IT architecture lacks a universally accepted definition. ... the terms architecture and infra-structure are sometimes used interchangeably, with architecture seen as the plan for the next infrastructure. More often, IT architecture refers to a firm’s list of technology standards. But viewing IT architecture only as technology standards does not connect it to business requirements. The enterprise IT architecture concept, though, does place technology standards in the context of business requirements.” (p. 32)

• At the enterprise level, an IT architecture is:
  – the organizing logic for applications, data, and infrastructure technologies, as captured in a set of policies and technical choices, intended to enable the firm’s business strategy. Accordingly, the enterprise architecture implies certain IT capabilities.
  – These capabilities are the objectives of the IT architecture, specifying what the architecture enables the business to do.
  – Enterprise architecture is not just the sum of the technology architecture, applications architecture, and data architecture.

Two distinct streams:
The Business (or Enterprise Architecture) vs the Software architecture
Different descriptions

• Different semantics
  – ‘architecturing’ (Corneliussen, 2008)
    • The process of architecturing
  – Represents different ‘states’
    • Of the system
    • Of a business
    • Of a social order

Generality, scope, audience

from the 2006 FEA Practice Guidance of US OMB; retrieved from Wikipedia Commons image library, 5/28/09
Software vs. Business Architecture

<table>
<thead>
<tr>
<th>Focus</th>
<th>Software architecture</th>
<th>Business architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Purpose</td>
<td>Interrelations among software components</td>
<td>Interrelations among business components</td>
</tr>
<tr>
<td>Scope</td>
<td>Documentation</td>
<td>Strategic planning</td>
</tr>
<tr>
<td>Approach</td>
<td>Top-Down</td>
<td>Top-Down</td>
</tr>
<tr>
<td>Used by</td>
<td>Engineers, Software developers, Software architects</td>
<td>Managers, Enterprise architects</td>
</tr>
<tr>
<td>Leading metaphors</td>
<td>Architecture as literature, Architecture as blueprint</td>
<td>Architecture as decision, Architecture as language</td>
</tr>
</tbody>
</table>

Table 1: Two architectural streams: Software architecture and Business architecture

(Corneliussen, 2008)

Zachman Framework

Figure 1: The Zachman ISA Framework from (Sowa and Zachman 1992)  
(Corneliussen, 2008)
Architecture is...

- Simplistic
  - A description of a systems gross structure
  - With sufficient detail to
    - appraise the completeness and accuracy
    - Conduct high-level analysis
  - Kruchen- “A Rational View”, 1996
Architectures have multiple views

• Logical view
  – Objects, classes categories
• Process view
  – Processes and threads
• Implementation view
• Modules and subsystems
• Deployment view
  – Processors, interconnections and threads
• Use case view
  – Complete overview system description from viewpoint of external actors

Architectural roles

• Understanding
• Reuse
• Construction
• Evolution
• Analysis
• Management