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The Data Warehousing Institute
South Florida Chapter Meeting

Robert J. Abate, *TDWI Faculty Member*

"The Convergence of SOA and Business Intelligence"

January 30th, 2009

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AGENDA – South FL Chapter

"The Convergence Of SOA & BI"

Topic	Duration (minutes)
Setting Up The Problem	15
Defining Information	5
Defining Services	10
Effective Governance	5
The Value Proposition Of	5
Questions & Answers	5

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Setting Up The Problem

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- **Building An Services Based Architecture [SBA] Requires**
  - "Common Communications Mechanisms & Definitions"
  - Integration architecture with defined layers of abstractions
  - Similar foundation to a Business Intelligence solution
- **Industry Now Being Dominated By SBA's**
  - Gartner notes that in 2008, **SBA's Are "Mainstream"**
  - Flexibility, Agility, Scalability & Reusability are all benefits of
- **This Presentation Will Demonstrate To Attendee's**
  - Definitions of Business Intelligence and SOA solutions
  - Why there is a convergence of these type of solutions
  - Key Features and Requirements
  - Best Practices And Trends

§ IT is perceived as not performing well

- Inhibitor to corporate progress – IT systems cannot be changed fast enough to meet market demands, seize opportunity or comply with a new requirement.
- Weak alignment between IT and business strategy – marked by an intractable language barrier.
- Not strategically aligned – IT does not know or follow corporate strategy.
- IT is almost never the source of innovations.

- **Harris Interactive recently polled 23,000 U.S. employees in key industries and functional areas and found that:**
  - Only 37% said they have a clear understanding of what their organization is trying to achieve and why
  - Only one in five was enthusiastic about their team and the organization's / corporation's goals
  - Only one in five said they have a clear "line of sight" between their tasks and their team and organization's goals
  - Only 15% felt that their organization fully enables them to execute key goals
  - Only 20% fully trusted the organization they work for

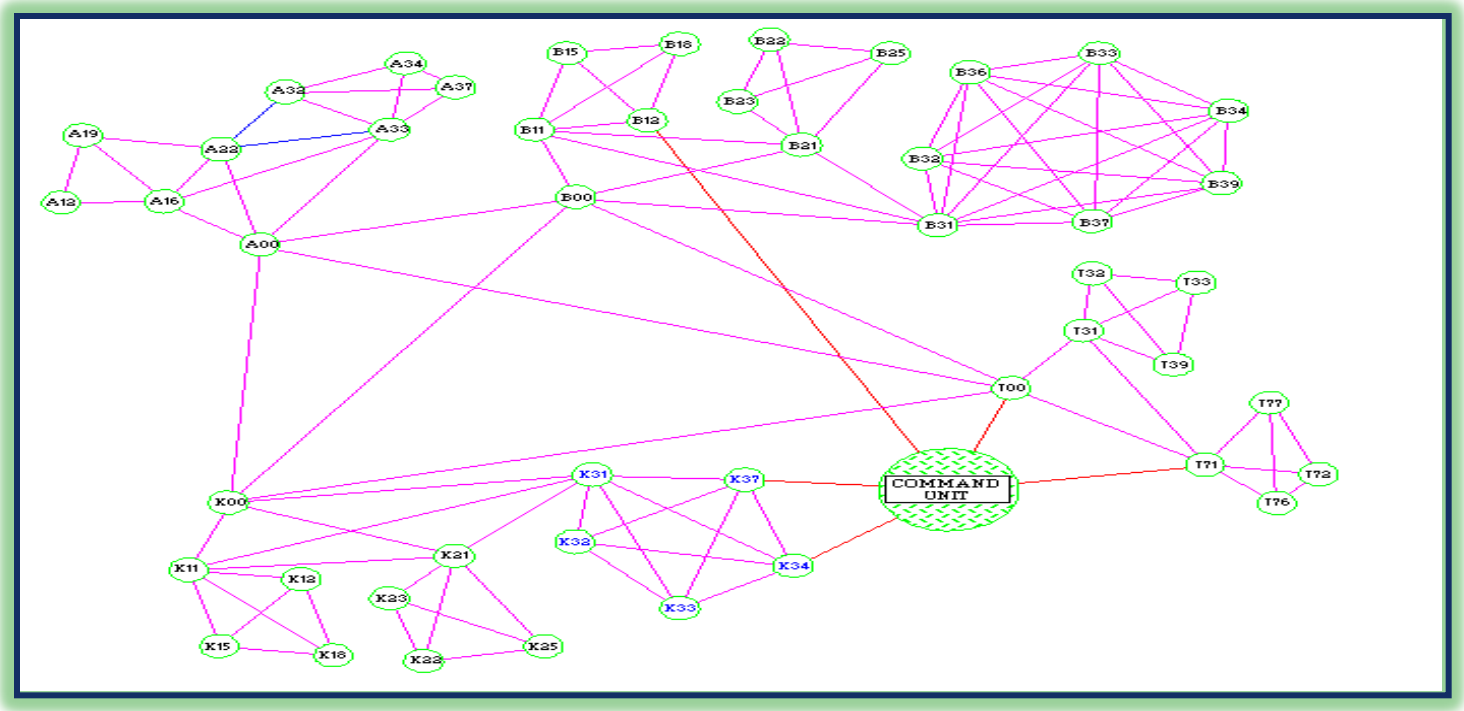
If a football team had these players on the field:

- Only 4 of the 11 players on the field would know which goal is theirs
- Only 2 of the 11 would care
- Only 2 of the 11 would know what position they play and what they are supposed to do
- 9 players out of 11 would, in some way, be competing against their own team rather than the opponent

Book Excerpt: *The 8th Habit, FORTUNE Magazine, November 29, 2004, page 162*

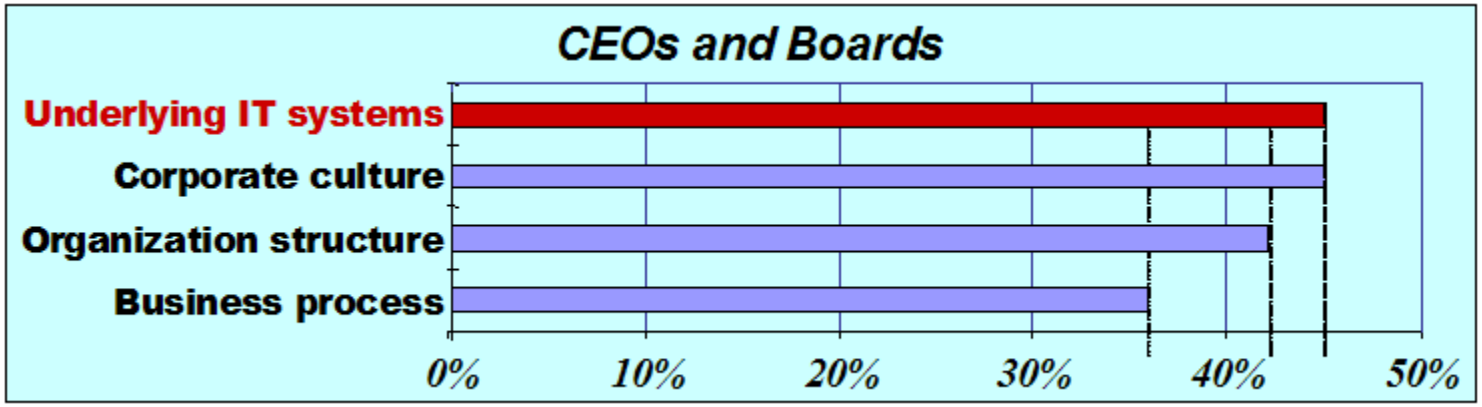
The complexity of systems has caused IT to be reactive rather than proactive

- Silo'd solutions, db's and applications with trapped business rules
- Multiple sources of information and no single "truth"
- No **"Architectural Blueprints"** to the enterprise…



Setting Up The Problem

Management Is Not Getting The Right Info



Major inhibitors to strategic change

Gartner

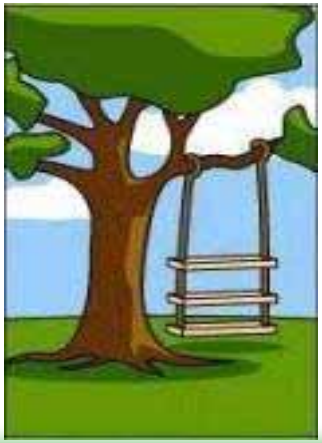
64% of CIO's answer 'No' to the question:
"Is management getting the right (secure) access and integrated information for making smart business decisions?"

Setting Up The Problem

What Is The Business Problem?

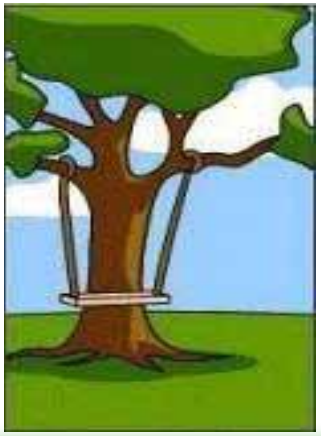
1. As proposed by the project sponsor

2. As defined by the requirements doc's



3. As designed by the Senior Analyst

4. As produced by the programmers



5. As installed at the user's site

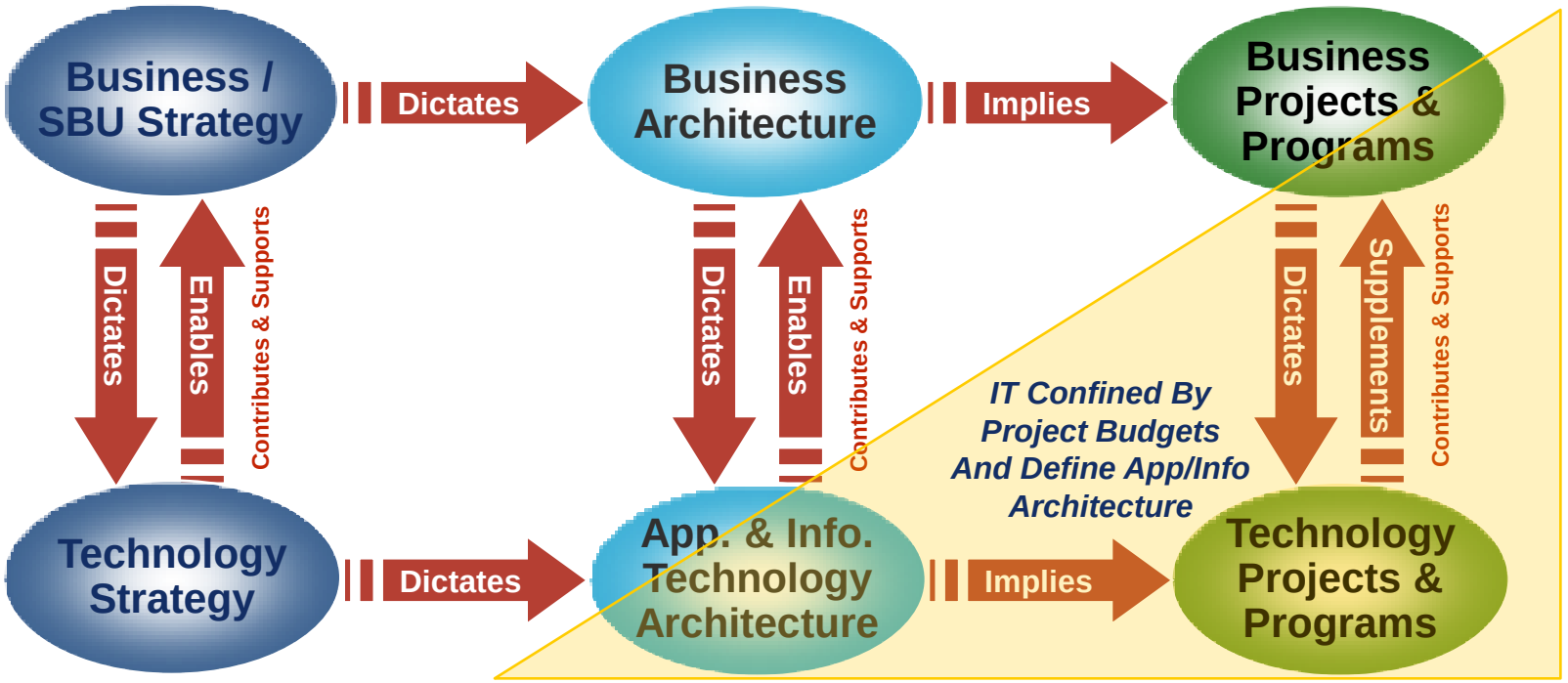
6. What The User Really Wanted!

"Analysts report that as many as 71% of software projects that fail do so because of poor requirements management, making it the single biggest reason for project failure"
– CIO Magazine, November 15th, 2005

Setting Up The Problem

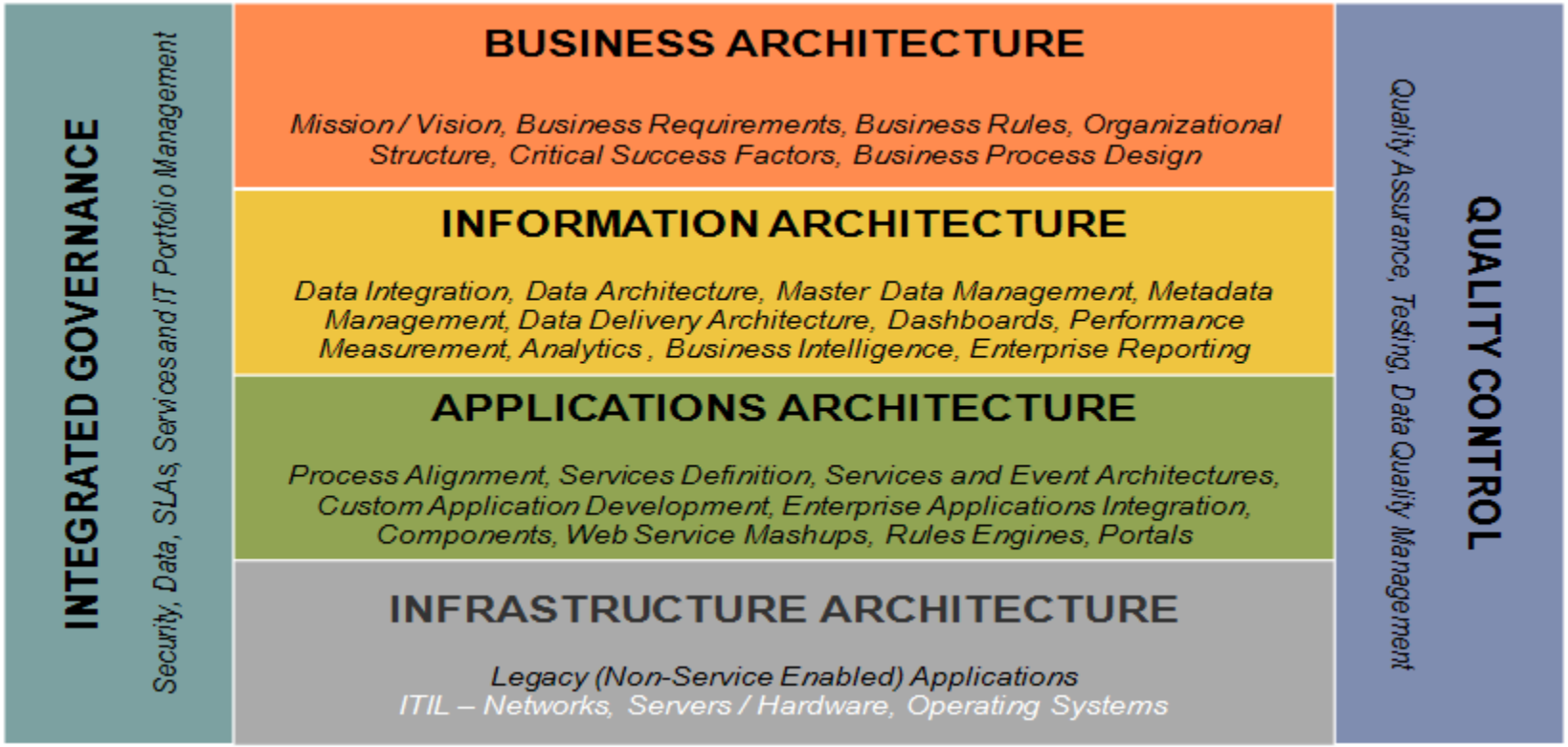
We're Missing Key Relationships

There Is An "Implied" Relationship Between Business & Technology Building Blocks



Business Architecture is a comprehensive framework for the representation of the business processes, information, rules, and organizational designs that result directly from the business strategy. It provides a coherent graphical means for the capture, management, and communication of business knowledge and needs to support business solutions in the form of actionable requirements.

- **At a minimum, basic layers are required to simplify building of solutions (creating abstractions)**
  - Business Architecture – Business Process, Requirements, …
  - Applications Architectures - SOA, EDA, WOA, WSx
  - Information Architectures – BI, D/W & Managed Data Environment



In the Gartner report: "Information & Application Architectures 2007," they note convergence of layers

- New architectures (SOA) have unprecedented info sharing
- A single common vocabulary and methodology required

	Architecture Viewpoints		
Perspective	**Business**	**Information**	**Technical**
Conceptual	▪ Process principles ▪ Organization requirements ▪ Functional map	▪ Information principles ▪ Integration requirements ▪ Information flow map	▪ Service-level requirements ▪ Software delivery principles ▪ Asset criticality
Logical	▪ Business process models ▪ Organizational rules	▪ Data models and design ▪ Object models ▪ Service and component design	▪ Technical reference model ▪ Patterns, frameworks and technical services
Implementation	▪ Business process rules ▪ Business services and workflows	▪ Data services ▪ Software services ▪ Databases ▪ Software solutions	▪ Service-oriented and event-driven architectures ▪ Business process platform

Source: Gartner (March 2007)

"Information & Application Architecture 2007 – 145355, Blecher & Sholler

- **Innovation**
  - Defined as: "Process of making change to do something new"
  - SBA's support rapid change of applications "functionality"
- **Agility**
  - Agility means the capability of rapidly and cost efficiently adapting to changes
  - SBA's built on easy to assemble and re-configure components
- **Reuse**
  - Services architectures support very high re-use of components
  - Governance / traceability are foundational pillars of SBA's

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Defining Information

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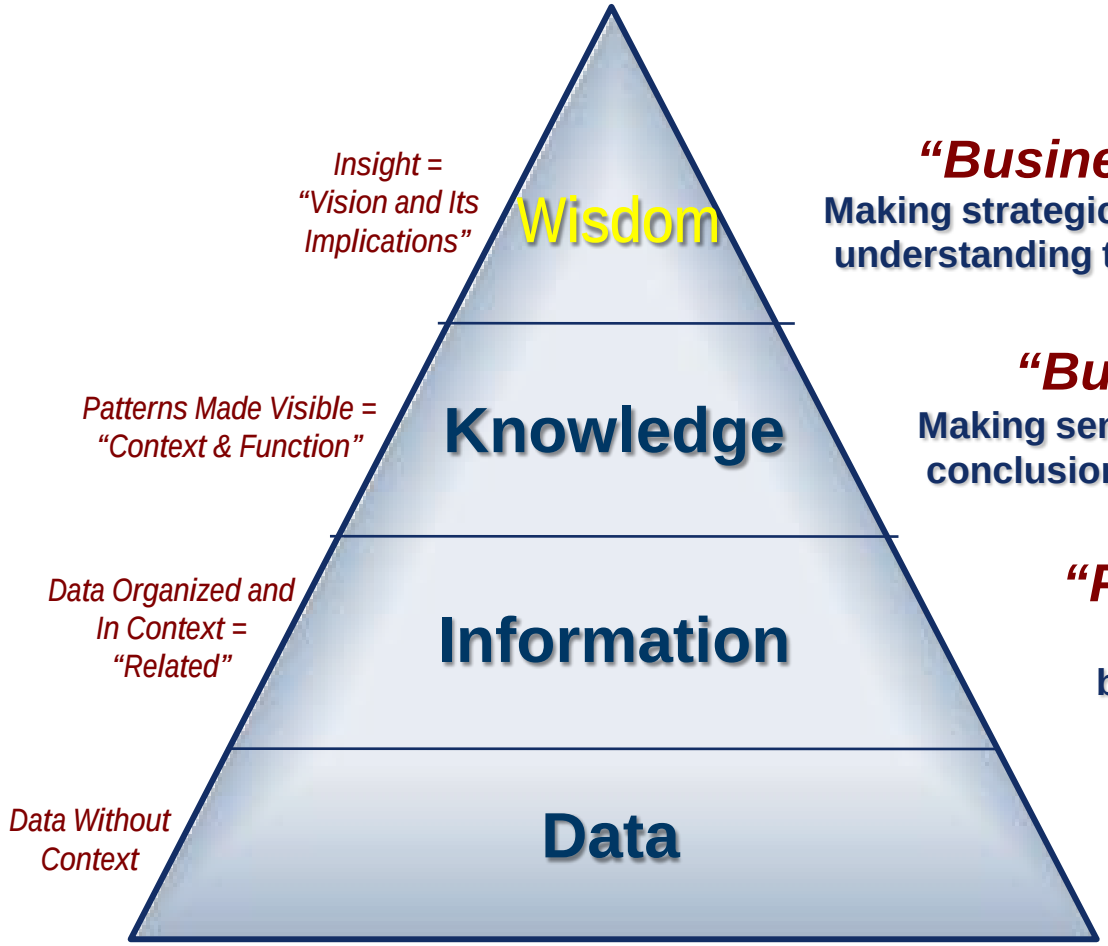
"*Business intelligence* (BI) refers to skills, knowledge, technologies, applications, quality, risks, security issues and practices used to help a business to acquire a better understanding of market behavior and commercial context."

Wikipedia



"Business Strategy Management"

Making strategic judgments based on the insight gained by understanding the business situation, metrics, and trends

"Business Intelligence & D/W"

Making sense of these facts so that we can now derive conclusions from related and non-related information

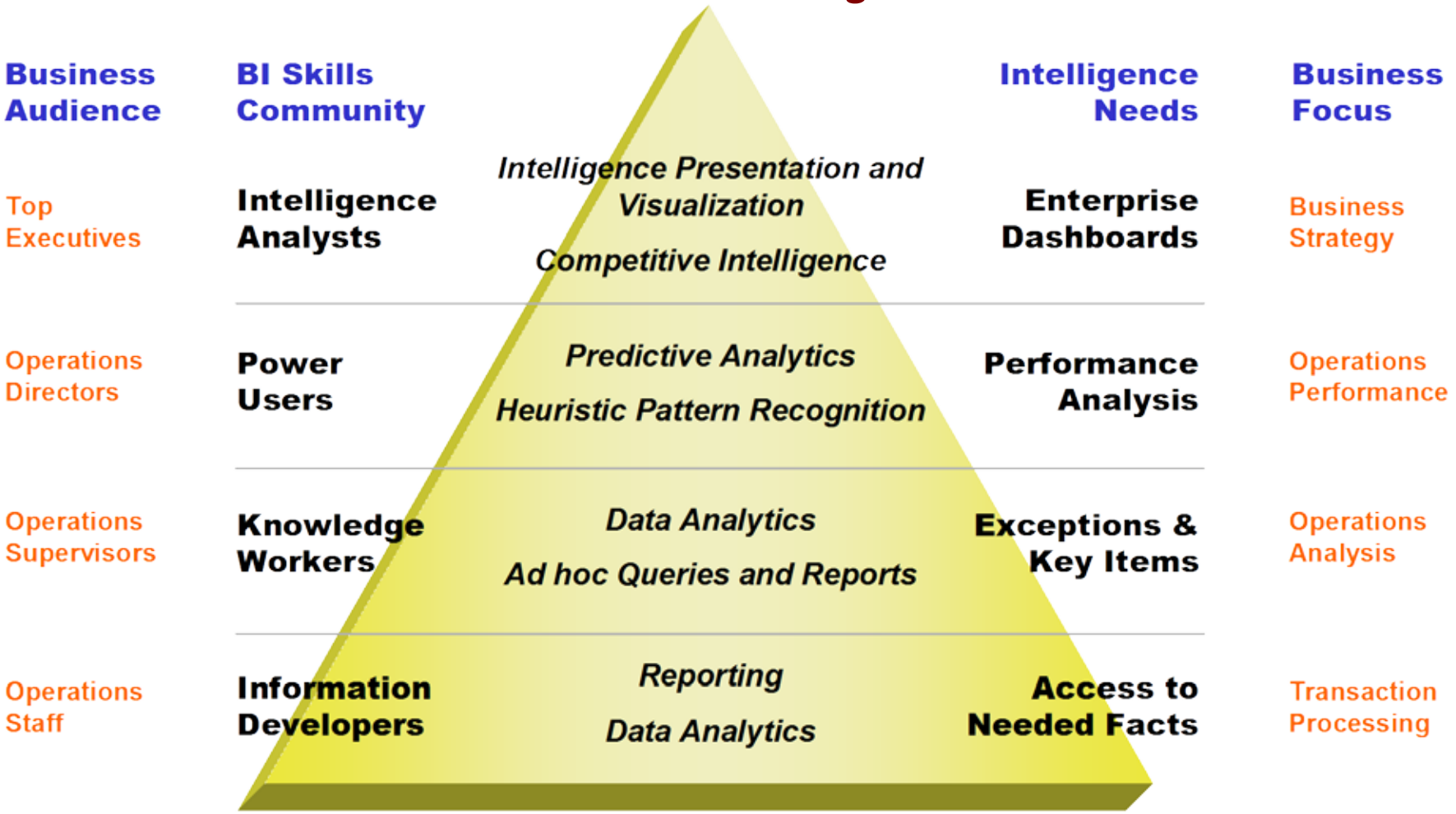
"Performance / Op Reporting"

Placing data into the context of the business and its operational processes

Raw Data / Reporting Projects

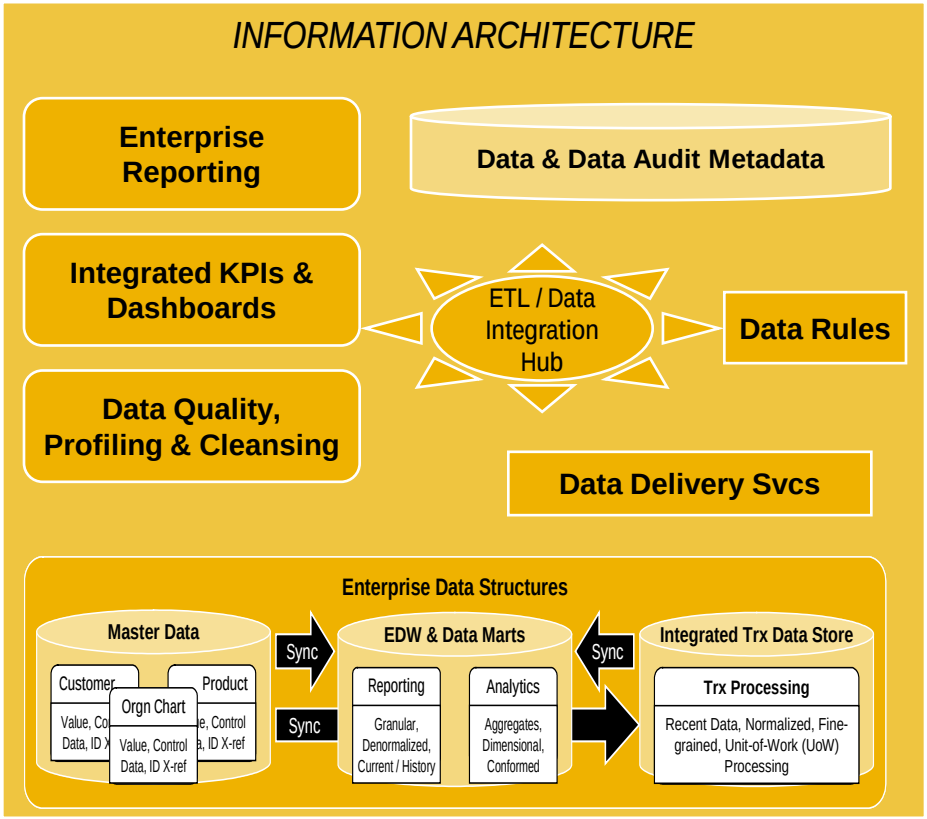
Analyze raw data to create end user reports

"Is management getting the right information for making decisions?"
64% of CIOs answer 'No' according to Gartner Research



For SOA-enabled applications to satisfy this wide range of diverse needs and users requires a new class of services: Data Delivery Services

Managed Data Environment



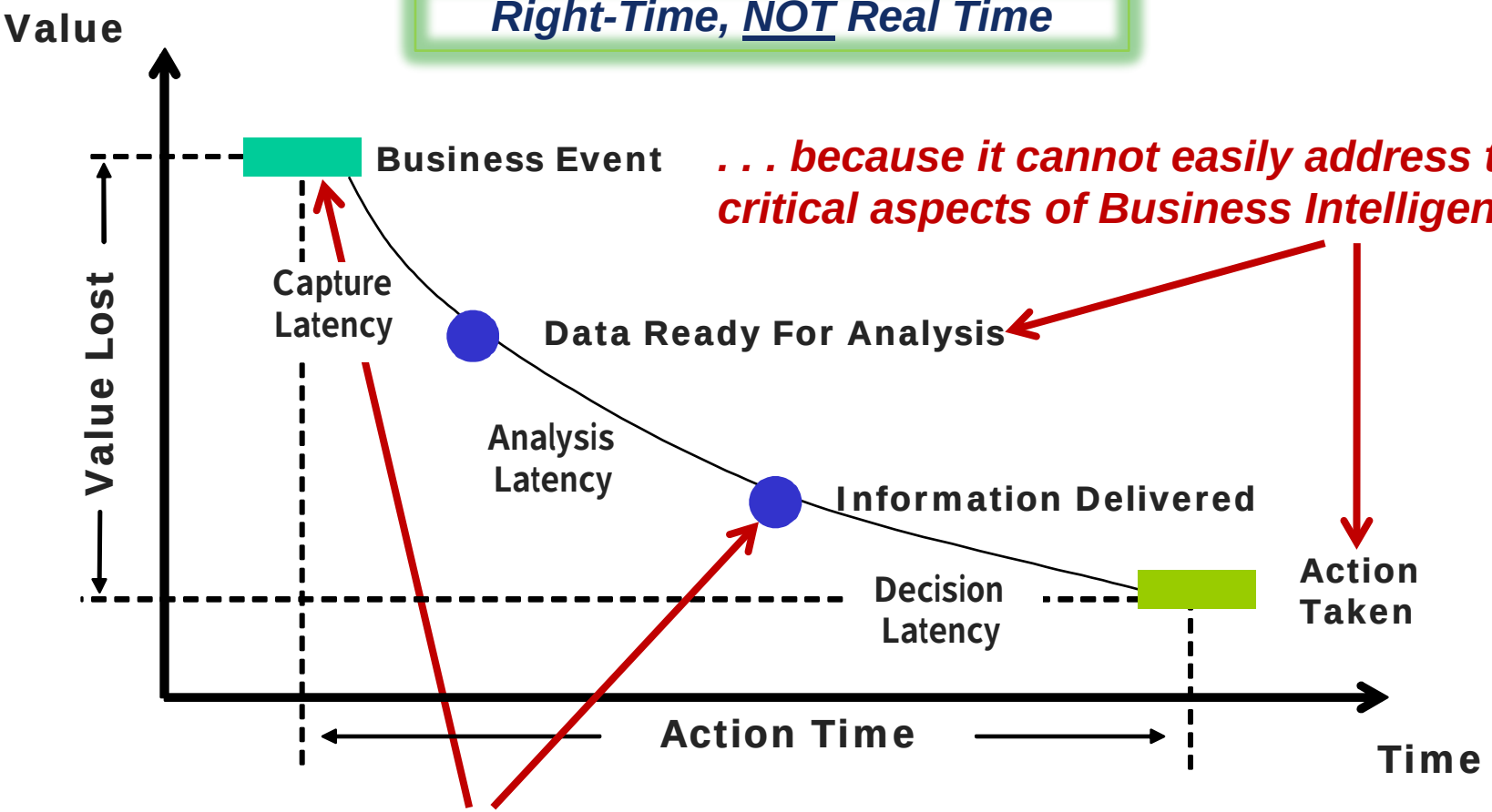
A Managed Data Environment is more than 'the single source of truth', it is the business's 'information assurance and delivery mechanism'

Strategy Components

- **Business Drivers**
  - problems, needs, initiatives and priorities
- **Data Management**
  - metadata and master data
  - standardization and quality
  - security, compliance, and governance
- **Information architecture**
  - modeling and structuring data
  - ETL data integration and rules
  - OLAP and reporting management
  - data delivery services (SOA-compliant)
  - data technologies compatibility
- **Performance management**
  - KPI relationships and metrics structure
  - dashboard development and integration
- **Analytics management**
  - enterprise reporting
  - analytics in transaction processing
  - "real-time" analytics
  - business activity monitoring (BAM)

THE TIME VALUE CURVE©:

Right-Time, NOT Real Time

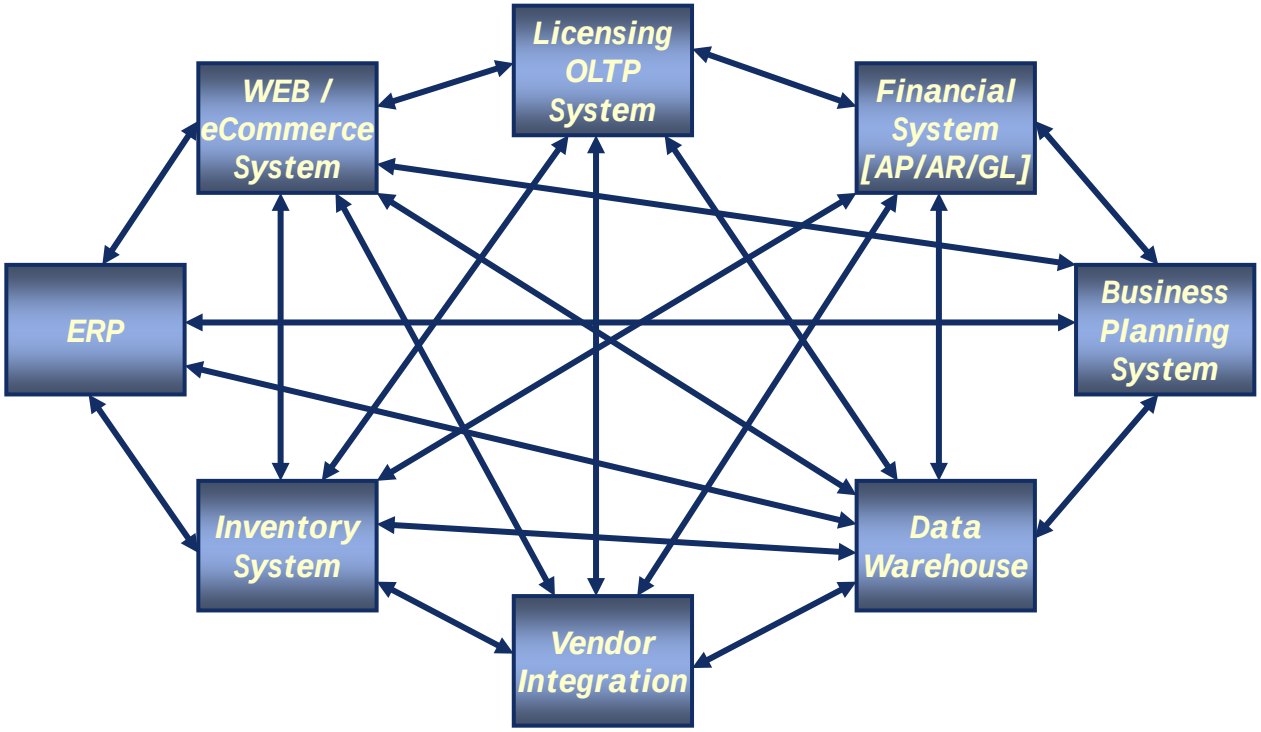


. . . because it cannot easily address these critical aspects of Business Intelligence

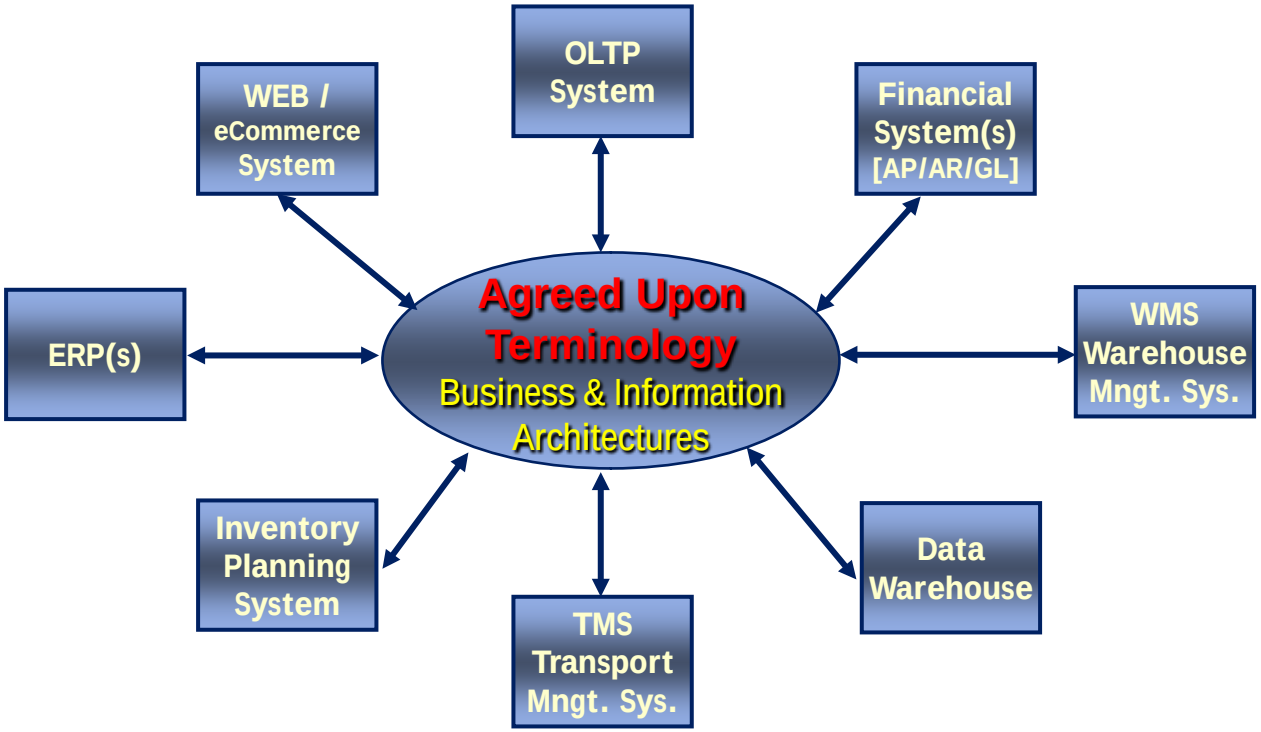
SOA can connect these two points in time, but it creates a false sense that technology solves the problem . . .

So, the complexity of IT systems has caused a "heroic" approach to integration that is chaotic

- *Mix of batch and real time transfers*
- *For every added system, have (N - 1) interfaces*
- *Multiple security mechanisms*
- *Multiple, disparate copies of data*
- *Inconsistent semantics*
- *No single dictionary / metadata*

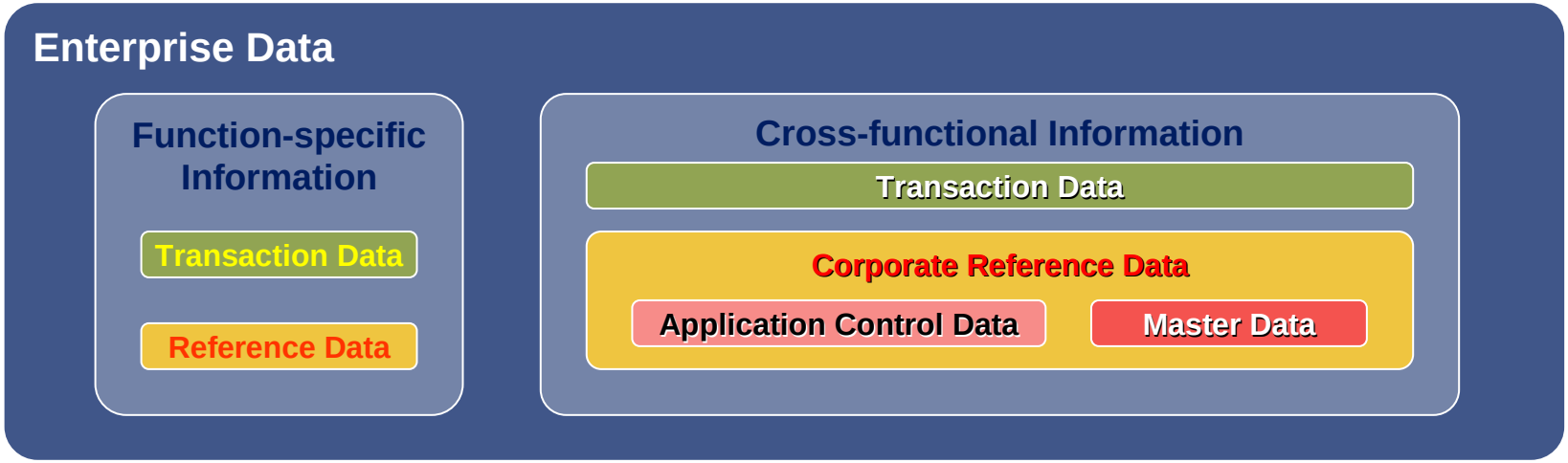


- **Business Intelligence / Data Warehouse and SOA must have an "agreed upon" terminology (metadata, meta-processes, models) – this is not a technology – which is used across the business so work is accomplished effectively.**
  - ***Architected***
    - ***Independent of technology (.NET, J2EE, and so forth)***
    - ***Agreed upon terminology and processes***
    - ***Built on consistent semantics, taxonomy, classifications, and rules***
    - ***A single security mechanism***
    - ***Defined events and processing aligned with business operations***



What is Master Data?

- Master data is the critical information that provides context and integrity to transactional data in the enterprise
- Some of the typical characteristics of Master Data that help understand it better are:
  - **Master Data usually contains hierarchies that provide ways to aggregate transactional data, e.g., customers roll up to households, days roll up to weeks/months/quarters etc.**
  - **Master Data typically changes less frequently than transactional data and share a "one-to-many" relationship, e.g., one claim may have multiple payment transactions**
  - **Master Data is almost always cross-functional, e.g., the list of customers is used by Marketing, Sales, Finance etc.**



Why Master Data Is Important

- Master data, or reference data, is information that is key to the operation of business . . . . This key business information may include data about customers, products, employees, materials, suppliers, etc. which often turns out to be non-transactional in nature.
- In this regard, master data can support transactional processes and operations, but its use is certainly not limited to such (analytics/reporting is another area greatly dependent on an organization's master data).
- Master data is often used by several functional groups and stored in different data systems across an organization and may or may not be referenced centrally; therefore, the possibility exists for duplicate and/or inaccurate master data.
- Thus Master Data is that persistent, non-transactional data that **defines a business entity for which there is, or should be, an agreed upon view across the organization**.

Wikipedia

The Consistency, Correctness, and Control That Master Data Provides Enables SOA and the Business

End-to-End Data Management

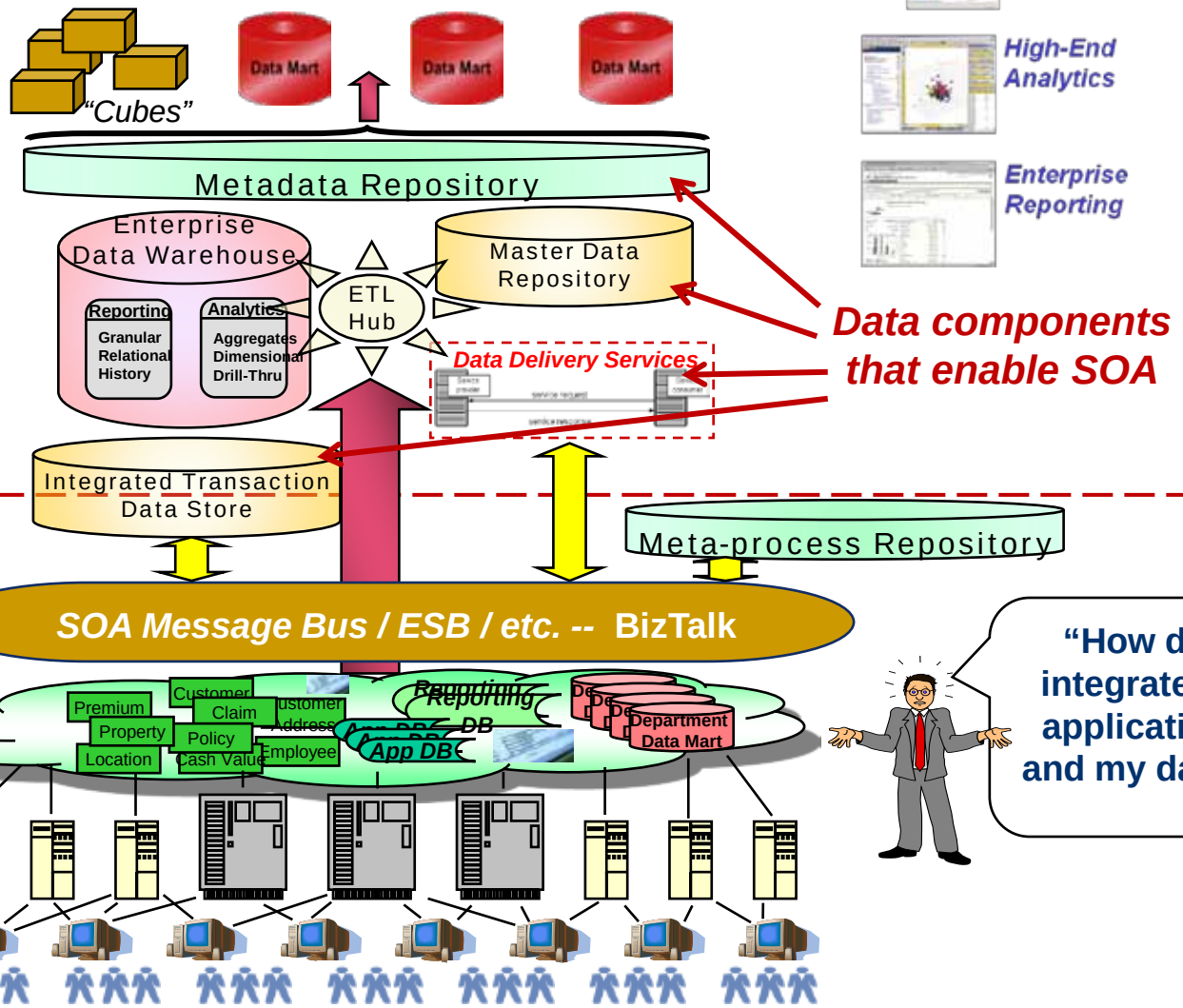
(Data Consolidated, Aggregated, Standardized, Dimensions Conformed)

Specialized Data Marts

Built as needed from the EDW

Enterprise Data Warehouse (EDW)

Data extracted from source systems of record



Universe of Application Data

Universe of Applications

Managed Data Environment

Application Environment

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Defining SOA

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What Is A "Unit Of Work" of "UOW"?

- Group of data attributes (or elements) that provides for a complete business or technical transaction (function like update address)
- Should conform to the rules of "ACID" (SOA & EDA)
  - Atomicity – Guarantee all the tasks of a transaction are performed
  - Consistency – Ensures the database remains in a consistent state
  - Isolation – Cannot see the data in an intermediate state
  - Durability – Guarantee the transaction will persist, and not be undone

What Is A "Service"?

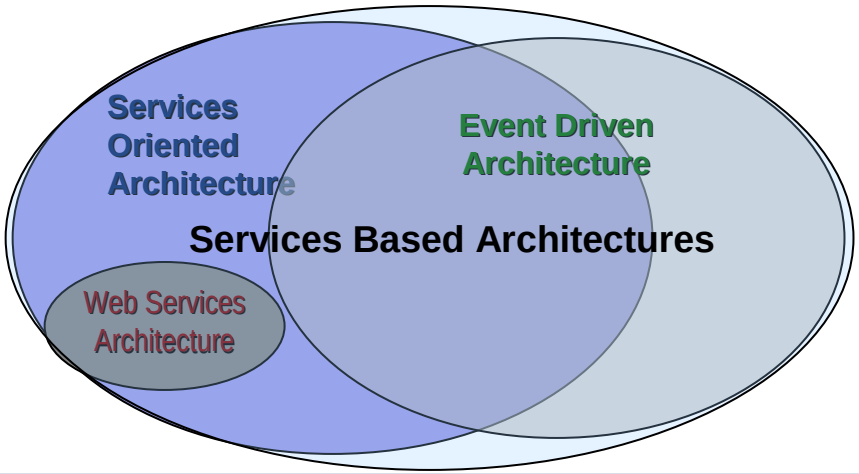
- A service is an application that operates on or delivers a Unit Of Work
- Is Designed To Receive Requests From Any Source Making No Assumptions As To The Functional Correctness (Syntactic Or Semantic) Of An Incoming Request.
- Within Each Request, Encompasses A Complete & Independent Unit Of Work (Business Or Technical)
- May Stand On It's Own Or Be Part Of A Larger Set Of Functions That Constitute A Larger Service; But It's Scope Is Such That Each Request Leaves The System In A Long Term Steady State
- Is Designed For And Provides For A Network-Accessible Interface
- Keep UOW's Together That Change Together (High Cohesion) & Build Separation Between Units That Change Independently (Low Coupling).

The means by which the needs of a service consumer are brought together with the capabilities of a service provider.

- **Business Architecture**
  - Defines requirements and needs in a top-down methodology
- **Model-driven development**
  - Foundation is reusable/iteratively developed integration approach
- **Managed Information Environment**
  - Information architecture, metadata and delivery services defined
- **Process Integration (messaging component)**
  - Orchestration, choreography & event correlation (real-time)
- **Governance and Security Architecture**
  - Architecture governance (Frameworks, Methods, Standards, etc.)
  - Development control (Reference Arch., SLA's, etc.)
  - Security Architecture
- **Resources and Tools Integration**
  - Organization (Reuse planning, component management, etc.)

- **A services based architecture can be built minimally in one of four architectural paradigms**
  - **Services Oriented Architecture [SOA]**
    - Utilizes **common metadata/processes** with real-time services
  - **Event Driven Architecture [EDA]**
    - Utilizes **common metadata/processes** with event-based services
    - Event "Sources" & "Sinks"
  - **Web Oriented Architecture**
    - **Does not use metadata**
    - Handles complex events
  - **Web Services Architecture**
    - **Does not use metadata**
    - Processing only
    - No event processing

Venn Diagram Of Services Architectures

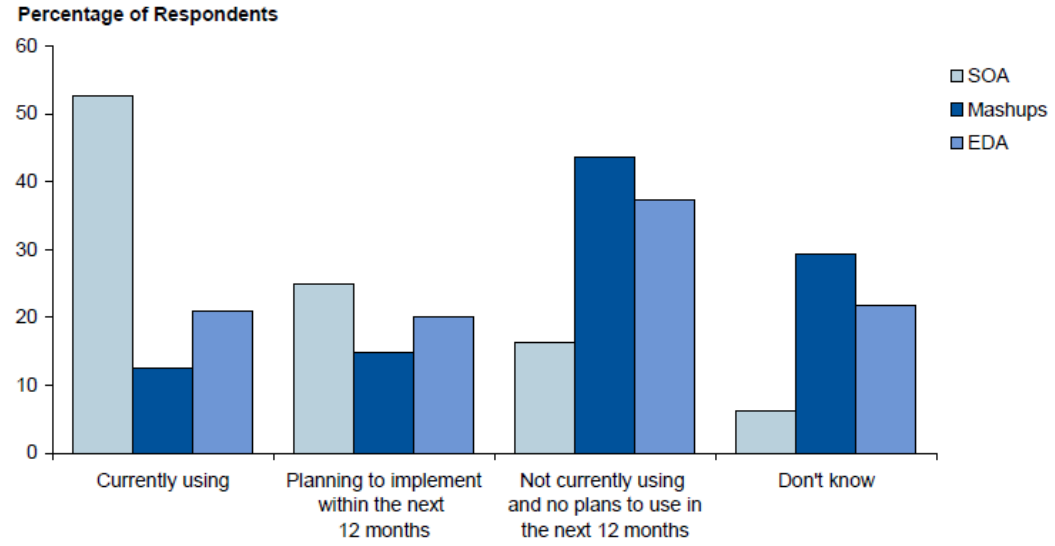


- **A services based architecture can be implemented minimally using one of three approaches**
  - **Top-Down Approach**
    - Referred to as "**Business Process Decomposition**"
    - Original, Model-Driven Development approach to building SOA's
  - **Bottom-Up Approach**
    - Referred to as "**Legacy Wrapping Approach**"
    - Creates "Wrappers" that create interfaces to Mainframes and ERP's
  - **Inside-Out or "Darwinian" Approach**
    - This method utilizes a "**Information-Centric approach**"
    - Used commonly when implementing "Master Data Management"
    - Originally popularized by Dr. Peter Aiken (XML Author)

Always Developed Iteratively – Never "Big Bang"!

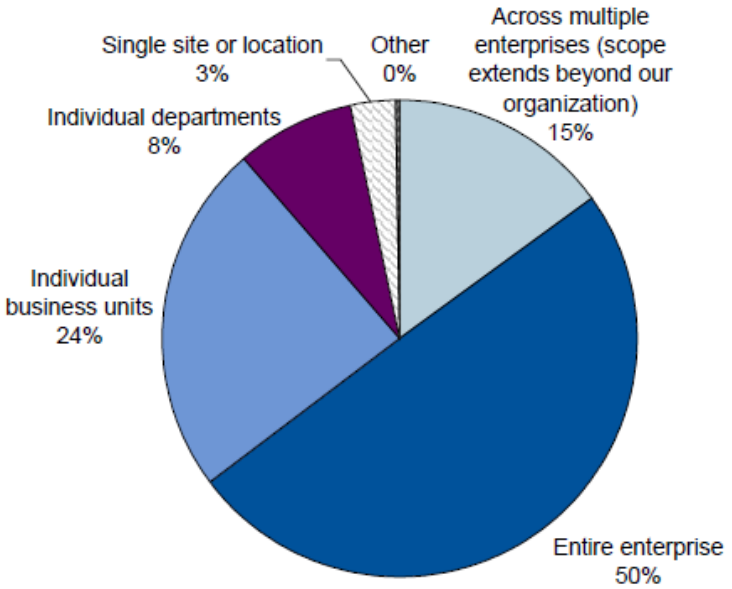
Defining SOA

SOA Is The Future Of Development



Source: Gartner (September 2008)

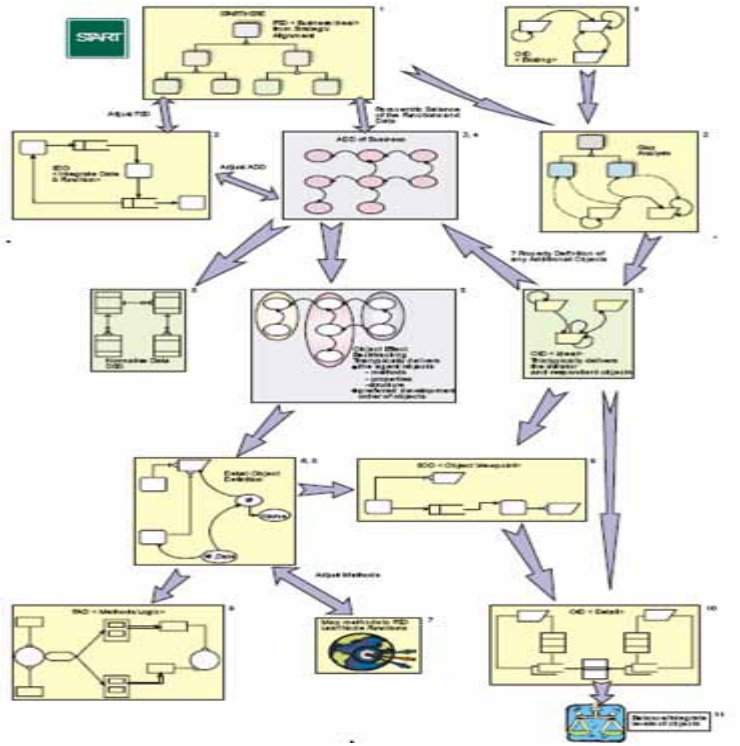
Gartner: "SOA Is Now Mainstream"

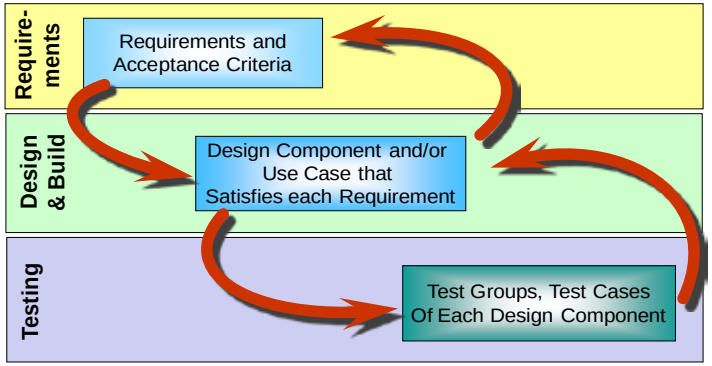


- SOA is a process not a product or tool
- "Culture Shift"
- SOA makes change easier with re-usable components

Source: Gartner (September 2008)

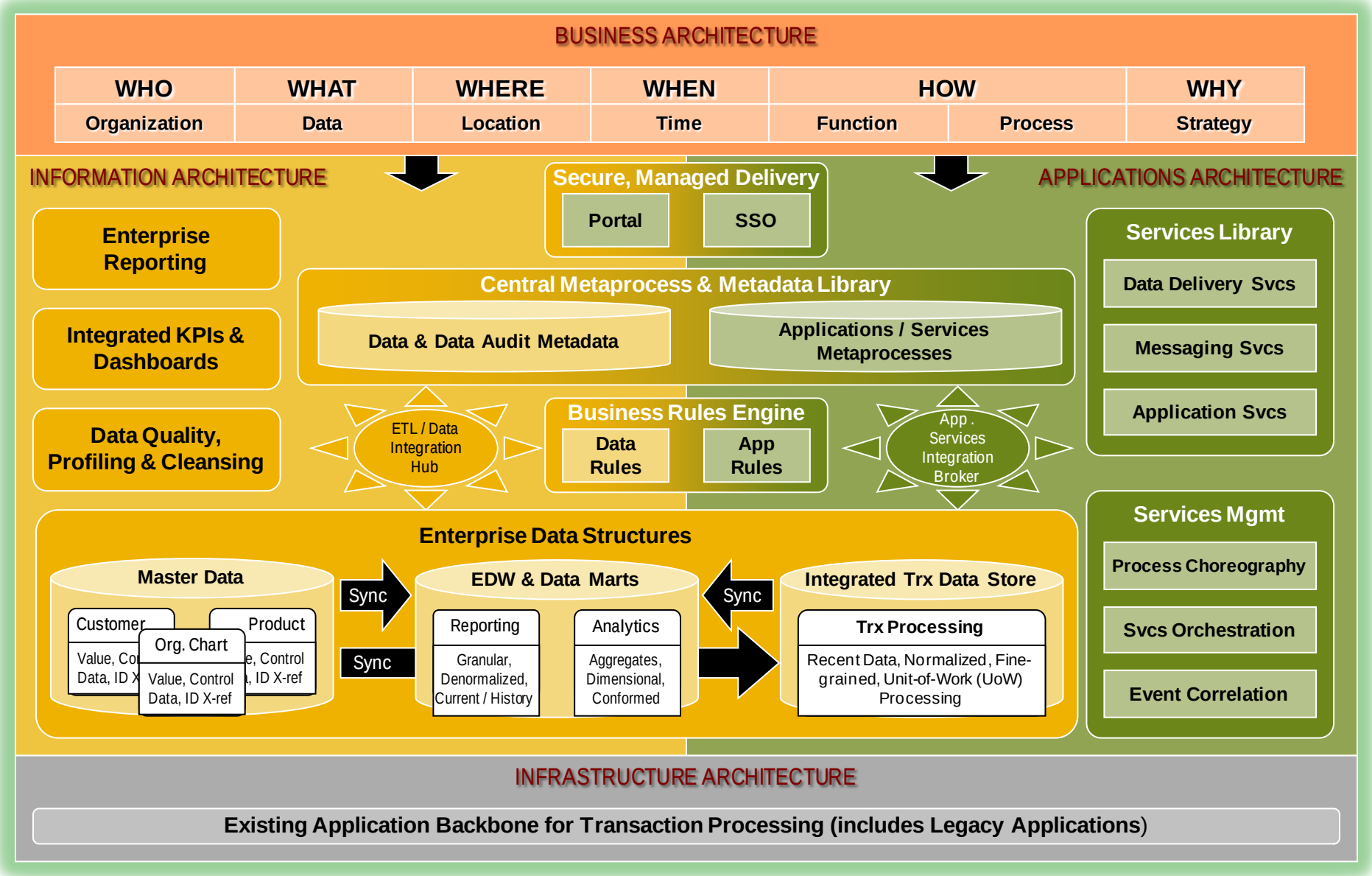
- Define business requirements in a manner that aligns IT and Business
- "Business Architecture" is graphical (pictures) and easy to understand
- Supports both application and information architectures
- Process is vendor agnostic
- A picture is worth a thousand words
- Provide for checking consistency and completeness throughout (Requirements Traceability)
- Supports incorporation of quality control and governance processes
- Model-driven approach should use a repository-based tool





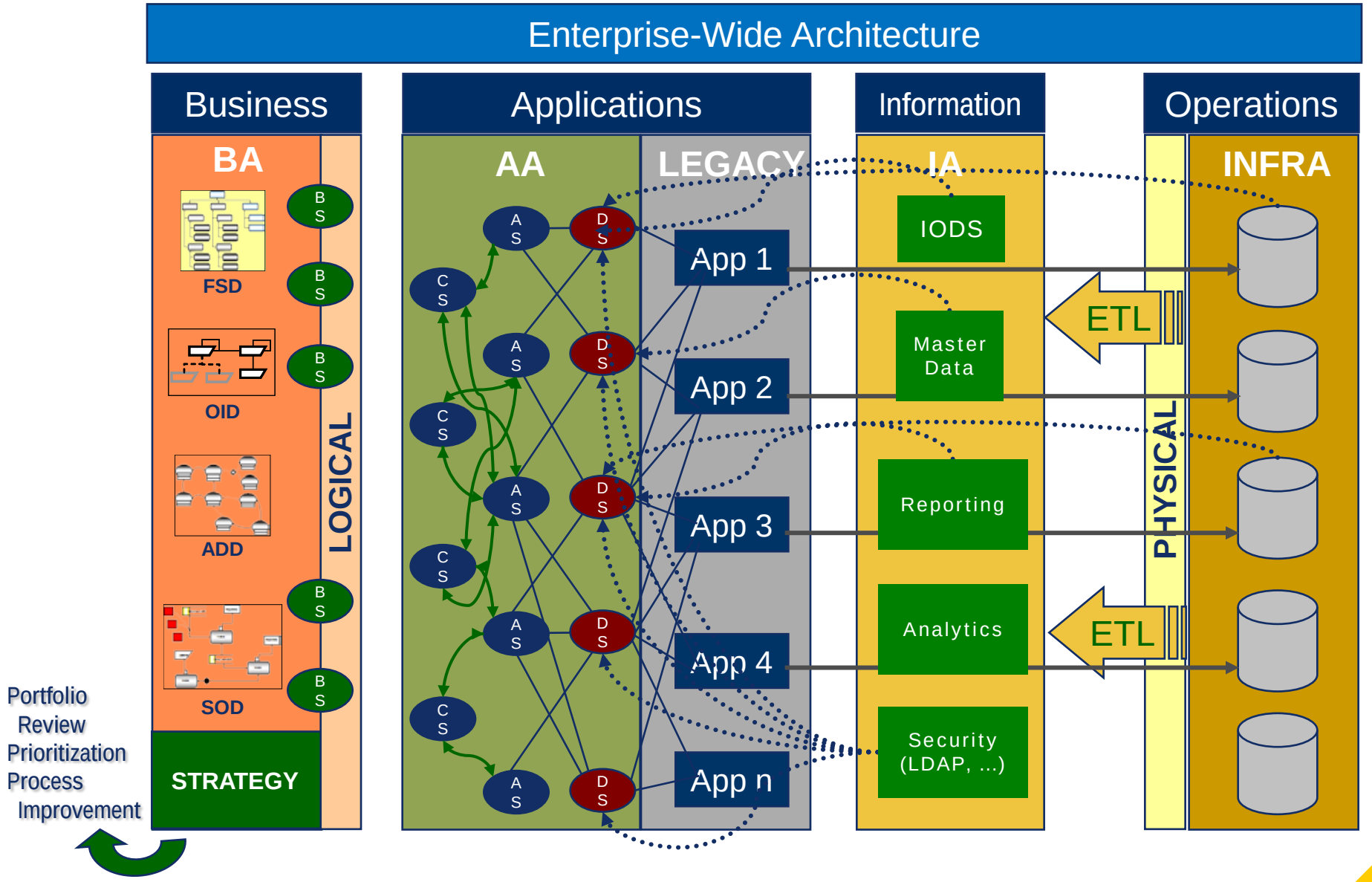
Defining SOA

SOA Implies Reference Architecture



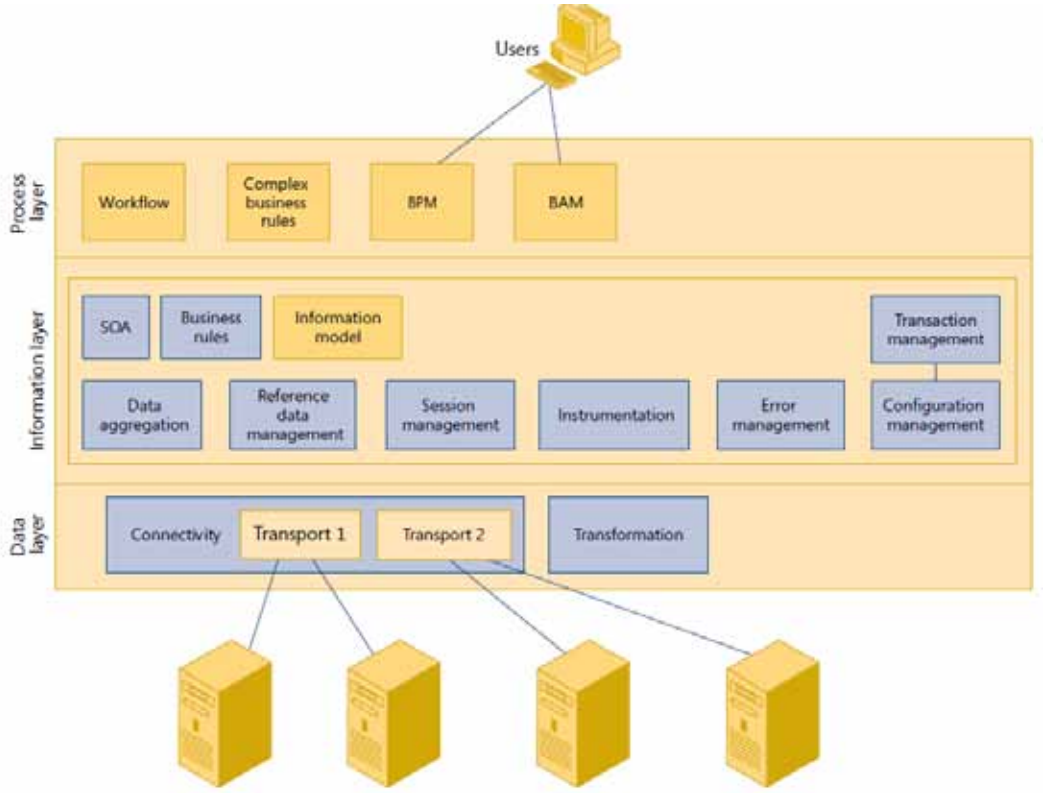
Defining SOA

SOA Conceptual Pictorial



Applications & Data Integration

Utilizing BizTalk As Workflow Server



Layer	Requirement	Description
Data	Connectivity	Basic connectivity in which applications are able to communicate with each other
	Transformation	Translation of data format, and so on among applications
Information	Data aggregation	Aggregated view of data across multiple systems
	Business rules	Development of business rules across multiple systems
	Transaction management	Ability to perform ACID transactions across multiple systems
	Information model	A cohesive data model across all systems where a common understanding of data entities and structure is achieved
	Reference data management	Management of commonly used reference data from multiple systems in a single location
	Session management	Management of session information across interactions and across systems
	Instrumentation	Common point for the logging of operational information
	Error management	Consistent approach to error management from a single rule set
	Configuration management	Ability to configure the run-time operation of the entire system, configure its communication with the various systems that make up the environment, and deploy new versions of the various components
	Workflow	Workflow processes that cross multiple systems
Process	Complex business rules	Shared, reusable business rules that cross multiple systems
	Business process modeling	Modeling of business processes across systems for optimization and integration
	Business activity monitoring	Monitoring the speed and efficiency of end-to-end business processes for optimization and issue tracking

Source: Microsoft *"The Architecture Journal"*, Journal 7, Page 19

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Effective Governance

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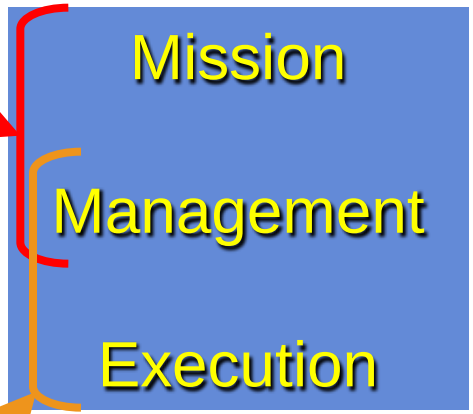
- **Governance** is the development and integration of a set of rules (policies, guidelines, and standards) for managing the corporation's assets (i.e.: Data)

- **Stewardship** is the execution of the policies and procedures set forth by the Governance Framework.

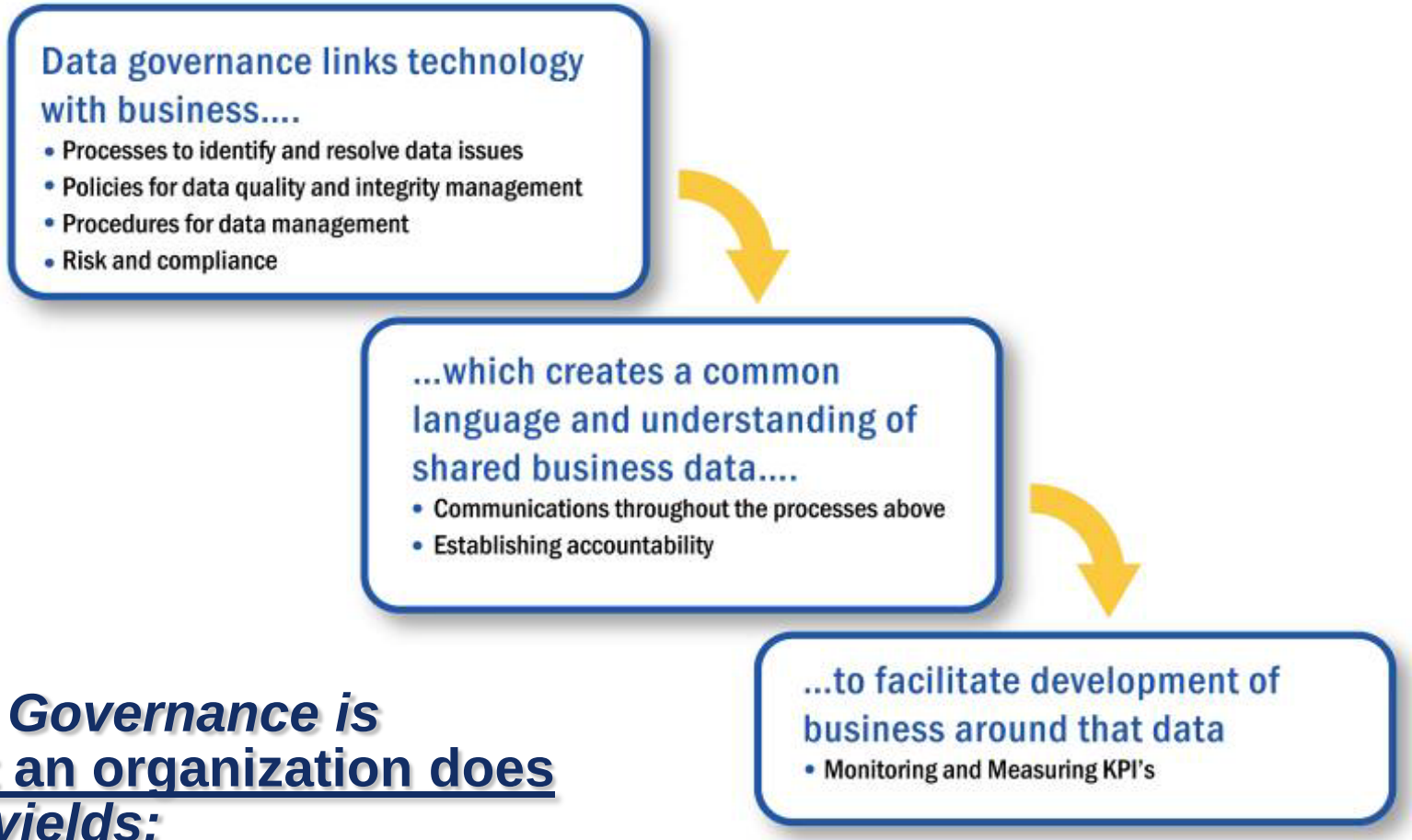


Governance provides a link between technology and business.

- That link is a common language and understanding of shared business data.
- It should facilitate the development of business around that data.

Stewardship provides the mechanism to implement the policies and limitations imposed by the Data Governance Plan or management.

- It should manage the development and execution of business data and day to day exceptions around that data.

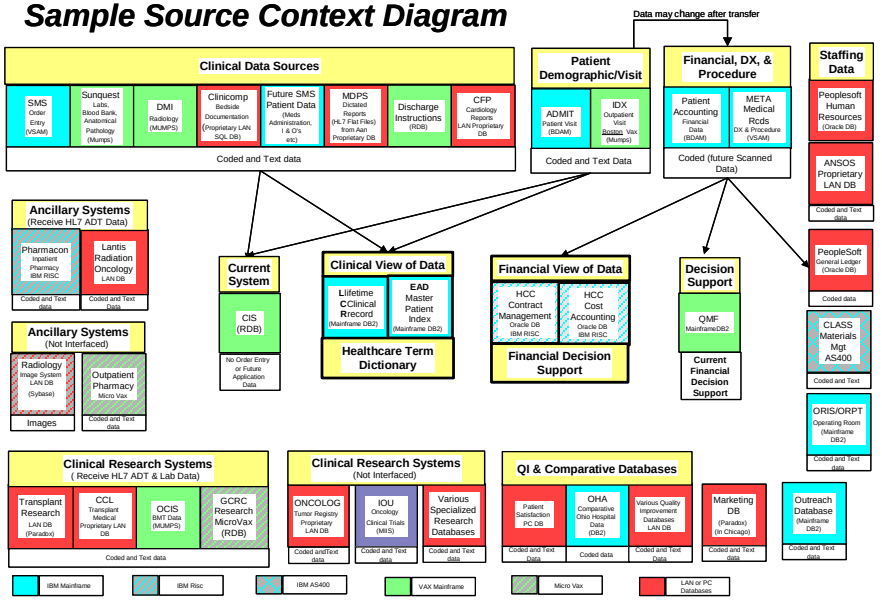


Data Governance is <u>what an organization does</u> that yields:

- **The highest quality decisions made at the lowest cost.**
- **Increased efficiency in conducting/completing IT projects for the business.**

§ Information / Data Governance includes…

- The development and integration of a set of rules (policies, guidelines, and standards) for managing the corporation's data
- Dedicated management of process and communications
  - Implementation of a Data Governance Management Team / Governance Manager
  - Formation of escalation process to gain consensus / empowerment to implement resolutions
- Artifacts include
  - Governance Charter / Model
  - Governance Guidelines / Policies
  - Enterprise Data Model
  - Data Mngt./Distribution Roadmap
  - Business Process Model(s)
  - Data Life Cycles
  - Business Rules
  - Source To Context Diagram



- **With SOA - Architecture & Governance are more inseparable**
- **Areas to consider wrapping with Governance / Quality**
  - **Business Processes** – governing business processes ensures compliance, control, consistency, and management of core processes used in the business
  - **Architectures** – governing architectures addresses the design 'blueprint' that binds business processes, applications and services, and data, together
  - **Data** – governing data addresses master data, metadata, data lifecycle, data quality, and data access in applications, analytics, reporting, B2B, and self-service for customers, suppliers, and employees
  - **Applications & Services** – governing business processes for consistency requires governing the applications and web- and SOA-services that support them
  - **IT Portfolio** – governing the IT portfolio addresses the combination of applications and services, data, and architectures IT manages at the application and service level and the technology level to ensure interconnectivity and interoperability
  - **Security** – governing security manages the risks associated with a world of business interconnectivity and application interoperability
  - **Service-level agreement [SLA]** – governing SLA's establishes and monitors the performance expectations for the data center and IT responsiveness.

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South Florida Chapter Meeting

The Value Proposition

January 30th, 2009

RCG INFORMATION TECHNOLOGY

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- **Build A Managed Information Environment**
  - Incrementally to align business strategies and goals with applications and systems (as business units and IT learn to work together)
  - Implement through business & IT management policies and practices (Data Governance, Data Quality) – expandable to the enterprise!
- **Focus On Business Context And Develop A True Integrated Information / Application Architecture**
  - Provide for architectural alignment with business architecture
  - Separate data from applications architecturally
- **Foster A New Business – IT Relationship**
  - Change focus from managing resources and tasks to managing assets
  - Change IT focus from “tool jockeys” to “trusted advisor architects” similar to an external IT services provider adding business enablement
- **Manage technology limitations and incompatibilities**
  - **Build integration “bridges” not “silo’s”**

The Value Proposition

Return On Investment

- **SOA provides agility and that means competitive advantage…**
- **SOA has high ROI** →
- **With Business Intelligence and Data Warehousing the business improves the bottom line and high ROI's** ↙

Business Intelligence & Data Warehousing

.. should expect to gain approximately $7.15 million in cumulative benefits over five years. Savings come from a combination of labor productivity savings, cost avoidance, software cost savings / avoidance, and hardware cost savings / avoidance. The project is expected to generate $3.3 million in net benefits over five years, achieving an overall ROI of 172 percent and an internal rate of return of 52 percent… investment is expected to pay for itself in 19 months.

Source: TDWI What Works Report: *"Dell Consolidates European Support System to Achieve 172 Percent ROI in Five Years"*, Volume 20, November 2005

Business Value Snapshot

Organization: International, enterprise-level telecom provider

Operational challenge: The company sought to better manage its budgets and align its service management processes with business strategies

Solution: SOA

Annual Benefits:

- Downtime reduction of 33%, resulting in a savings of $2 million annually
- Improved customer retention, leading to a savings of $1.35 million annually
- Reduced time to market for new services, resulting in an annual benefit of $1.8 million
- IT cost reduction of $739,485

ROI: 327% over three years with payback in four months

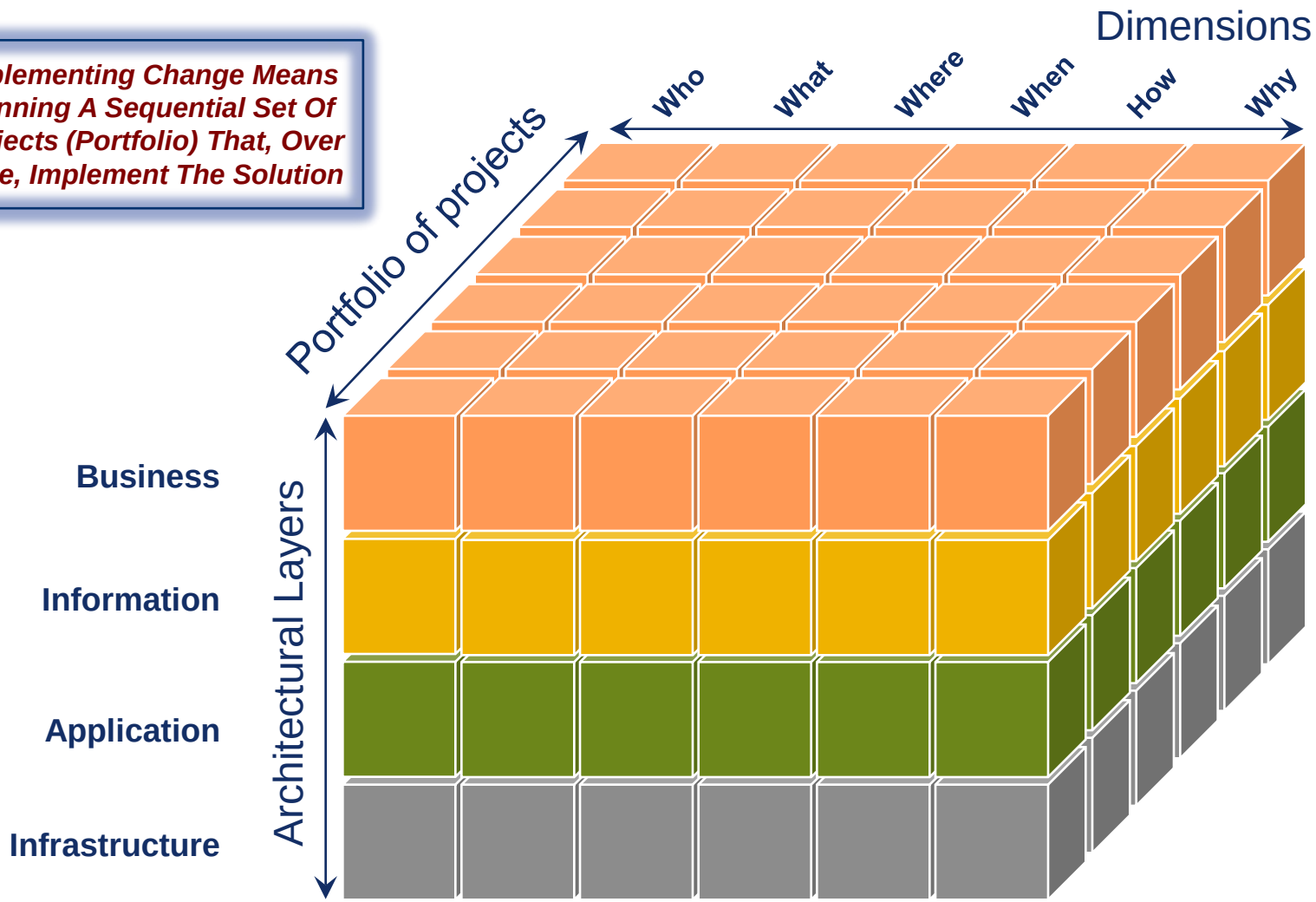
Source: IDC Business Value Report: "Reducing Operations Cost & Improving Customer Experience … SOA", August 2008, Page 1

The Value Proposition

Its All About Change

WHO	WHAT	WHERE	WHEN	HOW		WHY
Organization	Data	Location	Time	Function	Process Flow	Strategy

Implementing Change Means Running A Sequential Set Of Projects (Portfolio) That, Over Time, Implement The Solution



Questions & Answers *(Hopefully)*

Contact Information

"Services Based Architectures are the integration of people, process, technology, and artifacts creating an agile, interwoven and reusable enterprise of assets that solve real business needs and requirements" ***RJA -1996***

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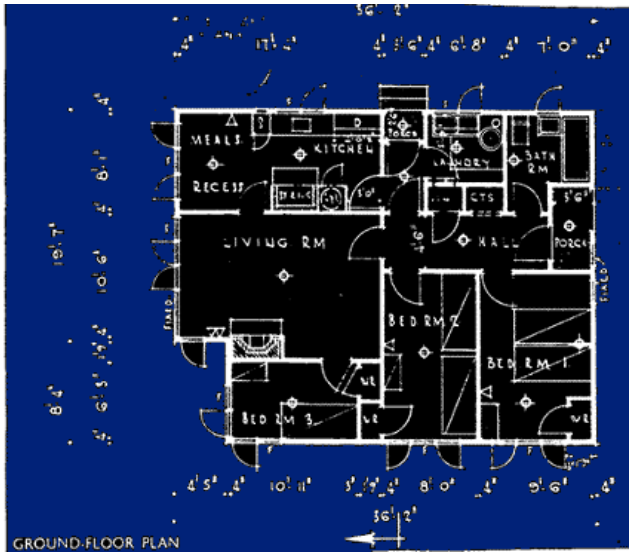

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