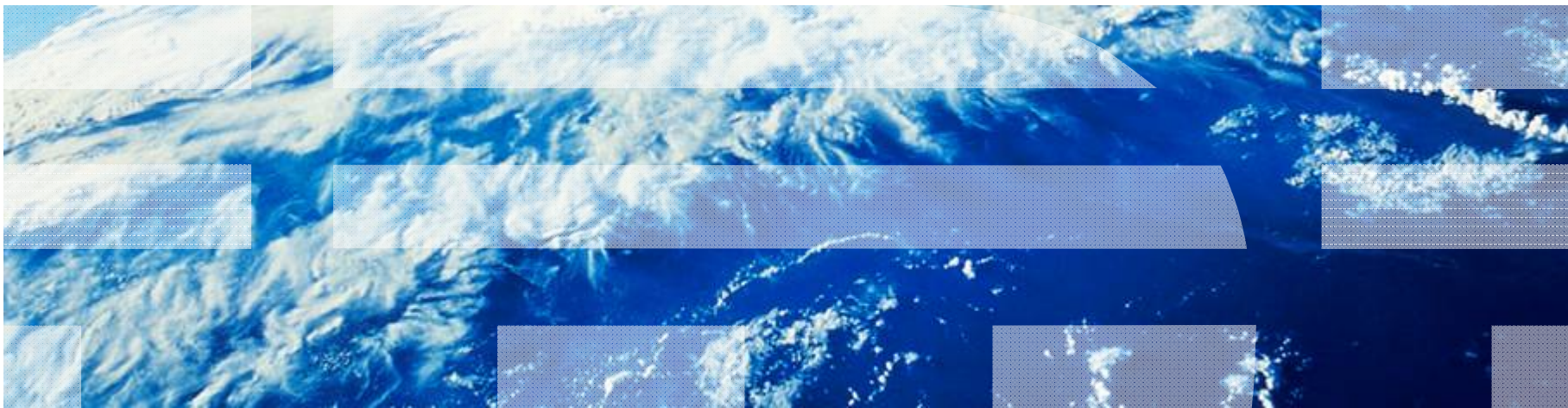Dr. Hans-Peter Hoidn
Worldwide SOA Team Member for CEEMEA
(Central Eastern Europe, Middle East & Africa)

Enterprise IT Architectures

EA (Enterprise Architecture)

Comments

- **The group presentations are on the IFI web page – thanks for your contribution**

- **Last lesson here next week – there will be some time for answering questions**

- **You may hand in questions via email**

- **Exam:
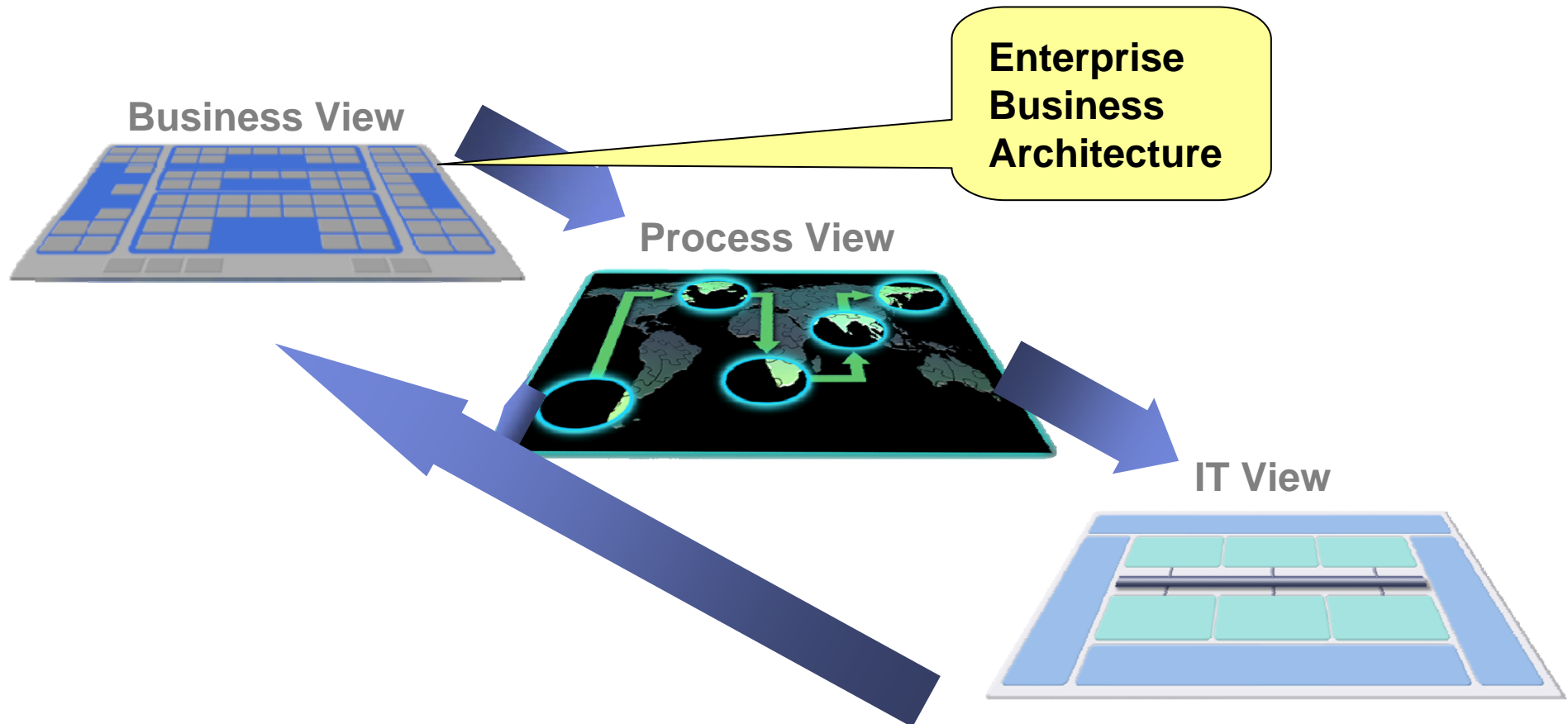Friday 22.01.2010 from 12:15 to 13:45 in 2.A.06/10
Open Book – Script can be used**

Agenda

I.   **Positioning Enterprise Architecture (EA)**

II.   **Enterprise Architecture – Main Aspects**

III. **Enterprise Architecture Methods**

IV. **Dynamic Infrastructure**

Recap: Aligning Strategy with Business and IT Execution

Business View

Enterprise Business Architecture

Process View

IT View

Positioning Enterprise Architecture (EA)

Why "Enterprise Architecture"

- *EA is helping enterprises do the right things right*

- **EA is a** holistic **approach to the control and co-ordination of IT based business projects**

- **Two viewpoints:**
  - Solution Architects **are focused on creating an IT based solution to a business problem**
  - Enterprise Architects **with a sense of what the enterprise needs to be and do, and how IT should be used in a wider sense**

Winchester House Syndrome

Yesterday's management approaches are not working in today's complex and fast-paced environment.
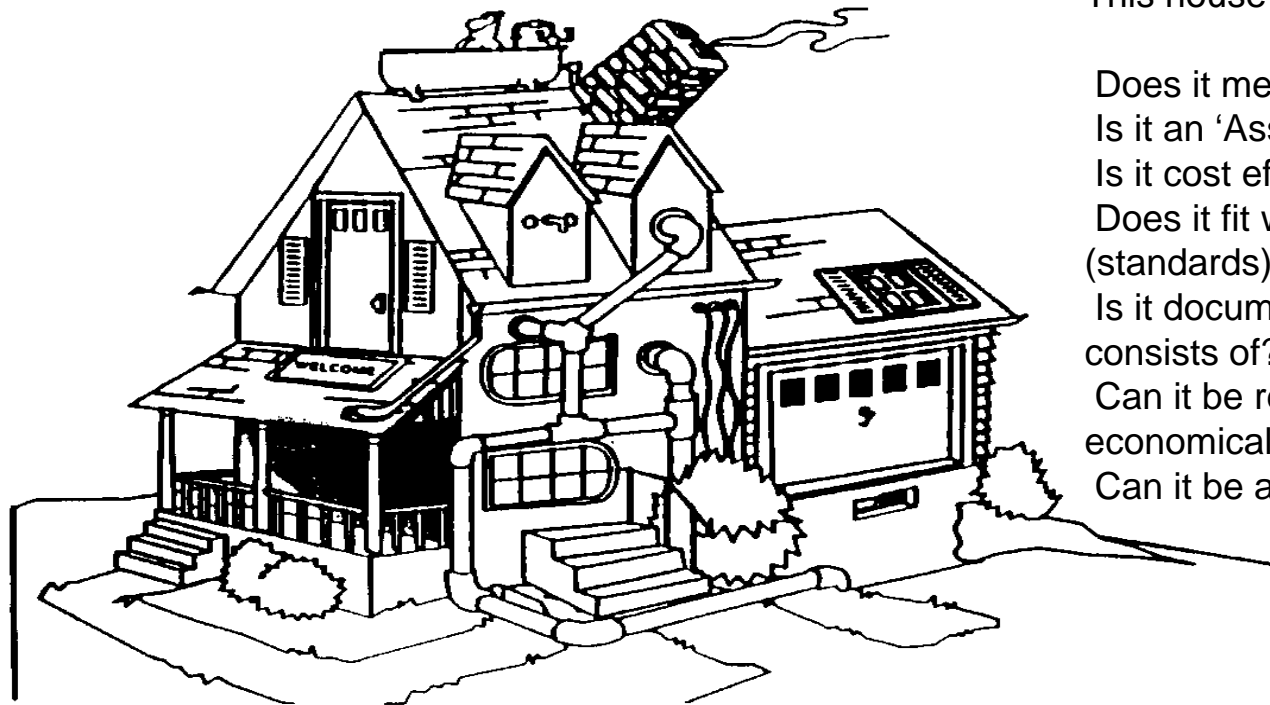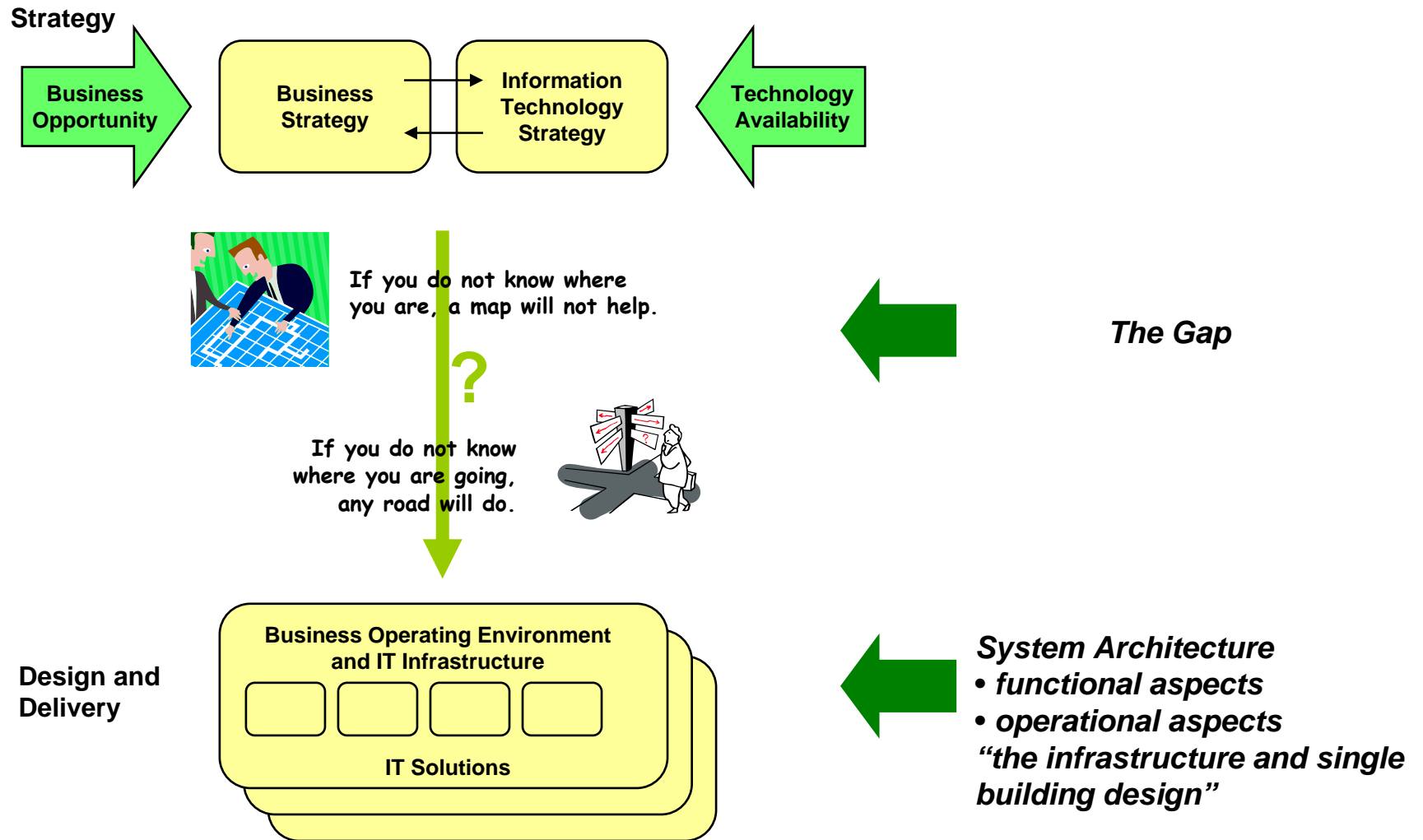
This house may function, but…

Does it meet business objectives?
Is it an 'Asset Junkyard'?
Is it cost effective?
Does it fit with the community (standards)?
Is it documented - who knows what it consists of?
Can it be repaired easily or economically?
Can it be adapted to changing needs?

'If you don't know where you're going, any road will get you there.'
Lewis Carroll

It can be a challenge to ensure IT based business solutions implement the business strategy…

Strategy

Business Opportunity → **Business Strategy** ⇄ **Information Technology Strategy** ← **Technology Availability**

If you do not know where you are, a map will not help.

?

If you do not know where you are going, any road will do.

The Gap

Design and Delivery

Business Operating Environment and IT Infrastructure

IT Solutions

System Architecture
- *functional aspects*
- *operational aspects*
"the infrastructure and single building design"

8

IBM

Enterprise Architecture provides the vital linkages between "strategy" and "implementation"

Strategy

Business Opportunity

Business Strategy

Information Technology Strategy

Technology Availability

Enterprise wide focus

Planning

EA tells the organization where they are on the map

!!

EA identifies where the organization wants to be and how to get there

Enterprise Architecture

Project focus

Design and Delivery

Business Operating Environment and IT Infrastructure

IT Solutions

System Architecture
- *functional aspects*
- *operational aspects*
"the infrastructure and single building design"

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Enterprise Architecture embraces both Business and IT Architectures, providing the "city plan" for "building projects"

Strategy

Enterprise wide focus

Planning

Project focus

Design and Delivery

Business Opportunity

Technology Availability

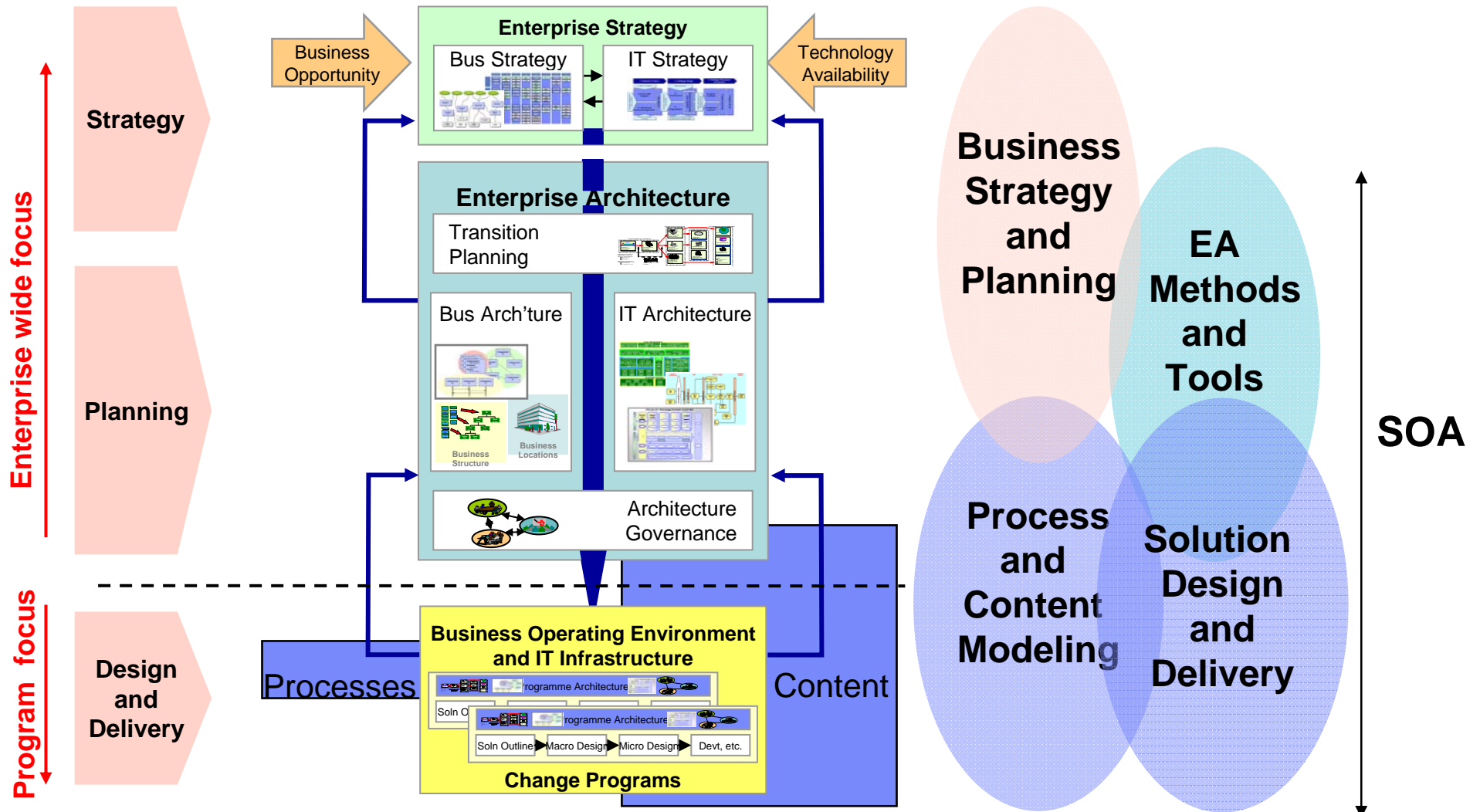Business Strategy

Information Technology Strategy

Enterprise Architecture

Business Architecture
- Processes
- Information
- People
- Locations

IT Architecture
- Applications
- Data
- Technology

Transition Plan

Business Operating Environment and IT Infrastructure

IT Solutions

Enterprise Architecture "the city plan"

System Architecture
• *"the building design"*

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Bridging the Gap Between Strategy and Delivery

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Definition

EA provides reference material in many forms

EA ensures the architecture is maintained and used

EA is not just passive or reactive, it is proactive

"The EA discipline defines and maintains the architecture models, governance and transition initiatives needed to effectively co-ordinate semi-autonomous groups towards common business and/or IT goals."

"neutral phrasing": EA works at many levels
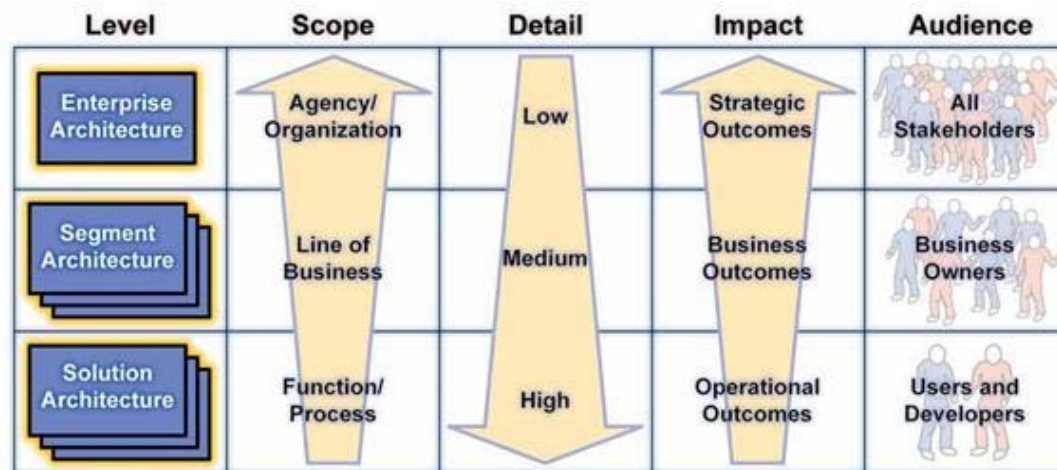
EA can address the business and IT domains

Enterprise Architecture vs. Solution Architecture

Enterprise Architecture is the formal organization (design or layout) of the components, structures and processes required or relevant to the attainment of the goals and visions invested or envisioned in an enterprise.

Level	Scope	Detail	Impact	Audience
Enterprise Architecture	Agency/ Organization	Low	Strategic Outcomes	All Stakeholders
Segment Architecture	Line of Business	Medium	Business Outcomes	Business Owners
Solution Architecture	Function/ Process	High	Operational Outcomes	Users and Developers

From US OMB 2006 FEA Practice Guidance

Solution architecture aims to address specific problems and requirements, usually through the design of specific information systems or applications.

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So we recognise two different types of IT Architect…

- **…Are responsible for ensuring the design of IT based business solutions meet the functional and non-functional requirements, within the constraints of budget, time, skills and other givens (such as IT Standards)**
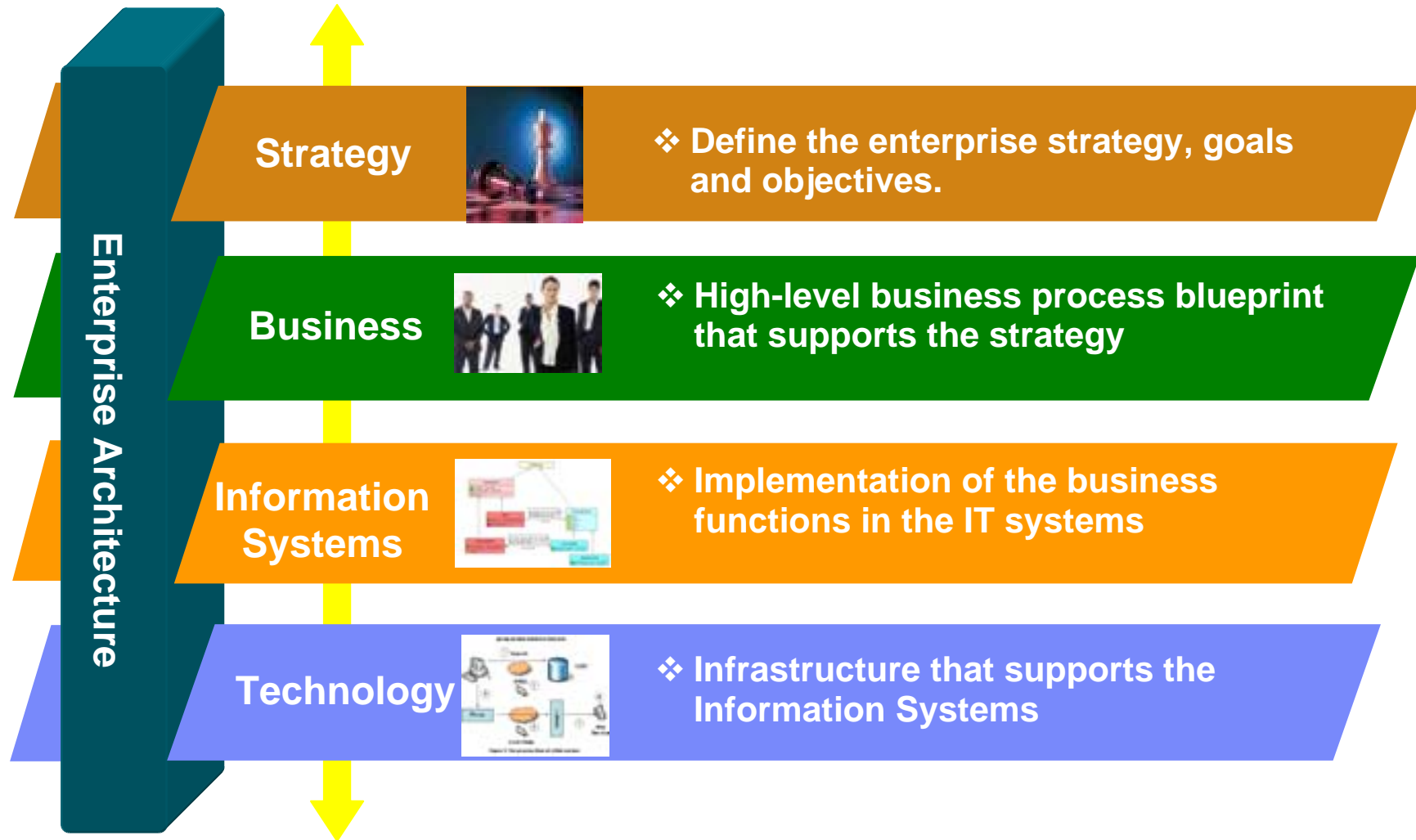
  "Solution Architects"

- **…Are responsible for ensuring an IT Organisation approaches the identification, specification and implementation of these IT based business solutions in a co-ordinated and standardised manner, aligned to the Enterprise's Business and IT Strategies.**

  "Enterprise Architects"

- **…Are generally *not* product specialists, although they must be able to work at a sufficient level of technological detail to be sure their architectures can be implemented.**

Enterprise Architecture Defined

Enterprise Architecture

Strategy
- ❖ **Define the enterprise strategy, goals and objectives.**

Business
- ❖ **High-level business process blueprint that supports the strategy**

Information Systems
- ❖ **Implementation of the business functions in the IT systems**

Technology
- ❖ **Infrastructure that supports the Information Systems**

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EA provides a context and guidance, keeping everyone "on the same road"

Strategy

Architecture

Enterprise Architecture

Dev Program

Architecture

Programme Architecture

Project   P   P   Infra. Proj

Infrastructure Architecture

Architecture   Arch

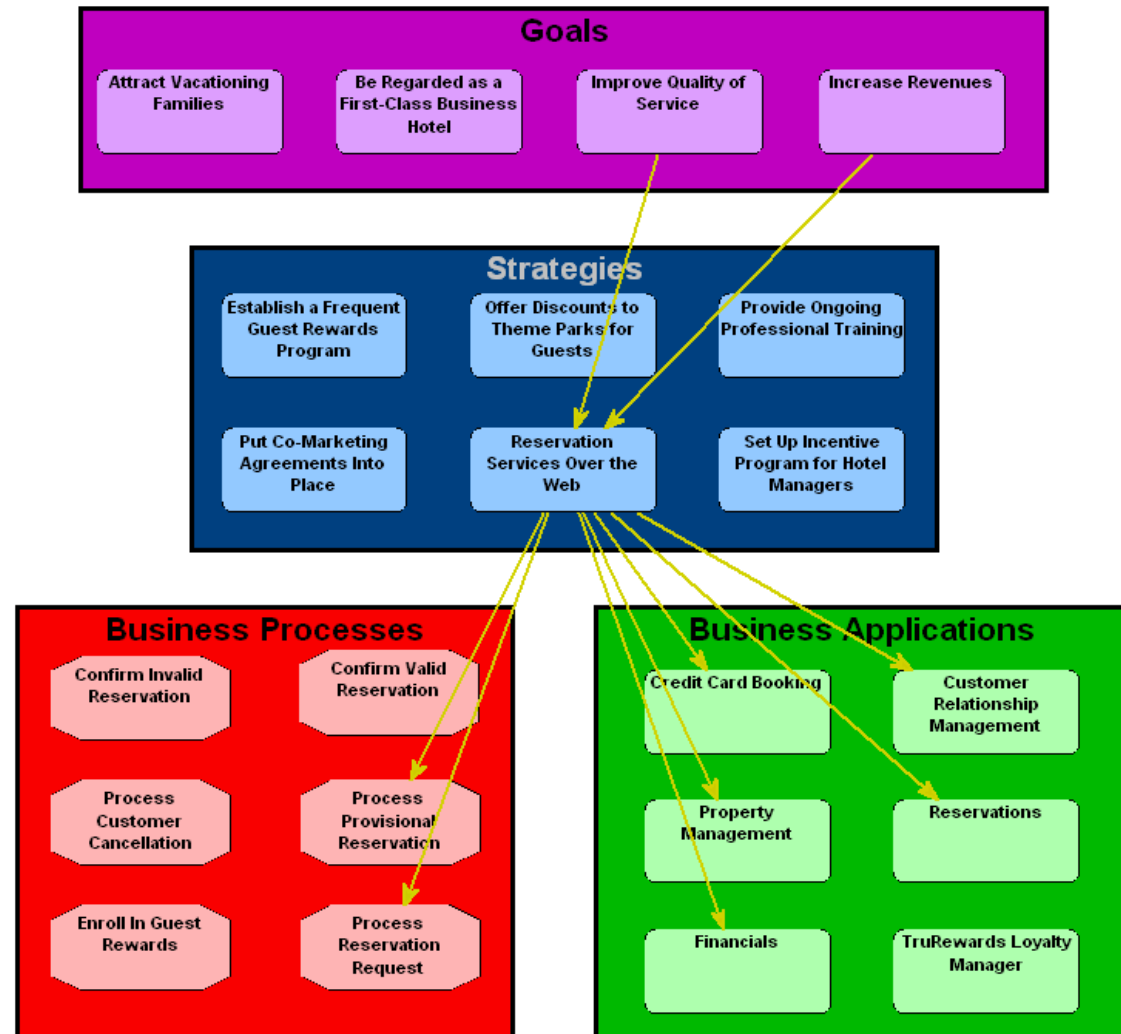Design   Design   D   D   D   D   D

IBM
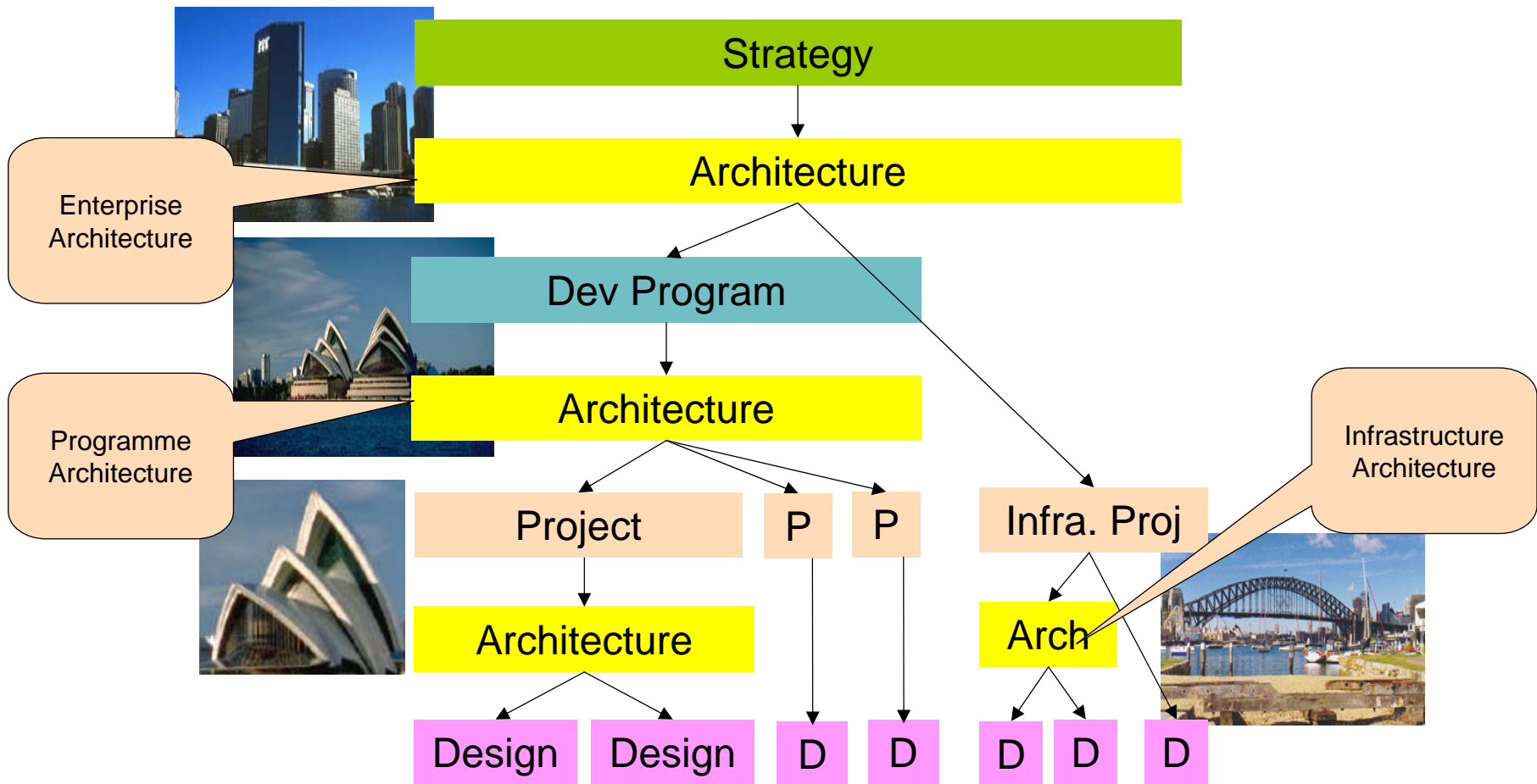
Benefits (1): Analyze the Linkage Between Technology and Business, Communicate Actionable Information

"How have we aligned technology investment with our business objectives?"

*"If we change our technology stack, what applications and organizations will be effected?"*

Goals
- Attract Vacationing Families
- Be Regarded as a First-Class Business Hotel
- Improve Quality of Service
- Increase Revenues

Strategies
- Establish a Frequent Guest Rewards Program
- Offer Discounts to Theme Parks for Guests
- Provide Ongoing Professional Training
- Put Co-Marketing Agreements Into Place
- Reservation Services Over the Web
- Set Up Incentive Program for Hotel Managers

Business Processes
- Confirm Invalid Reservation
- Confirm Valid Reservation
- Process Customer Cancellation
- Process Provisional Reservation
- Enroll In Guest Rewards
- Process Reservation Request

Business Applications
- Credit Card Booking
- Customer Relationship Management
- Property Management
- Reservations
- Financials
- TruRewards Loyalty Manager

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Benefits (2): Analyze Change to Processes…

What Happens If….?

Focus on Information needed to make a decision
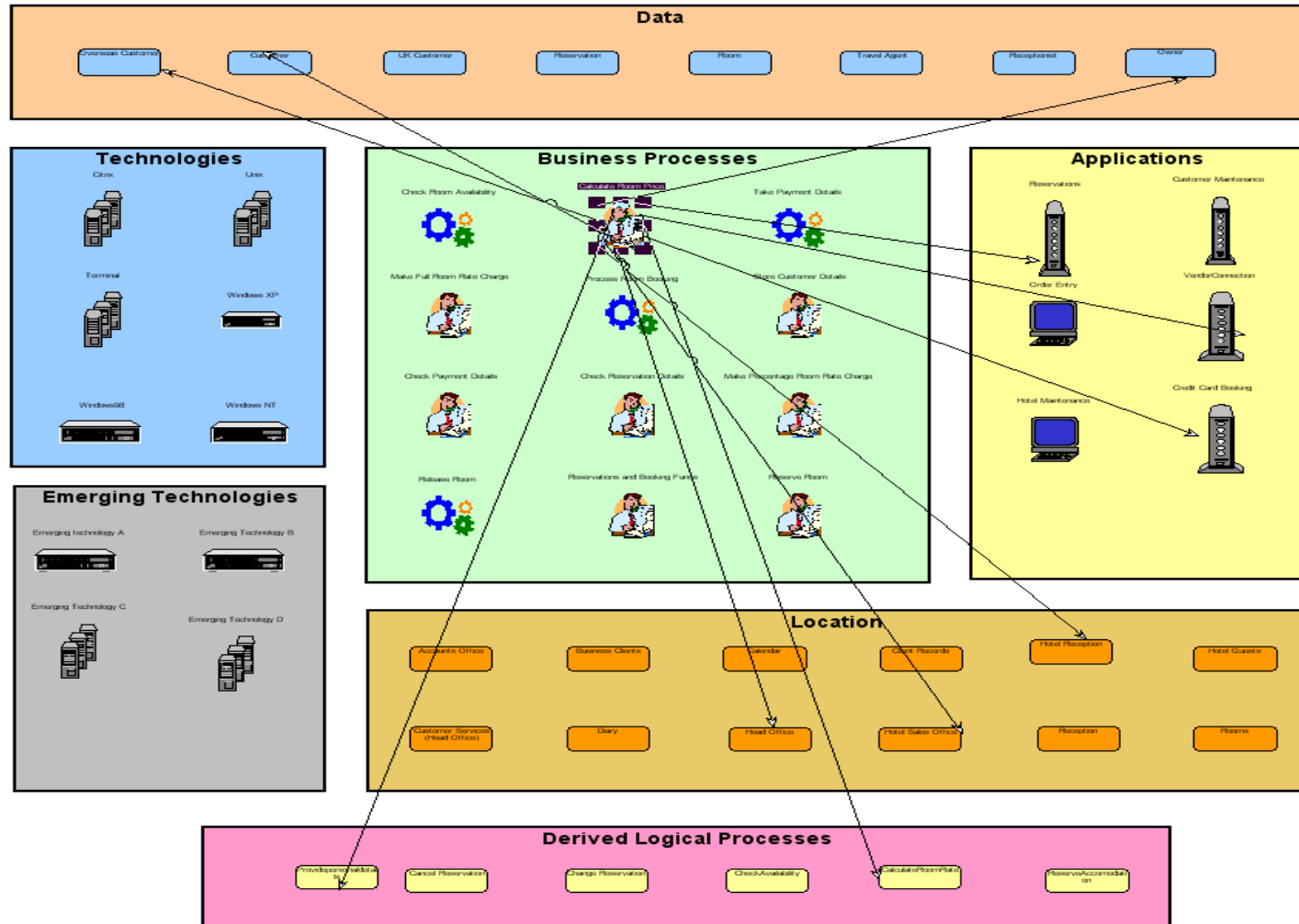
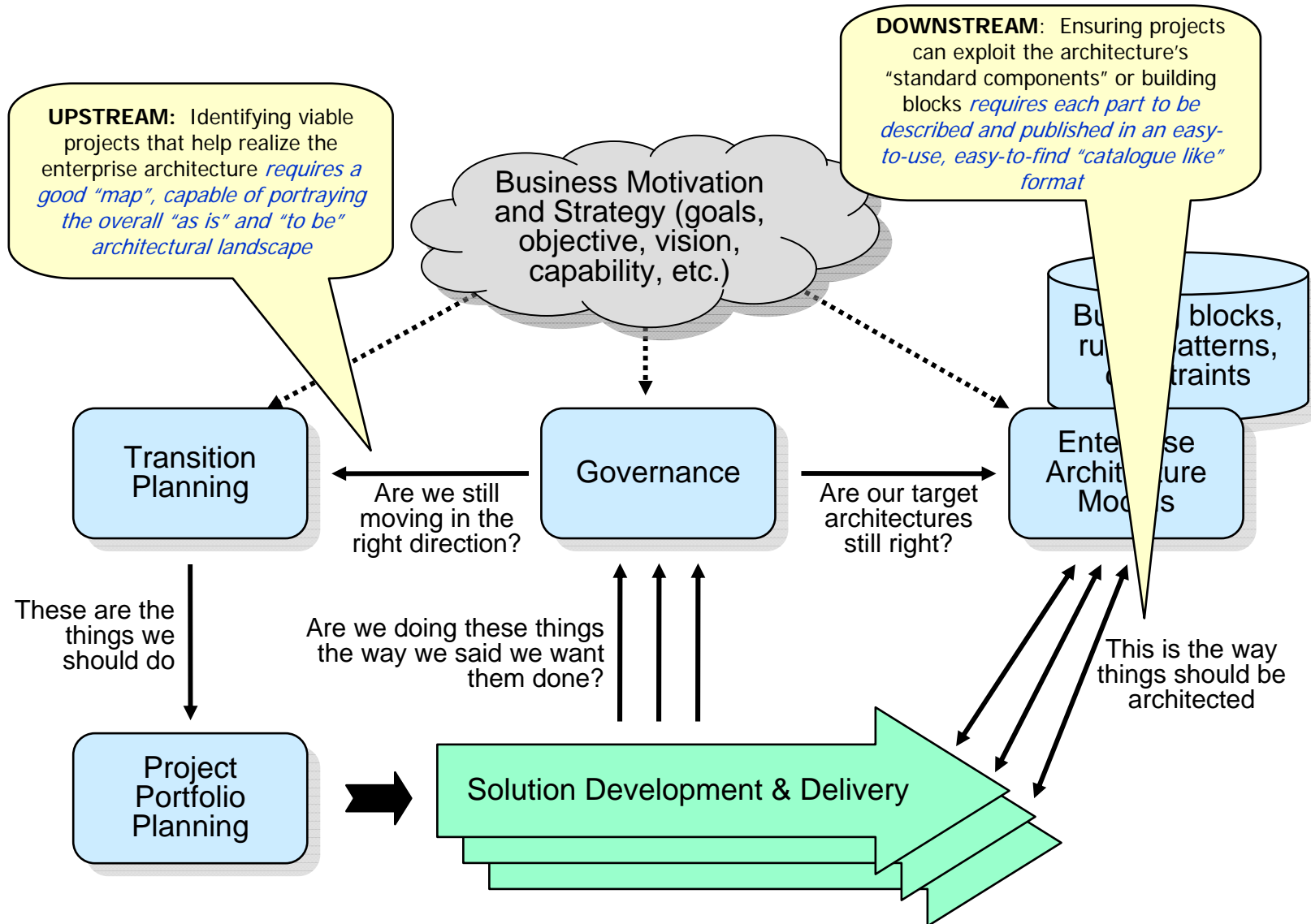# Enterprise Architecture – Main Aspects

Main aspects of an Enterprise Architecture

- Enterprise Architecture **is between the Business and IT Strategy and the programs and projects to be carried out**

- **Enterprise Architecture includes** Business Architecture **as well as** IT Architecture **(which is** IS Architecture **– Information System – and** Technology Architecture**)**

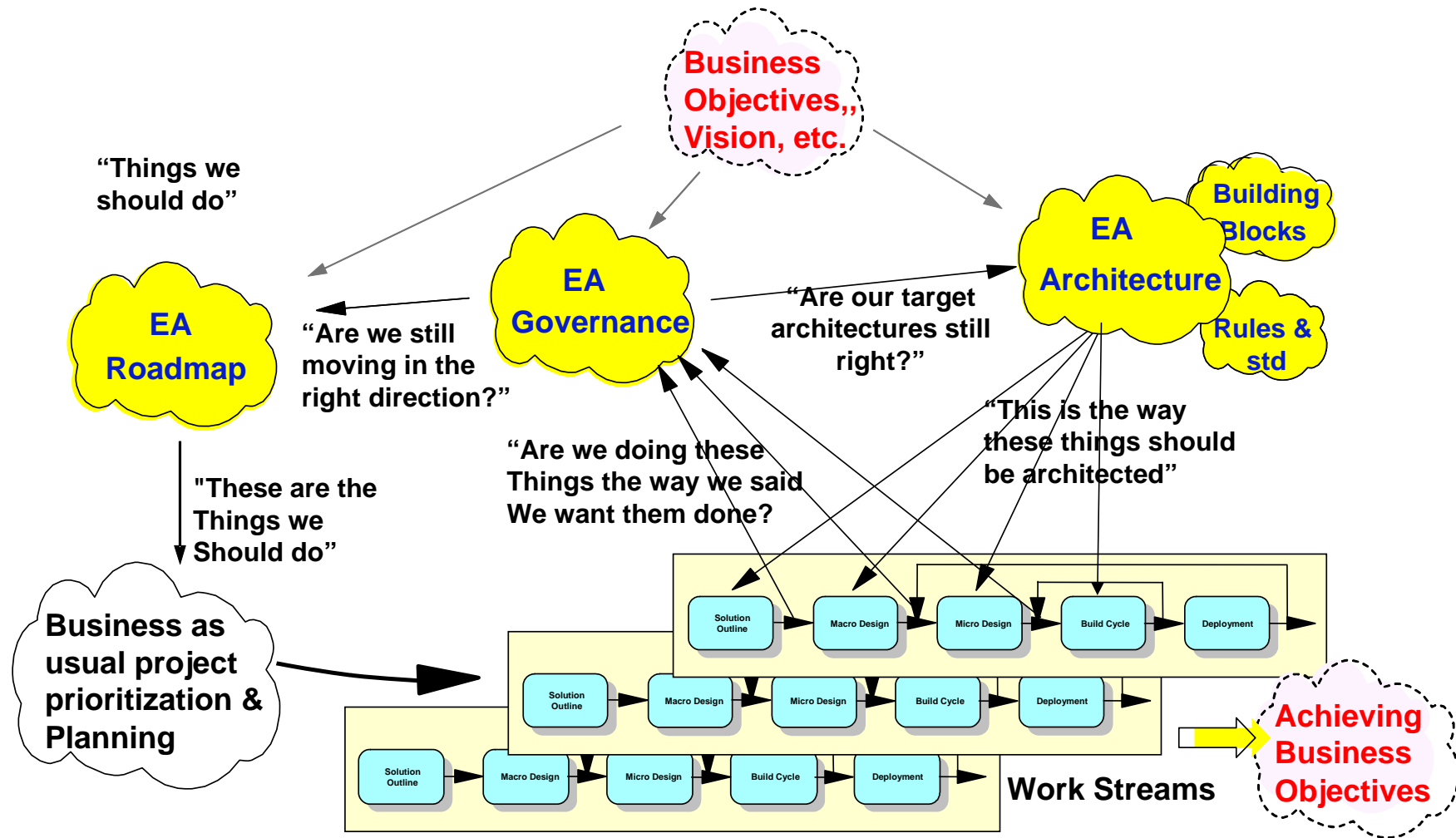- **Enterprise Architecture** guides **the programs and projects**
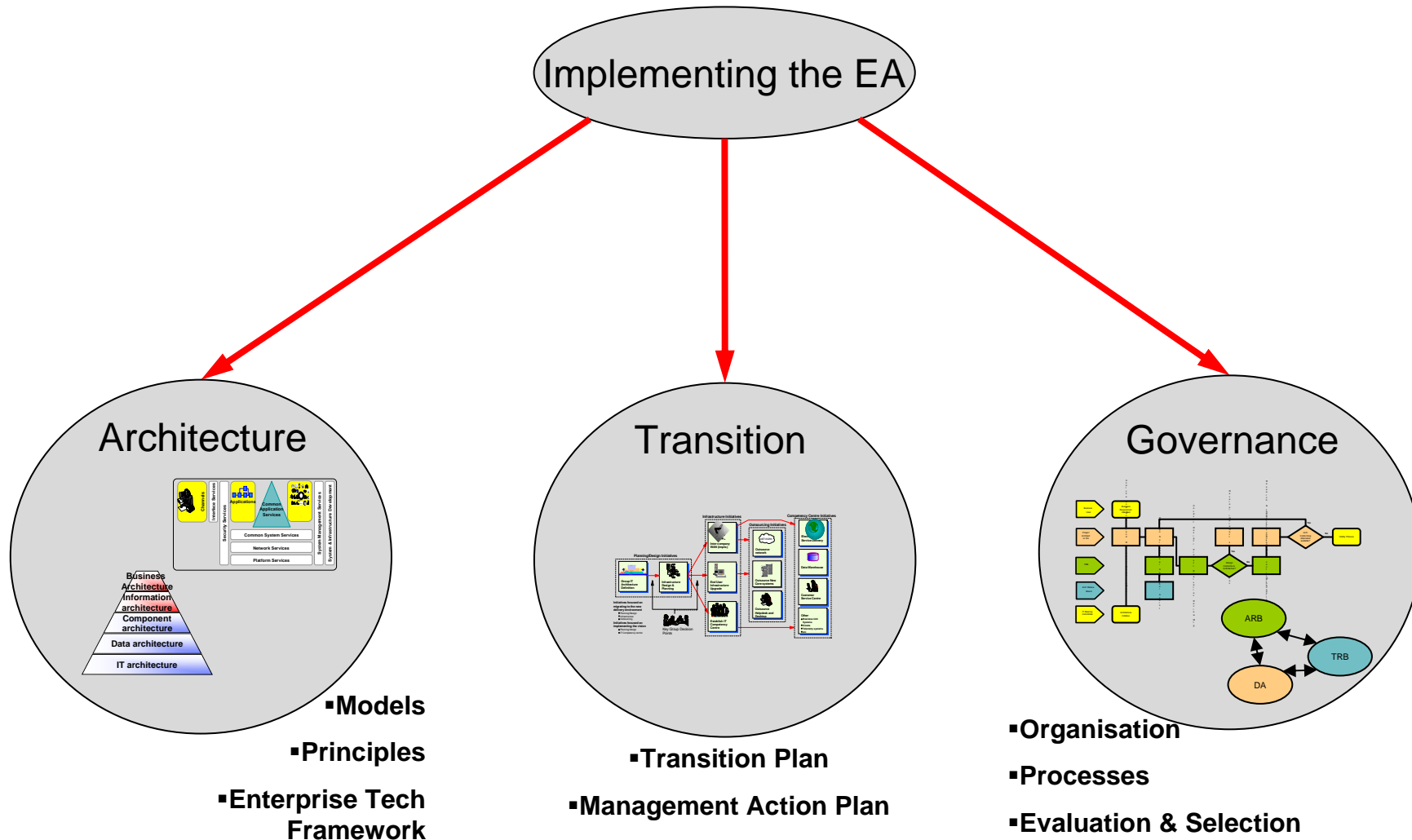
"Do the right things right"

UPSTREAM: Identifying viable projects that help realize the enterprise architecture *requires a good "map", capable of portraying the overall "as is" and "to be" architectural landscape*

DOWNSTREAM: Ensuring projects can exploit the architecture's "standard components" or building blocks *requires each part to be described and published in an easy-to-use, easy-to-find "catalogue like" format*

Business Motivation and Strategy (goals, objective, vision, capability, etc.)

Bu[ ]blocks, ru[ ]atterns, c[ ]traints

Transition Planning

Governance

Ente[ ]se Archit[ ]ure Mod[ ]s

Are we still moving in the right direction?

Are our target architectures still right?

These are the things we should do

Are we doing these things the way we said we want them done?

Project Portfolio Planning

Solution Development & Delivery

This is the way things should be architected

EA is More than Architecture

Therefore there are three aspects to implementing an Enterprise Architecture

Implementing the EA

Architecture
- Models
- Principles
- Enterprise Tech Framework

Transition
- Transition Plan
- Management Action Plan

Governance
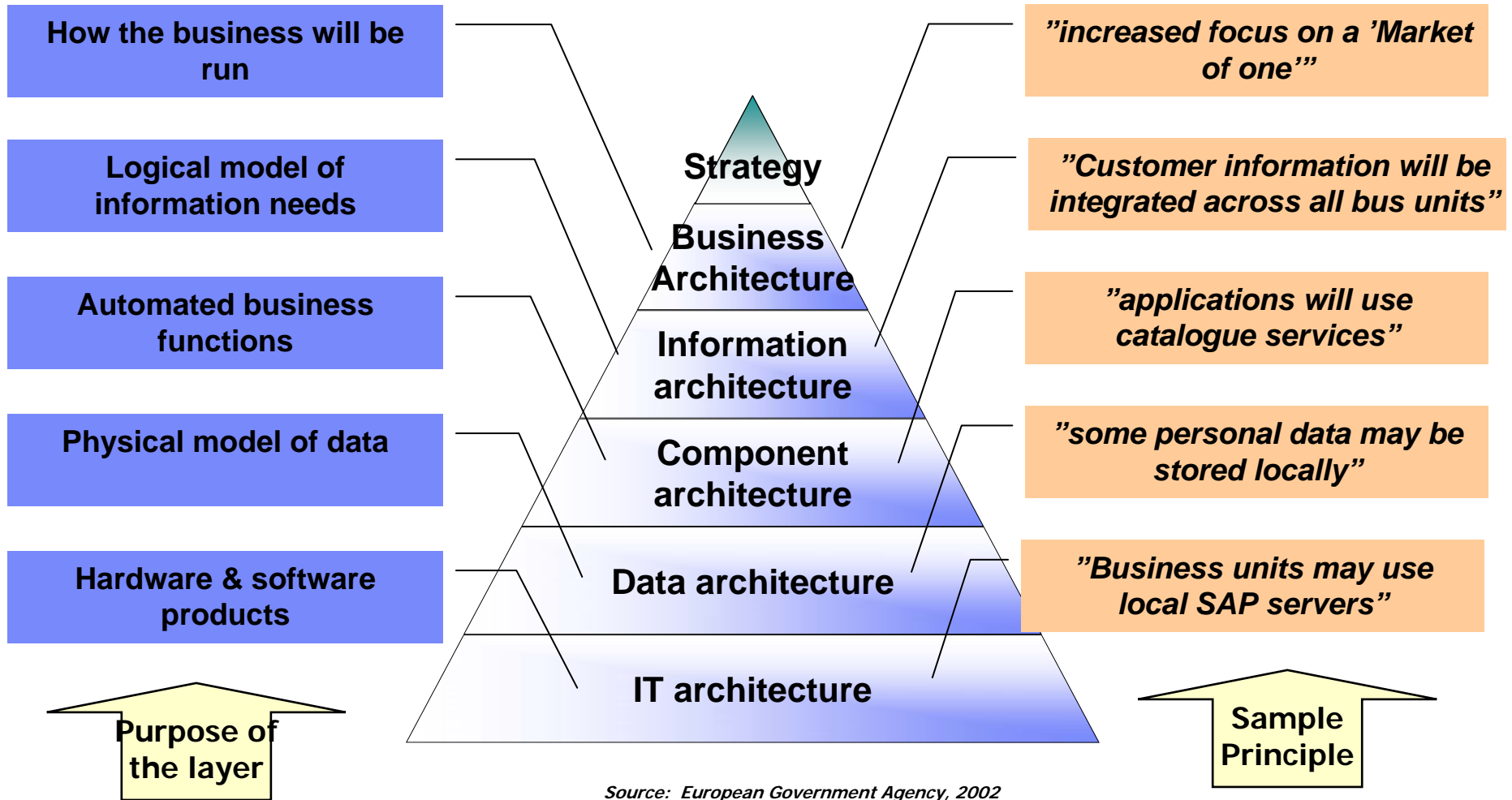- Organisation
- Processes
- Evaluation & Selection

Enterprise Architecture Methods

- **Enterprise Architecture methods provide** guidelines **and** templates **for the definition of an Enterprise Architecture**

- **Templates are available for** Work Products **/** Artifacts **– most of them as described in Architecture Methods**

- **Most popular Enterprise Architecture Methods**
  - **IBM**
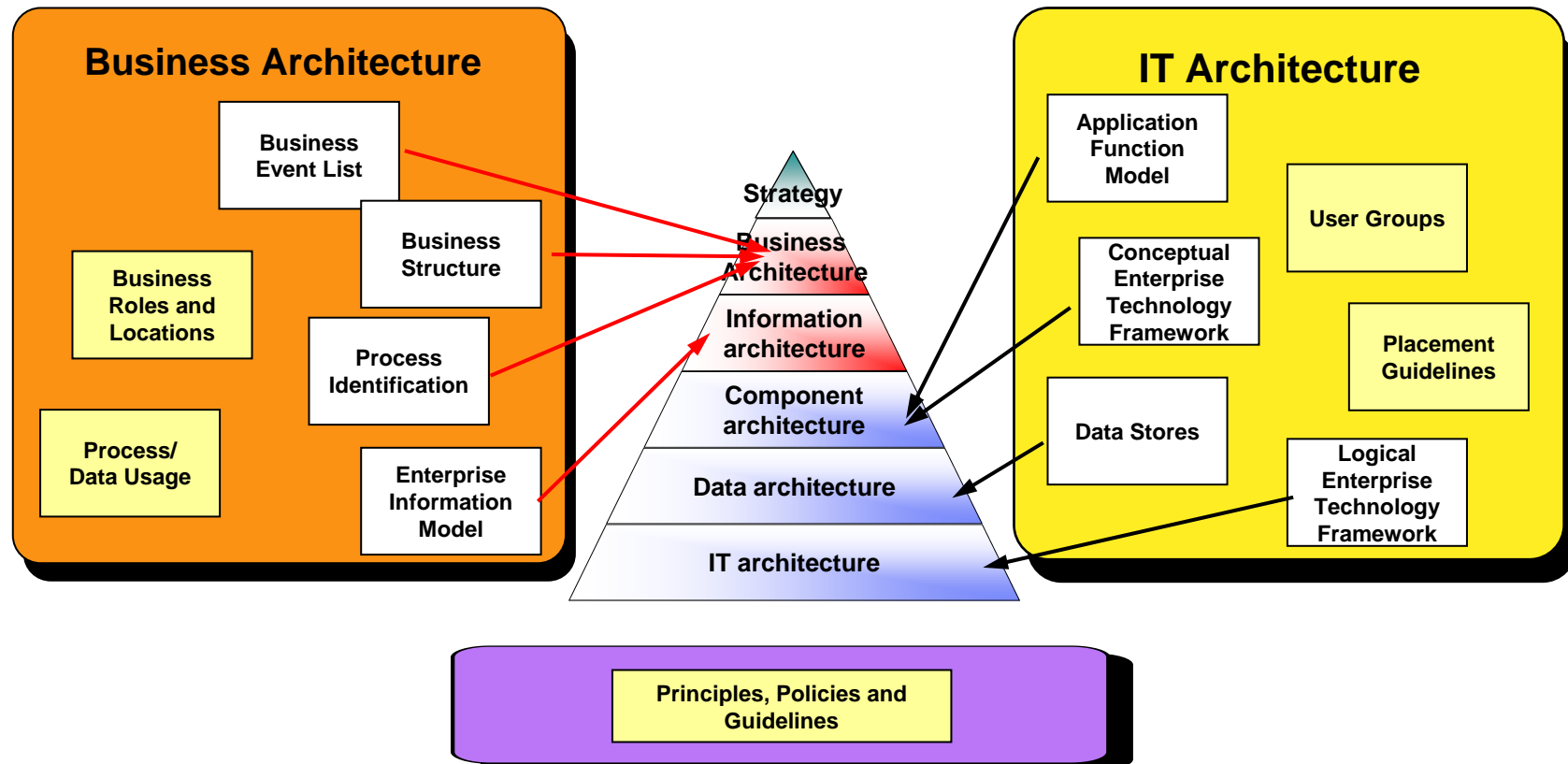 - **Zachman (www.zifa.com)**
  - **TOGAF (www.opengroup.org)**

A popular way of structuring an EA's architecture framework: is to adopt a simple layered approach
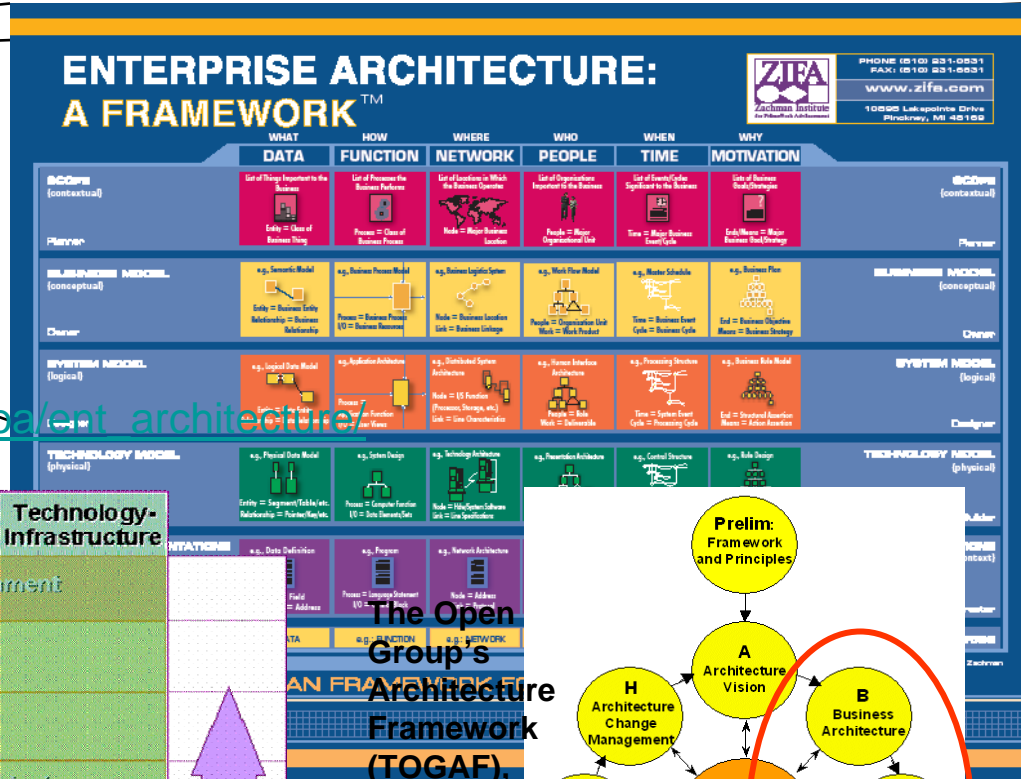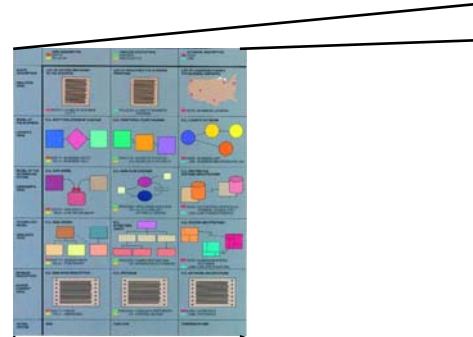
Purpose of the layer	Pyramid layer	Sample Principle
How the business will be run		*"increased focus on a 'Market of one'"*
Logical model of information needs	Strategy	*"Customer information will be integrated across all bus units"*
Automated business functions	Business Architecture	*"applications will use catalogue services"*
Physical model of data	Information architecture	*"some personal data may be stored locally"*
Hardware & software products	Component architecture	*"Business units may use local SAP servers"*
	Data architecture	
	IT architecture	

Purpose of the layer

Sample Principle

Source: European Government Agency, 2002

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And this structuring is closely followed in IBM's EA Method through "architecture neighbourhoods"

Business Architecture

- Business Event List
- Business Structure
- Business Roles and Locations
- Process Identification
- Process/ Data Usage
- Enterprise Information Model

IT Architecture

- Application Function Model
- User Groups
- Conceptual Enterprise Technology Framework
- Placement Guidelines
- Data Stores
- Logical Enterprise Technology Framework

Pyramid levels:
- Strategy
- Business Architecture
- Information architecture
- Component architecture
- Data architecture
- IT architecture

Principles, Policies and Guidelines

All EAs have a "framework" – a means of organizing, managing and communicating the architecture

http://www.capgemini.com/services/soa/ent_architecture/

© CapGemini, 2005
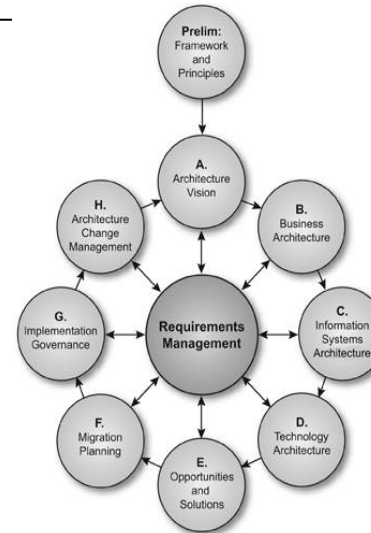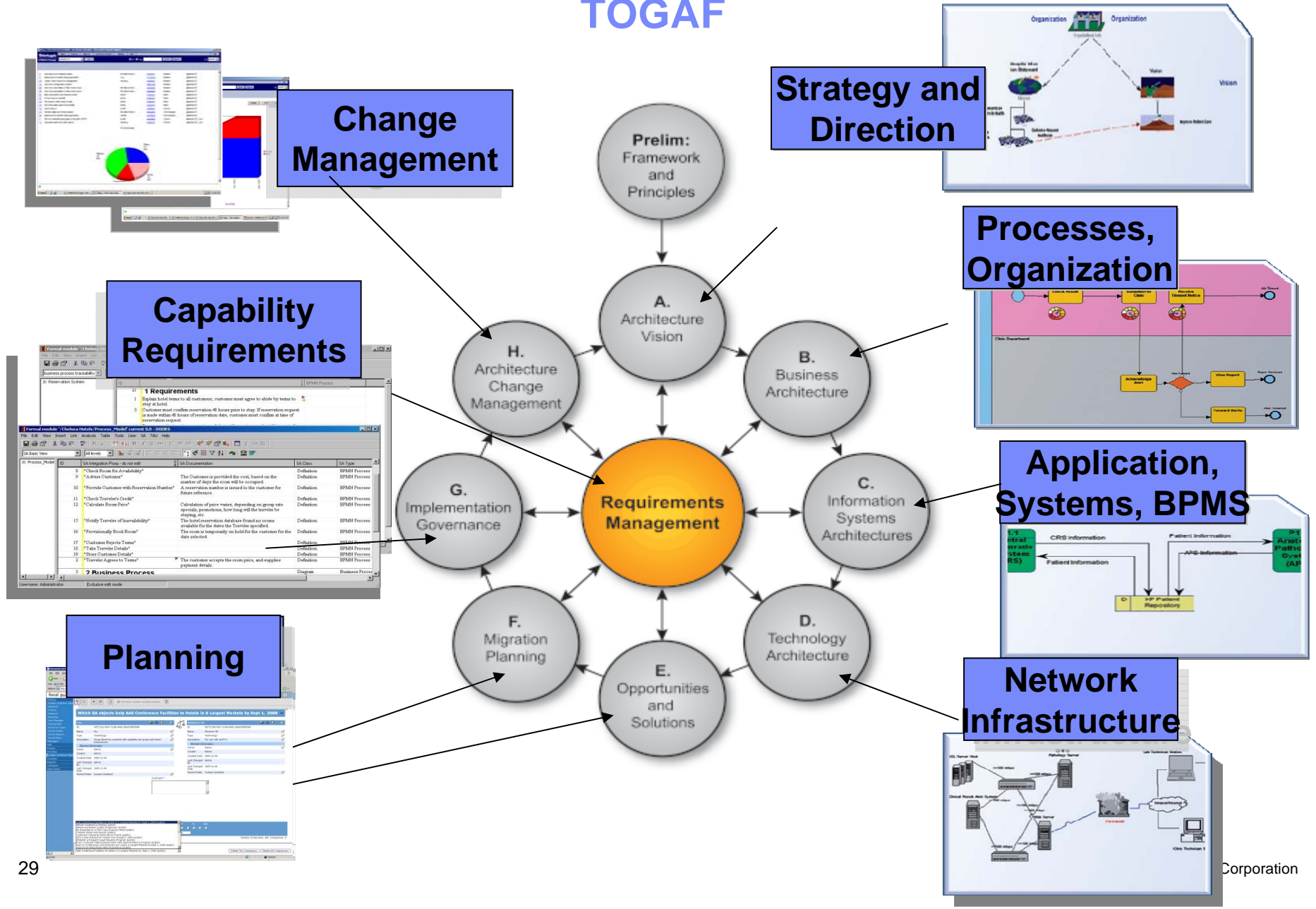
What is TOGAF v8.1.1

- **TOGAF v8.1.1 consists of the following :**
  - **Architecture Development Method (ADM)**
  - **Enterprise Continuum**
  - **Resource Base**

- **The ADM is depicted as the 'crop-circle' and represents the core of the TOGAF specification. It is a method for deriving a specific enterprise architecture.**

- **The Enterprise Continuum is a model for structuring a 'virtual repository' of architectural assets such as patterns, models, & architecture descriptions.**

- **The Resource Base is a set of 'good practice' resources such as guidelines, checklists and templates provided to assist the architect when using TOGAF ADM.**
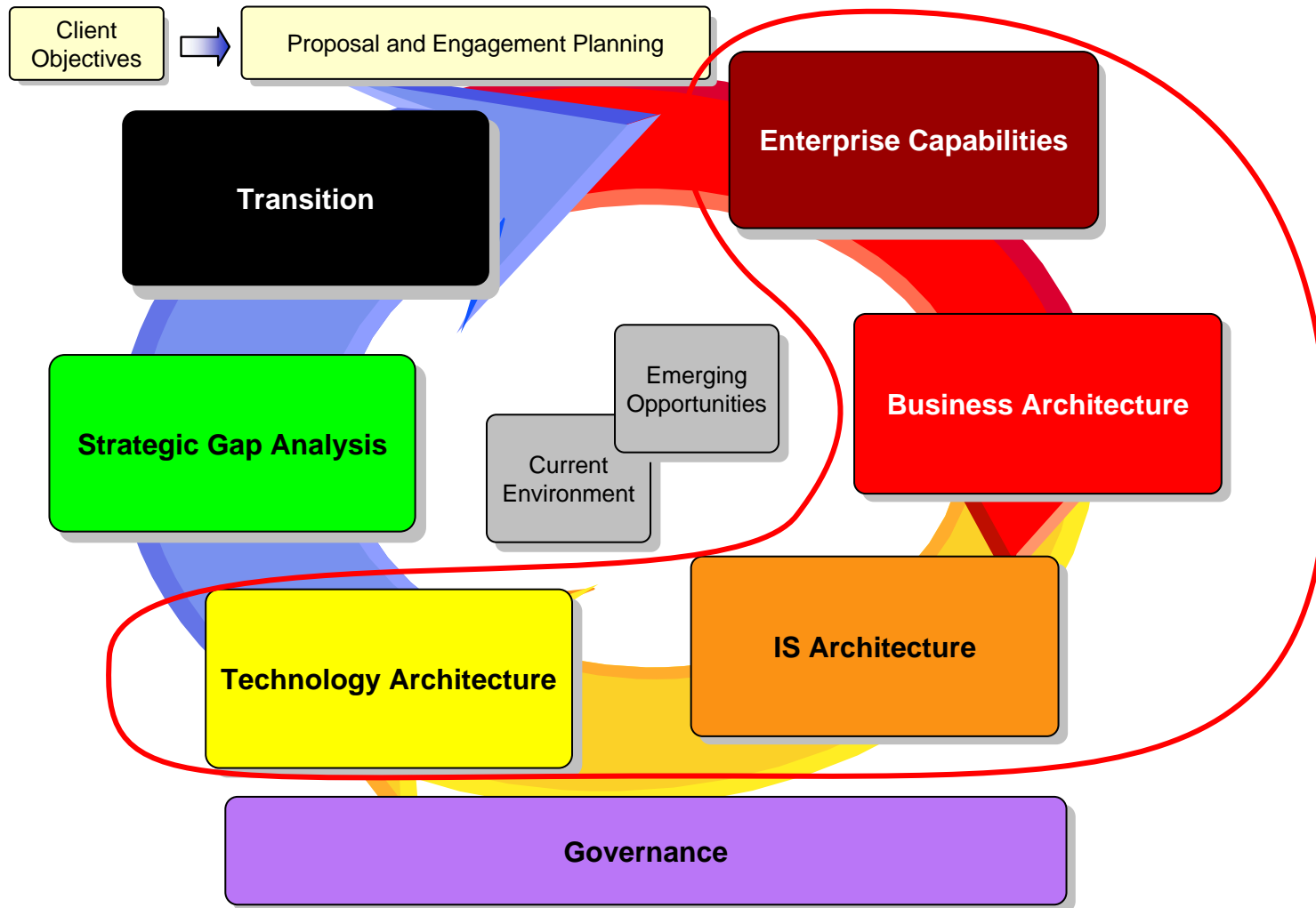
TOGAF

Change Management

Strategy and Direction

Processes, Organization

Capability Requirements

Application, Systems, BPMS

Planning

Network Infrastructure

Prelim: Framework and Principles

A. Architecture Vision

B. Business Architecture

C. Information Systems Architectures

D. Technology Architecture

E. Opportunities and Solutions

F. Migration Planning

G. Implementation Governance

H. Architecture Change Management

Requirements Management

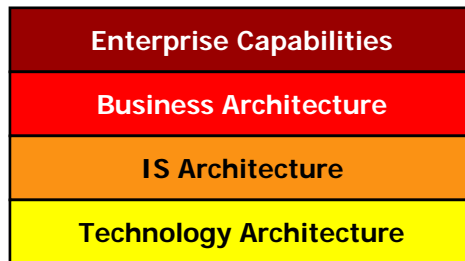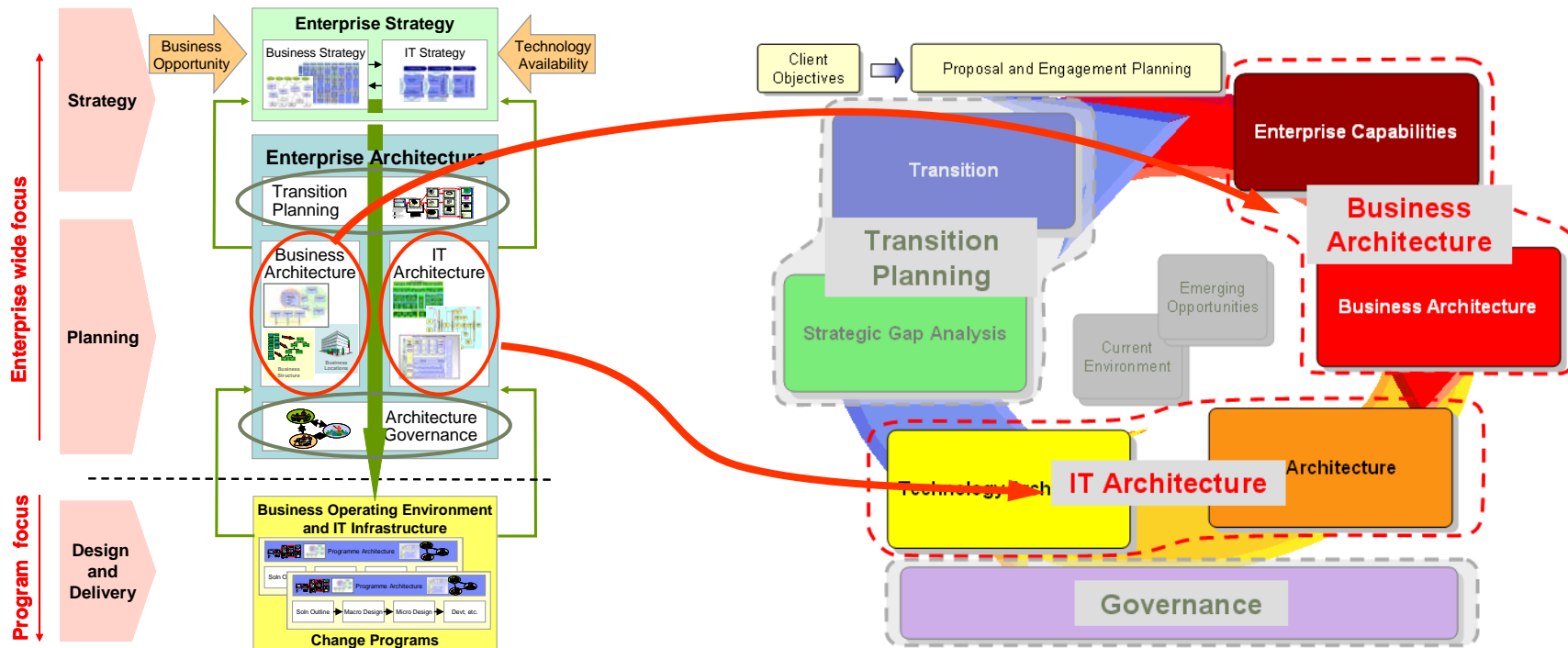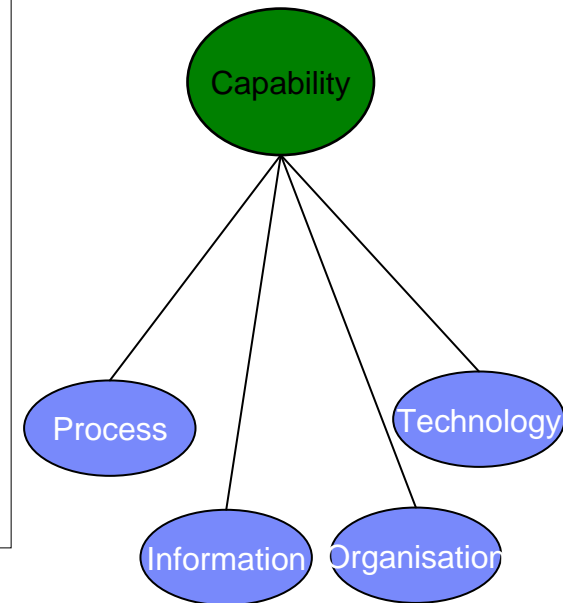# EA Method Overview

All EAs have a "framework" – a means of organizing, managing and communicating the architecture
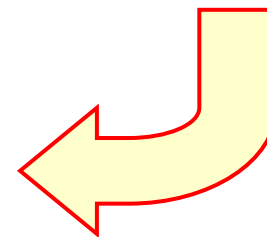
The EA Consulting Method's architectural layers

Enterprise Capabilities: Linking Strategy to Architecture (Example Amazon)
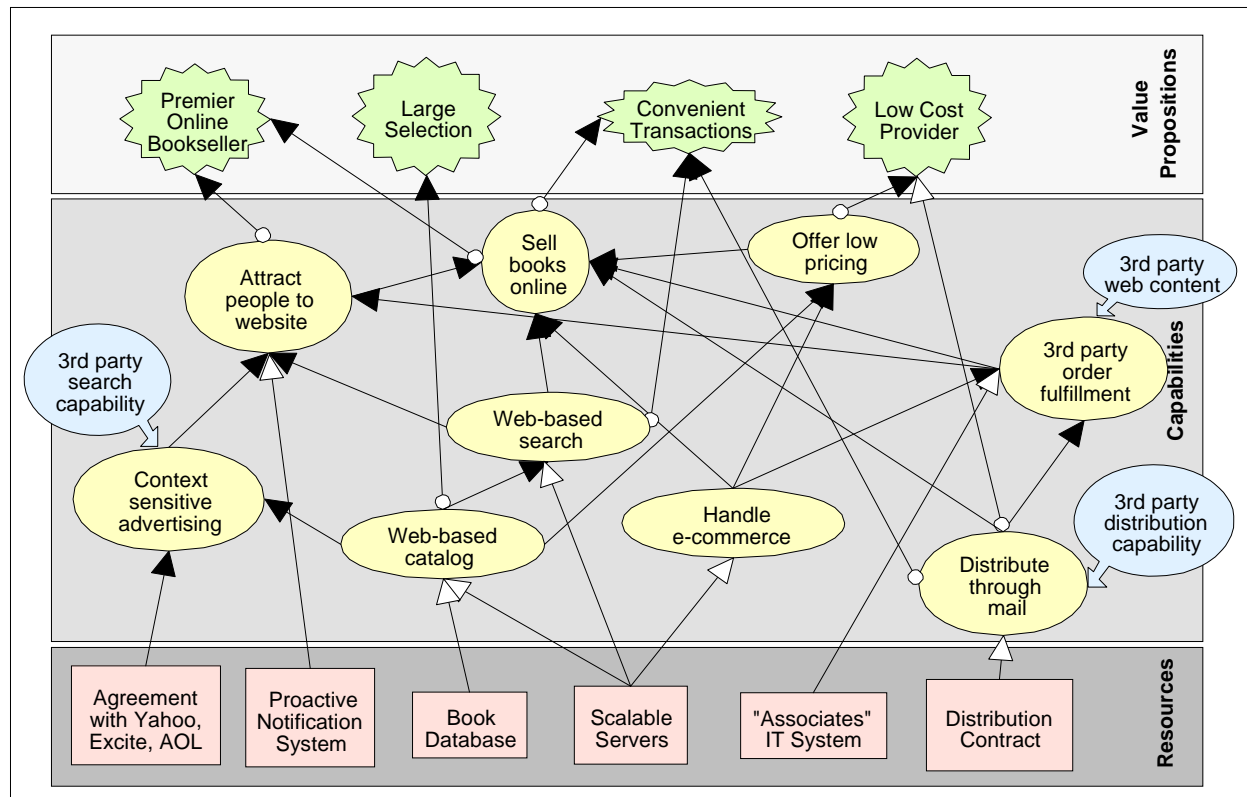
EA Work Products guide and govern how *Solution* Work Products are constructed (Same Types of Work Products)

Enterprise Architecture

Business Architecture

IT Architecture

User Architecture

Application Architecture

Data Architecture

Technology Architecture
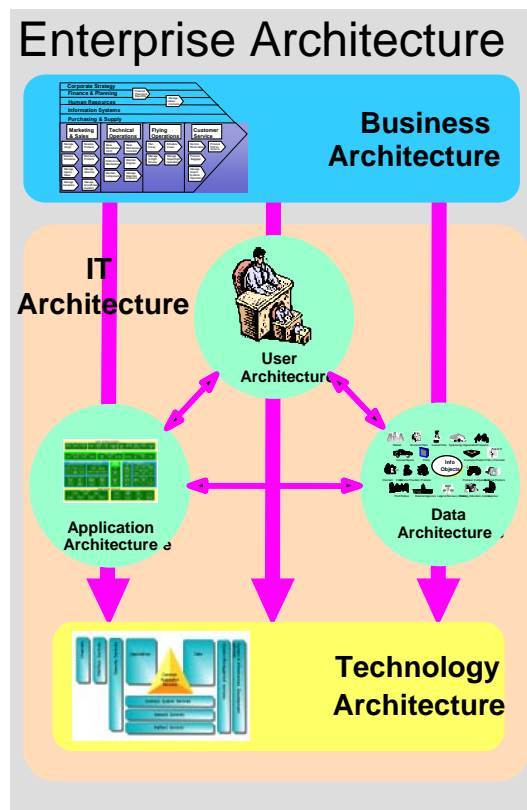
"EA constrains and co-ordinates the construction of IT based business systems"

Reference Architectures

Requirements

Use Case Model

Context Diagram

Non-fn Rqts

Architecture

Arch Over Diagram

Component Model

Deployment Units

Operational Model

Viability
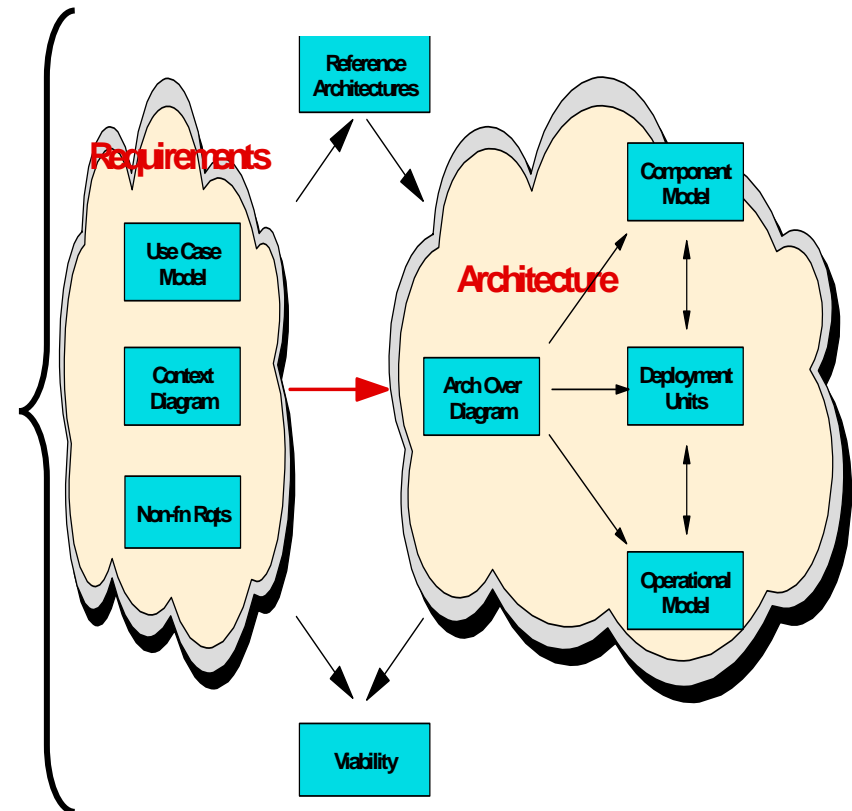
Enterprise Architecture – Business View

Example Business Context

IBM

Recap: Approach for SOA

Business Components (CBM)

Service *Modeling* (SOMA)

SOA *Realization*

Business-Aligned IT Architecture

Step 1: Break down your business into components
- **Decide what is strategically important, and what is just operations in the value chain domains**
- **Analyze the different KPIs attached to these components**
- **Prioritize and scope your transformation projects**

Step 2: Define a Service Model
- **Identify your services based on your business components**
- **Specify the services and components accordingly**
- ***Make SOA realization decisions based on architectural decisions***

Step 3: Implement a Service Model
- **Develop a service-oriented architecture to support the Componentized Business**
- **Implement service based scoping policy for projects**
- **Implement appropriate governance mechanism**

Component Business Model (CBM) – Definition (1)

A **Business Component** is a part of an enterprise that has the potential to operate autonomously, for example, as a separate company, or as part of another company.

Columns are Business Competencies, defined as large business areas with characteristic skills and capabilities, for example, product development or supply chain.

An **Operational Level** characterizes the scope of decision making. The three levels used in CBM are direct, control and execute.
- Direct is about strategy, overall direction and policy.
- Control is about monitoring, managing exceptions and tactical decision making
- Execute is about doing the work

	Business Administration	New Business Development	Relationship Management	Servicing & Sales	Product Fulfillment	Financial Control and Accounting
Direct	Business Planning	Sector Planning	Account Planning	Sales Planning	Fulfillment Planning	Portfolio Planning
Control	Business Unit Tracking	Sector Management	Relationship Management	Sales Management	Fulfillment Planning	Compliance
	Staff Appraisals	Product Management	Credit Assessment			Reconciliation
Execute	Staff Administration	Product Directory	Credit Administration	Sales	Product Fulfillment	Customer Accounts
				Customer Dialogue	Document Management	
	Production Administration	Marketing Campaigns		Contact Routing		General Ledger

CBM – Definition (2): The building block of a component business model is a 'business component'

A component is a business in microcosm. It has activities, resources, applications, infrastructure. It has a governance model. It provides goods and services (business services)

Business Component Elements

Each business component has differentiated capabilities

Each business component defines and decides on the use of all resources needed to perform the defined activities

Each business component has business services which form the interfaces to other business components

Each business component has a governance structure within which it manages its activities

Domain Decomposition– Component Business Modeling for JKE
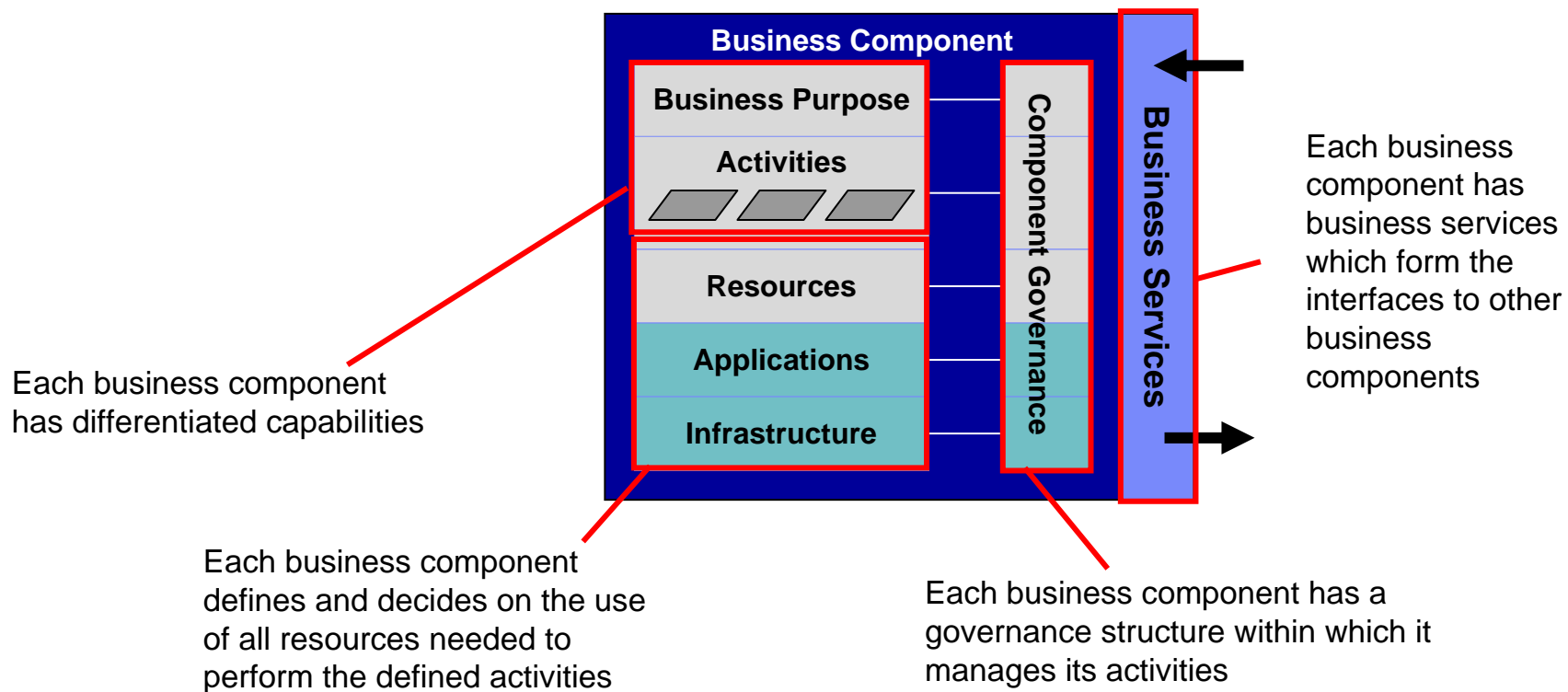
	Business Administration	New Business Development	Relationship Management	Servicing & Sales	Product Fulfillment	Financial Control and Accounting
Directing	Business Planning	Sector Planning	Account Planning	Sales Planning	Fulfillment Planning	Portfolio Planning
Controlling	Business Unit Tracking / Staff Appraisals	Sector Management / Product Management	Relationship Management / Credit Assessment	Sales Management	Fulfillment Monitoring	Compliance / Reconciliation
Executing	Account Administration / Product Administration / Purchasing / Branch/Store Operations	Product Directory / Marketing Campaigns	Credit Administration	Sales / Customer Service / Collections	Product Fulfillment / Document Management	Customer Accounts / General Ledger

Target Competency
- Base
- Competitive
- Differentiated

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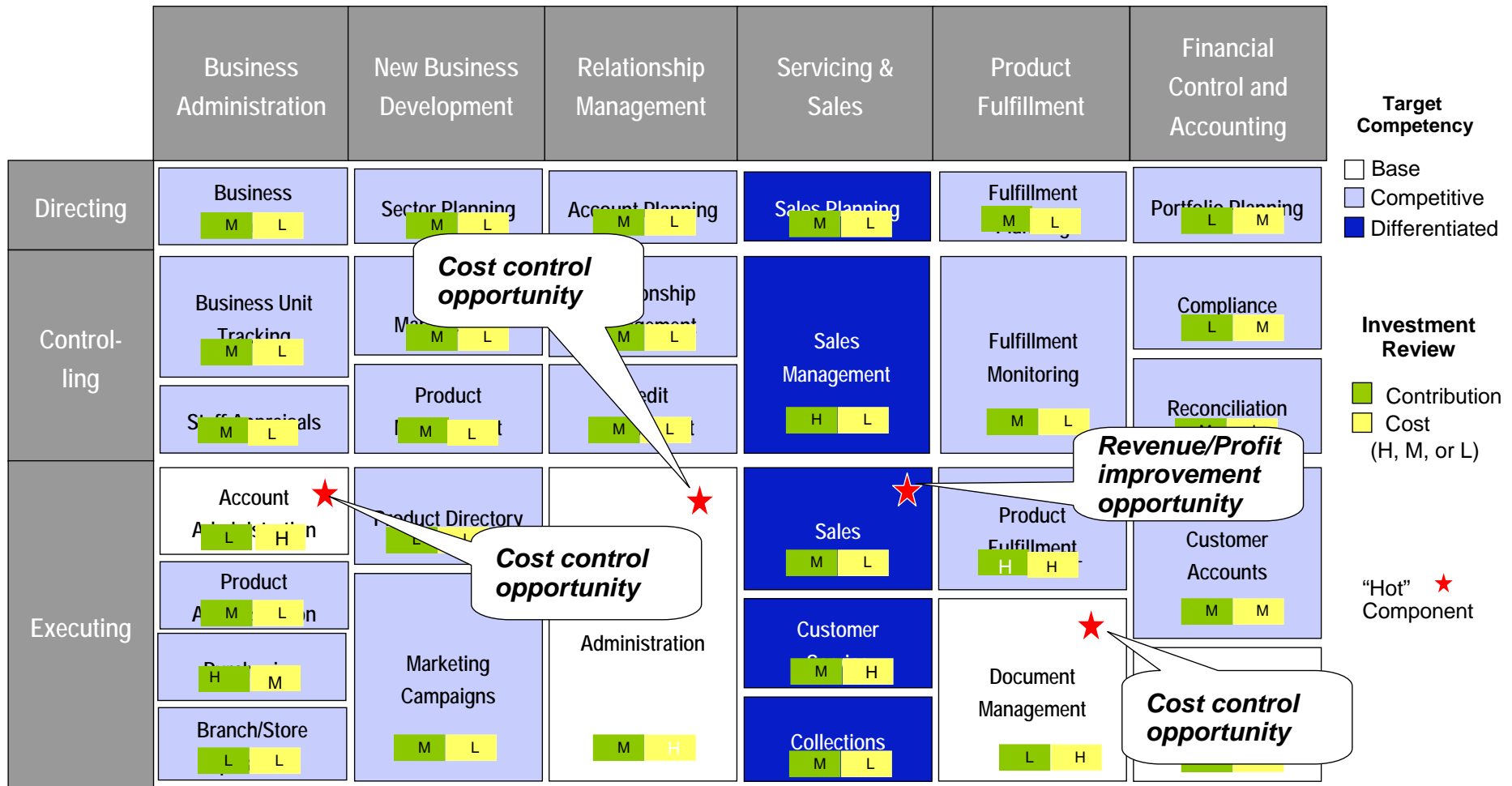# Domain Decomposition– Component Business Modeling for JKE

	Business Administration	New Business Development	Relationship Management	Servicing & Sales	Product Fulfillment	Financial Control and Accounting
Directing	Business M L	Sector Planning M L	Account Planning M L	Sales Planning M L	Fulfillment M L	Portfolio Planning L M
Control-ling	Business Unit Tracking M L / Staff Appraisals M L	Ma... M L / Product ... M L	...onship ...ment M L / ...edit ...t M L	Sales Management H L	Fulfillment Monitoring M L	Compliance L M / Reconciliation M L
Executing	Account Administration L H / Product A...on M L / P...k H M / Branch/Store L L	Product Directory ... / Marketing Campaigns M L	Administration M H	Sales M L / Customer Se... M H / Collections M L	Product Fulfillment H H / Document Management L H	Customer Accounts M M

Target Competency
- ☐ Base
- ☐ Competitive
- ■ Differentiated

Investment Review
- ☐ Contribution (green)
- ☐ Cost (yellow)
(H, M, or L)

★ "Hot" Component

Cost control opportunity

Cost control opportunity

Revenue/Profit improvement opportunity

Cost control opportunity

IBM

CBM and IT Systems Coverage for JKE
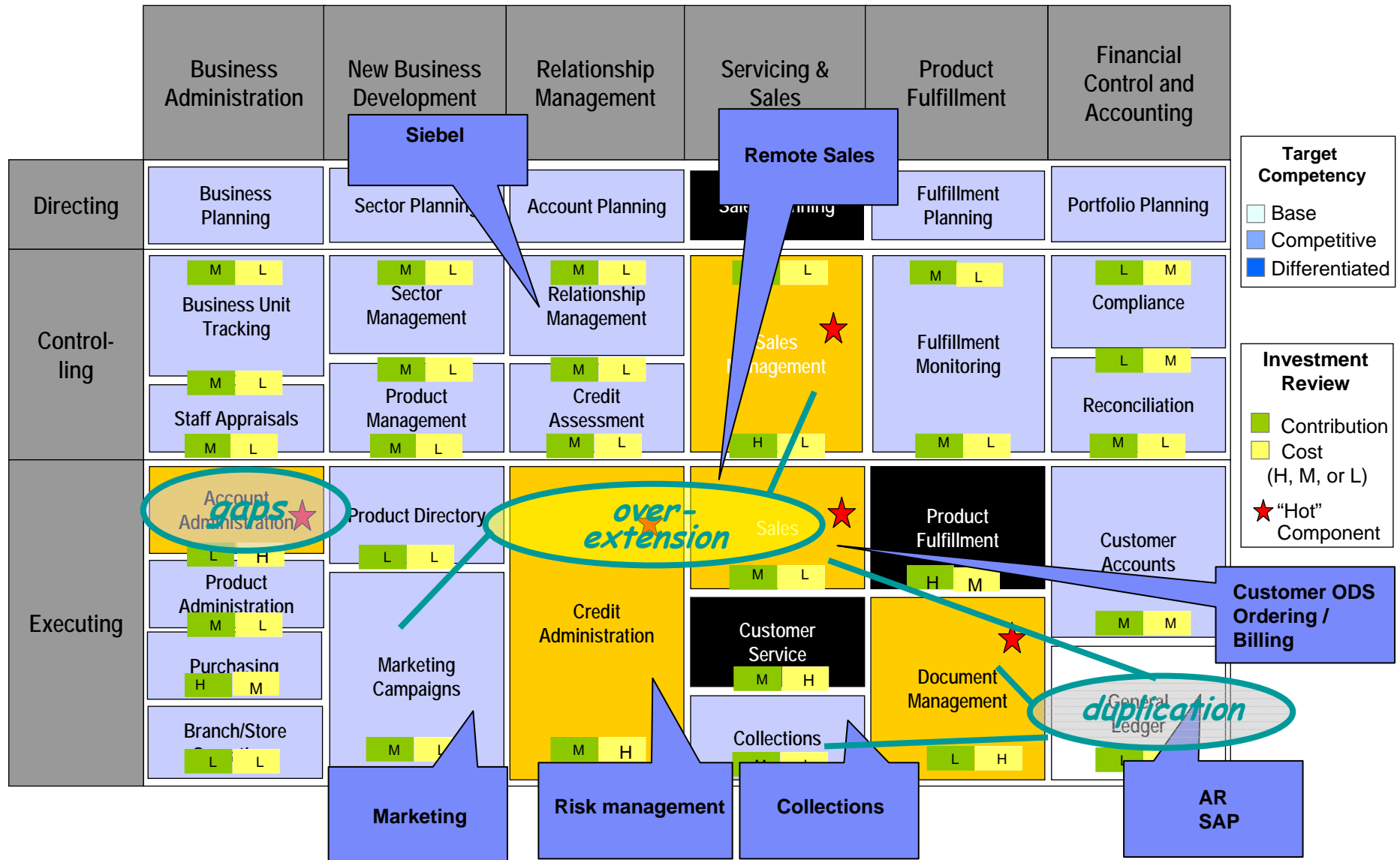
Key Performance Indicators for JKE

- Account Administration

  Automate the manual tasks for creating and administering accounts

  Decrease cost of account activation by 50%

- Credit Administration

  Design and build optimized services to support converged organization

  Negotiate better prices with our vendors taking advantage of our combined size

  Decrease negotiated cost (Vendor volume discounts) of credit report retrieval by 20%

  Automate 75% of all credit report retrievals

  Implement consistent business rules to manage risk

  Decrease number of credit report retrievals by 10%

- …

Business Goals and Key Performance Indicators

Business Goals

Requirements:	ROI	Cost	Benefit	Priority
GOAL1: Cost Reduction Cost Reduction of 10% by 2007	1000000	20000	1020000	High
GOAL2: Increase Products Per Customer Increase Products Per Customer by 10% by 2007	250000	50000	300000	Medium
GOAL3: Increase Availability Increase Availability of On-Line Presence to 99.999%	25000	15000	40000	
GOAL4: Reduce Risk of Regulatory Non-Compliance Reduce Risk of Regulatory Non-Compliance	100000	20000	120000	
GOAL5: Increase Customer Self-Service Increase Customer Self-Service via Internet to 85% by 2006	50000	5000	55000	
GOAL6: Decrease Time to Market Decrease Time to Market for New Products by 10% by 2007	250000	30000	280000	

Key Performance Indicators

Requirements:	Priority	Status
KPI1: Decrease cost of account activation Decrease cost of account activation by 50%	Medium	Proposed
KPI2: Decrease negotiated cost of credit report retrieval Decrease negotiated cost (Vendor volume discounts) of credit report..	Medium	Proposed
KPI3: Automate credit report retrievals Automate 75% of all credit report retrievals	Medium	Proposed
KPI4: Decrease number of credit report retrievals Decrease number of credit report retrievals by 10%	Medium	Proposed
KPI5: Increase electronic applications Increase electronic applications by 25%	Medium	Proposed
KPI6: Reduce call center calls Reduce number of call center calls by sales force and offices (stores).	Medium	Proposed

- **Key Performance Indicators (KPIs) are used to define a metric (simple or composed measurable unit) that measures of much the service implementation fulfills the initial requirements (business goal)**
- **Each Business Goal that is going to be realized with a specific service implementation should have an associated KPI.**
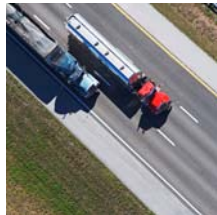
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Dynamic Infrastructure

It's time to start thinking differently about Infrastructure – we need a *Dynamic* Infrastructure

we need our infrastructure to propel us forward, not hold us back

Infrastructure that is instrumented, interconnected and intelligent.

Infrastructure that brings together business and IT to create new possibilities.

Mobility Infrastructure	Facilities Infrastructure	Production Infrastructure	Technology Infrastructure	Communications Infrastructure

Address today's operational challenges to *free up resources* for new investments.

***Converge business and IT infrastructure* to work in concert, achieving breakthrough productivity and greater business value.**

Utilize alternative sourcing approaches, like *Cloud Computing*, to deliver new services with agility and speed.

IBM

What is Cloud Computing?

A user experience and a business model
- Cloud computing is an emerging style of IT delivery in which applications, data, and IT resources are **rapidly provisioned** and provided as **standardized offerings** to users over the web in a **flexible pricing model.**

An infrastructure management and services delivery methodology
- Cloud computing is a way of **managing** large numbers of highly **virtualized resources** such that, from a management perspective, they resemble a single large resource. This can then be used to deliver services with **elastic scaling**.
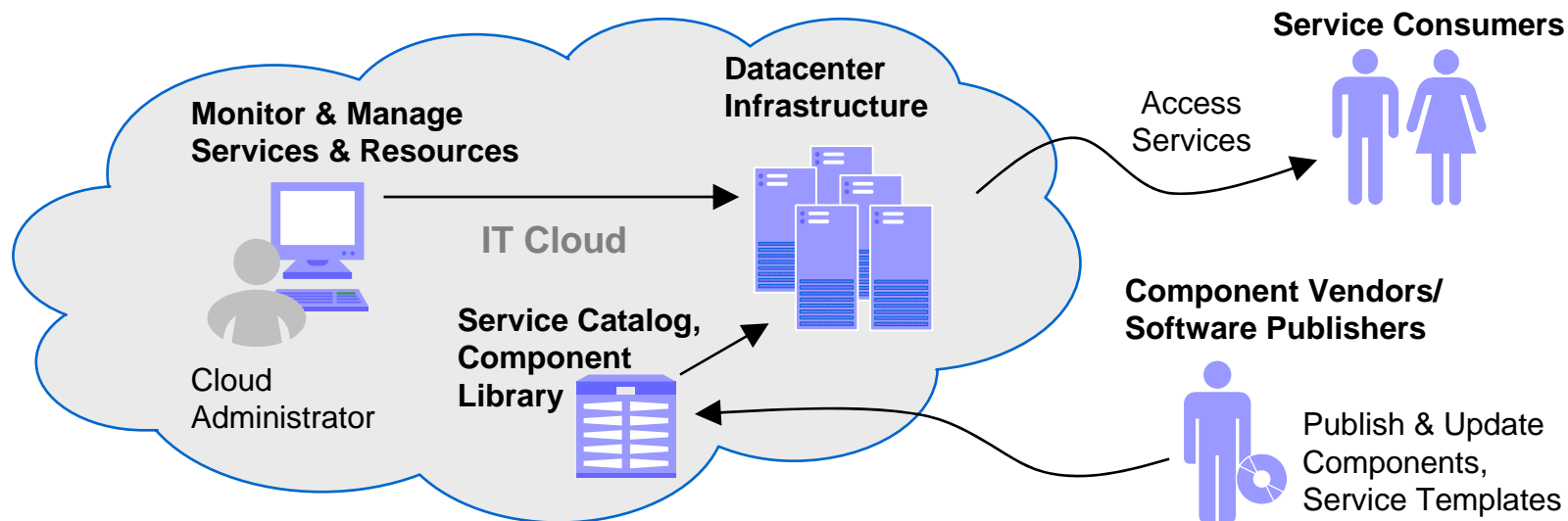
Cloud Computing Deployments and Services Models

Public Clouds
(provider - Internet)

Private Clouds
(data center - Intranet)

Hybrid Clouds
(public and private)

Services

Applications, Processes and Information as a service

Software platforms as a service
(optimized middleware – application servers,
database servers, portal servers, etc.)

Infrastructure as a service
(virtualized servers, storage, networking)
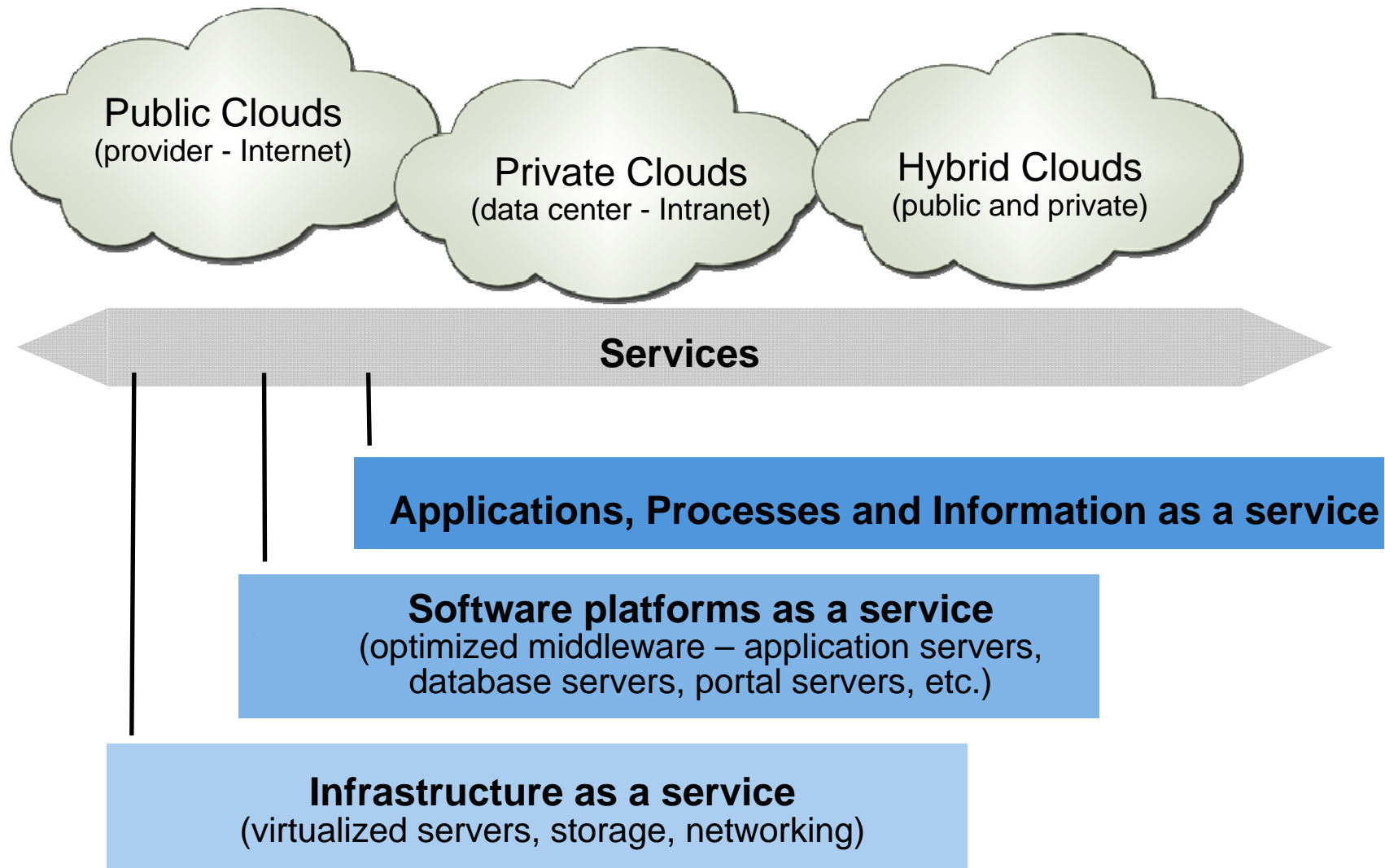
The Managed Cloud
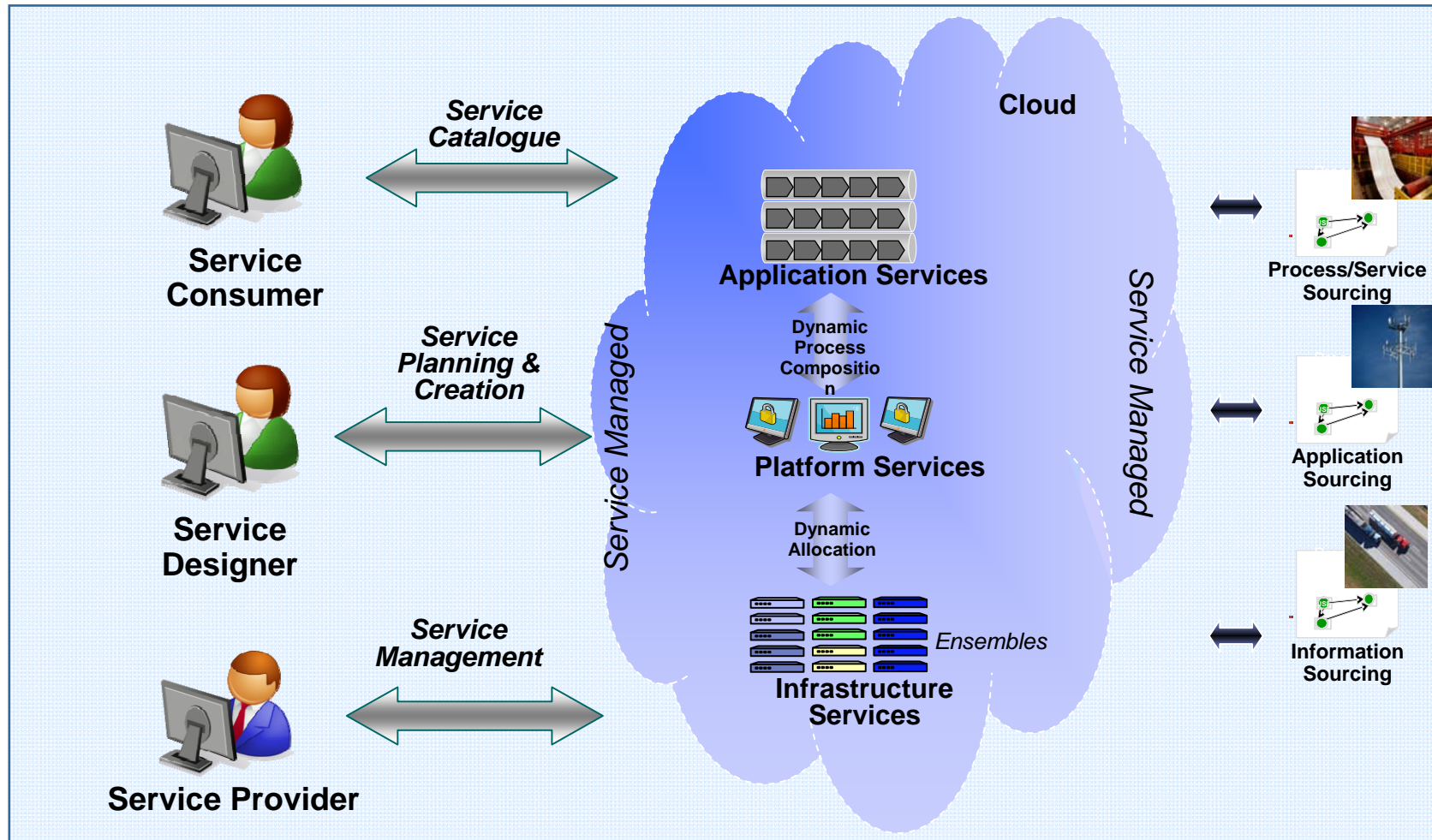
Architectural Model for Cloud Computing

Service Request & Operations

IT Infrastructure & Application Provider

Service Creation & Deployment

End User Requests & Operators

. . .

Service Catalog Request UI Operational UI

Service Management

User Request Management/Self Service Portal

Service Lifecycle Management

| Image Lifecycle Management | Provisioning /Usage Accounting | Performance Management | Availability/Backup/ Restore |

| Security: Identity, Access, Integrity, Isolation, Audit & Compliance | Non-Traditional IT Asset Management | License Management |

Service Oriented Architecture   *Information Architecture*

Optimized Middleware
(image deployment, integrated security, workload mgmt., high-availability)

Virtualized Infrastructure

Virtual Resources & Aggregations

Server Virt.   Storage Virt.   Network Virt.

System Resources

SMP Servers   Blades   Storage Servers   Storage   Network Hardware

Virtual Image Management

Design & Build

Image Library (Store)

Deployment

Operational Lifecycle of Images

Lifecycle of a Cloud Service

Service Instantiation
- Automated process that provide governance and efficiency
- Fulfilment process
- Change and Configuration

Service Offering
- Easy to access, easy to use self Service Catalogue

Service Definition
- Model and instantiate services
- Integrate with development and operations

Service Operations
- Service availability, performance, and use reports
- Service support, security

Service Instance Termination

Subscriber

Service Catalog

Service Designer

Subscription & Instantiation

Service Transition

Offering

Definition

Service Design

Cloud Service

Production

Service Operations

Termination

Administrator

Subscriber

IT Operator

Process Platform
Process Engine, Middleware, Virtualized and Physical Resources
Virtual Servers • Virtual Networks • Virtual Storage • Virtual Applications • Ensembles
Servers • Network • Storage • Facilities Infrastructure (Power, Cooling, etc.)

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Explore the New Business Model

- **To investigate with Blue Works in a Cloud**
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- **Use company name paananen**
- **Enter your information**
- **Join**

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Questions