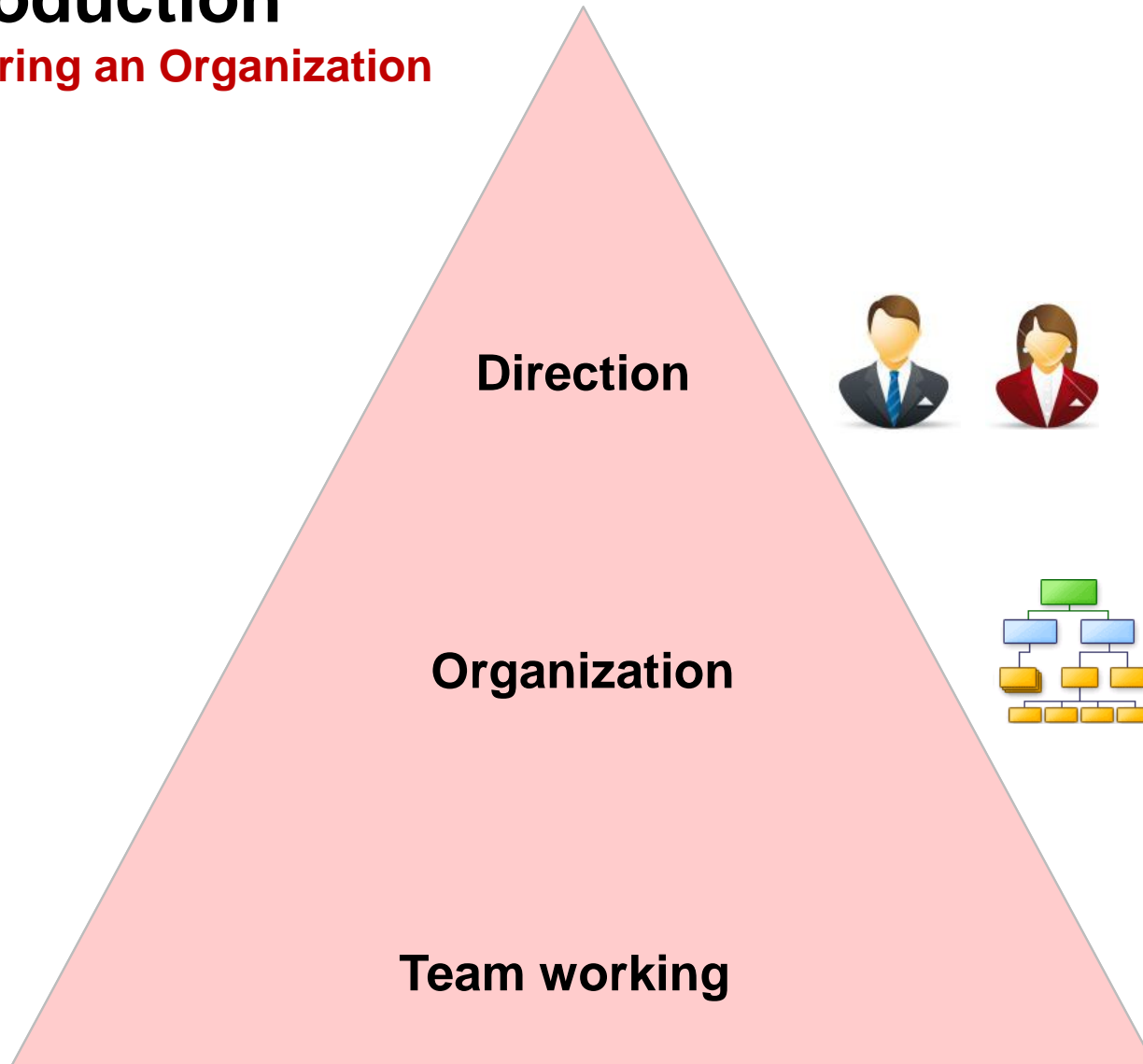# Enterprise Architecture

Danairat T.
Enterprise Architect
Certified Java Programmer, TOGAF Silver
ISACA Member
danairat@gmail.com

Agenda

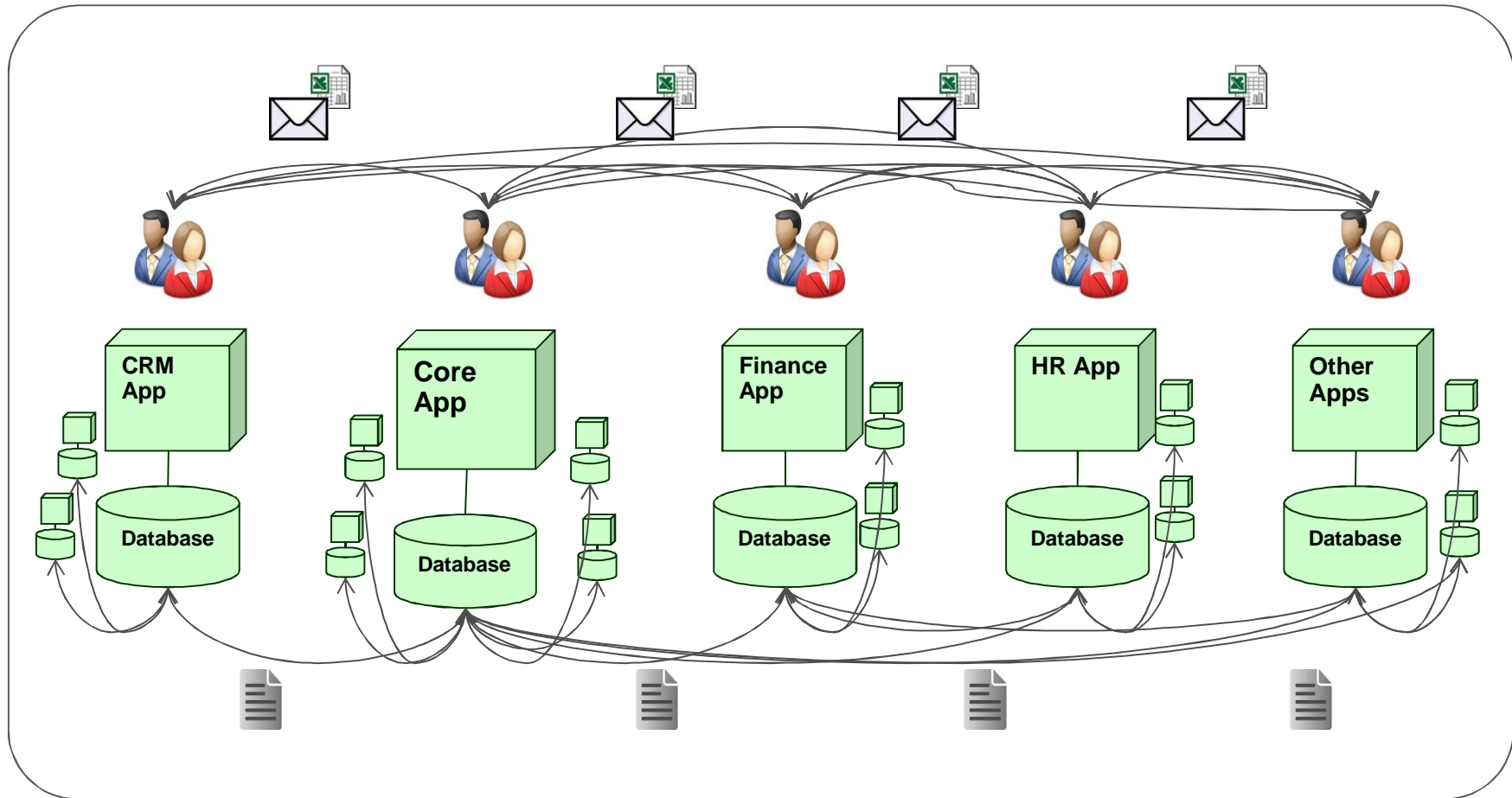- Introduction
- Enterprise Reference Architecture
- Architecture Development Process
- Summary

Introduction
Exploring an Organization

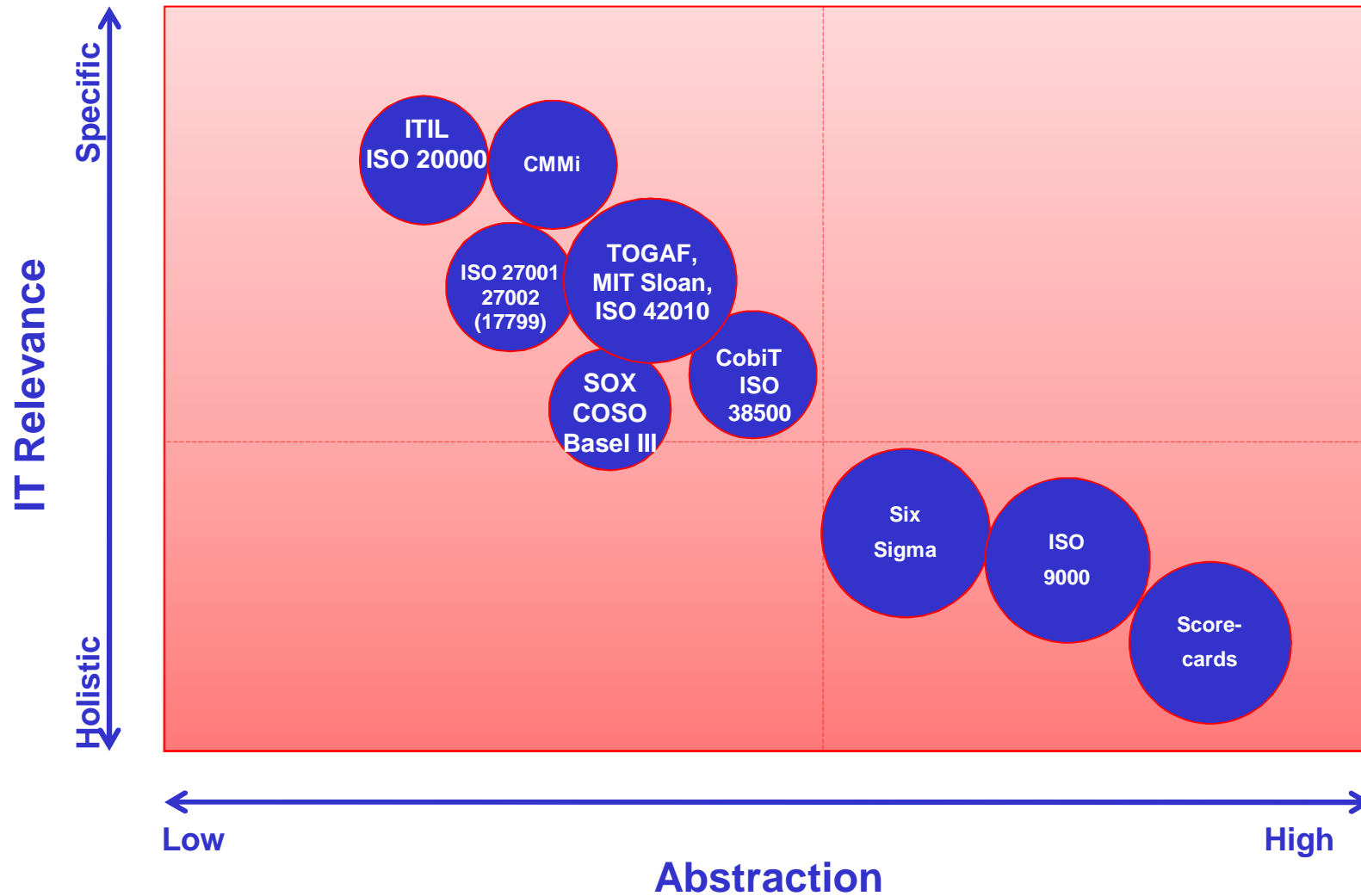**Direction**

Organization

Team working

Why We Need Business Transformation
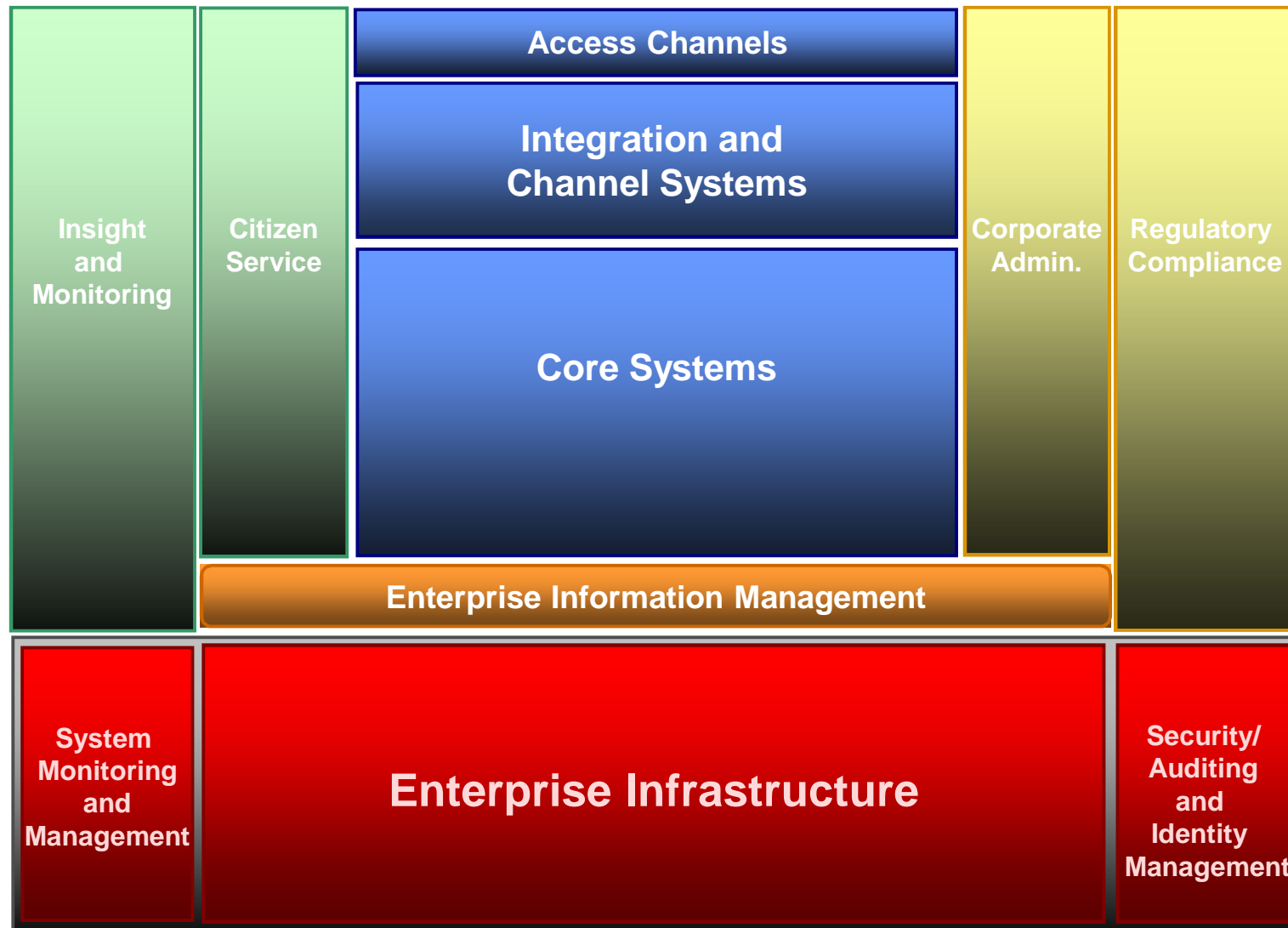

IT System Deployment – Silos and inefficient to scale business

There are many of related standards/guidelines

IT Relevance (Specific → Holistic)
Abstraction (Low → High)

- ITIL ISO 20000
- CMMi
- ISO 27001 27002 (17799)
- TOGAF, MIT Sloan, ISO 42010
- SOX COSO Basel III
- CobiT ISO 38500
- Six Sigma
- ISO 9000
- Score-cards

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The Enterprise Reference Architecture

Insight and Monitoring

Citizen Service

Access Channels

Integration and Channel Systems

Core Systems

Corporate Admin.

Regulatory Compliance

Enterprise Information Management

System Monitoring and Management

Enterprise Infrastructure

Security/ Auditing and Identity Management

The Enterprise Reference Architecture

Insight and Monitoring	Citizen Service	Access Channels		Corporate Admin.	Regulatory Compliance
		Integration and Channel Systems			
		Core Systems			

Enterprise Information Management

Customer Data	Product Data	Payment Data	Accounting	Org. Hierarchy

Enterprise Infrastructure

System Monitoring and Management	User Centric	Security/ Auditing and Identity Management
	Process Centric	
	Data Centric	
	Decision Centric	
	H/W, Storage, OS, Database, AppServer Platform	

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Sample Reference Architecture

The Technology Landscape

Insight and Monitoring

- BI

Sales and Marketing

- CRM
- Product Portfolio Management

Core Processes

- New Business Life
- New Business Motor
- New Business Group
- New Business Non-Motor
- Claim Life
- Claim Motor
- Claim Non-Motor
- Renewal Life
- Renewal Motor
- Renewal Non-Motor
- Core Insurance System

Corporate Admin.

- HCM
- Finance - Premium receive
- Finance - compensation

Regulatory Compliance

- GRC

Enterprise Information Management

| Customer Data | Product Data | Payment Data | Accounting | Org. Hierarchy |

Common Enterprise Technology

System Monitoring and Management

- Web and Mobile Technology
- Business Process Management Technology
- Data Integration Technology
- Events and Rules Processing Technology
- AppServer Platform, DBaaS Platform, OS, Hardware, Network

Security/ Auditing and Identity Management

Group Workshop - The Current Enterprise Architecture

Write down your existing enterprise architecture foot print
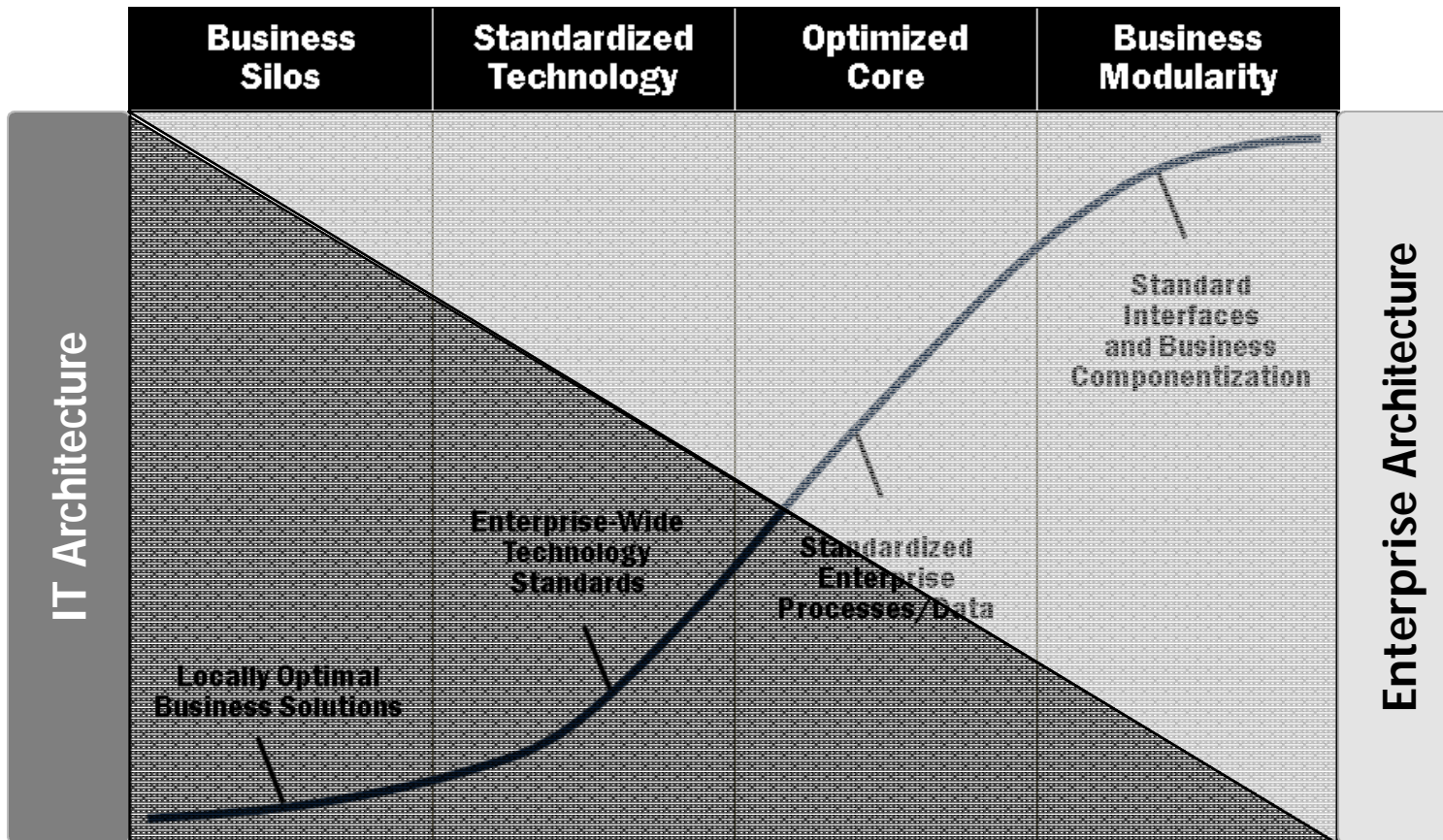
Team Name: *xxx*
1. *Name, Company, E-mail*   3. *Name, Company, E-mail*
2. *Name, Company, E-mail*   4. *Name, Company, E-mail*

Enterprise Reference Architecture

Business Insight and Monitoring	Citizen Services	Access Channels	Corporate Admin.	Regulatory Compliance
		Core Business Processing Systems		

Master Data

System Monitoring and Management	Enterprise Infrastructure	Security/ Auditing and Identity Management

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Transformation Maturity Model

Business Silos	Standardized Technology	Optimized Core	Business Modularity

IT Architecture — **Enterprise Architecture**

Standard Interfaces and Business Componentization

Enterprise-Wide Technology Standards

Standardized Enterprise Processes/Data

Locally Optimal Business Solutions

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Enterprise Architecture Maturity – Details

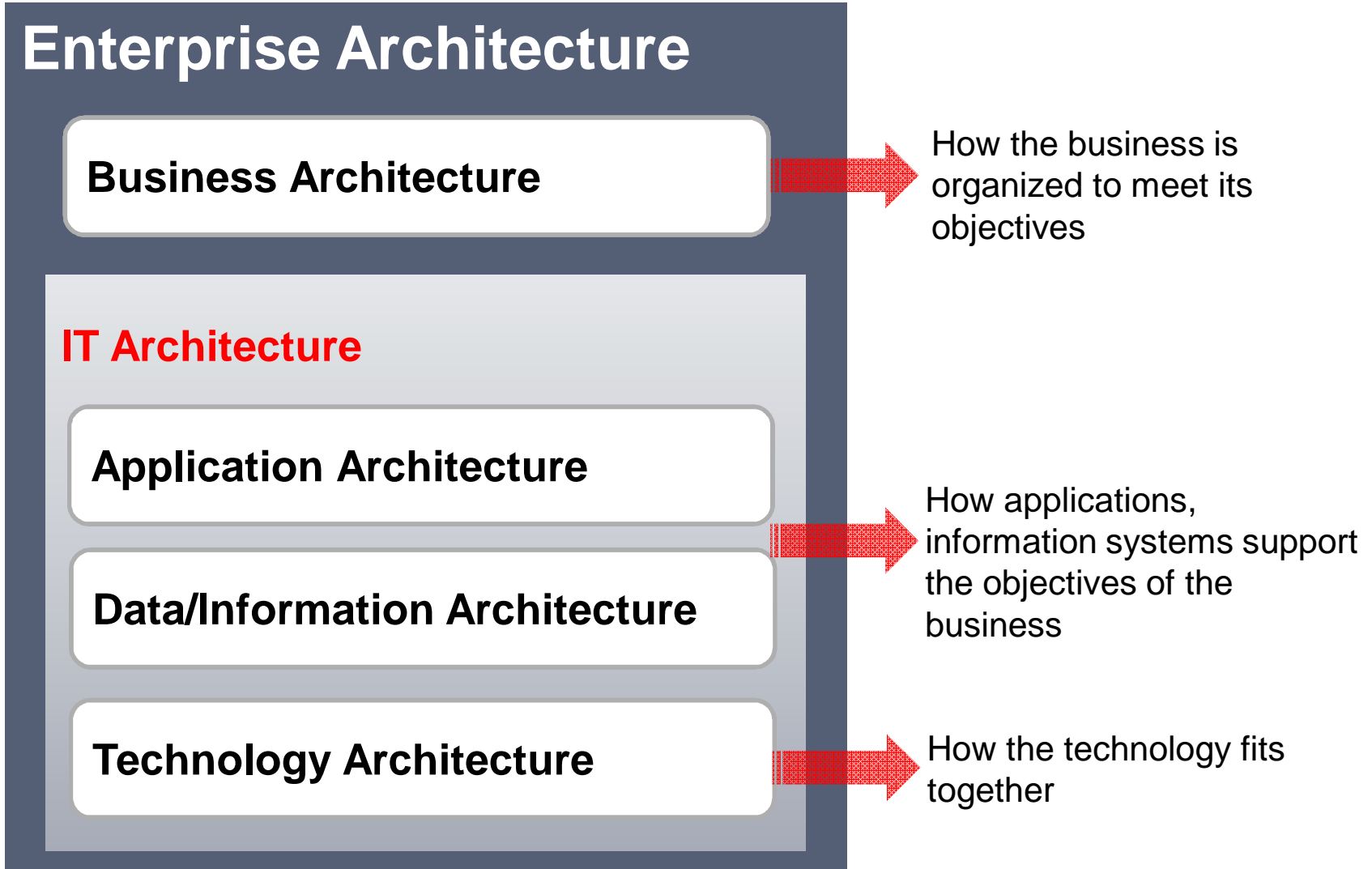| Business Silos	Standardized	Optimized Core	Bus Modularity
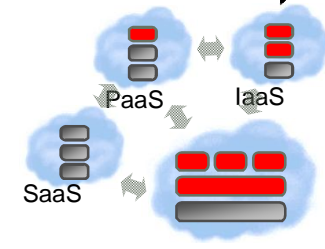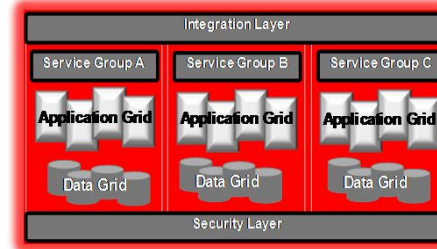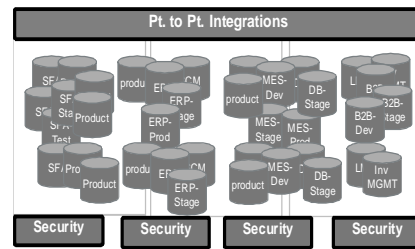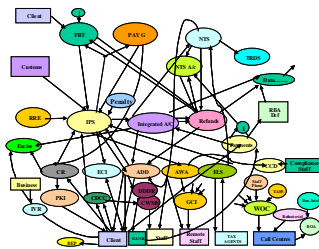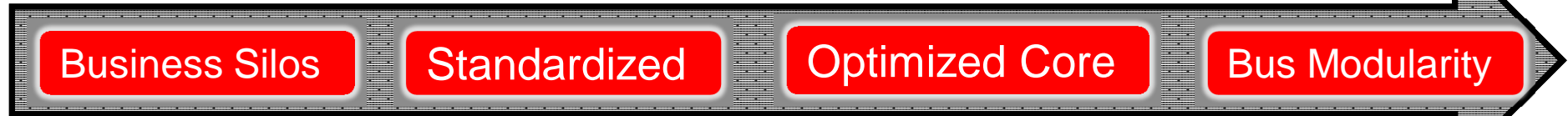
- **Local IT silos**

- **Peak load sized**

- **Difficult to scale**

- **Difficult to change**

- **Expensive to manage**

- **Complexity driven risk**

- **Standardized interfaces/systems**

- **Lower license and support costs**

- **Increased utilization of IT skills**

- **Reduced IT project time/costs/risks**

- **Pools of resources**

- **Consolidated**

- **Better productivity**

- **Higher QoS**

- **Improved IT agility**

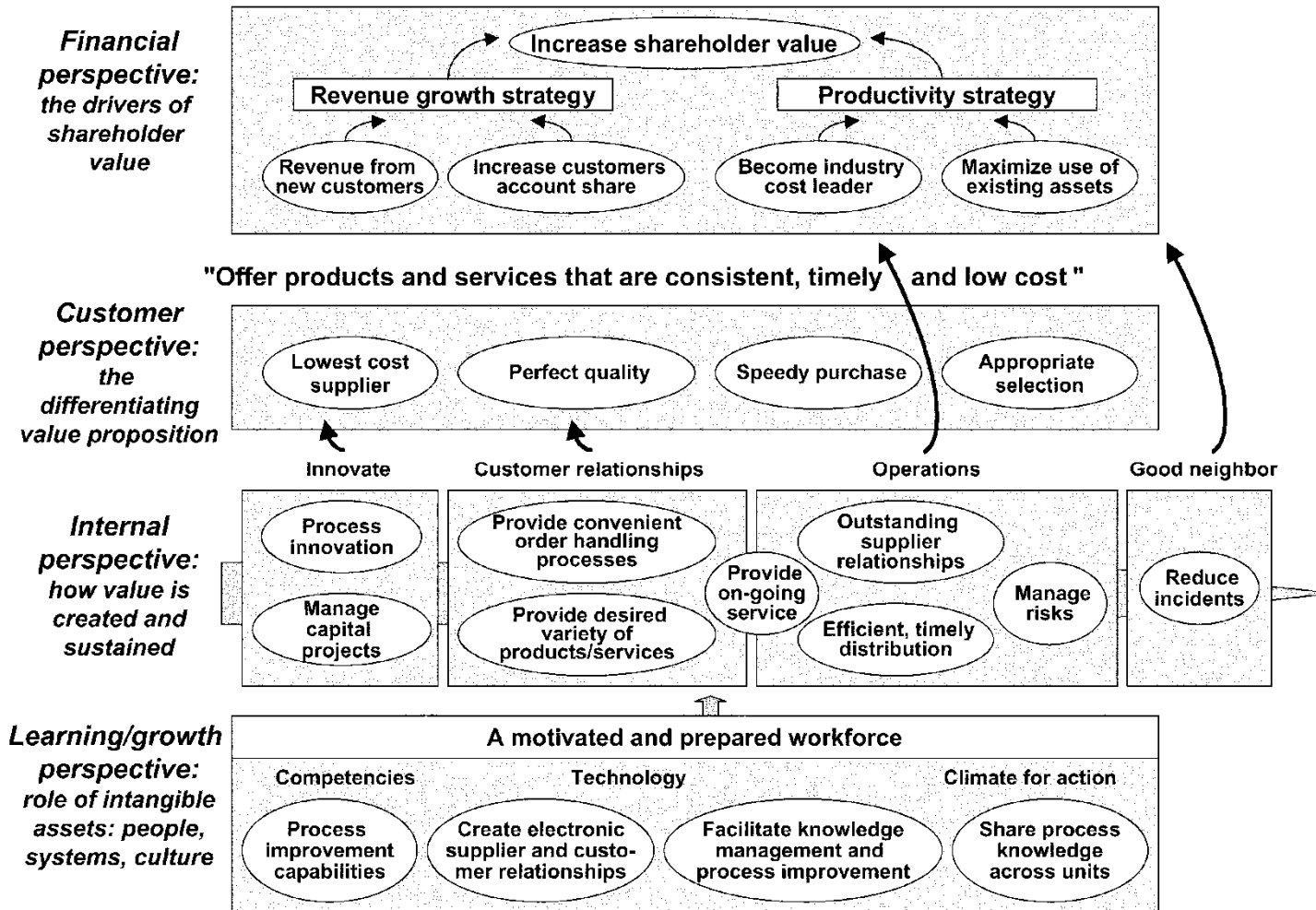- **Improved security and management**

- **Rapid provisioning**

- **Lower costs**

- **IT as a "Business"**

- **Faster project turnaround**

- **Greater focus on business**

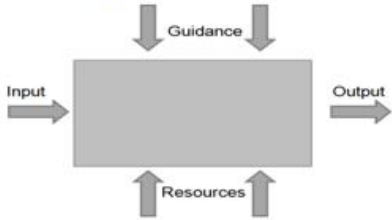# Architecture Domains

Enterprise Architecture

Business Architecture ➡ How the business is organized to meet its objectives

IT Architecture

Application Architecture

Data/Information Architecture ➡ How applications, information systems support the objectives of the business

Technology Architecture ➡ How the technology fits together

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Business Architecture

Business Strategy Map

Financial perspective: the drivers of shareholder value

- Increase shareholder value
- Revenue growth strategy
- Productivity strategy
- Revenue from new customers
- Increase customers account share
- Become industry cost leader
- Maximize use of existing assets

"Offer products and services that are consistent, timely and low cost"

Customer perspective: the differentiating value proposition

- Lowest cost supplier
- Perfect quality
- Speedy purchase
- Appropriate selection

Internal perspective: how value is created and sustained

Innovate
- Process innovation
- Manage capital projects

Customer relationships
- Provide convenient order handling processes
- Provide desired variety of products/services

Operations
- Provide on-going service
- Outstanding supplier relationships
- Efficient, timely distribution
- Manage risks

Good neighbor
- Reduce incidents

Learning/growth perspective: role of intangible assets: people, systems, culture

A motivated and prepared workforce

Competencies
- Process improvement capabilities

Technology
- Create electronic supplier and customer relationships
- Facilitate knowledge management and process improvement

Climate for action
- Share process knowledge across units

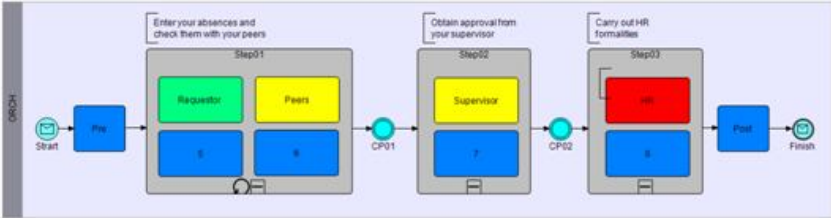# Business Architecture and BPMN

4 phases of business process development
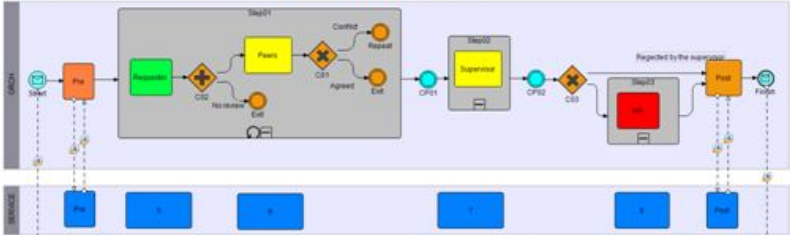

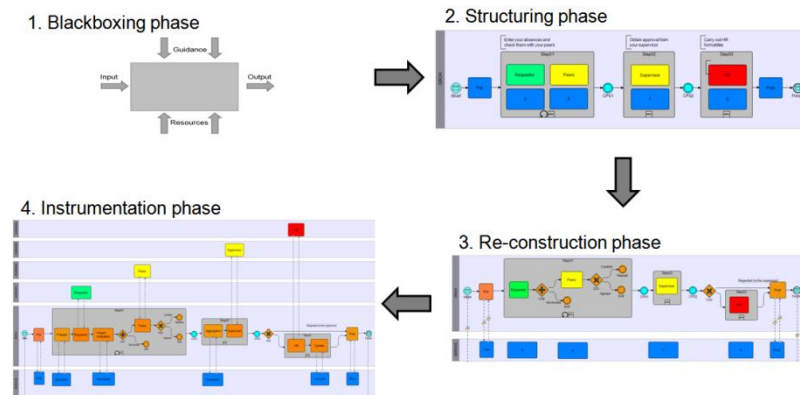1. Blackboxing phase

2. Structuring phase

3. Re-construction phase

4. Instrumentation phase
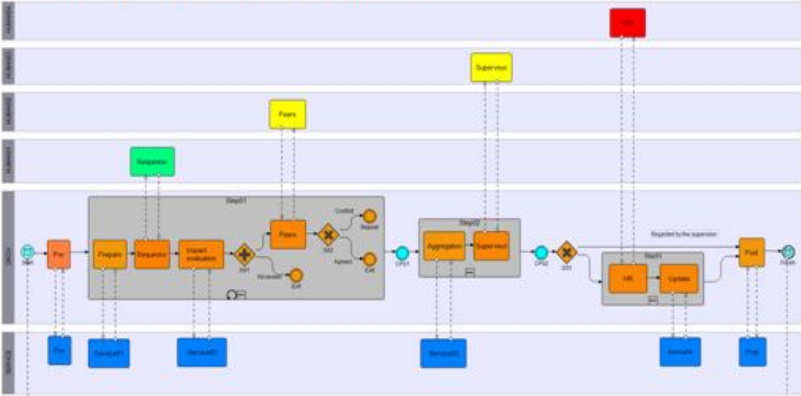
Group Workshop: Business Process Modeling
Developing BPMN

Brainstorm 1 hr. and Presentation 15 mins.

1. Introducing Group Members
2. Giving Process Name and Descriptions
3. BPMN Phase 1: Block Boxing Phase
4. BPMN Phase 2: Structuring Phase
5. BPMN Phase 3: Re-Construction Phase
6. BPMN Phase 4: Instrument Phase

Group Workshop – Business Objectives

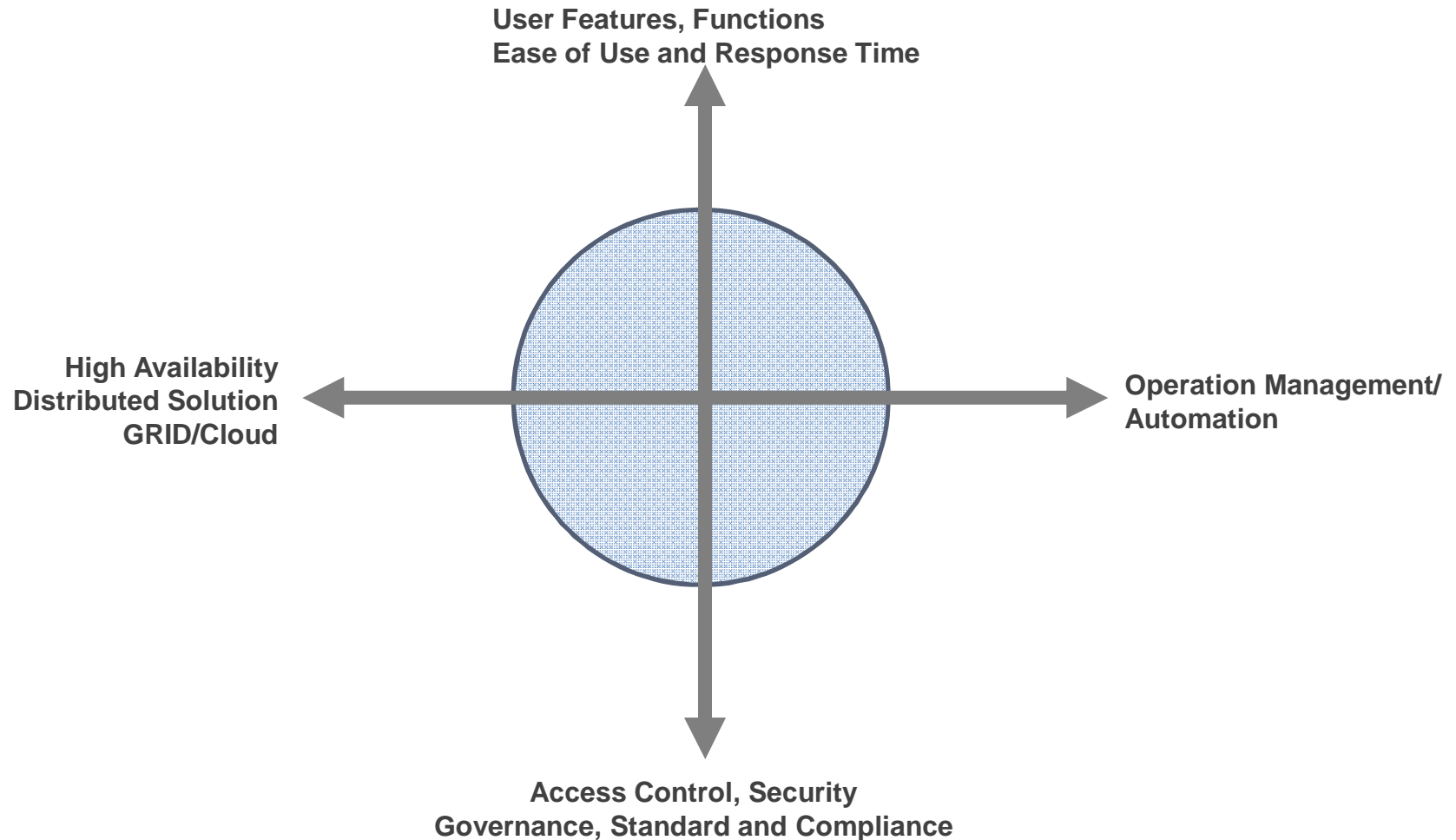| #	Business Owner	Business Objective	Business Service - Process Name and short desc.	Business Issues	Supported Applications Name	Application Issues	Remarks

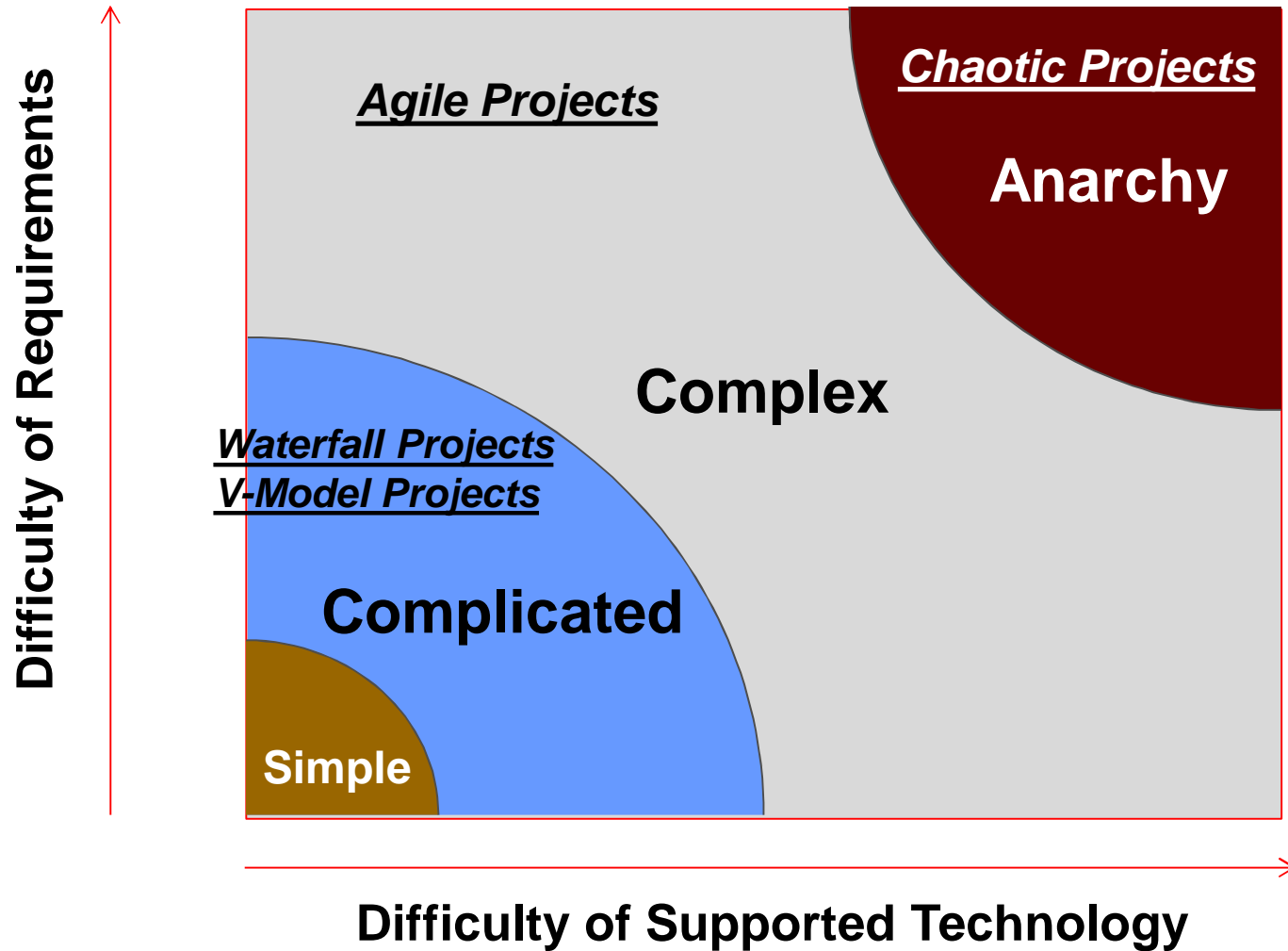**1.5 hrs. brainstrom and 15 mins. presentation**

Application Architecture

Application Development Framework

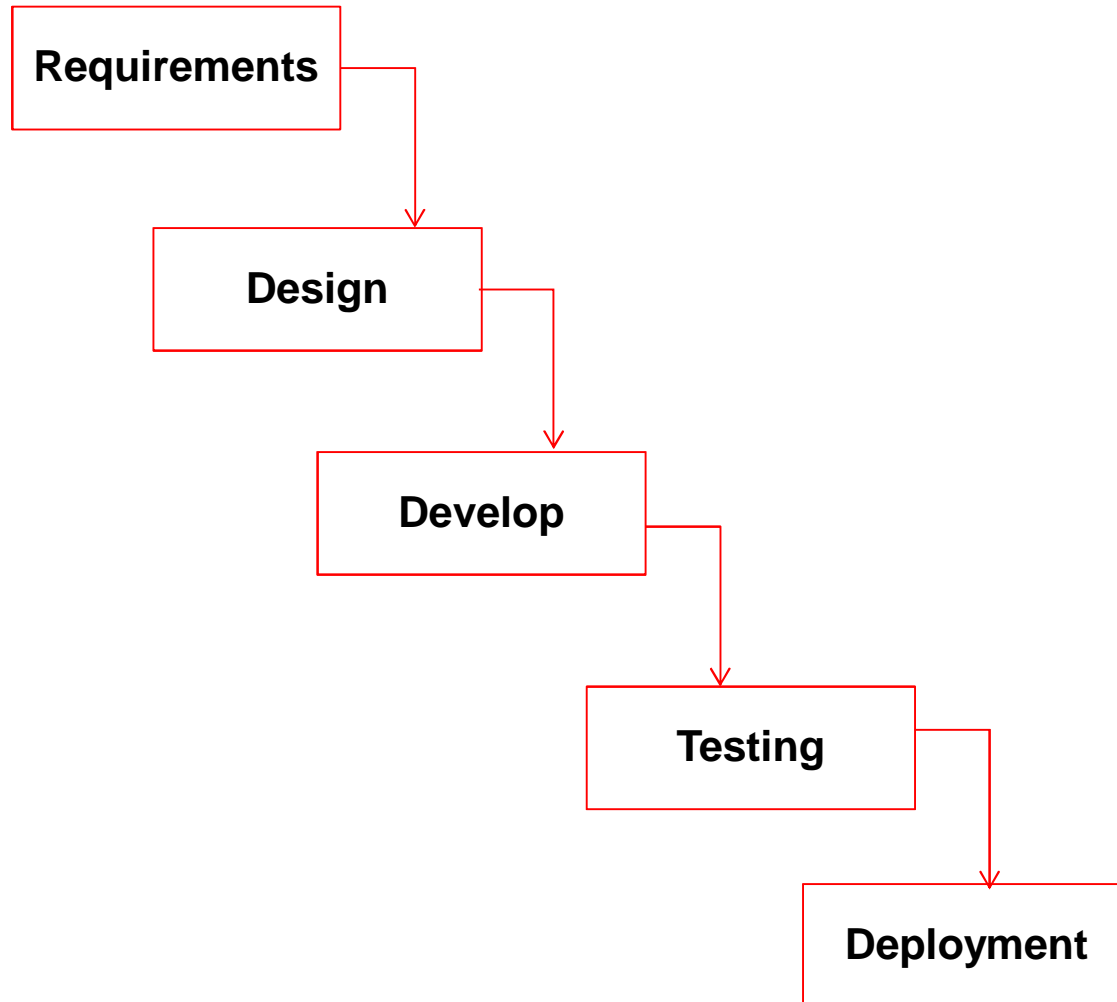An application framework represents the **partial implementation of a specific area of an application**
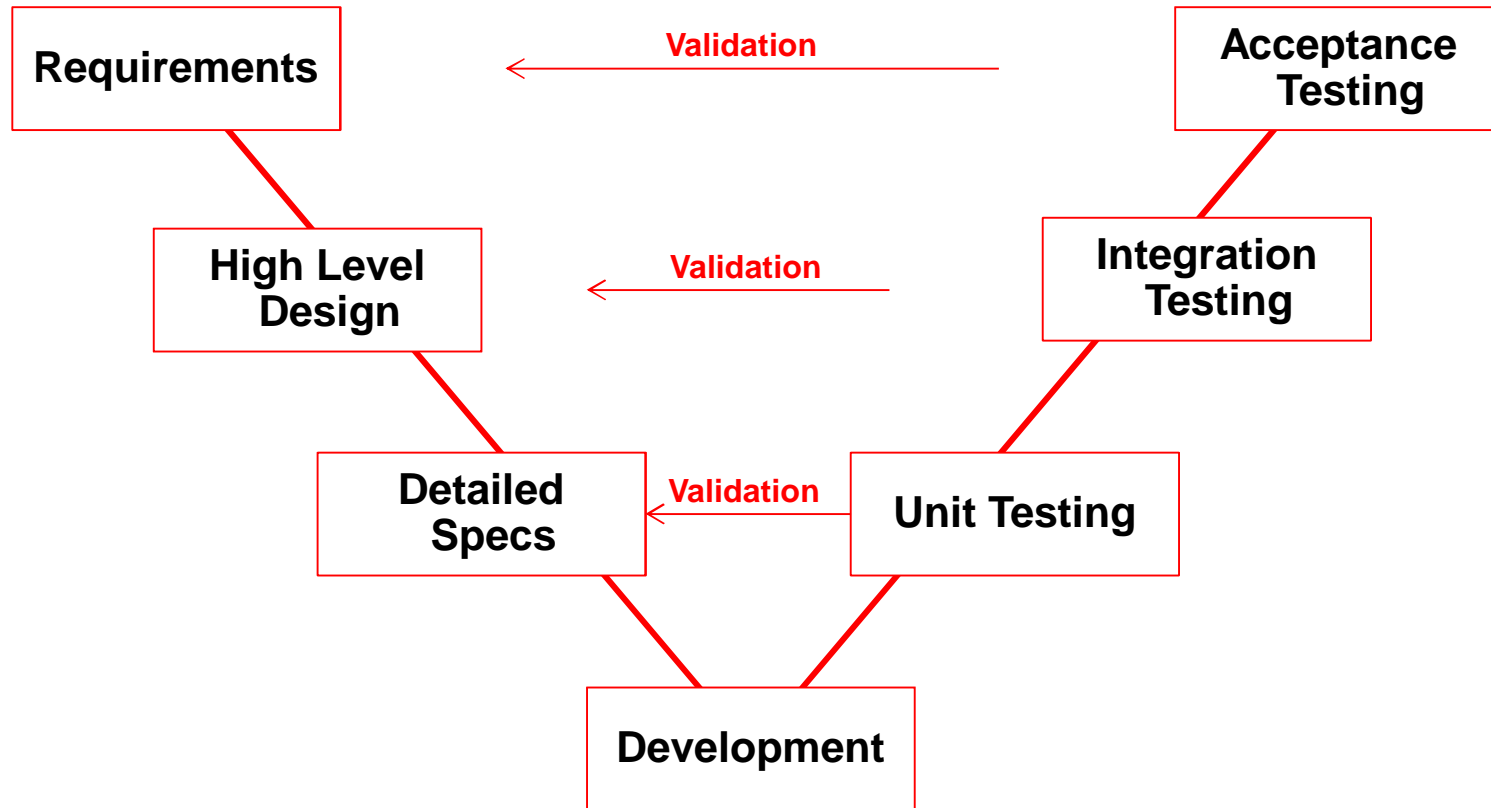
Functional and Non Functional Analysis

User Features, Functions
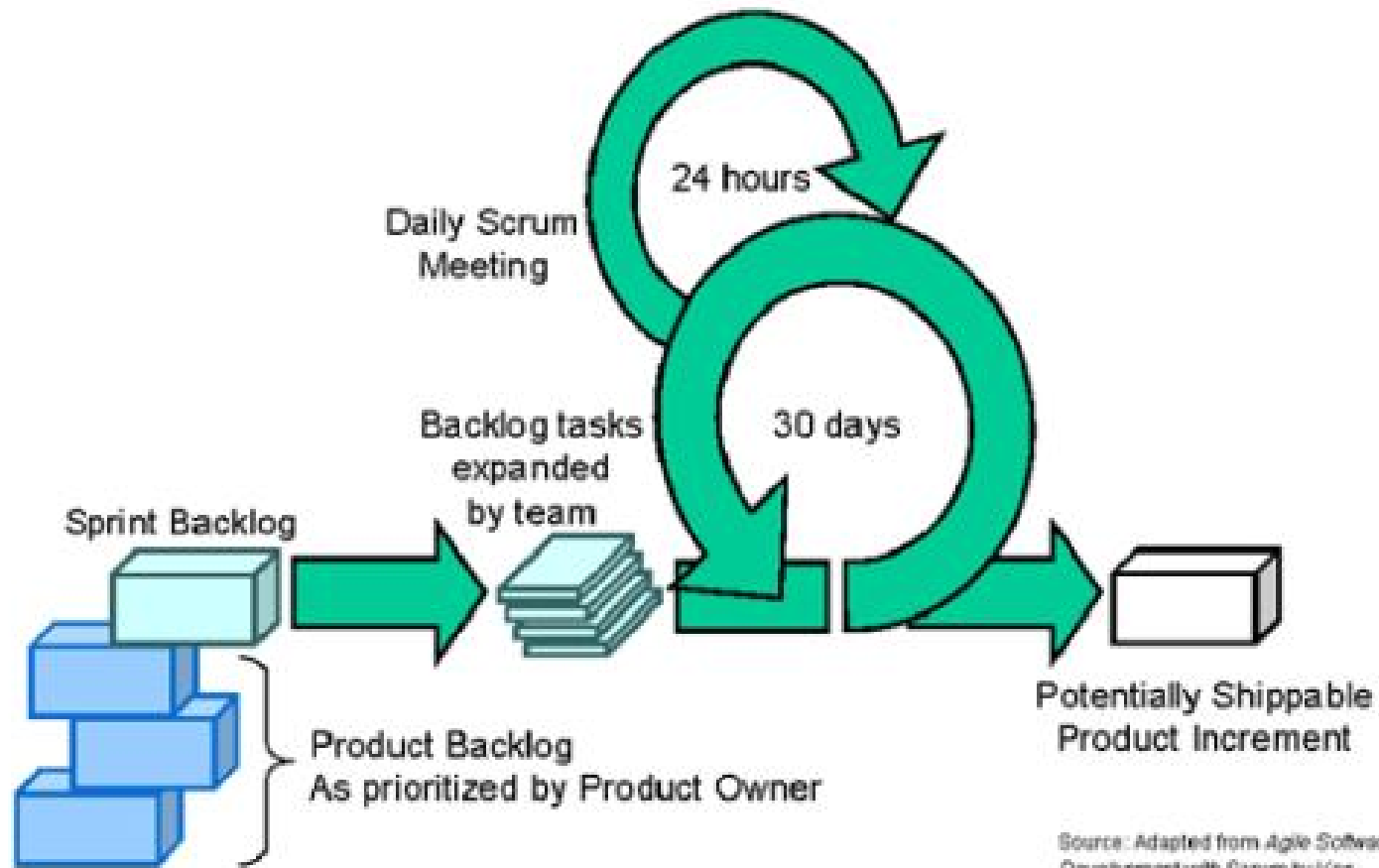**Ease of Use and Response Time**

High Availability
Distributed Solution
GRID/Cloud

Operation Management/
Automation

Access Control, Security
Governance, Standard and Compliance

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When to use which methodology

Difficulty of Requirements (vertical axis)

Difficulty of Supported Technology (horizontal axis)

Chaotic Projects
Anarchy

Agile Projects

Complex

Waterfall Projects
V-Model Projects

Complicated

Simple

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Waterfall Model

Requirements

Design

Develop

Testing

Deployment

V-Model

Requirements

Acceptance Testing

High Level Design

Integration Testing

Detailed Specs

Unit Testing

Development

Validation

Validation

Validation

Agile – Scrum Method

24 hours

Daily Scrum
Meeting

Sprint Backlog

Backlog tasks
expanded
by team

30 days

Product Backlog
As prioritized by Product Owner

Potentially Shippable
Product Increment

Source: Adapted from *Agile Software
Development with Scrum* by Ken
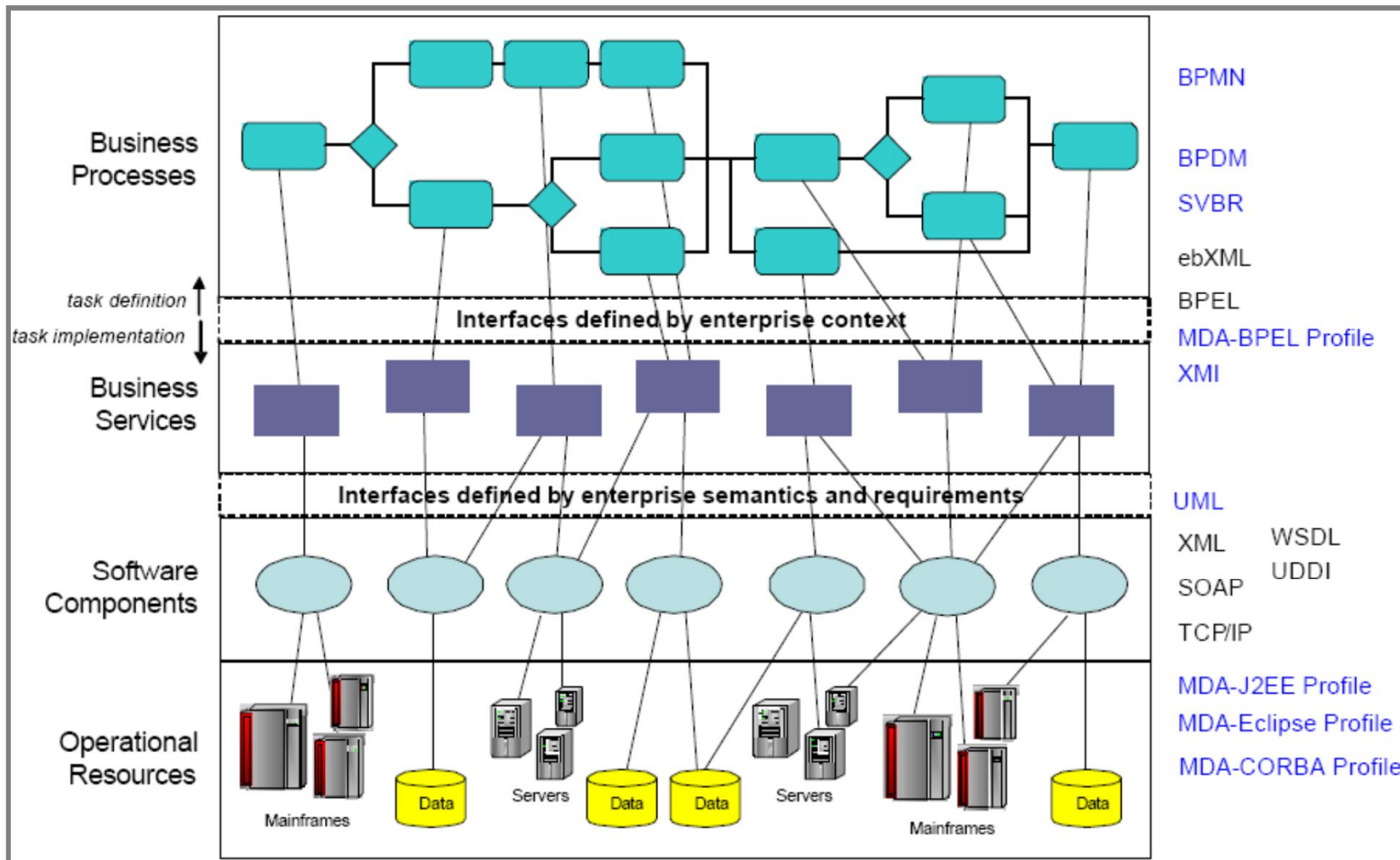Schwaber and Mike Beedle.

Group workshop - Business Services and IT Alignment
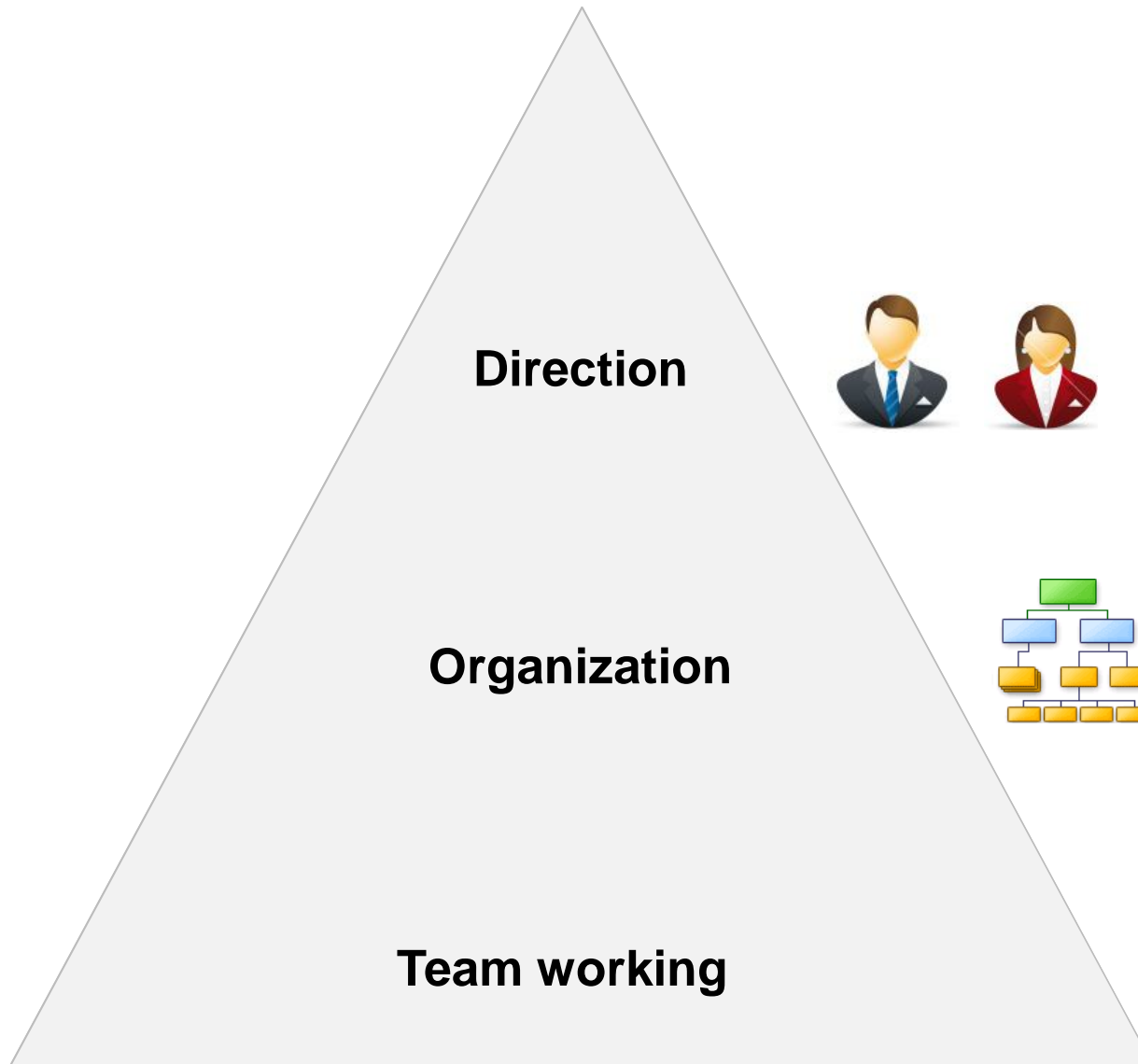## 1.5 hrs. brainstorm and 15 mins. presentation
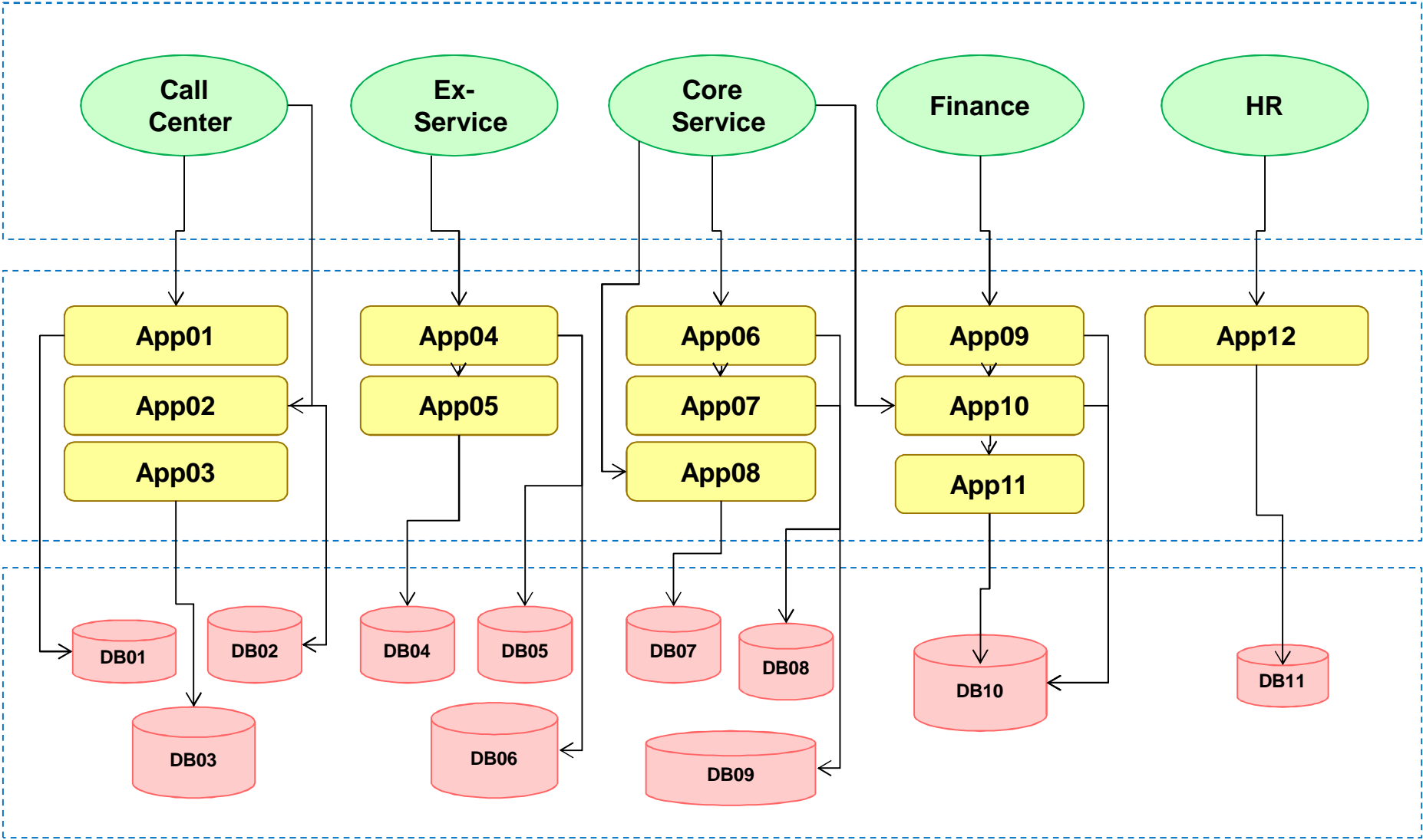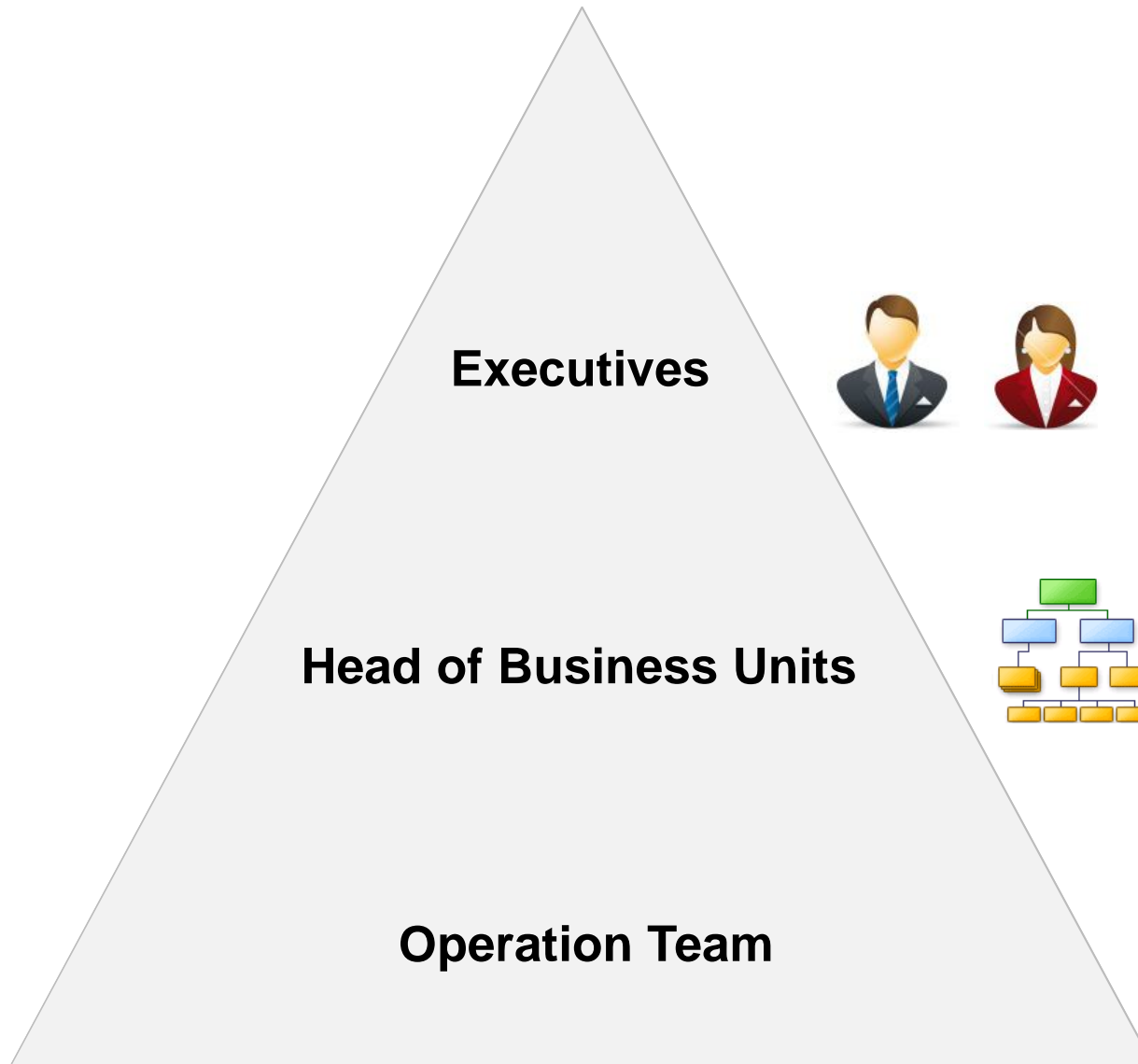
Object Management Group - Process Standards

Data and Information Architecture

Discovering the Enterprise Data

Direction

Organization

Team working

Discovering the Enterprise Data

Executives

Head of Business Units

Operation Team

Discovering the Enterprise Data

Executive Summary Data — Executives

Master Data — Head of Business Units

Transactional Data — Operation Team

Discovering The Enterprise Data
Drill in the Executive Reports
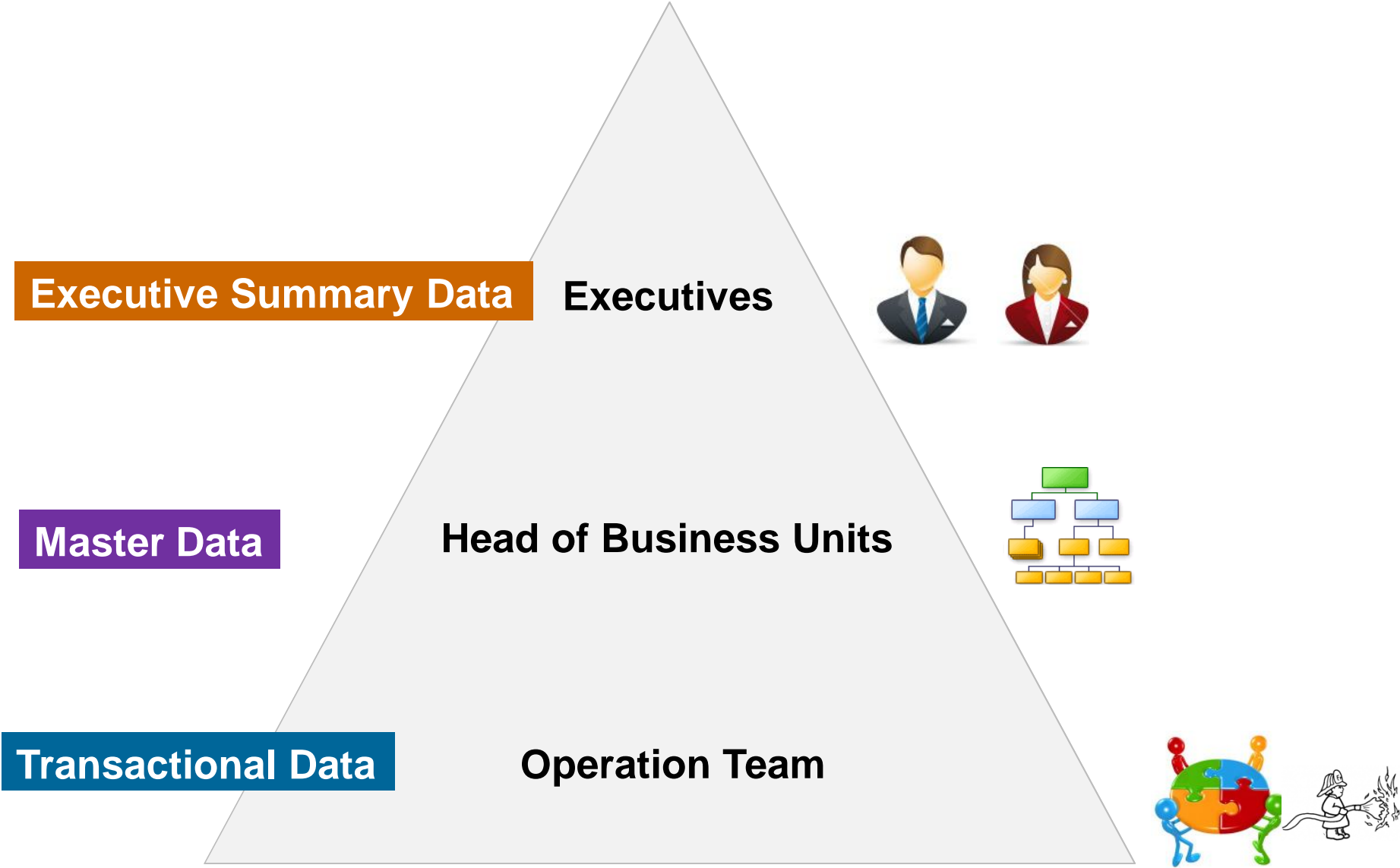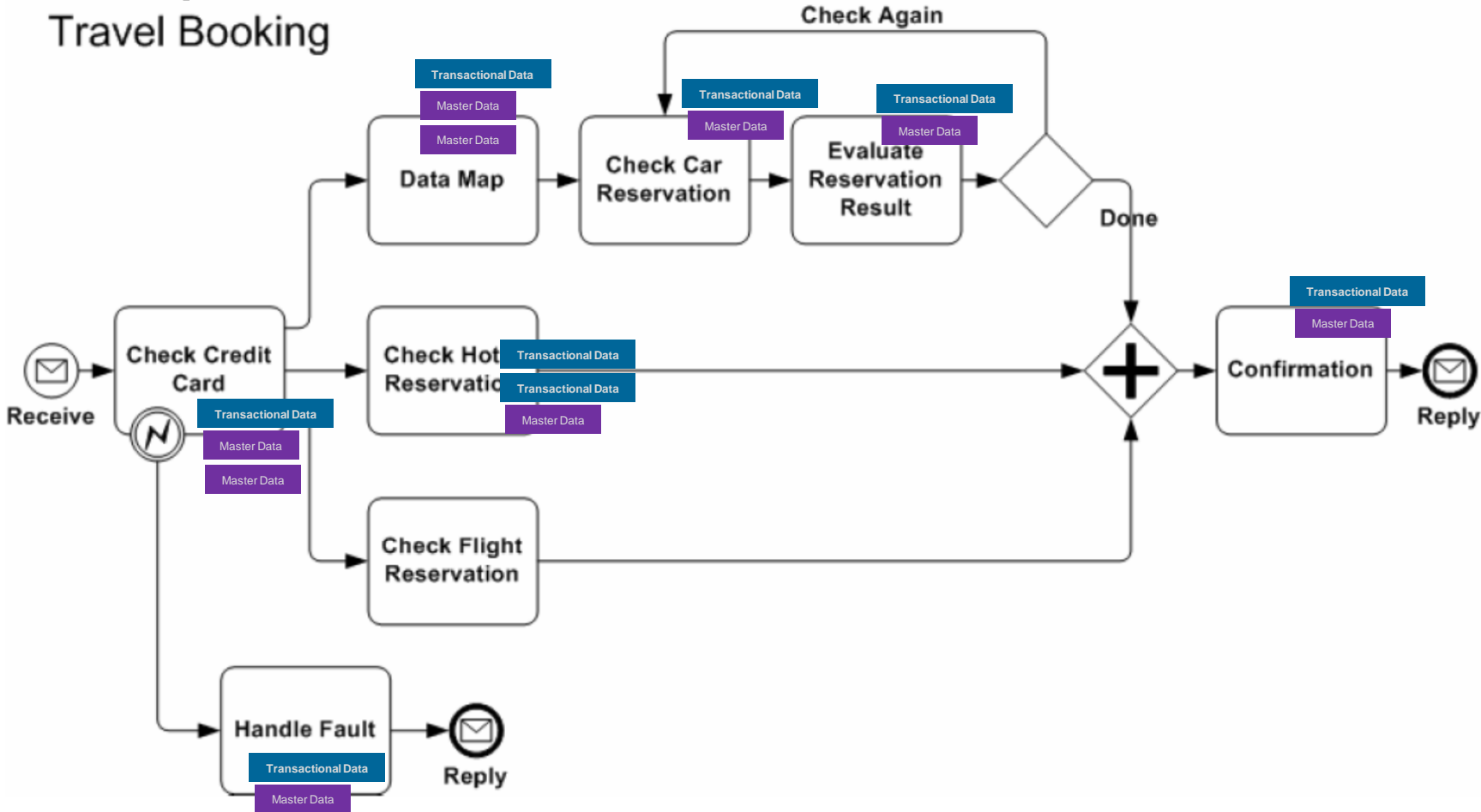
Discovery The Enterprise Data
Drill in the Business Process

Example
Travel Booking

Enterprise Data Flow

Transactional Integration Data

Application Specific Data

Enterprise Operational Data

Enterprise Data Warehouse, Data Marts and BI

SOA

ws → **App1 Data**

ws → **App2 Data**

ws → **App3 Data**

ETL/ELT → **ODS**

ETL/ELT → **Data Warehouse**
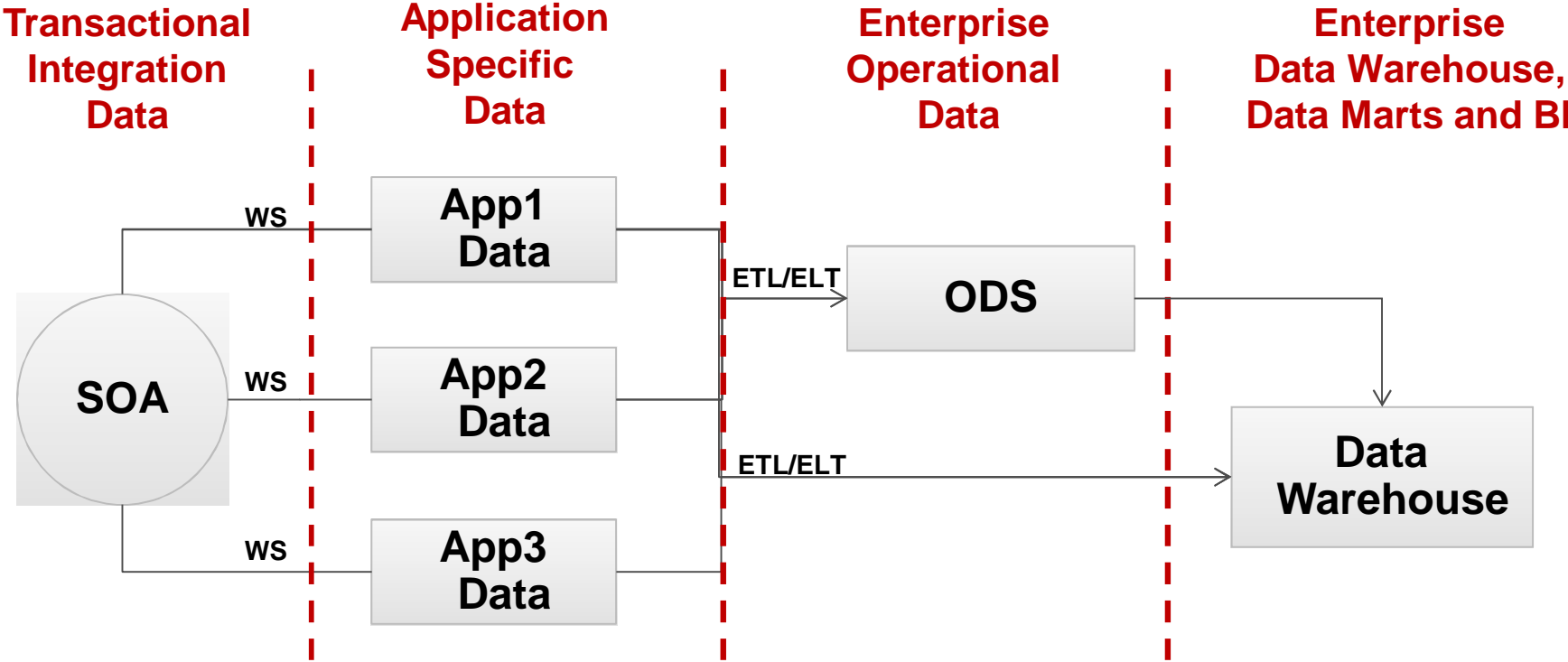
Master Data

← **Data Management Process** →

Data Governance, Data Architecture Management, Data Modeling, Data Quality, DW/BI, Metadata Management, Document/Content Management

Data Quality

The state of completeness, validity, consistency, timeliness and accuracy that makes data appropriate for an enterprise use

Three Main Data Quality Metrics
- Business Relevance
    - Executive Reports/Critical Business Process
- Accountability
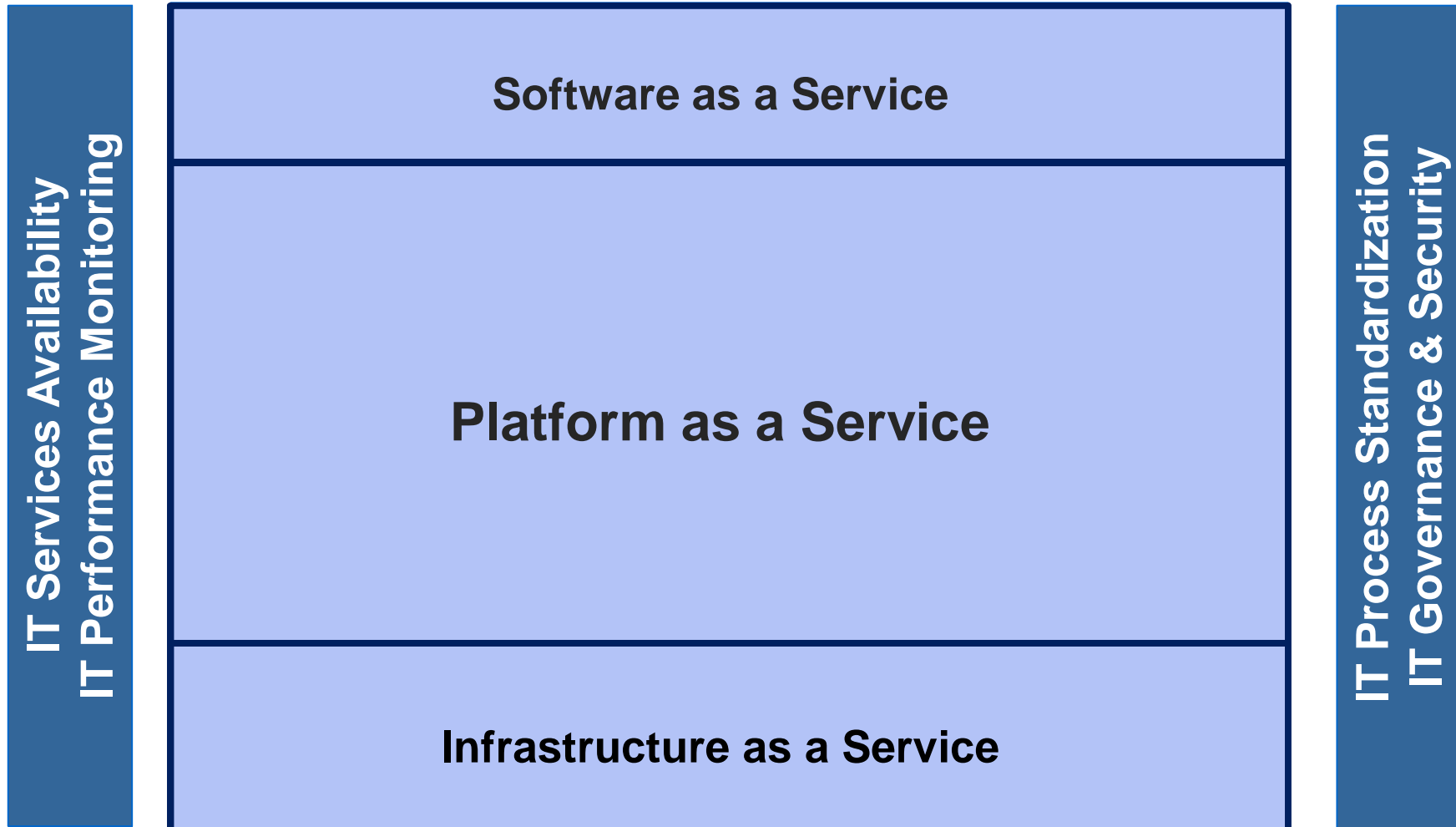- Controllability and Track-ability

Enterprise Data Quality Worksheet

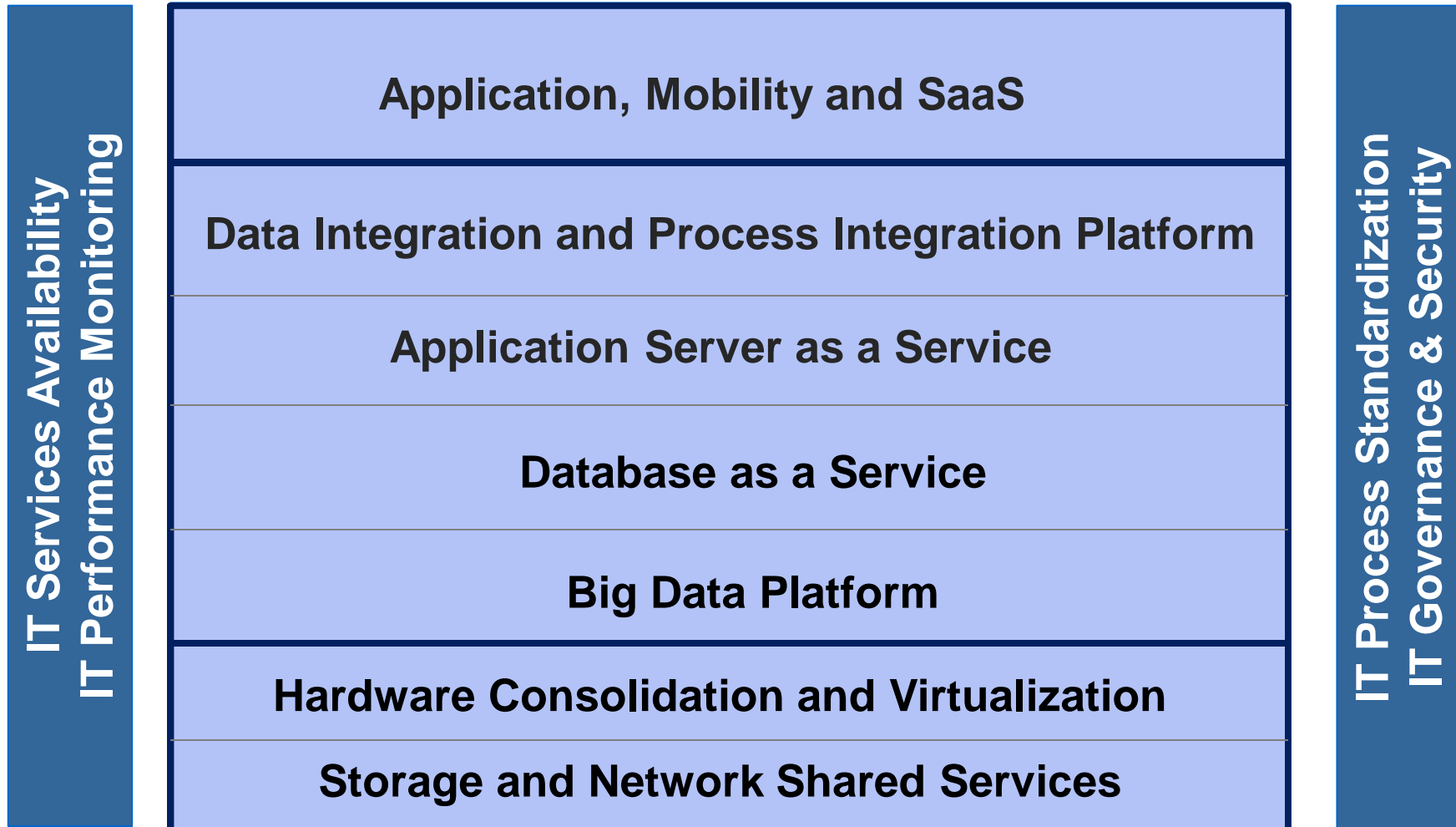| No.	Master/ Transactional/ Summary Data	Data Name	Owner	Used by Critical Business Processes (Y/N)	Use By Executive Reports (Y/N)	Change Control (Y/N)	Sample Data Structure, Data Type, Data Range	Current Issues With % of Records are align with its profiling	Remarks

Data Management Scope – Table Matrix

	Goals and Principles	Activities	Primary Deliverables	Roles and Responsibilities	Practices and Techniques	Technology	Organisation and Culture
Data Governance							
Data Architecture Management							
Data Development							
Data Operations Management	← Scope of Each Data Management Function →						
Data Security Management							
Data Quality Management							
Reference and Master Data Management							
Data Warehousing and Business Intelligence Management							
Document and Content Management							
Metadata Management							

Technology Architecture

IT Shared Services Stack

IT Services Availability
IT Performance Monitoring

Software as a Service

Platform as a Service

Infrastructure as a Service

IT Process Standardization
IT Governance & Security

IT Shared Services Stack

IT Services Availability / IT Performance Monitoring		IT Process Standardization / IT Governance & Security
	Application, Mobility and SaaS	
	Data Integration and Process Integration Platform	
	Application Server as a Service	
	Database as a Service	
	Big Data Platform	
	Hardware Consolidation and Virtualization	
	Storage and Network Shared Services	

Cloud Roadmap

Public Clouds ▶ **Hybrid**

Public Cloud Evolution

SaaS IaaS PaaS

PaaS IaaS

SaaS Virtual Private Cloud

Private Cloud Evolution

App1 App2 App3

App1 App2 App3
Private PaaS
Private IaaS

App1 App2 App3
Private PaaS
Private IaaS

Silo'd	▶	**Grid**	▶	**Private Cloud**	▶	**Hybrid**
• Physical		• Virtual		• Self-service		• Federation with public clouds
• Dedicated		• Shared services		• Policy-based resource mgmt		• Interoperability
• Static		• Dynamic		• Chargeback		• Cloud bursting
• Heterogeneous		• Standardized appliances		• Capacity planning		

Technology Standard and Key Consideration
Database Server and Application Server

Access Channels

Integration and Channel Systems

Core Systems

Insight and Monitoring

Sales and Marketing

Corporate Admin.

Regulatory Compliance

Enterprise Infrastructure
User Centric
Process Centric
Data Centric
Decision Centric

System Monitoring and Management

Security/ Auditing and Identity Management

H/W, Storage, OS, Database, AppServer Platform
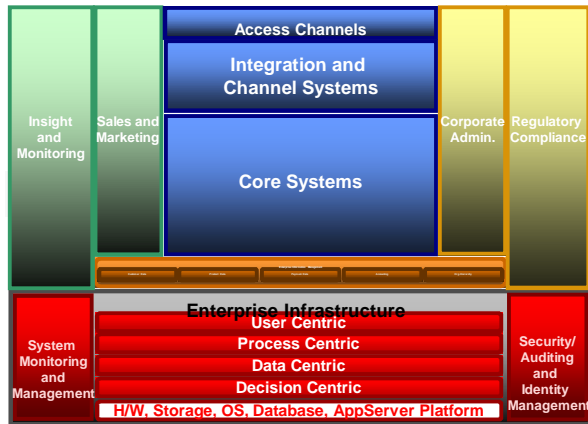
Database

- **ANSI (American National Standards Institute) SQL**
- **DB Programming support**
- **DB and System Diagnostic and Tuning Tool**
- **Segregation of Duty Support**
- **Active-Active Clustering**
- **DB Machine**

Application Server

- **Open Development Framework**
- **Monitoring Matric; eg. JMX, Managed Bean**
- **In-Memory Session Clustering**
- **Deployment Descriptor**
- **Declarative Transaction**
- **Declarative Security Access Control**
- **Application Server Machine**

Enterprise Workflow Application

Web Portal Anatomy

Monitoring and Management Technology

Various Technologies in open communication protocol
and standard operation procedure
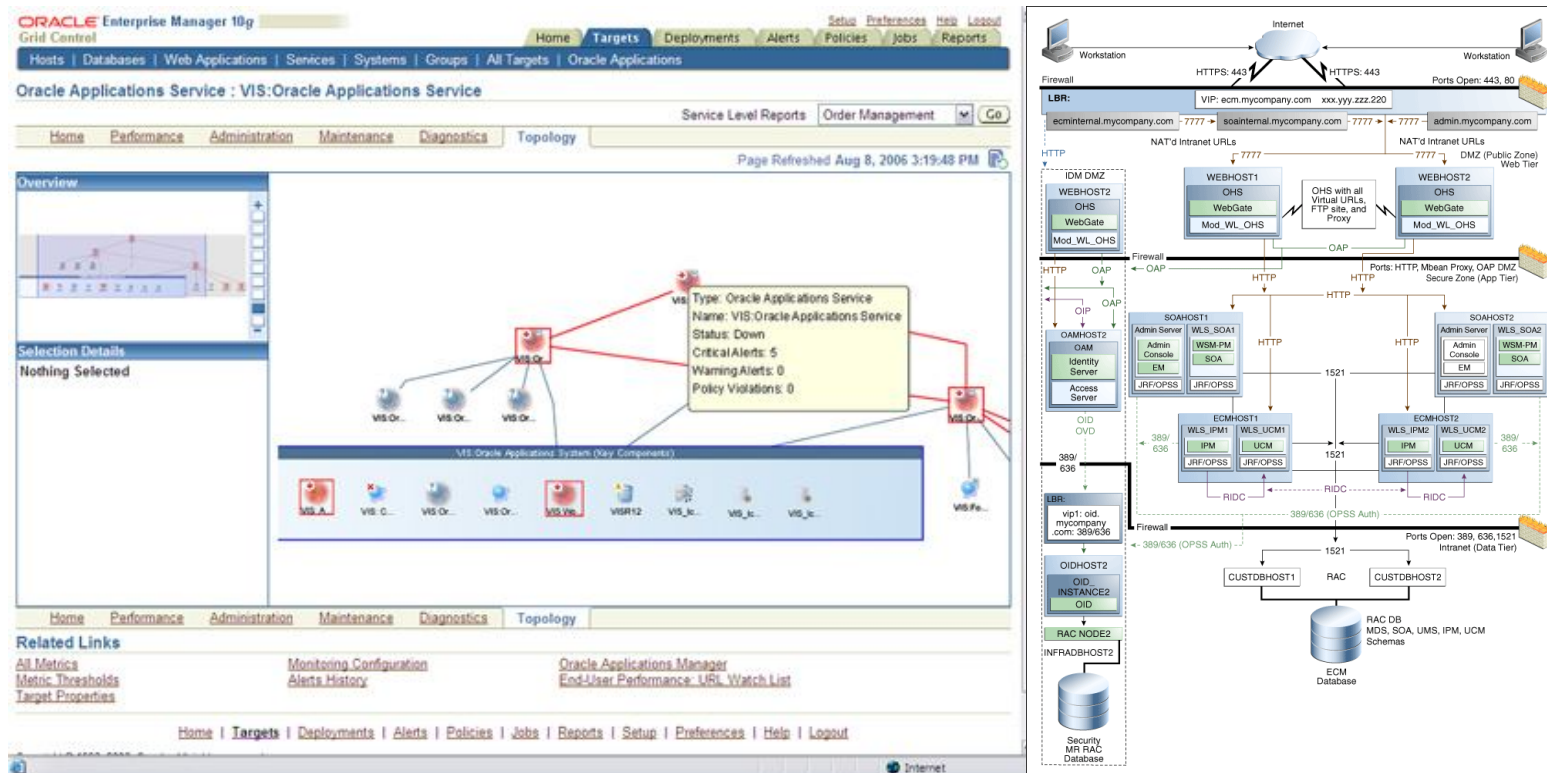
System Architecture Guideline

DC Site – Preferred Solution

Internet

Strong Room

DMZ

| Web Server1 | Web Server2 | Web Server3 | Web Server4 |

Web Server1

LBR | LBR | LBR | LBR

Very Secured Zone

LBR

App Tier

Logon Server1

Enterprise Report, Dashboard

Workflow and Rules Server1

App Consolidation Server1 Server2

App Server

Application Processing

Data Tier

Meta data 1 | Meta data 2

Database + Storage

App DB1 | App DB2

Database + Storage

DB1 | DB2

Database + Storage

ODS Tier

Operational Data Service and Enterprise Report Processing

EDS DB1 | EDS DB2

Database + Storage

DW Tier

Enterprise Data Warehouse1 | Enterprise Data Warehouse2

Database + Storage

Linking Application to Business Goals
Owner: Business Units

Business Objectives

#	Business Goals	Business Objectives	Owner	Supported by Business Processes	Remarks

Business Processes

#	Business Process Name	Owner	Strategic Business Process (Y/N)	Main Service Description	Main Business Users (Sales,Marketing, Core Processing, Corp Admin)	High Level Business Process (Please attach up-to-date document)	Expected Transaction Complete Duration (hr,day,week)	Actual Transaction Complete Duration (hr,day,week)	Total of Transaction / year	% of Transaction Duration done by automated system	Supported by Application(s)	Current Issues	Remarks

Linking Application to Business Goals
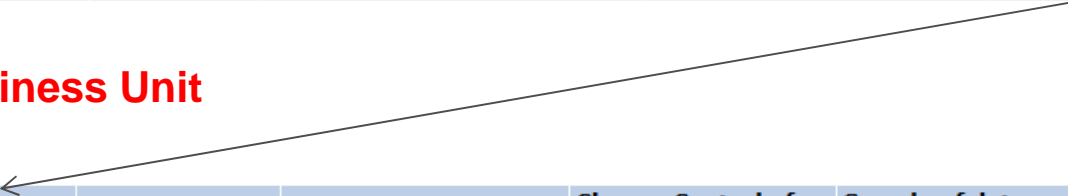
Owner: Technology Unit

Applications

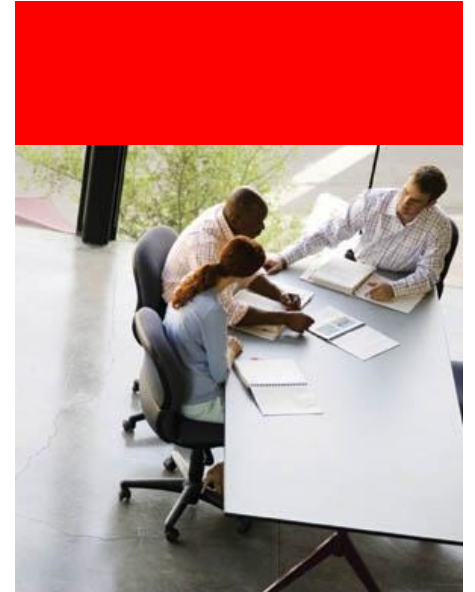| #	Application Name	Owner	High Level Application Flow with User (SOD) Roles Partitioning (please attach up-to-date document)	Application Integration Details (Online/Batch) to which systems	Data Required	Current Issues	Remarks

Owner: Business Unit

Data

#	Master Data Name	Owner	Description	Change Control of master data (Y/N)	Sample of data structure if any	Current Issues	Ramarks

Linking Application to Business Goals
Owner: Technology Unit

Technology

#	Application Name	Total Users/Concurrent Users	Average End User Response Time (sec.)	Application Software Language	Application Custom Built / Application Vendor	Application Operating System	Application OS Virtualization (Y/N) if yes, please provide product name	Single sign-on (Y/N) if yes, please provide product name	Single User Dashboard Portal (Y/N) if yes, please provide product name	Application Availability Monitoring Tool (Y/N) if yes, please provide product name	% of Application system growth / year	Application Maintainance Cost /year	Database Vendor-Version	Database Operating System	Database OS Virtualization (Y/N) if yes, please provide product name	% of Database system growth /year	Database System Maintainance Cost / year

Strategic Roadmap

Strategic Roadmap

<Sample>

		Current State	<Named Transition>	<Named Transition>	Future State
Business Architecture	**Business Objectives**	Maximize ROI of local business initiatives	Optimize IT efficiency and lower IT costs	Standardize cost, quality & consistency of business ops. Leverage knowledge across BUs	Increase speed to market and strategic agility
	Bus Op Model	Diversified	Coordinated	Replicated	Unified
	Business / IT Strategy	Maximize local business unit agility by maintaining full autonomy	Share IT infrastructure across business units for IT efficiency	Share core processes and/or data for business operational efficiency	Provide plug-and-play business process modules for strategic agility across enterprise
	EA Maturity	Business Silos	Standardized Technology	Optimized Core	Business Modularity
Application Architecture	**Architecture Strategy**	Customize & optimize local apps for BU needs	Provide shared infrastructure services via apps rationalization	Rationalize, standardize and optimize core business processes. Deploy enterprise apps.	Create/deploy/reuse plug-and-play business process components
Information Architecture	**Architecture Strategy**	Maintain data for BU needs	Rationalize data used by shared services	Standardize data assets and interchanges. Integrate and share info across BUs and COIs	Provide real time BI and implement predictive models
Technology Architecture	**Architecture Strategy**	Optimize platform for individual applications & data access via tuning configurations	Standardize tech; provide shared infrastructure platform	Optimize platform for shared core business apps/processes & data via virtualization	Fully leverage a service-oriented architecture

Strategic Roadmap

		Current State	<Named Transition>	<Named Transition>	<Named Transition>
Business Architecture	**Business Objectives**				
	Bus Operating Model				
	Business / IT Strategy				
	EA Maturity	Business Silo	Standardization	Optimization	Business Modularity
Application Architecture	**Architecture Strategy**				
Information Architecture	**Architecture Strategy**				
Technology Architecture	**Architecture Strategy**				

Proposed Implementation
<Sample>

Solution/ Initiative	Project	Standardization & Optimization				Growth			
		2014		**2015**		**2016**		**2017**	
		H1	H2	H1	H2	H1	H2	H1	H2
Information Standardization	Common Data Model								
	Common Information Exchange								
Dev Stabilization	Development Standards								
Business Process Optimization & Application Rationalization	Customer Service								
	Web-based Access								
	Carrier Interfaces								
	Billing / Refills								
	Business Intelligence								
IT Consolidation & Standardization	Unified DB Services								
	Unified Application Services								
	"Initiative" Services								

Group Workshop – Enterprise Business Process Future State

Write down your future state

Team Name: *xxx*
1. *Name, Company, E-mail*   3. *Name, Company, E-mail*
2. *Name, Company, E-mail*   4. *Name, Company, E-mail*

Enterprise Reference Architecture

Business Insight and Monitoring

Sales and Marketing

Core Business Processing Systems

Corporate Admin.

Regulatory Compliance

Enterprise Information Management

System Monitoring and Management

Enterprise Infrastructure

Security/ Auditing and Identity Management
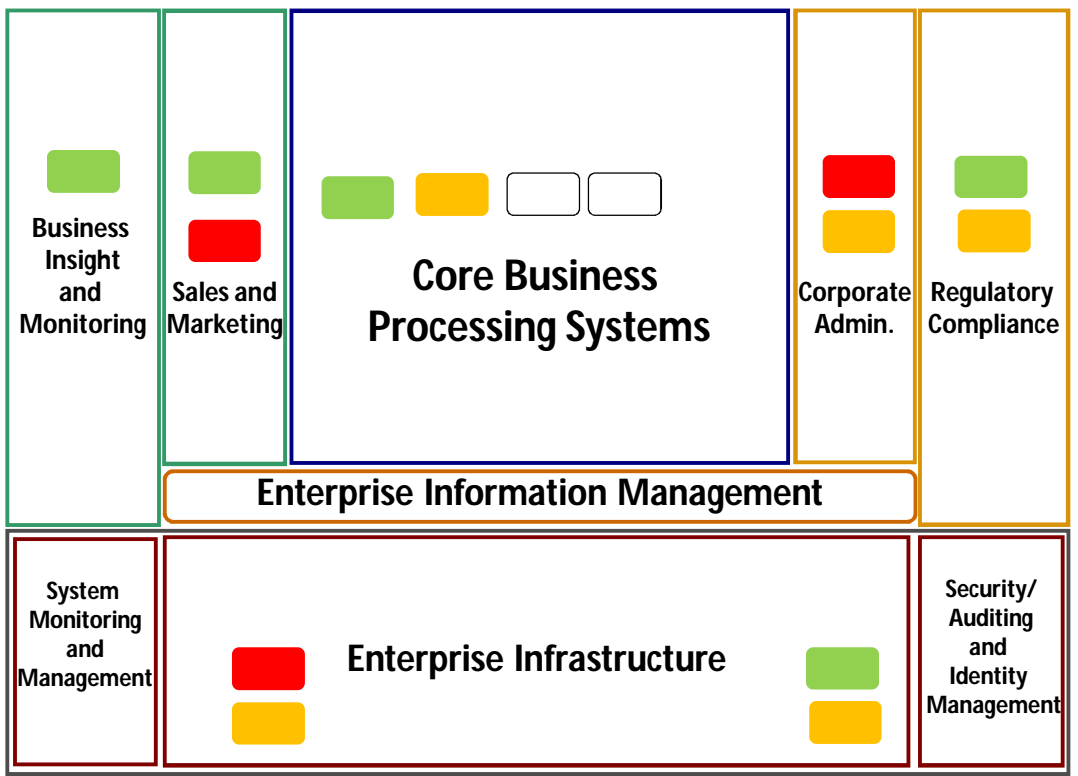
Legend:
- 🟩 New
- 🟧 Changed
- 🟥 Retired
- ⬜ Unchanged

Summary

- Enterprise Reference Architecture
- Architecture Development Process
  - Business Architecture
  - Application Architecture
  - Data Architecture
  - Technology Architecture
- Strategic Roadmap

Thank you very much.